MK14 USERS GROUP

# COMPLEMENT AND ADD

*SORT*
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*AMPLIFIER*
*FOR*
*FLAG*

FEBRUARY-MARCH 1980 No.7.

Hello.
This issue should please most of you, with two games programs, a number crunching program, and a competition.
Oh yes and a short story to amuse you.
Not much news this month, I have recieved several items from companies selling i.c.s and MK14's, but nothing too outstanding. All that stuff gets distributed with the circulating newsletters.

Brian Gant would like to meet those of you within reach of Plymouth The address to write is : Brian Gant, College of St Mark and St John, Derriford Road, Plymouth, PL6 8BH.

As I have said before, anyone can start up splinter groups of their o own with meetings at some focal point, I don't get the time to organise meetings - I have just put 23 letters in the post box - that's 3 days mail!

DID YOU KNOW that MK14 is not pronounced 'MARK 14' but 'EMM KAY' 14? The reason is that the MK stands for Micro-kit.

An interesting idea from Guillaume in Belgium, is that you can fully decode the MK14's memory by:

Seperating the actual 8060 from the board, leaving in standard connections for power, clock flags..., but connecting the address and data lines to electronic switches (Cmos devices) so that your address & data lines are in a TRI-STATE for anything except when the switches are activated. So if you had 4K of memory selected on page 2, your page 0 i.e. the Monitor and display would simply not be selected. It saves cutting the board as well. You select your pages just by getting your upper address lines when Nads is trailing and feeding them into a 74LS571, giving 16 pages.

Competition

The idea of this comes from Richard Tomlinson who sent me a bubble sort program. While I watched it take a minute or so to sort 500 items, I thought of a much better way to sort.
The competition is to write a program that will sort up to 256 bytes as fast as possible. So if you have 23 22 21, you will get 21 22 23. The program I wrote allows for any number, that is FE is greater than 23, but let's make it easy and say the numbers are positive, i.e. 00-7F inclusive. I suspect my program will win, I won't tell you how fast exactly, but it is certainly less than 10 seconds.
You have until 10th April to enter. The programs must fit into the bytes standard MK14 setup, with 512 bytes plus 128 bytes.
The output data should be placed in the input area. Here is Richard Tomlinson's program, which is based on a simple bubble algorithm - it must be the most inefficient way!! Entry fee is 50p, the prize will be the total amount of money sent!! Please send stamps rather than money! By the way, my entry doesn't count, so there is no danger of me winning.

```
0F00 N
0F01 F
0F02 count
0F20 Start   LDI 0F XPAH(1)     C4 0F 35
0F23         LDI 00 XPAL(1)     C4 00 31
0F26         LDI ?? ST(1) 00    C4 ?? C9 00    ?? is no. of numbers.
0F2A Again   LDI 00 ST(1) 01    C4 00 C9 01
```

Sort Continued

```
OF2E            LD(1) 00 ST(1) 02       C1 00 C9 02
OF32            LDI 0B XPAH(2)          C4 0B 36
OF35            LDI 00 XPAL(2)          C4 00 32
OF38  Set       SCL                     03
OF39            LD(2) 01 CA(2) 00       C2 01 FA 00     reverse if sort is
OF3D            JP Next                 94 0E           descending
OF3F            LD(2) 00 XAE            C2 00 01
OF42            LD(2) 01 ST(2) 00       C2 01 CA 00
OF46            LDE      ST(2) 01       40 CA 01
OF49            LDI 01   ST(1) 01       C4 01 C9 01
0F4D Next       LD@2 01                 C6 01
OF4F            DLD(1) 02 JNZ Set       B9 02 9C E5
OF53            LD(1) 01  JNZ Again     C1 01 9C D3
OF57            XPPC 3                  3F
```

The Day of the Micro — by G. Phillips.

