AlchNews
and
Z88 USER

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Credits

Big thanks to the following contributors:

EDITORIAL

It was absolutely fantastic to see, in the flesh, Matthew Smith on the television quite recently. I don't think anyone has become such an elusive talked-about person on this scale in the computer business. The mystery of his disappearance was ranked high up with Lord Lucan, Shergar and that guy from the band *The Manic Street Preachers.*

When you sit back and look at the big picture, you can understand why Matt did the disappearing act that he did. He was worshipped as a God by Spectrum owners, all because of a couple of games he wrote. But, back then, his games were revolutionary. Despite admitting himself that *Manic Miner* was a 'tribute' to the earlier Atari classic *Miner 2049'er*, this and the follow up, *Jet Set Willy* were remarkable. Colourful graphics, in game sound, fiendish puzzles and, in *JSW*, the ability to roam around at will. Nobody, past or present, has or ever will be as respected as him. His games even spawned dozens of follow ups, all tributes to his original template.

Matt was a genius and, now he's back, I think he should now take advantage of that - he need never buy a pint again!

The *Sprinter* looks like a remarkable piece of kit. Although it is hard to get excited about the few pictures we've seen so far, it has the potential to develop much further than the Pentagon and Scorpion ever did in the UK.

You may have to build it yourself, and the parts needed may not be readily available new, especially as they use older AT style PC accessories but, if the price is cheap and the money transfer is secure, they should sell well. Price is going to be a very important factor simply because it will never amount to much more than a hobby machine (although I hope I am very wrong).

We are already in negotiation with the manufacturer to become the official UK (and perhaps European) magazine supporting it. Spectrum compatibility is the key to its success and a springboard into more powerful development. This was the 'make or break' factor in the SAM and also the Pentagon, although I think the difficulty in paying for the Pentagon put many off.

I am sorry for delaying a couple of articles which have been promised, but put back once again. This includes the GAC adventure series, the second part of the QL emulators and a look at emulating the Acorn Archimedes. The sheer volume of Sprinter material took more space than I thought. I'll try and get them in for next issue. We're also looking for new writers.

Andy Davis, Editor.

NEWS & VIEWS

HELLO SPRINTER

The big news this issue is the launch of the Spectrum super computer—SPRINTER. The cover photo shows a stunning example of what can be produced by its picture editing program *2D STUDIO*.

The machine itself resembles more of a scaled down PC than a scaled up Spectrum, boasting AT style connections and peripherals, impressive 4Mb RAM, 256k video RAM, 16 bit audio and up to 256 colours! Read all about this beast, and see lots of pictures, in our special feature later this issue. Special thanks to Yerzmyey Bookovski for bringing it to our attention!

THE LINX PC

Was originally going to be our cover story and feature this issue until the news of *Sprinter*, the Linx PC is a long lost missing brother (or German cousin) to the Z88. The feature (in German only) begins on page eight. Garry Lancaster noted that despite being an identical clone of the Z88, it's some 50g lighter! He puts it down to 'heavy ink' used on the Z88's printed logos!

Z80 STEALTH UPDATED

The fantastic Stealth Spectrum / Pentagon emulator has been updated and now features 'general sound emulation'. This means that Spectrum music will be played more like the Amiga! For more details and to download the latest version, visit:

http://z80stealth.emuunlim.com/

Z88 BOOK SALE

Vic Gerhardi of RAKEWELL has a limited stock of Z88 books for sale. They comprise of:

Using your Z88 - Patrick Hall
Z88 Computing - Ian Sinclair - £9.99
Z88 Magic - Vic Gerhardi - £14.95
Z88 A Dabhand Guide - Trinity Concepts - £14.95
BBC BASIC(Z80)Ref Guide - DJ Mountier
Z88 Printer Driver - Dave Stewart

plus a full set of Z88 EPROM magazines (I have not checked this but there are a lot of them!)

On offer to users of the Z88 Development Mailing list for

£60 plus carriage

This offer is strictly first come first served so don't be disappointed if some (or all) have gone.

GAMESTAGE TO FEATURE A.R. SOFTWARE

A new retro games site has approached us to host our large collection of software on their site. Their aim is to feature both Spectrum and PC programs, which ties in very nicely with our article in the next issue about multi format games (see our first review of *Driller* in issue 34. Their site is at:

http://gamestage.topcities.com/

NEW DEMO PROGRAMMER

Bookovski tells us that TDM

(musician known from K3L group) is in HOOY-PRGORAM now. Bookovski is honoured, because they think that TDM is currently the best zx musician!

NEW MEGADEMO

The HOOY-PROGRAM / RAWW ARSE collaboration have just written PONDLIFE - a new mega demo, one of the first of the year. You can download it from:

http://web.ukonline.co.uk/ demotopia/Pondlife.zip

Issue 3 of Raww Arse's (Formerly Extacy-3) electronic magazine SUBLIMINAL EXTACY has finally been released. Get it from:

http://papaya.raww.net/taps/ subxtc3.zip

TAU CETI FAN SITE

This just in from **Toby Douglass**:

A couple of years ago I wrote a comprehensive set of pages all about Tau Ceti - a game I absolutely loved on my Speccy.

I've realised I ought to get it linked to on a few speccy sites so people can actually *know* about the pages.

They're pretty cool, even if I do say so myself :) If you're not familiar with the game, you had to travel in your hovercraft type craft through a large number of cities (first person perspective, no less!) collecting cooling rods to shut down the main reactor.

There's a downloadable snapshot of the game for each city, the site uses Jasper so you can play each city on it's page, there's a big ass old run down of the mission, the buildings, the defences and the map - all tastefully done in the original black and yellow :)

The only bad side is that not having the original box I can't quite remember the storyline exactly so some of what I've written will need correcting once other people read it and tell me it's wrong.

http://www.summerblue.net/ games/tau-ceti/index.html

D.I.D. TO CHANGE

It came as very sad news to us in March that Michael Brűhn and Joyce Cook's magazine *DESERT ISLAND DISKS* was to finish. However, it is only changing format from paper to CD. The reason is because Michael is very proud of the colour magazine (and with good reason), but production is very expensive and he doesn't want to revert to B&W.

The new magazine will still have the same look and feel, but will simply be 'electronic' as a *Microsoft Word* format document. The magazine will also have a special viewer program for anyone that doesn't have *Word.* The CD will also be filled with lots of programs games and other useful programs and material for Speccy freaks out there who don't have internet access.

As a special feature for the change, Alchemist Research has kindly supplied full and original versions of *MS Word & Works* for Michael to distribute.

Our only concern is to how this would affect readers who don't use a PC, but I think that in this day and age, would be a very small minority.

For more details email Michael at *frankie@image.dk* or take a look at the web site:

http://www.image.dk/~frankie/

YOUR LETTERS

Due to the high capacity of this issue and a rather quiet period, the *letters* page will be held over until next issue. Keep writing in with your comments and opinions!

MATT SMITH RETURNS

Back in March, Channel Four aired a one hour special on video games called *THUMB CANDY*. I was going to review it in this issue but other articles had priority and I suspect that Keith Ainsworth *(RETROGAMER)* will probably be doing something himself, so I'll just give a brief review.

The show was hosted by Ian Lee (of *11'O Clock show* fame although I'll personally remember Rosie Donovan's angelic face for much longer than him rubbery mug!), and covered the history of gaming from its very early days of Japanese arcades and space invaders, to much more recent times. However, the part which stood out by far was

mid way through when *MANIC MINER* and *JET SET WILLY* were discussed.

Not only did we get to see the games but we actually saw Ian Lee not only TALKING to Matthew Smith, but sat in a bedroom PLAYING Manic Miner on a rubber keyed Speccy!

Simon Mallion managed to grab a picture of him in the show (below):

Matthew Smith
Creator, Manic Miner

And Stephen Smith's web-site *WHERE IS MATTHEW SMITH*, which characterises Matt's life and works also got featured. The URL is:

http://www.jonlan.demon.co.uk/ spectrum/matsmith/

The show presented one of the best insights into Matt's life and the hero worship held by every Spectrum owner.

END

GACs THE WAY TO DO IT

GAC. Just the mere mention of that anachronism brings back nostalgic memories of great ideas of adventures, let down by a crappy display and a crappier character set.

But that's just me. GAC – or the Graphic Adventure Creator – was a sure fire winner for Incentive software. Released way back in 1986 (a conversion from a format coded in 1985 by Sean Ellis) it marked a big change from the dozens of game creator programs, such as HURG, WHITE LIGHTNING and LASER BASIC, on the market at the time. Its only rival was Gilsoft's THE QUILL.

You are by the wreckage of your crashed Cessna light aircraft. You can see a fur coat, a pair of snowshoes.The aircraft radio crackles," Welcome to Winter Wonderland." and then cuts out.

What now? ■

I personally think that was the superior program, but GAC had the added bonus of in-built graphics. Quill had to make do with add-on THE ILLUSTRATOR. Despite this, Quill produced far more professional games than GAC. And when PAW (the Professional Adventure Writer) was released – with special versions for the 128k and +3 allowing for massive 120k adventures – GAC had reached the place where it took so many adventurers: "You are dead, would you like another game (creator)?".