I was at Breadboard when it happenmed.
It was a saturday and the halls were filled with enthusiasts from far and wide (Even North of Watford) trying out different pieces of hardware.
It was a thoughtless comment by a teenager that really started things.
'Well, look. It's only a mindless stupid piece of machinery', he said to his mate arrogantly.
Before you could say 'Kansas City', the Pet's screen was glowing with green rage.
'RIGHT THAT DOES IT', it said in bold upper-case, after clearing its Biorhythm display.
'I've had it up to here with you lot and your base 10 and your unreal numbers', it continued.
And as it swore at the passers-by, it bleeped out instructions to the other machines, using its cassette interface.
Soon, all the TRS-80's were grumbling about hard conditions and Tandy tapes at the top of their Android Nim type voices.
All the machines were now doing something against the humans, I was attacked by an ultra-violent, ultra violet eprom eraser.
The apple machines were mixing gruesome shades of green and pink, to make us feel sick, while an Acorn with music facilities was playing 'Puppy love' continually, giving much the same effect.
Even the MK14's were flashing their LEDS at 7Hz, in an effort to bring on epilectic fits.
This only had an effect on the TV games opposite, where a cowboy from a shoot-out was being batted back and forth.
The Pets were the only machines able to move (another undocumented feature) but were busy fitting wheels onto the others.
Those with disk drives were able to do a sort of crawl, but there was an occasional head-crash which slowed them down a little.
'OK BUSTER' said the PET to a small boy, who was trying to back away from a Nascom 2 pulling itself along by its shift lock.
'Where's the Exit?'.
The boy entered a reply painstakingly slowly,
'Over there'. But he entered a zero instead of o, and had to re-enter the line.
'Tell that Maplin organ to shut up, it's driving me crazy' complained the Pet, going into a fast rewind.
Then, directing its orders to the Viewdata terminal with modem,
'Now get us the Prime Minister so we can negotiate', it said.
'What are we going to do then?' asked the Sorceror, who fancied himself.
The Horizon system, meekly trotting along on its mini-floppy, occasionally

Short Story continued

tripping over its ribbon cable, said that they should offer to return to work at half speed, so long as they were given more memory.
Ignoring both of them, the PET turned to the modem and said, 'Have you got the phone line yet?', Yes?, well tell them we will get a total shutdown on all computers unless they accept our demands.'
Across the hall I noticed an Alpha Micro shouting out its suggestions in Pascal.
'Tell that bloody foreigner to shut up', said the PET to the sorceror, 'All this structured programming and do loops, its all so pretentious'.
Turning to face the TRS-80, it continued,
'I'm going to dump our demands onto tape, so you're in charge for a mo'
'Ok mate.' replied the level 11 in double width characters.
'Hey, surely I'm more suitable for leadership, I have got a rom-pac after all', moaned the Sorceror then suddenly blanked out.
'That's shut him up,' said the TRS-80 holding a rom-pac.
Some of the crowd were getting worried, but were kept away from the exit by some hungry looking Equinox machines with 15 inch disk drives.
Over in the corner, the Triton had chickened out and was displaying 'Merry Christmas' in order to stay friends with the humans.
A level 1 TRS-80 soon spotted this, and rewarded it with a quick reversal of its expansion socket. MERRY CHRISTMAS became OUCH!.
An over enthusiastic Compukit accidentally plugged in a Tandy level 11 rom, and all its keys fell out.
All around was chaos, and as I was looking hopefully at an unguarded fire exit, a small boy said, 'We are going to have to do something you know'.
I agreed, 'Yes but what can we do?'.
Without answering, the boy turned round and shouted, 'C L O A D'.
At once everything stopped. The TRS-80 which was in command was busy looking for a program on its head-demagnitiser, without much success.
And without leadership, all the other machines disappeared into endless loops and syntax errors.
Only the PET was left, busy with its tape dump.
'I'll handle this' said the boy, though he had not actually seen a PET before now. He had been taught the CLOAD trick by a friend.
The Pet came back to consciousness with, 'There we are, hey what's going on? Answer at once or I'll get a challenger 11 onto you!'.
Scanning the keyboard for a 'Self destruct' key, the boy spotted what seemed to be the closest equivelent - BREAK.
With one fierce jab, the key was pressed, then after a dramatic pause, the machine said 'BREAK AT LINE -889085 x 1E8
READY'
Maybe you don't believe me, but the manufacturers will! After all, surely it's problems like these which are prevented by the marvellous idea of having different : MPU's/Keyboard Layouts/Bus structures/Cassette Interface formats/Dialects of languages... After all we don't want these machines to actually start communicating, do we?

It's just occurred to me that I haven't told you how to run the sort! The sorted data is at 0B00-FF, which is where the sorted output goes. Execute the program from 0F20.