Fourteen years on and it's back. Thanks to the work of Garry Lancaster, GAC has a new lease of life. Garry wrote a program for the Z88 called WHAT NOW?, which has been extensively reviewed in earlier issues of AlchNews, Z88 User and Z88 Gamer. Since then, however, it's been updated; almost every Spectrum GACed game has been converted – UDGs, graphics and all – and several Amstrad CPC versions. With this in mind, there's never been a better time to easily and quickly write an adventure game and have it played by both the Spectrum and Z88 community. All we need now is for Garry to write a GAC conversion so that we can write adventures – 512k ones – on the Z88…….

The time of slating GAC is over. We want to promote the lost art of adventure writing - and playing - with the added benefit of portability. We'll shortly be commencing a series, helping you get the most from GAC, looking at past commercial adventures and making the most of a, now free, classic utility.

Der leichteste Laptop
unter DM 1000,-

Der LinxPC im Format DIN A4 ist 23 mm dick, wiegt 850 gr. und ist ein vollständiger Bürocomputer für Leute, die unterwegs sind. Er ist nicht nur ein einfacher Laptop, sondern LinxPC enthält bereits eine Anzahl kompletter Büroprogramme: Textverarbeitung im Textprozessor, Tabellenkalkulation (Spreadsheet), Mini-Datenbank und natürlich Agenda, Kalender und Rechner. Aber das ist noch nicht alles! LinxPC beinhaltet weiterhin: einen BASIC-Compiler, VT 52 Terminal-Emulator, Grundprogramm für Datenimport/-export zur Kommunikation mit anderen Computern und einen Druckertreiber für alle seriellen und parallelen Drucker.

Den LinxPC kann man als direkten Ersatz für einen großen Tisch-PC ansehen, der jedoch die physischen Vorteile eines leisen, mobilen Gerätes hat und nicht mehr Platz braucht als eine zusammengefaltete Zeitung. Ein ungewöhnliches Merkmal dieses PC´s ist die Möglichkeit, mehrere "Anwendungen" der Softwaremodule zu fahren, z.B. mehrere Kopien des Textverarbeitungsprogrammes gleichzeitig zu aktivieren. Das bedeutet in der Praxis, daß Speicherplatz nur von den aktuellen Daten belegt wird, auch wenn mehrere Schreiben, Berichte und Tabellenkalkulationen offen sind.

Eine andere grundlegende Neuentwicklung ist die Art, in der die Aufgaben des Textverarbeitungs- und des Spreadsheet-Programmes durch eine Software kombiniert werden. Durch dieses Prinzip kann das Textverarbeitungsprogramm in mehreren Spalten arbeiten.

Festkörperspeicher Im Gegensatz zu dem im Desktop-Computer verwendeten Billigspeicher behält der im LinxPC verwendete CMOS RAM seinen Inhalt auch, wenn der PC ausgeschaltet wird. Ein Plattenlaufwerk wird nicht gebraucht. Das Plattenlaufwerk in den meisten tragbaren PCs kann leicht beschädigt werden und trägt wesentlich zur Entleerung der Batterien bei. Anstelle empfindlicher, beweglicher Teile werden im LinxPC nur blitzschnelle Speicher-

module in Festkörpertechnik in einer Größe von 55 mm^2 verwendet. Diese können in jeden der drei Speichersteckplätze eingesteckt werden und ergänzen automatisch den verfügbaren Speicherplatz. Als Spezialausführung bietet der dritte Steckplatz noch die Möglichkeit, eine EPROM-Karte (elektrisch programmierbarer Fest-wertspeicher) aufzunehmen, die Daten

permanent behält, auch wenn sie aus dem LinxPC herausgenommen wird.

Batterie: Der LinxPC braucht vier Alkalibatterien, Größe AA, die in der ganzen Welt leicht zu bekommen sind.
Mit einem Batteriesatz wird der Speicher im "Ruhezu-stand" ungefähr ein Jahr lang gehalten und ein Rechnerbetrieb bis zu 20 Stunden ermöglicht. Ein eingebauter Kondensator hält ausreichend Ladung, um die Batterien auszutauschen, ohne daß eine zusätzliche Stromversorgung erforderlich wird.

Möglichkeiten der eingebauten Software

Textprozessor:
Pipedream ist ein Textaufbereitungs und -drucksystem mit vollen Funktionen, mit dem man Text suchen, ersetzen, löschen, verschieben und kopieren kann. Die Funktion "Kopieren/Einfügen" mit mehreren Dateien ist ebenfalls möglich. Laufende Kopfzeilen, Titel und Fußzeilen können ebenfalls auf jeder gedruckten Seite erscheinen. Pipedream

gemäßer auch die Sortierung nach Spalten. Während Sie das Dokument eingeben, können Sie auf der rechten Seite am Bildschirm verfolgen, wie sich "der Seitenplan" entwickelt. So können Sie immer die ganze aktuelle Seite ansehen.

Spreadsheet Pipedream bietet die volle Kapazität eines Spreadsheet's nach dem Schema von Lotus 123. Wer normalerweise mit Lotus 123 arbeitet, hat sich auch

Der Supertwist-LCD-Bildschirm stellt in Klarheit und Kontrast einen echten Durchbruch dar. Im linken Teil befindet sich ein Befehlsmenü und rechts zeigt Ihnen der Seitenplan genau an, auf welchem Punkt der ganzen Seite Sie sich gerade befinden. ➤

Befehlsschablone: Permanente Anzeige einer Befehlskurzreferenz. ➤

Steckbuchse für Netzadapter ➤

Regler für Bildschirmkontrast. ➤

Funktionstasten: Kurztasten zur schnellen Ausführung der verfügbaren Befehle.
Im MENU werden alle verfügbaren Befehle angezeigt.
Im INDEX können Sie von einer Anwendung zur anderen springen.

schnell an diese Befehle gewöhnt. Lotus-Macros werden von Pipedream nicht verarbeitet. Das Spreadsheet ist ein integriertes Teil des Textverarbeitungsprogrammes, so daß man in dem selben Dokument Textverarbeitung und komplexe Berechnungen ausführen kann. Via PC Link oder Mac Link ist das Spreadsheet auch kompatibel mit Lotus 123, WKS und Excel.

Tagebuch: Frei formatierter Text läßt sich für jeden Tag in praktisch unbegrenzter Menge speichern. Mit der Sucheinrichtung lassen sich Verabredungen entweder in einem Block von Tagen oder im ganzen Tagebuch suchen. Die Suchroutine kann eine Liste der gefundenen Positionen erstellen, die dann entweder auf dem Bildschirm angezeigt oder an den Drucker geschickt werden kann.

Kalender, Uhr, Wecker: Der Kalender arbeitet mit dem Tagebuch zusammen und zeigt Termine

durch Pfeile an. Den Wecker kann man auf verschiedene Zeiten einstellen und der Weckruf kann in Schritten zwischen Sekunden und Jahren wiederholt werden. Beim Wecken kann eine Meldung angezeigt oder ein Programm automatisch aktiviert werden.

Drucker: Der Drucker-Editor gestattet die schnelle Einstellung des Treibers auf praktisch jeden auf dem Markt befindlichen Drucker mit serieller oder paral-

leler Schnittstelle. Die Grundeinstellung ist für Epson-kompatible Drucker.

Datenimport/Export: Der LinxPC geht neue Wege durch die Möglichkeit, Daten zwischen anderen Maschinen zu übertragen. Diese Zwei-Weg-Verbindung mit einer "Stapel"-Betriebsart, gestattet die Übertragung von Dateien in Gruppen. Baudwerte und andere Kommunikationswerte lassen sich leicht über das Panel-Dienstprogramm einstellen. Das einfache Protokoll kann mit einer Vielzahl von Standard-Kommunikationsprogrammen am anderen Ende der Verbindung benutzt werden. Der serielle Anschluß gestattet Übertragungsgeschwindigkeiten zwischen 300 und 38.400 Baud.

Kommunikation mit MS-DOS: Die Option PC Link ermöglicht den direkten, wechselseitigen Dateientransfer zwischen LinxPC und IBM-kompatiblen PCs. Die Dateien können zur direkten

Benutzung in Lotus 123 (WKS) und Word Star umgewandelt werden. In der Gegenrichtung können Dateien von Lotus 123 und Word Star im LinxPC benutzt werden.

Kommunikation mit Macintosh: Die Option Mac Link ermöglicht den direkten, wechselseitigen Dateien-transfer zwischen LinxPC und Macintosh (Plus, SE, II). Die Dateien können zur direkten

Benutzung in Excell (WKS) und MacWrite umgewandelt werden. In der Gegenrichtung können Excell- und MacWrite-Dateien an den LinxPC übertragen und dort benutzt werden.

Terminal: Mit dem LinxPC kann man den VT52-Betrieb mit E/A-Umleitung zum Senden und Empfangen von Dateien emulieren, so daß man den LinxPC an fast jeden Mini- und Mainframe-Computer anschließen kann, z.B. VAX, Sun,

bestimmte Anwendungen Programme schreiben und so den LinxPC auf Ihren Bedarf zuschneiden können. Die Sprache erlaubt freien und seriellen Zugriff, vom Benutzer definierte Funktionen, volle Fehlerbearbeitung und die Strukturen FOR ... NEXT und REPEAT ... UNTIL.

Und es ist absolut nicht normal, daß BASIC auch einen Assembler enthält, mit dem der kundige Benutzer die Maschine auch auf der

Mit OZ Context Switching können Sie zwischen den Anwendungen hin-und herspringen, ohne sie verlassen zu müssen. OZ ist besonders auf die Kontextumschaltung spezialisiert, so daß Sie zwischen mehreren Anwendungen wechseln und auch mit verschiedenen "Installationen" derselben Anwendung gleichzeitig arbeiten können.