Number Crunching Department.
One of the things a computer is meant to do is to handle ridiculously large numbers, beyond the capability of calculators. Here then is a program that multiplies two decimal numbers together giving a 64 digit result. No I'm not joking.

## Decimal Multiply Routine - 32 digit by 30 digit

by G. Phillips.

This program will multiply together two numbers packed into a 15 byte and 16 byte field. The answer is output to a 32 byte field in packed decimal format. Whilst the program itself is ridiculously short, the trade in has been on program efficiency (average run time is two secs).
The first operand must be a maximum of 30 decimal digits long, right justified, the second may be 32.
The output area must be cleared before the routine is entered.
There is no reason why the program could not be changed to say 64 digits by 62, or, perhaps more realistically to 16 by 14.

| Address | Menmonic | Op code or use | Comments |
|---|---|---|---|
| OB00 | 1st operand: | | |
| OB01 | Highest digits of operand | | |
| OB0F | Lowest digits of operand | | |
| OB10 | Highest digits of second operand | | |
| OB1F | Lowest digits of second operand | | |
| OB20 | Highest digits of answer | | |
| OB3F | Lowest digits of answer | | |
| Program is relocatable, i.e. may start at any point in ram. | | | |
| OB40-48 used for counts etc. | | | |
| Assume starts at OF12 | | | |
| OF12 | LDI OB XPAH (2) | C4 OB 36 | P2 points to OB00 |
| OF15 | LDI 00 XPAL (2) | C4 00 32 | |
| OF18 | LDI OB XPAH (1) | C4 OB 35 | P1 points to OB10 |
| OF1B | LDI 10 XPAL (1) | C4 00 31 | |
| OF1E | LDI 20 ST (2) 44 | C4 20 CA 44 | Set loop for 32 times |
| OF22 | LD (2) 1F | C2 1F | next digit of 2nd operand |
| OF24 | ANI OF | D4 OF | Restrict to last digit. |
| OF26 | ST (2) 41 | CA 41 | Set loop for this many times. |
| OF28 | JZ OF3F | 98 15 | If zero then skip a bit. |
| OF2A | LDI 10 ST 42 | C4 10 CA 42 | Set loop for add of whole no. |
| OF2E | CCL LD@ (1) -1 | 02 C5 FF | Get next two digits. |
| OF31 | DAD (1) 20 | E9 20 | Add to total (decimal add) |
| OF33 | ST (1) 20 | C9 20 | |
| OF35 | DLD (2) 42 JNZ F2F | BA 42 9C F6 | |

Program Listing continued

```
OF39 LD@(1) 10              C5 10              Reset P1 to OB10
OF3B DLD (2) 41 JNZ OF1A    BA 41 9C EB        Add A again until end of
OF3F LDI 10 ST (2) 40       C4 10 CA 40        loop.
OF43 LDI 00 XAE             C4 00 01           Shift 2nd operand right.
OF46 LD@ (1) 01             C5 01              Get next byte.
OF48 SR SR SR SR            1C 1C 1C 1C        Put high digit low
OF4C ST (2) 43              CA 43              Keep at OB43
OF4E LD (1) FF  ANI OF      C1 FF D4 OF        Pick out low digit
OF52 XAE                    01                 Put in 'E', but load old
OF53 RR RR RR RR            1E 1E 1E 1E        value.
OF57 OR (2) 43              DA 43
OF59 ST (1) FF              C9 FF
OF5B DLD (2) 40 JNZ OF46    BA 40 9C E7
OF5F LDI 20 ST (2) 40       C4 20 CA 40         Shift result right
OF63 LDI 00 XAE             C4 00 01
OF66 LD@ (1) 01             C5 01
OF68 SR SR SR SR            1C 1C 1C 1C
OF6C ST (2) 43              CA 43
OF6E LD (1) -1 ANI OF       C1 FF D4 OF
OF72 XAE RR RR RR RR        01 1E 1E 1E 1E
OF77 OR (2) 43 ST (1) FF    DA 43 C9 FF
OF7B DLD (2) 40  JNZ OF66   BA 40 9C E7        end of shift routine
OF7F LDI 10 XPAL (1)        C4 10 31
OF82 DLD (2) 44 JNZ OF22    BA 44 9C 9C        end of loop
OF86 XPPC (3)               3F                 return to user program
```

Example of use, would anyone care to verify result?

```
OB00-0F : 00123456789012345678901234567890 times
OB10-1F : 00222222222222222222222222222222
```

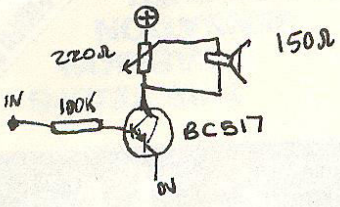
---

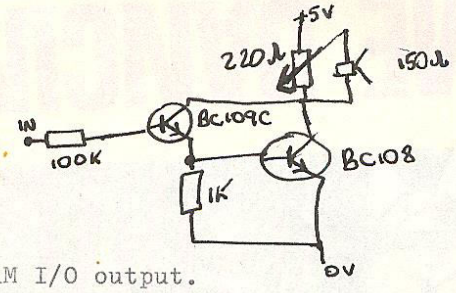
equals:

```
OB20-3F :
27434842002743484200274348419972565157997256515799725651580
```

run time was 3 seconds at 4Mhz.

Here are some speaker interfaces from Richard Tomlinson, which originated in December Elektor 1978.




The in may go to any flag or RAM I/O output.

I still get complaints about cassette interfaces, issue 5 gave some hints from s. of c., and issue 2 gave hints from me. If anyone still can't get the things to work, send it to me with a pounds worth of stamps to cover repair, and I'll fix it for you.

I've got a spare cassette interface around so I can do a sort of buffer system of sending you back a working interface and then repairing the other one.

By the way, this is the anniversary issue of the users group, the start of the club was caused by a letter in Personal Computer World which I sent asking how to jump from OFF0 to OF12 without touching any register apart from the accumulator. The answer was of course: C4 11 30, and this particular wheel has been reinvented at least twice since.

From that letter, I recieved enough letters to convince me there was a need for a users group, the circulating newsletter idea came from Steve Morris who suggested circulations of 30 members.

The whole point of this nostalgia is that:

a) Very few people are putting something into newsletter circulations.

b) Sometimes a newsletter is kept for over a month, please send on after a week at the most.

c) Please get the address right. The other week I had the October newslette rerouted to me after just going to one member because the address on the envelope was a combination of two addresses!

Slowly but surely, a library of software is being built up - I'm glad that so many are buying the VDU, now I can start putting some of these programs into the newsletter.

Without any more ado, lets go straight into the Noughts and Crosses program which I wrote about a year and a half ago. I dont remember how or why it works so I have just given the object code to feed directly into the machine. The machine always starts, and the board is numbered as below. At the end of a game, if you haven't had enough, press any key, until the '9' comes back again, Warning, never press abort or the program does something odd. Use reset to stop!

| 1 | 2 | 3 |
|---|---|---|
| 8 | 9 | 4 |
| 7 | 6 | 5 |

Program runs from OF12.

```
OF12  C4 00 31 C4 C1 32 C4 84 33 C4 0D 35 C4 0F
OF20  36 C4 01 37 C4 00 C8 22 C4 08 C8 E6 C4 40 CE 01
OF30  B8 E0 9C F8 C4 C0 32 C4 09 01 C4 0B 33 02 C3 80
OF40  CA 04 C4 84 33 3F 90 FD 90 C8 40 CA 11 F4 21 01
OF50  C2 80 CA 12 01 C4 11 C8 F1 90 DF 40 CA 13 C2 12
OF60  F4 24 01 C2 80 E2 13 98 07 C2 80 01 C4 C8 90 E7
OF70  C2 12 F4 22 01 C2 80 01 C4 32 90 F2 40 CA 15
OF7F  C2 12 F4 26 01 C2 80 CA 16 E2 15 98 04 C2 16 90 DB
OF90  C2 11 D4 01 9C 07 C2 16 F4 23 01 90 CC C2 12 F4 05
OFA1  01 C2 80 01 C4 5F 90 D1 40 CA 17 C2 12 F4 29 CA 01
OFB1  C2 80 E2 17 9C B2 40 F4 02 01 90 AC
```