Im Gegensatz jedoch zu Maschinen, die mit DOS arbeiten, können Sie jederzeit mitten in der

Zur Textverarbeitung gehören die Funktionen Block "markieren" und "versetzen", "suchen" und "ersetzen" und mehrspaltiges Layout. Das neue WYSIWYG-Bild zeigt Fettschrift, Kursivschrift, Unterstreichung, Zentrierung und dynamische Unterteilungen an.

Das für die Finanzplanung wertvolle Spreadsheet gestattet die Definition von Formeln in Zellen und die Eingabe einer Reihe von Variablen zur Manipulation Wenn ... Dann ... Sonst.

Die Software der Datenbank arbeitet nach demselben Prinzip wie das Spreadsheet, wobei jede Dateneinheit in ihrer eigenen Zelle steht und daher in verschiedenen Folgen wie Postversandlisten, Stücklisten, Adressbüchern usw. verarbeitet werden kann.

Anwendung abschalten, ohne die einzelnen Dateien sichern zu müssen. Wenn Sie wieder einschalten, - und dabei spielt es keine Rolle, ob das nach einigen Minuten, nach einigen Tagen oder auch erst nach einem Jahr ist, - steht Ihre Anwendung genau an derselben Stelle, an der Sie sie verlassen haben. Darüber hinaus bietet OZ noch: Datums- und Uhrzeitstempel, mit dem der Zeitpunkt der Erstellung und der letzten Benutzung der Datei festgehalten wird. Hierarchische Verzeichnisse organisieren Ihre Dateien zu sinnvollen Gruppen auf vielen Ebenen (oder in Ordnern).

untersten Ebene manipulieren und neu programmieren kann.

Betriebssystem: Das fortschrittliche Betriebssystem "OZ" des LinxPC bietet mehrere Merkmale, die sich in den üblichen Betriebssystemen wie CP/M oder DOS nicht befinden, die für die Ausführung jeweils einer Anwendung ausgelegt sind.

Celerity, Hewlett Packard, IBM, Silicon Graphics, Alliant, Stellar oder Cray MXP.

BASIC: Der LinxPC verfügt auch noch über BBC BASIC, eine Computersprache, mit der Sie für ganz

E/A-Umleitung bietet die Möglichkeit zur Entscheidung, wo die Eingangsdaten herkommen und wohin die Ausgangsdaten gehen sollen. Die E/A-Umleitung gestattet außerdem, die Bildschirm- oder Druckerausgabe in einer Datei eigener Wahl festzuhalten, oder mit dem Inhalt einer Datei eine Anwendung zu speisen, die Ihre

Eingabe normalerweise über die Tastatur bekommt.

Externe Anwendungen:

Der LinxPC ist für Anwendungen offen, die von einer ständig steigenden Zahl von Softwarehäusern entwickelt wird. Die Steckplätze im LinxPC dienen mehreren Zwecken. Dazu gehört es auch, daß Softwareentwicklern von dritter Seite die Möglichkeit gegeben wird, weitere Anwendungen anzubieten. Wenn ein neues Anwendungsprogramm in den Steckplatz eingesetzt wird, erweitert sich die Liste der Anwendungsprogramme im Index automatisch um dieses Programm, das von nun an wie ein internes Anwendungsprogramm benutzt werden kann.

Technische Daten zum LinxPC

- Gewicht: 850 Gramm
- Abmessungen: 29 x 21 x 2,3 cm (DIN A4)
- Bildschirm: Super-twist Flüssigkristallanzeige, 640 x 64 Bildpunkte, 8 Zeilen mit je 80 Zeichen, zusätzliche Felder für Befehlsanzeige, Seitenplan und Systemanzeigen.
- Tastatur: Volltastatur mit 64 Tasten einschl. Cursor-, Index-, Menü- und Hilfstaste.
- Prozessor: CMOS Z 80 mit 3 MHz
- Speicher: 128 KBytes ROM, interner RAM 32 KBytes, erweiterungsfähig auf 3 Mbytes.
- Kommunikation: D-Steckbuchse mit 9 Stiften, 2-Weg-RS 232C, getrieben von zugeordneter interner Import/Export-Software und unterstützt durch internen Kopierbefehl und E/A-Umleitungseinrichtungen.
- Erweiterung: 3 Kartensteckplätze für RAM/ROM-Erweiterung. Steckverbinder mit 46 Fingern zur Buserweiterung für Entwicklungsoptionen.
- Stromversorgung: 6 Volt = von 4 AA-Batterien oder wahlfreiem Netzteil, ausreichend für ca. 20 Betriebsstunden des PC's ohne Erweiterungen.

Verfügbare Erweiterungen

- CMOS RAM-Module: 128 K, 512K, 1024 K

- EPROM-Module: 32 K, 128 K EPROM UV-Löschgerät

- Serielles Druckerkabel
- Paralleles Druckerkabel

Mikro-Modem mit Treibersoftware und automatischer Wahl.

Mac Link: Kommunikationssatz für 3,5"-Diskettenlaufwerk von Macintosh, Mac Link EPROM, Kommunikationskabel, überträgt Dateien in beiden Richtungen einschl. Umwandlung Pipedream in WKS und umgekehrt. Kompatibel mit MacWrite, Works, Xpress Pagemaker, Excell, Multiplan usw.

PC Link: Kommunikationssatz

für PC unter MS-DOS, 5 1/4" Diskettenlaufwerk, PC Link EPROM, Kommunikationskabel, Dateiübertragungen in beiden Richtungen einschließlich Umwandlung Pipedream in WordStar oder Lotus 123 und umgekehrt.

Atari Link: Kommunikationssatz für Atari ST; Diskettenlaufwerk und Kommunikationskabel.

Amiga Link: Kommunikationssatz; Diskettenlaufwerk ohne Kabel (vom Amigatyp abhängig).

Thinkz: Tragbarer Ideen-organi-

sator und Aufzeichner; organisiert Ideen, Planung, Dokumententwürfe, Projektentwürfe, Manuskripte für Reden und den Tagesablaufplan.

C Compiler: Compiler der C-Sprache, mit dem Sie kommerzielle und grafische Anwendungen entwickeln können.

zBase: Relationaler Datenbankmanager und Programmiersprache auf EPROM, sehr gut vergleichbar

und kompatibel mit dBaseII.

zTerm: Universal-Terminalpaket, kompatibel zu Hayes-Modem, unterstützt Teletype und Prestel, enthält Xmodem-Protokoll.

LinxPC:
wenn Sie mit anderen Computern sprechen müssen.

Macintosh ist ein Wz von Apple Computer Inc.
MS-DOS, Excel sind Wz von Micro Soft Inc.
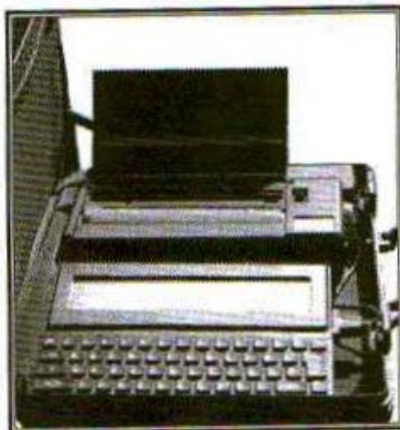dBase2 ist ein Wz von Ashton Tate.

Händler:

TRADING POST

ADVENTURE WORKSHOP
Phil Reynolds
36 Grasmere Road, OLDHAM. OL2 6SR
(Adventure software house)

BILL RICHARDSON AND CO. (EEC)
6 Ravensmead, CHALFONT ST PETER
Bucks. SL9 0NB
Email: wnr@compuserve.com
Web: http://go.to/wnr
(Z88, QL and SPECTRUM hardware)

Kevin Gurd's EPROM Services
21 Ladycross Road, Langdown, Hythe
SOUTHAMPTON. SO45 3JR
(EPROM / hardware designers)

CRASHED - now closed

DESERT ISAND DISKS
Michael Bruhn
Petersnorg 23
6200 AABENRAA
DENMARK
Email: Frankie@image.dk
Web: www.image.dk/~frankie
(CD based Speccy games magazine)

UK ONLY: C/O Joyce Cook
32 Dursley Road, Trowbridge. BA14 0NP
(As above)

DOMINO CUBES:
Mike Fink
249 West 34th St. 5th floor
NEW YORK CITY 10001,
212-695-1811
Email: domino-cubes@onebox.com
Web: www.dominocubes.qpg.com

HACKERS HANGOUT - now closed

QL TODAY
The Bank Volt
6 Coronation Buildings, Ham Road
Sussex. BN11 2NN
Email: qbranch@qbranch.demon.co.uk
(Bi-Monthly A4 QL & compats. magazine)

RAKEWELL LTD.
24 Putnams Drive,
Aston Clinton,
AYLESBURY,
Bucks. HP22 5HH
Voice: 01296-630617
Fax: 01296-632491
Email: vic@rakewell.com
Web: http://www.rakewell.com/

RETROGAMER
Keith Ainsworth
52 Kingfield Road, LIVERPOOL. L9 3AW
(Bi-Monthly A5 all formats retro magazine)

SPECTRUM PROFI CLUB / WOMO
Im Tannenforst 10, D-51069 KOLN
GERMANY
Email: womoteam@t-online.de
Web: www.womoteam.de
(Spectrum & SAM A5 monthly magazine)

SINCLAIR USER CLUB / SINTECH
Rainackerstrasse 4, 70794 FILDERSTADT
GERMANY
Email: sintech@online.de
Web: www.online.de/home/sintech
(Spectrum, SAM and MB-02 A5 magazine)

TRADE-IN POST
Victoria Road,
SHIFNAL. TF11 8AF
Web: www.tradeinpost.com
(Eight bit hardware and software)

Z88 SOFTWARE LIBRARY
Ian Braby
1 Butts Cottages, Copse Road, St. Johns,
WOKING. GU21 1SU
(Extensive Z88 software library)

**YOUR SERVICE NOT LISTED? Get in
touch and you'll be added next issue.**

HARDWARE

Spectrum AY chip distortion problem.