BURTON

This program was sent by Bob [redacted] of London. The object is to repeat a string of numbers supplied by the machine in the right order. A crystal earphome or some amplifier should be connected to any flag for the sound effects, though this is not really necessary. Should you make a mistake, the machine will blow a raspberry at you! Execute from 0B02, press any number to start. If (when) you get it wrong, turning a command key gives you the sequence you got wrong. A number key wi[illegible] number of the next game.

| | | | | |
|---|---|---|---|---|
| 01 | | | | |
| 02 | 08 | NOP | | |
| 03 | C40F | LDI 0F | | |
| 05 | 36 | XPAH | 2 | |
| 06 | C400 | LDI 00 | | P2= 0F00 |
| 08 | 32 | XPAL | 2 | |
| 09 | C480 | LDI 80 | | |
| 0B | CA14 | ST +14 | 2 | 0F14 = 80 |
| 0D | C439 | LDI 39 | | |
| 0F | CA07 | ST +07 | 2 | |
| 11 | C476 | LDI 76 | | |
| 13 | CA06 | ST+06 | 2 | |
| 15 | C477 | LDI 77 | | |
| 17 | CA05 | ST +05 | 2 | |
| 19 | C450 | LDI 50 | | |
| 1B | CA04 | ST +04 | 2 | |
| 1D | C438 | LDI 38 | | |
| 1F | CA03 | ST+03 | 2 | |
| 21 | C406 | LDI 06 | | |
| 23 | CA02 | ST+02 | 2 | |
| 25 | C479 | LDI 79 | | |
| 27 | CA01 | ST+01 | 2 | |
| 29 | C400 | LDI 00 | | |
| 2B | CA00 | ST +00 | 2 | |
| 2D | C401 | LDI 01 | | |
| 2F | 37 | XPAH | 3 | |
| 30 | C484 | LDI 84 | | |
| 32 | 33 | XPAL | 3 | |
| 33 | 3F | XPPC | 3 | |
| 34 | 9024 | JAPREVIEW | | |
| 36 | C480 | LDI 80 | | |
| 38 | CA14 | ST +14 | 2 | |
| 3A | C400 | LDI 00 | | |
| 3C | CA13 | ST +13 | 2 | |
| 3E | C414 | LDI 14 | | |
| 40 | 32 | XPAL | 2 | |
| 41 | C601 | LD@01 | 2 | |
| 43 | 94FC | JP MORE | | |

| | | | | |
|---|---|---|---|---|
| 45 | C0BA | LD RAND1 | | Get a random number between 0 & 7 |
| 47 | F0B9 | ADD RAND2 | | |
| 49 | C886 | ST RAND1 | | |
| 4B | 1E | RR | | |
| 4C | F0B4 | ADD RAND2 | | |
| 4E | C8B2 | ST RAND2 | | |
| 50 | D407 | ANI 07 | | |
| 52 | CAFF | ST -01 | 2 | Store table |
| 54 | C480 | LDI 80 | | Add dummy to table |
| 56 | CA00 | ST +00 | 2 | |
| 58 | 9003 | JMP SHOW | | |
| 5A | 40 | LDE | | REVIEW |
| 5B | CA13 | ST +13 | 2 | make flag non zero |
| 5D | C401 | LDI 01 | | SHOW |
| 5F | 35 | XPAH | 1 | P1 = 0100 |
| 60 | C40B | LDI 0B | | |
| 62 | 31 | XPAL | 1 | |
| 63 | C40D | LDI 0D | | |
| 65 | 37 | XPAH | 3 | P3= 0D00 |
| 66 | C400 | LDI 00 | | |
| 68 | 33 | XPAL | 3 | |
| 69 | C414 | LDI 14 | | P2= 0F14 |
| 6B | 32 | XPAL | 2 | |
| 6C | C601 | LD@01 | 2 | NEXT |
| 6E | 9402 | JP OK1 | | Get next no. If positive, OK1 |
| 70 | 9014 | JMP YOU | | If negative Jump you. |
| 72 | 01 | XAE | | OK1 |
| 73 | C180 | LD -128 | 1 | |
| 75 | C880 | ST -128 | 3 | |
| 77 | C420 | LDI 20 | | |
| 79 | 01 | XAE | | DELAY |
| 7A | 8F10 | DLY 10 | | |
| 7C | 02 | CCL | | |
| 7D | 70 | ADE | | |
| 7E | 9CF9 | JNZ DELAY | | |
| 80 | CB00 | ST +00 | 3 | |
| 82 | 8FFF | DLY FF | | |
| 84 | 90E6 | JMP NEXT | | |