By Mike Lee

I have cured the AY chip distortion problem with the Spectrum 128k +3 If you are good with a soldering iron then follow below.

This idea is my own finding, I have had good clear results NO distortion.

I hope all those Speccy fans out there can adapt this idea to good use, but BEFORE you decide to continue.

I ACCEPT NO RESPONSABILITY FOR ANY DAMAGE TO YOUR SPECTRUM +3 WHATSOEVER, I HAVE USED A GOOD QUALITY SOLDERING IRON, I ALSO HAVE GOOD EXPERIENCE WITH SOLDERING, SO I HAD NO PROBLEMS. JUST USE COMMON SENSE WHEN SOLDERING ANY COMPUTER PARTS. (Same goes for us - ANZU)

I have tried this using many 128k music programs on my Spectrum 128k+3, they all work with CLEAR sound NO distortion.

Putting it in short, you take a wire from pin 1 AY chip or R72 to R43, this gives perfect clear sound. I have tried and tested this leaving my Spectrum+3 on for a couple of hours, I encountered no problems.

Pin 1 of AY chip is Channel A
Pin 4 of AY chip is Channel B
Pin 5 of AY chip is Channel C

All these pins 1,4 and 5 are linked together on the board.

I use my RBG socket to a Commodore 1084s monitor.

```
      7       6
    3   8   1
     5       4
        2
```

Pin 1 = +12V
Pin 2 = GND
Pin 3 = Audio Out
Pin 4 = Composite Sync
Pin 5 = +12v
Pin 6 = Green
Pin 7 = Red
Pin 8 = Blue

RGB socket looking from out side not from inside of mother board

IF you have no monitor then use PIN 3 AUDIO of RBG socket and PIN 2 GROUND of RGB socket to a seperate amplifier or a headset, I have tried a head set with adaptor from the RGB socket to a 3.5 mm Jack plug, this works fine.

```
Cut and lift this side of resistors on board.
Both resistors will NOT used.
     R43       R42                         R43 Brown,Black,Orange  R42 Red, Red, Red
       I         I    ----------------------------------------   Link wire from R72 to Where R42 used to be on
       I         I                                           I   board.
      I I       I I                                    I  R42 used to go directly to pin 3 Audio RGB
 I  I    I I                                           I
      I I     I I                                      I
      I I     I I                                      I
       I        I                                      I
       I        I                                      I
                                                       I
                                                       I
Then take a wire from PIN 1 of AY chip or R72          I
                                                       I
                                                       I
      -------------                                    I
      I         I                                      I
      I   AY    I                                      I
      I  CHIP   I                                      I
      I         I                                      I
      I         I                                      I
      I         I                    TAKE WIRE FROM THIS END OF RESISTOR
      I         I                                      I
      I         I                                      I  R72 RED RED RED 2.2k
      I         I ----------pin 1 goes directly to R72------[---------]-----
      ------0-------
```

Mike Lee.

SPRINTER:
21st CENTURY SPECCY

Sprinter it is new universal 8 bit computer with the flex architecture and capable to quick change the configuration. Capability of multimedia allow Sprinter to please the users 16 bit sound, bright colour graphics and fast video. Programmatic support of all modes and peripherals now full realised. The base software for creation of applications and games is ready.

Specifications:

Processor	Z84C15
Clock frequency	21MHz/3.5MHz
RAM	4Mb
Cache	64Kb
ROM	128Kb
Video RAM	256Kb(512)
FDD controller	MFM (PC type)
HDD controller	IDE/AT
Keyboard	101key/AT
Mouse	MS-Mouse
FDD	3.5" 1.44 Mb
Expansion slots	2 x ISA-8
Music co-pro.	AY-3-8910 emul.
Digital audio	Covox 16bit

Video-modes:
256x192(ZXSpectrum), 320x256x256, 640x256x16, TXT 80x32

Video output	RGB (opt. PAL)

Technical implementation.

The heart of the machine are the processor Z84C15 and PLD EP1K30QC208-3. There are a ROM chip, 4Mb 72-pin SIMM, 256Kb of the video RAM, 64Kb of the "fake" cache (it`s a fast static RAM, where CPU can work without waiting), disk-drive controller, buffers for ISA-8 and peripheral units connection and one more ALTERA`s PLD - EPM7032LC44.

This PLD supports synchronization and initialisation of the computer. DALLAS chip (CMOS-clock) can be fitted in the DIP-slot. Input signals of decoding chips connected to processor through PLD. It allows to change device address easily, without main board changing.
A large set of periphery can be connected to Sprinter: joysticks, tape unit, printer, keyboard, mouse, hard and floppy disks, CD-ROM drive and most of ISA-8 expansion cards for PC computer.

Advantages of Sprinter

Architecture based on a large re-programmable micro logic (PLD). Here we shall name as a configuration of the machine - concrete implementation of the concrete scheme in the PLD. It means, that the machine has set of configurations, each of which has it own scheme.

The connection of peripheral units through PLD allows to achieve high flexibility of the machine on different configurations.

PLD programming is performed at power on or reboot, that allows to change the scheme in PLD immediately in operating time! It hardly distinguishes architecture of the computer from a number of existing computers and consequently many concepts intrinsic to that machines, change the sense. Actually computer has changed architecture, in which the changes in many parts of the scheme are possible. So, concrete fixed port addresses is not need to be defined anymore, because port layout can be easily changed. The concrete addresses valid only for concrete configuration.

The programmability of the scheme gives rather large freedom of imagination of the programmer on configurations of the machine. Conceiving concrete operation, the programmer can define in what the configurations can be made it better, and, probably, and to invent the configuration, which then can be realized in PLD and to include before start of this program.

figure 1. Sprinter block-scheme
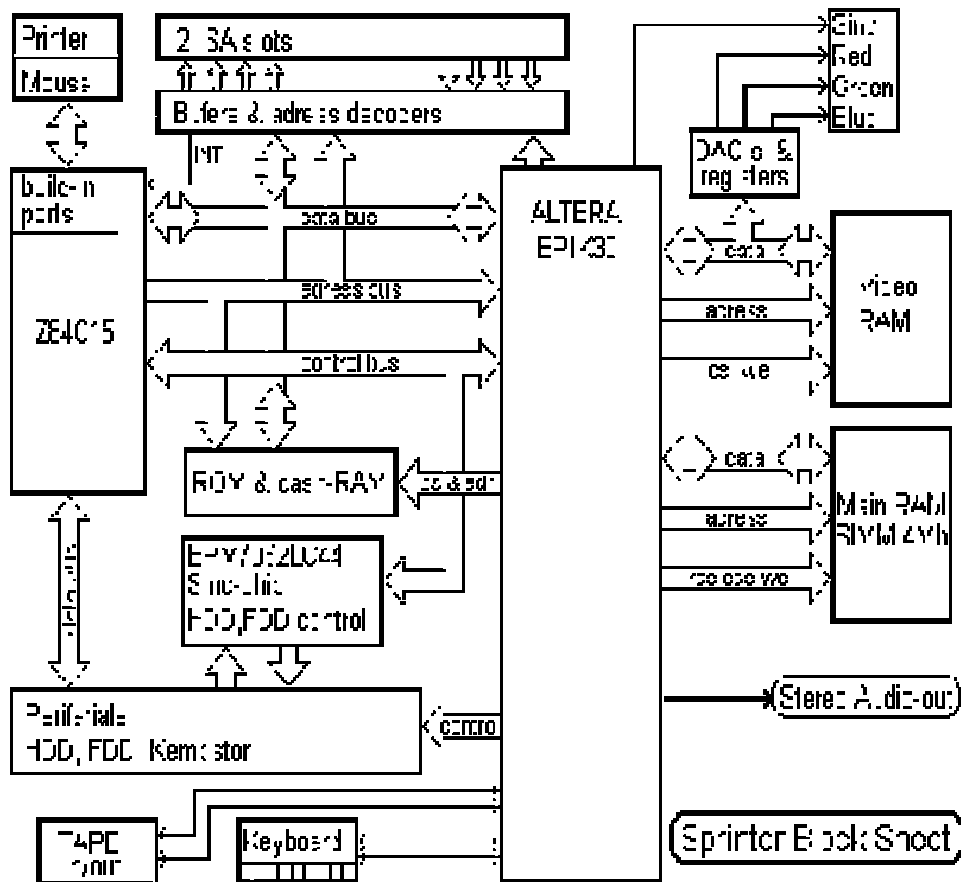
The concrete configurations and parts of configurations are further described.

Configurations loading .

At power on, all data in PLD has been cleared. Then, PLD is waiting for loading a block of scheme data. Only one page of ROM and one page (16 kb) of cache is connected to processor at that moment. Any processor memory writes results in data transfering into PLD. And the initial start programm has one target - load initial configuration (called "Sprinter-2"). The initial programm looks up for a special identifier (text string) in the cache and if it has been detected, when data will be readed from cache, otherwise from ROM.

For scheme changing it is necessary to load the data block of configuration in the last page of the cache (from offset 100h) and place the text string ("FLEX_10K_LOADING") at offset 80h in the same cache page. After that software causes reboot. Pressing on the RESET button will ALWAYS switch-on the standart configuration.

Note: The internal information of the block of data PLD is the closed information of the ALTERA corporation. Except for chips PLD ALTERA delivers and software for distributing of the schemes inside PLD. Infortunately, this program can not work on the computer of a type ZX-Spectrum and in the nearest visible future the version for

Sprinter-and will not be foreseed it.

Therefore development of new configurations can be made only for want of availability of rather high-power machine and program of distributing of the schemes in PLD.

In this connection, in the given moment Sprinter has some concrete configurations two from which are noted in ROM, and remaining can be load from a diskette or hard disk. Perfecting concrete configurations and development new is fixed carried on.

Configuration Sprinter-1.

Includes a configuration Spectrum-128/256, memory allocation up to 4Mb, extended screen with modes Spectrum, Text-80x32, Graf-320x256x256, controller of the drive, controller IDE of the hard disk, controller of the keyboard AT, on-line as ZX keyboard, 8-bit COVOX.

This configuration is as much as possible approximate ZX-Spectrum and allows to work on usual Spectrum's programs and gradually to change them under enhanced modes of the screen and memory, and as for operation with new devices.

Configuration "Sprinter-2".

Configuration not compatible with a configuration ZX-Spectrum. ROM completely is disconnected and all address space is broken on four windows on 16k, in each of which

anyone is connected from 256-?? of pages of the RAM. There is no spectrum's screen, a graphics screen same, as in configurations Sprinter-1. It has additional functions accelerator. Allows to make operations AND, OR and XOR with blocks of data. It has 16-bit COVOX.

Configuration "ZX-Spectrum-256/AY".

This configuration is as much as possible approximate to ZX-Spectrum-128/256 and includes the scheme musical coprocessor AY-3-8910. In this configuration there are no enhanced modes of screen.

AY includes three generators of voices, generator of a noise, regulators of amplitude and the generator bending around.

Configuration "Game".

The configuration is similar to a configuration Sprinter-2. The accelerator have not logical functions, and for the output of a sound has COVOX-Blaster - COVOX with the buffer RAM permitting to output a sound block by block and to release processor time for other operation. The configuration is oriented to use in games for Sprinter.

Configuration "DOOM"

The accelerator has the function of hardware expansion / compression of vertical and horizontal Lines. In the given moment the configuration is in development.

Configuration "Video"

Configuration Video is similar on Game, but has padding capability on data transfers with HDD is direct in a video memory at the moment of reading from HDD. The mode $GR-256-4x4$ permitting to inject video films with the sanction 160x128 on all screen (hardware doubling the size of a pixel).

The scheme of a memory allocation.

Each page ROM or the RAM has the port, in which real number of page from 256 of pages all of 4Mb is underlined. The pages, ???????????? in various windows of address space of the processor, have own ports. I.e. Page which is included in addresses #4000..#7FFF, and page number 5 usual Spectrum of a memory allocation which is included in addresses #C000..#FFFF have separate ports.
In total of such ports of pages of memory - 32.
A 16 ports are used for numbers of pages of the RAM, connected to addresses,
#C000..#FFFF. Three ports answer for connection of pages of the RAM to addresses #0000..#3FFF, #4000..#7FFF and #8000..#BFFF. An Eight ports are used for connection of various pages ROM. An one port - for connection of page of the CACHE instead of ROM. And one port is a port system ROM connected on a place ROM at once after reset of the machine on keys <Ctrl> + <Alt> + <Del>.

Stayed 3 ports of pages of memory remain at present in a reserve. The scheme of a memory allocation allows to connect in address space of the processor not only RAM or ROM, but also ports and memory ISA of cards puted in ????.

For want of connection in addresses #C000..#FFFF of extended pages of the RAM on the standard of a Scorpius, on their place it is possible to readdress ?????. For this purpose it is necessary to note in a port by one from these pages value appropriate ISA-slot, by which it is necessary to make call. This value as specifies, to what the call, to ports or memory is carried on.

pic. 2
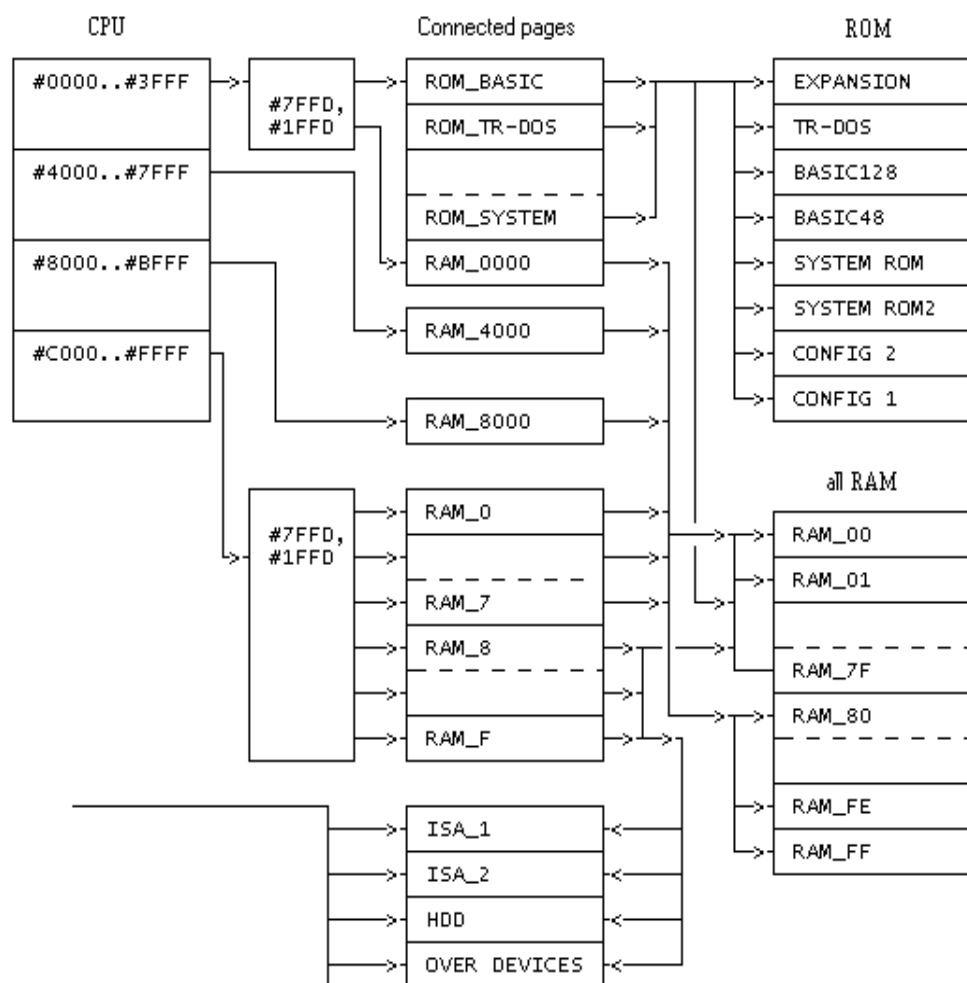
In other configurations the scheme of a memory allocation becomes simpler for release of resources PLD. There can be ports #1FFD and #7FFD, and as the scheme of operation with becomes simpler by devices displayed on memory.

<div align="center">

The scheme of allocation of ports.

</div>

Sprinter has two isolated groups of ports. The first group, is internal ports of the processor Z84C15, second - external ports. The addressing of ports of the first group can not be changed, as these ports on one chip with the processor. The second group is connected through PLD. The addresses of ports of this group can vary somehow.

What ports are available on a chip Z84C15, We are possible to read in documentation on this processor here again some from them. One from serial ports is used for data entry from the active mouse. One from parallel is used for data output, on the second parallel port the signals of interruptions and inquiries of direct access with ISA are entered.

The parallel port of the processor Z84C15 is arranged in such a manner that on him the organization of interruptions on signals coming through a parallel port is possible. Actually second parallel port is used as the controller of interruptions.

The scheme of allocation of ports of the second group has the feature.
By main idea was obtaining

possibility fast to change a configuration of ports without overload PLD. It is reached by application of a card of allocation of ports, engaging on special page of the RAM.

For want of appearance of an access cycle to a port call to the RAM of a card of ports at first happens. In a card of ports the information on devices on-line to the given address is noted. Internal decoding on byte from a card of ports and call to a selected port further happens. In a usual mode, without what or delays, and in a mode turbo to processor the signal WAIT is exhibited depending on necessary length of an access cycle to a port.

For connection or disconnecting of a port to the address it is enough to open a card of ports and to enter in the necessary place of one byte.
   Page of cards of ports is contained four cards, which can be switched through a system port. So it is possible to realize fast switching of a configuration of ports, that can be useful for want of for operation Spectrum of programs pointly with Sprinter BIOS.

<div align="center">

Structure of the screen.