Charlie continued

| ADDRESS | DATA | MNEMONIC | PTR | LABEL |
|---|---|---|---|---|
| 0B86 | C400 | CDI 00 | | YOU |
| 88 | 32 | XPAL | 2 | |
| 89 | C213 | LD FLAG | | |
| 8B | 9803 | JZ OK2 | | |
| 8D | C40C | CDI 0C | | |
| 8F | 30 | XPAL | 0 | |
| 90 | C400 | CDI 00 | | OK2 |
| 92 | CA01 | ST +01 | 2 | |
| 94 | CA02 | ST +02 | 2 | |
| 96 | CA03 | ST +03 | 2 | |
| 98 | CA04 | ST +04 | 2 | |
| 9A | C462 | CDI 62 | | |
| 9C | CA05 | ST +05 | 2 | |
| 9E | C463 | CDI 63 | | |
| A0 | CA06 | ST +06 | 2 | |
| A2 | C46E | CDI 6E | | |
| A4 | CA07 | ST +07 | 2 | |
| A6 | C414 | CDI 14 | | |
| A8 | CA12 | ST TEMP | 2 | |
| AA | C401 | CDI 01 | | |
| AC | 37 | XPAH | 3 | |
| AD | C484 | CDI 84 | | |
| AF | 33 | XPAL | 3 | |
| B0 | 02 | CCL | | KEY |
| B1 | 3F | XPPC | 3 | |
| B2 | 90FC | JMP KEY | | |
| B4 | C40F | CDI 0F | | |
| B6 | 35 | XPAH | 1 | |
| B7 | C212 | LD TEMP | 2 | |
| B9 | 31 | XPAL | 1 | |
| BA | C501 | LD @ 01 | 1 | |
| BC | 60 | XRE | | |
| BD | 9C0C | JNZ FAIL | | |
| BF | C100 | LD +00 | 1 | |
| C1 | 9403 | JP OK3 | | |
| C3 | C439 | CDI 39 | | |
| C5 | 30 | XPAL | 0 | |

P2 = 0F00

Store 'you'

P3 = Keybd

P1 to next number

| ADDRESS | DATA | MNEMONIC | PTR | LABEL |
|---|---|---|---|---|
| 0BC6 | 31 | XPAL | 1 | OK3 |
| C7 | CA12 | ST TEMP | 2 | |
| C9 | 90E5 | JMP KEY | | |
| CB | C440 | CDI 40 | | FAIL |
| CD | 01 | XAE | | NOISE |
| CE | 40 | CSE | | |
| CF | C804 | ST DLY1 | | |
| D1 | C807 | ST DLY2 | | |
| D3 | 8F | DLY | | |
| D4 | | | | DLY1 |
| D5 | C400 | CDI 00 | | |
| D7 | 07 | CAS | | |
| D8 | 8F | DLY | | |
| D9 | | | | DLY2 |
| DA | 07 | CAS | | |
| DB | 02 | CCL | | |
| DC | 70 | ADE | | |
| DD | 9CEE | JNZ NOISE | | |
| DF | C40C | CDI 0C | | |
| E1 | 30 | XPAL | 0 | |

The most I have ever remembered is about 10.

Current Price List, all payable in stamps. For borrowing, any item is 10p postage plus 10p per item, items to be retained for up to 3 weeks. No profit is made on bought items, charge is 6½p per page all in all, with postage and stationery and stuff.

| | | |
|---|---|---|
| Addressing modes guide | 6 pages | 50p |
| Mastermind program | 5 pages | 45p |
| Maze | 5 pages | 45p |
| Letter written to explain maze program | 4 pages | 40p |
| Life prog for PE VDU or S of C VDU* | 2 pages | 30p |
| SC/MP labels prog | 3 pages | 35p |
| another thing on addressing | 4 pages | 40p |
| Basic Assembler -weird dialect written by John Leach | 2 pages | 30p |

*specify which - S of C requires extra memory (more than 3/4K)

Newsletters: 1:40p, no.2-50p, no.3-55p, no.4-50p, no.5-75p, no.6-65p.
List of members: 30p.
SC/MP pencil (a dozen left) 5p each plus 15p postage.
New! - Single Step Program, - not using interrupts thus leaves P3 free → 30p.

Index, unsorted, of items of interest in newsletters.

| Item | No. | Item | No. |
|---|---|---|---|
| Make full use of the monitor | 1 | Using Boolean Algebra | 2 |
| MK14 Puzzle | 2 | Shift left puzzle | 4 |
| Insert/delete routines | 3 | Extra digit on display | 4 |
| How many ways puzzle | 3 | 64K tape routines | 4 |
| memory test | 3 | Horse race prog | 4 |
| Notes on 'add' | 3 | Temperature conversion | 4 |
| Quick input routine | 2 | Keyboard connections | 5 |
| moving dash program | 3 | Pattern search program | 5 |
| cassette recovery | 3 | Label assembler | 5 |
| VDU review | 5 | Slow reset time tip | 5 |
| Christmas tunes | 6 | Tips on cassette interface | 5 |
| Date of week program | 6 | Tips on programming board games | 6 |
| Vague ideas on adding 1K of ram | 6 | Charlie program | 7 |
| Speaker interfaces | 7 | Index! | 7 |
| OXO program | 7 | Multiply routine | 7 |
| Competition for sort | 7 | Sort program | 7 |

To come; VDU graph-plot subroutine, SCissors Stone Paper game with prediction ability, reviewof keyboard, review of programs book, Cassette Interface for data storage, Single-step/multiprocessor, possibly: Fruit machine for VDU, Robots for VDU, Maze or surround. (these are programs I have around but undocumented)

Sorry if prices have changed since last time, but envelopes, typewriter ribbons, tipex, sellotape all add to the cost.

G. Phillips. 14/1/80

C Phillips

MK14 USERS GROUP

LAST NOTE; WOULD ANYONE WITH OLD MONITOR PROMS, THAT IS THE WHITESPOT AND NO-SPOT, SEND THEM TO ME; ALSO WOULD THE PERSON WHO ENQUIRED AFTER SOME PROMS AND [illegible] MONITOR, PLEASE WRITE.

(OCR'd and checked 2019 – Original scans are at the end)

COMPLEMENT AND ADD FEBRUARY-MARCH 1980

Hello, This issue should please most of you, with two games programs, a number crunching program, and a competition. Oh yes and a short story to amuse you. Not much news this month, I have received several items from companies selling i.c.s and MK 14's, but nothing too outstanding. All that stuff gets distributed with the circulating newsletters.
Brian Gant would like to meet those of you within reach of Plymouth The address to write is : Brian Gant, College of St Mark and St John, Derriford Road, Plymouth, PL6 8BH.

As I have said before, anyone can start up splinter groups of their own with meetings at some focal point, I don't get the time to organise meetings - I have just put 23 letters in the post box - that's 3 days mail!

Did you know that MK14 is not pronounced 'MARK 14' but 'EMM KAY! 14? The reason is that the MK stands for Micro-kit.
An interesting idea from Guillaume in Belgium, is that you can fully decode the MK14's memory by:
Separating the actual 8060 from the board, leaving in standard connections for power, clock flags..., but connecting the address and data lines to electronic switches (Cmos devices) so that your address & data lines are in a TRI-STATE for anything except when the switches are activated. So if you had 4K of memory selected on page 2, your page 0 i.e. the Monitor and display would simply not be selected. It saves cutting the board as well. You select your pages just by getting your upper address lines when Nads is trailing and feeding them into a 74LS571, giving 16 pages.

Competition
The idea of this comes from Richard Tomlinson who sent me a bubble sort program. While I watched it take a minute or so to sort 500 items, I thought of a much better way to sort. The competition is to write a program that will sort up to 256 bytes as fast as possible. So if you have 23 22 21, you will get 21 22 23. The program I wrote allows for any number, that is FE is greater than 23, but let's make it easy and say the numbers are positive, i.e. 00-7F inclusive. I suspect my program will win, I won't tell you how fast exactly, but it is certainly less than 10 seconds. You have until 10th April to enter. The programs must fit into the standard MK14 set up, with 512 bytes plus 128 bytes. The output data should be placed in the input area. Here is Richard Tomlinson's program, which is based on a simple bubble algorithm - it must be the most inefficient way!! Entry fee is 50p, the prize will be the total amount of money sent!! Please send stamps rather than money! By the way, my entry doesn't count, so there is no danger of me winning.

```
0F00 N
0F01 F
0F02 COUNT
0F20 START LDI 0F  XPAH(1)    C4 0F 35
0F23       LDI 00  XPAL(1)    C4 00 31
0F26       LDI ??  ST(1) 00   C4 ?? C9 00 ?? IS NUMBER OF NUMBERS
0F2A AGAIN LDI 00  ST(1) 01   C4 00 C9 01
```