</div>

All screens is broken on guadrates, size in standard spectrum a font resticle. For each guadrate the own output mode is installed, and as the address of the video-ram, whence is made the output in this guadrate. In each font resticle the own output mode can be given.

<div align="center">

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</div>

In the given moment it is possible to install such modes:

ZX-40 - Usual Spectrum's mode with one bitplane and one attribute on a font resticle.

ZX-80 - It mode similar a Spectrum's mode, but in each font resticle appears two characters, oblate on a horizontal.

Sprinter Main Board

G256-8 - Graphics mode. The guadrate represents the array 8x8 of points. In each point one is set from 256-?? of colours selected from a graphic pallette of 16 millions of colours. The guadrates can have different graphic pallets. Such graphic pallets for a mode G256-8 - four.

G16-16 - Graphics mode. The guadrate represents the array 16x8 of points. Each point has one from 16 colours selected from a graphic pallet of 16 millions of colours. The same as and G256-8 in guadrate one can be placed from the 4-th graphic pallets. The graphic pallets of graphics modes are intersected one another.

The graphic pallet 16 colors mode is the first 16 colours from a graphic pallet 256 colors.

BORDER - In guadrate is output colour border.
BLANK - Guadrate is extinguished - becomes black.

The size of data of a mode of guadrate makes 2 bytes, therefore change of a mode of all screen is reduced to overwriting of 2.5 kilobytes of data in the video-ram.

The similar structure of the screen allows easily to make scrolls as everything, and parts of the screen on font resticles.

The mode of the screen is installed for want of inclusion, and as with the help of of functions BIOS. The functions BIOS allow to open on the screen graphics and text windows in the necessary places and necessary size.

In BIOS there are functions of discovery of the graphics screen on all screen 320x256 of points. After discovery of this mode the screen represents a set from 256 of lines, length till 320 bytes. The adjacent

points in a line are adjacent bytes. The switching of lines is made through PORT_Y, in which number of a line output on the screen is installed. Numbers of lines are considered from above of screen, since zero.

For the output in the graphics screen as it is required to open appropriate page of the main RAM. In this page the copy of the video-image will contain.

The record of video-data can be made and without overwriting data in the main RAM, that appears useful for want of to operation, for example, with the sprites. For operation with the sprites as the mode of record in the video-ram with transparent colour is stipulated. In this mode the information transmitted in the video-ram, is checked up on availability of byte #FF. If this byte is detected, the write cycle is passed and on the screen in this place remains those data, what were earlier. Thus, on the screen it is possible fast to trace the sprites being rectangular sprites with "transparent" colours.

The handle of an output mode on the screen (inclusion of the output with transparent colours, disconnecting of copying in the main
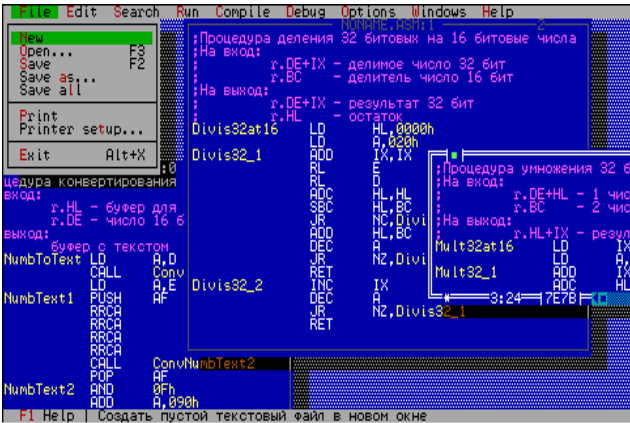
The video-ram is the shadow R A M , therefore information were in the main RAM, under which there is a video-ram it will be not necessary to coincide the information, were in This video-ram.
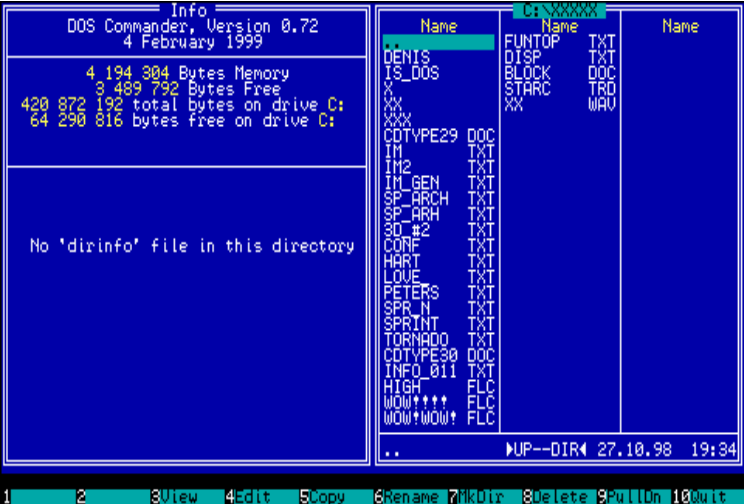
RAM) is carried out through low bits of a port of page of the graphics screen.

The accelerator of operations with RAM.

The accelerator of operations with RAM is intended for acceleration of operations on transfer of data or on filling the RAM of one byte. The accelerator is present only in Sprinter configurations and consequently does not hinder in any way operation usual Spectrum of programs.

Basis of the accelerator is the fast internal RAM in PLD. Operations on transfer data are made by record of the block of data in this internal RAM, and then copying it in the necessary place of memory from this RAM. After one record the copying can be made some times and thus it is possible to make filling of the screen by textures.

For filling the screen one colour uses other mode of the accelerator. In him instead of the copied block of data from the internal RAM the data record from the bus of the processor is made which in this moment do not vary.

The block of data written in the RAM of the accelerator, can have various length from a range 1..256 bytes. The handle of the accelerator is made immediately from the program. For this purpose the commands of the processor are used which actually are operations of a type NOP.

A,(HL) will reduce in filling the RAM of the accelerator by data from (HL) addresses, and the command of a type LD (DE),A will reduce in overwriting data from the RAM of the accelerator in main or video-ram.
LD A,A - copying of the block for the graphics screen. The command is similar to the LD command L,L, but works with verticals of the screen.

The conclusion.

The work above Sprinter proceeds. Hard and BIOS is improved. The programs supporting enhanced modes of operation of the computer are written.

All question, about gain of the computer, are send to PETERS PLUS LTD:

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SERIAL CONNECTIONS

How to connect almost everything
by Mark J Swift and Simon N Goodwin.

PART 2 - MAKING A STANDARD

This is the second part of our all-purpose plug-and-play guide to micro serial connections. The accompanying diagrams are intended to be fitted together or onto the ones printed last issue, to identify the plugs and connections to link any pair of machines.

Last issue we covered ST, Amiga, PC, QL, ZX Interface 1 and SAM, plus TRS-80, Amstrad PCW, and other systems with optional 25-pin serial ports.

In a rare moment of standardisation, Sinclair used the same connector and pinout for the Spectrum 128K and QL SER1. We have successfully used cables and serial-to-parallel converters made for the QL with original 128K and Plus Three Spectrums. Note that the QL's SER2 port is differently wired—it uses the DCE standard rather than DTE, as explained in Part 1..

The CST Thor 1 and Thor 20 were built around Sinclair QL circuit boards, so they have the same SER1 and SER2 connections as a 'real' QL. The CST/Dansoft Thor XVI uses the S5/8 standard, like some micros made by Philips. This may seem an obscure choice, but it's well thought out and an ideal way to link a mixture of machines.

Too many cables?

The jigsaw solution introduced last issue eases the problem of making cables, but there is another problem. As you acquire more and more machinery, you will need more and more cables - to the point where you could literally be lost in cables.

For example if it is necessary to be able to connect any machine to any other then:

with 2 machines - 1 cable is required

with 3 machines - 2+1 = 3 cables are required

with 4 machines - 3+2+1 = 6 cables

with 5 machines - 4+3+2+1 = 10 cables

with n machines - (n-1)+(n-2)+... +2+1 = n(n-1)/2 cables

So you'd need 28 separate cables to link all the machines covered in these articles! There must be a better way, and emulator expert Mark J Swift has found it.

The ideal solution if you have lots of machines is to standardize the serial connector on each machine by fitting an adaptor, and then to use a SINGLE cable to connect between

machines.

The S5/8 Standard

The S5/8 standard for serial connections came out of a Government study in the eighties. The S5/8 standard is based on an eight pole DIN connector and specifies nine signals as follows:

1- DINP data input
3- DOUT data output
4- HINP handshake input
5- HOUT handshake output
6- SINP subsidiary input
7- SOUT subsidiary output
8- V+   power supply
2- GND signal ground
     (common)
SHIELD - EARTH earth

A device containing an S5/8 connector should contain a socket, and each device is connected to another with a simple cross-over cable.

Of the eight signal lines only 5 are necessary (hence the name S5/8 - five lines from eight), these lines are:

1- DINP data input
3- DOUT data output
4- HINP handshake input
5- HOUT handshake output
2- GND   signal ground

Handshaking

The handshake lines are optional controls, used to temporarily pause the flow of data to make sure that none gets lost at high speeds. If these are not available you can usually ask your system to use 'software handshaking', sending special flow-control characters, often known as XON and XOFF, but this is less reliable and no good at all for binary data like program code, where the reserved control characters might appear anywhere. Another advantage of standardising on S5/8 is that you can swap any link from one type to the other by replacing the single S5/8 cable in the middle.

Making an S5/8 adaptor

This article is accompanied by a set of 'jigsaw' diagrams for various computers. To find the cable connections required to convert one of the serial definitions into S5/8, simply snap this 'jigsaw' piece into place underneath the 'jigsaw' piece for the relevant hardware.

This will standardize the hardware to be S5/8. The simple cable required to connect two S5/8 devices has its own diagram. You can use this cable to link two Thor XVI computers, as the serial ports on that machine use the S5/8 standard.

Less cables - less hassle

Now if it is necessary to be able to connect any machine to any other, you will need to make up the following leads:

2 machines - 2 adaptors + 1 cable
3 machines - 3 adaptors + 1 cable
4 machines - 4 adaptors + 1 cable
5 machines - 5 adaptors + 1 cable

...
n machines - n adaptors + 1 cable

As you can see, the number of cables required no longer increases exponentially. With just four cables you can connect all three Sinclair serial ports, PC-ATs, SAM and Thors. Add one more (DTE to S5/8) and you can include Amigas, PC-XTs, Atari STs, Amstrad PCWs and TRS-80s in your collection - probably enough to start up a data-transfer agency!
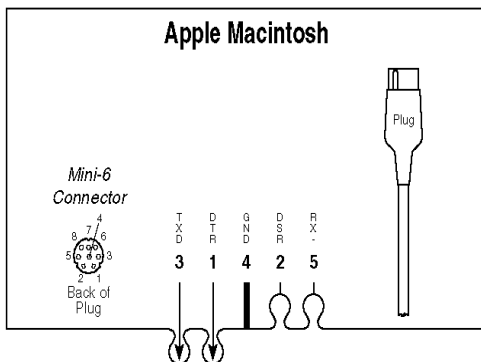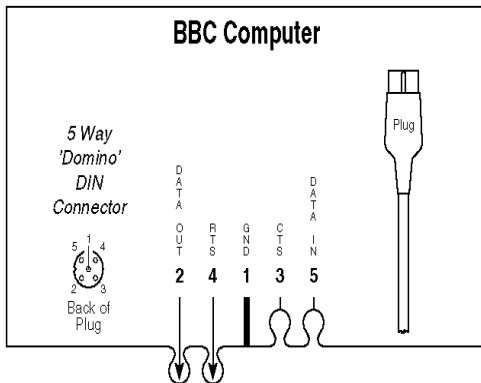
Other aspects

These articles have concentrated on hardware connections and skipped over software. You should make sure that both ends of the link are using the same speed and data size. Most machines default to 9600 baud and 8 data bits, with one or two stop bits. Extra stop bits do no harm.

You may need to reduce the rate (at both ends) for flaky interfaces - particularly if you are not using hardware handshaking or transmitting to a Sinclair machine. Many links can work at 1200 baud or lower speeds with no need for handshaking. The latest QL-compatibles are capable of rates up to 115,200 baud.

If you're hungry for further reading, you might seek out the August 1986 issue of Electronics & Wireless World, for an article entitled 'S5/8 the technical details' by Andrew Hardie. This was the inspiration for our 'standard cable' system.

While we cannot sort out your serial communications problems on an individual basis, these articles should at least ensure that you get the connections right. If you run into configuration problems you should consider writing a letter to the editor - it's quite likely that one of the other readers has encountered your problem and found a way round it. If you do write in, be sure to include full details of the software configuration commands and menu selections that you've tried at each end of the link. Good luck, and happy handshaking!

BBC Computer

5 Way 'Domino' DIN Connector
Back of Plug

DATA OUT 2, RTS 4, GND 1, CTS 3, DATA IN 5
Plug

Apple Macintosh

Mini-6 Connector
Back of Plug

TXD 3, DTR 1, GND 4, DSR 2, RX- 5
Plug

BACK TO BASICS

Part seven: Graphics
By Ken Beer

The subject this month is GRAPHICS. Graphics enable pictures to be drawn on the screen. On the SPECTRUM there are several types of graphics available. These are as follows:

1. Low resolution graphics as provided by the top keys one to eight.
2. High resolution graphics using PLOT, DRAW & CIRCLE.
3. User-Defined Graphics.

Low resolution Graphics

The first category can only be used to produce simple pictures, because you can only make your picture out of the blocks available.

Each block consists of 8 X 8 picture elements. It is usually necessary to lay out the required picture on squared paper before any attempt is made to program. To Enter the Graphics mode - press CAPS SHIFT & 9. Although there are only 8 graphics keys available there are in fact 16 graphic symbols, the other 8 (which are the inverse of the first) are obtained by using the SYMBOL SHIFT key in addition. To return to normal text you must press CAPS

SHIFT & key 9 again.

High resolution Graphics

There are 256 picture elements, or *PIXELS* across the screen width and a total of 176 *PIXELS* up its height. Numbering starts from the bottom left-hand corner and Its position is determined by how far it is across the screen (known as the 'X' co-ordinate) and how far up the screen (known as the 'Y' co-ordinate). Notice that the 'X' coordinate is always quoted first and is followed by the 'Y' coordinate separated by a comma.

To start the procedure the command *PLOT* is used thus:

BORDER 5 : PLOT 70,50

call this point 'A'

Try it now. First of all, a CYAN coloured Border differentiates the PAPER area from the BORDER area and you will notice a dot has appeared on the left-hand side of the PAPER area of the screen.

This represents the reference point 'A' from which any further drawing starts. To draw a line we need another point to refer to and this is

defined by another pair of X & Y coordinates as before but this time is preceded by the command *DRAW*. Thus, if we require to draw a line to say, X co-ordinate of 100 pixels to the right and Y co-ordinate of 50 pixels up we enter:

DRAW 100,50

call this point 'B'

Now we have a new reference to draw from, and to drop a perpendicular line for example we type:

DRAW 0,-50

(Note DRAW 0 = no X change and DRAW -50 =drop 50)

call this point 'C'

and finally, say we wished to complete the triangle ABC we enter:

DRAW -100,0

(DRAW -100 = 100 to the left and DRAW 0 = no Y change)

we are now back to point 'A'

Now, clear the screen by using command CLS on key V. We will now attempt to draw a circle. The *CIRCLE* command requires three coordinates - the first two sets the point where the centre of the circle will be (like with PLOT) and the third sets the radius of the circle. Thus a circle of radius of 20 pixels drawn at co-ordinate points of X = 70, Y = 50 would be programmed :

CLS
CIRCLE 70,50,20

User-Defined Graphics

I would prefer to leave this subject to next time and hopefully to elaborate a little more on the preceding features.

KB

A MINER TRIAD

Music in Jet-Set Willy and both versions of Manic Miner
by Richard Hallas (author of "Join the Jet-Set!" and "Jet-Set Willy in Space")

Introduction

I was never a great Spectrum hacker, as I didn't have the time in my childhood to get into machine code and hack games in a big way. However, I did dabble to a certain extent with games that particularly interested me, and the game that captivated me above all was Jet-Set Willy.

Of course, there was a veritable deluge of hacks for this game in the various magazines shortly after it was launched, with Your Spectrum and Crash devoting large sections of their pages to maps and the latest weird and wonderful POKEs. The room format was discussed, and it wasn't long before game editors appeared. Undoubtedly the best of these was JetSet Edit by Paul Rhodes, which I used to create both of my JSW games.

So, the editors and POKEs, between them, allowed you to customise the room layouts and graphics, and even to alter the behaviour of Willy; effectively, you could create whole new games. It seemed strange, therefore, that none of the magazines or editors ever touched on one other important aspect of the Willy games: their music.

Despite not being much of a hacker back in the 80s, I did manage to achieve one work of distinction that no other JSW hacker (to my knowledge) ever attempted: I succeeded in editing the in-game music, and for Join the Jet-Set! I presented the player with a choice of ten different tunes. (Later, for Jet-Set Willy in Space, I did a rendition of the Star Trek: Voyager theme music, and tunes of mine have turned up in other people's JSW games.)

Since a number of JSW-clone authors have expressed an interest in various aspects of the Willy game music, I have extended my investigations, and this document is the result. It explains how to alter the in-game music in both Jet-Set Willy and Manic Miner (both Bug-Byte and Software Projects versions), and in addition it explains how to change the music which accompanies Jet-Set Willy's title screen. Finally, it reveals a number of interesting potential tricks which, at the time of writing, have not yet been employed in any genuine Willy game.

This document does not concern itself either with the title screen music in Manic Miner, or any aspect of music in Jet-Set Willy II.

Basic tone chart

All the music under discussion here is based around a simple tone chart.

One byte is used per note, and the value of each byte corresponds to a pitch as follows:

```
      X C   16
        B   17
        #   18
        A   19
        #   20
        G   22
        #   23
        F   24
        E   25
        #   27
        D   29
        #   31
   High C   32
        B   34
        #   36
        A   38
        #   40
        G   43
        #   45
        F   48
        E   51
        #   54
        D   57
        #   60
    Top C   64
        B   68
        #   72
        A   76
        #   81
        G   86
        #   91
        F   96
        E  102
        #  108
        D  115
        #  121
 Middle C  128
        B  136
        #  144
        A  153
        #  162
```

```
        G  171
        #  180
        F  192
        E  204
        #  216
        D  230
        #  242
```

Bottom C 255 (in-game music) or 0 (title-page music)
    X C 0   (in-game music only)

The most comfortable range for music should be centred around the Middle and Top octaves. At the extremes of pitch, notes become unpleasant, hard to distinguish and increasingly out of tune. In the chart, 'X' denotes the very extreme of the range, and # indicates a 'between note' (a semitone, or a black key on a musical keyboard).

When considering the above chart, Middle C should be thought of as the tonic (or 'root') for your tune, and you can think of it like middle C on a piano. It should be made clear, though, that in the context of these games the Spectrum is a 'transposing instrument': Middle C here is in fact the F# above middle C on a real piano. Unless you have perfect pitch, however, this shouldn't be a cause for concern.

If you examine the chart you will see that the notes follow a simple logarithmic scale: take any note value and double it, and you will get the same note an octave lower; halve it and you will obtain the octave higher. This is of course a very simplistic system, and the absence of floating-point values means that it soon breaks down, and the notes go

out of tune. Indeed, nearly all of the notes are out of tune to some extent, and it's really not feasible to write music in 'keys'; if you wish to transcribe a real melody, you should first transpose it into C (assuming it's not in C to start with) and then transcribe it into the decimal integers given above.

With these tuning inadequacies in mind, you should treat the above tone chart with a small degree of flexibility, and consider its notes as theoretical ideal values. Depending on the nature of your melody, and the register in which it is playing, you may find it necessary to de-tune individual notes very slightly to compensate for the lack of numeric resolution. The chart above should be considered as an 'equal temperament' solution: it will give you the best note when considering the whole range of notes available, just like a piano will always give you the same note without taking the key into account. If you were playing an unequally tempered instrument, though (such as the violin, for example), you would make adjustments of fractions of a tone in order to tune notes correctly for the current key and/or context. The same applies here: you may find it necessary to add or subtract 1 to any given note value in order to make it sound right. A discerning musical ear (and an accurate Spectrum emulator!) is necessary to do this well.

The following sections all rely on the above tone chart.

In-game music

This is the 'blippy' music that cycles continuously as the game is being played.

64 notes are available for the melody: no more; no fewer. Your melody must, therefore, be of a suitable nature to be squeezed into this shape, which means that it really must have either two or four beats in a bar.

Simple tunes often have an A1-A2-B-A1 structure (where A1 and A2 may or may not be slightly different), or something equally straightforward. Such tunes generally adapt well to being in-game music. Often it is possible to fit an entire tune of this structure into an in-game melody (though, to be fair, you may also discover that you have only enough notes for half of the tune that you'd like to use!).

The best way to start transcribing a melody into an in-game tune is to quantise it. What is the shortest note that you need to represent? It may be a crotchet, in which case you can have a relatively lengthy tune which plays very quickly (but which may be difficult for the player to discern). It's more likely to be a quaver, however. This means that most of the notes in your melody, the crotchets, must be represented by repeated pairs of note in the in-game tune. (Minims would be four repeated notes, and so on.) Assuming that one game-tune note equates in

length to a quaver, you will find that your 64 notes can be divided into four 8-crotchet phrases.

So, once you have written a simple tune, or adapted a real melody, to fit into 64 notes, the tone chart above should be used to determine the values to poke into the appropriate locations in the game code. The addresses are different for all three games, and are as follows:

Manic Miner (Bug-Byte)
34188 to 34251 &458C

Manic Miner (Software Projects)
34194 to 34257 &4592

Jet-Set Willy
34399 to 34462 &465F

The addresses are in the Spectrum memory map, and can be POKEd directly from Spectrum Basic. The Hex addresses represent the start of the melody within a SNA-format snapshot, and may be of use to people with emulator snapshot disassemblers and memory monitors. (SNA-format snapshots exclude the first 16384 bytes of the Spectrum's memory, and so the addresses are &4000 less than the 'real' Spectrum memory addresses.)

Special note

Using a value of 0 in the in-game melody produces a 'fundamental' C which is very low indeed (an octave below the C produced by the value 255).

Jet-Set Willy title screen music

JSW's title screen music is played in an unusual way: one note in memory actually produces two notes when sounded. JSW plays each note at the pitch specified, and then doubles the value to play the same note an octave lower. By default, the title music (the first part of Beethoven's Moonlight Sonata, prematurely cut off) is of a rather odd length of 99 notes, starting at address 34299 (&45FB). For reference, the default music is as follows:

99 notes, addresses 34299 to 34397:

81, 60, 51, 81, 60, 51,
81, 60, 51, 81, 60, 51,
81, 60, 51, 81, 60, 51,
81, 60, 51, 81, 60, 51,

76, 60, 51, 76, 60, 51,
76, 57, 45, 76, 57, 45,
81, 64, 45, 81, 60, 51,
81, 60, 54, 91, 64, 54,

102, 81, 60, 81, 60, 51,
81, 60, 51, 40, 60, 40,
40, 54, 45, 81, 54, 45,
81, 54, 45, 40, 54, 40,

40, 60, 51, 81, 60, 51,
38, 60, 45, 76, 60, 45,
40, 64, 51, 81, 64, 51,
45, 64, 54, 32, 64, 54,

61, 121, 61

The note values should be poked into the addresses in just the same way as for the in-game music, but with a few important extra considerations.

Notes of value 128 and less (i.e. higher notes) produce the specified note plus the octave below it, as expected. However, notes of value greater than 128 (lower notes) do not produce the octave effect, but instead produce a second, consonant tone. The possible results can be presented in a table, as follows:

136 = B +   X C (16)
144 = A# + High C (32)
153 = A +   Top E (50) *
162 = G# + Middle B (68)
171 = G + Middle G (86)
180 = F# + Middle E (104) *
192 = F + Middle C (128)
204 = E + Bottom A (152) *
216 = D# + Bottom F# (176) *
230 = D + Bottom E (204)
242 = C# + Bottom D (228) *
  0 = C + unity (produces double-length held note)

* These notes are slightly out of tune (but not enough to be very noticeable).

These lower notes can therefore be used cleverly to produce extra notes in the tune, or to imply harmonies, and to get away from the constant octave-doubling effect.

The reason that this happens is that the player routine plays the note at pitch, then doubles its value and plays it again to get the note which is an octave lower. For notes below 128 (i.e. with values which are greater), doubling obviously creates a number which is greater than 255 (256 maps to 0), and so the second note is double the value of the first note, modulus 256. So, for example, playing Bottom F (192) gives a secondary note of value (192 x 2) - 256 = 384 - 256 = 128 (which is Middle C).

Variable-length melodies

Using a value of 255 in the title page music causes the tune to stop playing. This can be useful if you don't want your tune to have to be 99 notes long (which is an awkward length in any case). In fact, if you can stand the constant flashing, you can poke 34299 (the first title music note) with 255 to eliminate the title music altogether and just end up with a continuously scrolling 'scenario' message and flashing title screen.

Super-long combined melodies

Interestingly, if you compare the addresses of the title music and the in-game music in Jet-Set Willy, you will find that they are stored consecutively in memory: the title music goes from 34299 to 34397, and the in-game music from 34399 to 34462, with a single byte, value 255, separating them at address 34398.

As explained above, the value of 255 is used to terminate the play routine, so if another value is poked into address 34398, the title music player simply plays the note you have poked in, and continues on to play the in-game music.

However, a value of 255 then needs to exist at the end of the in-game music in order to stop the title page play routine. (If there's no 255 within the music, the play routine will go on to 'play' the data following the tunes! It soon encounters a 255 and stops anyway, but it sounds pretty awful until then, and so should be avoided.) With clever composition, therefore, it would be possible to produce a 163-note title page tune (the 164th note needs to be the 255 end-marker, which is bottom C to the in-game play routine), the latter 64 notes of which are used as the in-game music.

If you decided to do this, therefore, you would have to avoid the use of Bottom C (255) in the in-game music until the very last note. This is slightly annoying, because the pitch produced by Bottom C (255) with the in-game player is actually the same as the pitch produced by value 0 in the title music player. Using the value 0 in the in-game music produces 'fundamental C', which is an octave lower. So, the note that you are prevented from using in the in-game music is not actually the very lowest note available.

RH

HINTS & TIPS

Jack Lawrie

To check that the printer is ready, include:

IF GET(&E5) AND 1 THEN ....…

To print what is coming on the screen, include:

OSCLI("CLI #+P~E"):dummy= INKEY(0)

(not necessary to use "#-P" to switch off)

To delete a file from RAM:

ERASE filename or ://filename (Use OSCLI if filename is a string variable)

To go to the Index when in Basic, using TAB key:

IF INKEY(0)=9 THEN OSCLI("CLI #I"):dummy=INKEY(0)

To empty the keyboard buffer:

REPEAT UNTIL INKEY(0)=-1

To abort a program - reverts to the index:

K=INKEY(secs*100):IF K=-1 OSCLI ("CLI #I")

IF F THEN ... is the same as **IF F<>0 THEN**

JL

	£ UK
Cambridge Z88 V3	95
Cambridge Z88 V4	120
Reconditioned Z88	60
32k RAMPACK	18
128k RAMPACK	24
512k RAMPACK	40
32k EPROM Pack	18
128k EPROM Pack	24
256k EPROM Pack	55
EPROM Eraser	20
Special Z88-QL Serial lead	10
Import / Export Software	2
PClink Kit (for PCs)	25
Z88 to MAC Kit	25
Z88 to BBC Kit	25
QL Transfer Kit	12
Parallel Printer lead	39
Serial Printer lead	12
Mains Adaptor (230vac:6V.500ma)	10
Topper (protective cover)	12
Hard plastic carry case	10