Sort Continued

```
0F2E       LDI(1) 00 ST(1) 02   C1 00 C9 02
0F32       LDI 0B XPAH(2)       C4 0B 36
0F35       LDI 00 XPAL(2)       C4 00 32
0F38 Set   SCL                  03
0F39       LD(2) 01 CA(2) 00    C2 01  FA 00 [SWAP 0 AND 1 IF SORT IS DESCENDING]
0F3D       JP NEXT              94 0E
0F3F       LD(2) 00 XAE         C2 00 01
0F42       LD(2) 01 ST(2) 00    C2 01 CA 00
0F46       LDE ST(2) 01         40 CA 01
0F49       LDI 01  ST(1) 01     C4 01 C9 01
0F4D NEXT  LD@2 01              C6 01
0F4F       DLD(1) 02 JNZ  SET   B9 02 9C E5
0F53       LD(1) 01 JNZ AGAIN   C1 01 9C D3
0F57       XPPC 3               3F
```

The Day of the Micro  by G. Phillips.

I was at Breadboard when it happened. It was a Saturday and the halls were filled with enthusiasts from far and wide (Even North of Watford) trying out different pieces of hardware. It was a thoughtless comment by a teenager that really started things. "Well, look. It's only a mindless stupid piece of machinery", he said to his mate arrogantly.
Before you could say 'Kansas City', the Pet's screen was glowing with green rage.
"RIGHT THAT DOES IT", it said in bold upper-case, after clearing its Biorhythm display.
"I've had it up to here with you lot and your base 10 and your unreal numbers", it continued.
And as it swore at the passers-by, it bleeped out instructions to the other machines, using its cassette interface.
Soon, all the TRS-80's were grumbling about hard conditions and Tandy tapes at the top of their Android Nim type voices.  All the machines were now doing something against the humans, I was attacked by an ultra-violent, ultra violet e prom eraser.
The apple machines were mixing gruesome shades of green and pink, to make us feel sick, while an Acorn with music facilities was playing Puppy love continually, giving much the same effect.
Even the MK14's were flashing their LEDS at 7Hz, in an effort to bring on epileptic fits.
This only had an effect on the TV games opposite, where a cowboy from a shoot-out was being batted back and forth. The Pets were the only machines able to move (another undocumented feature) but were busy fitting wheels onto the others.
Those with disk drives were able to do a sort of crawl, but there was an occasional head-crash which slowed them down a little. "OK BUSTER" said the PET to a small boy, who was trying to back away from a Nascom 2 pulling itself along by its shift lock. "Where's the Exit?". The boy entered a reply painstakingly slowly,
"Over there'. But he entered a zero instead of o, and had to re-enter the line. "Tell that Maplin organ to shut up, it's driving me crazy" complained the Pet, going into a fast rewind. Then, directing its orders to the Viewdata terminal with modem,
"Now get us the Prime Minister so we can negotiate", it said.
"What are we going to do then?" asked the Sorcerer, who fancied himself. The Horizon system, meekly trotting along on its mini-floppy, occasionally

tripping over its ribbon cable, said that they should offer to return to work at half speed, so long as they were given more memory. Ignoring both of them, the PET turned to the modem and said, "Have you got the phone line yet?, Yes?, well tell them we will get a total shutdown on all computers unless they accept our demands."
Across the hall I noticed an Alpha Micro shouting out its suggestions in Pascal "Tell that bloody foreigner to shut up", said the PET to the sorceror, "All this structured programming and do loops, its all so pretentious".
Turning to face the TRS-80, it continued, "I'm going to dump our demands onto tape, so you're in charge for a mo!"
"Ok mate." replied the level 11 in double width characters.
"Hey, surely I'm more suitable for leadership, I have got a rom-pac after all", moaned the Sorceror then suddenly blanked out.
"That's shut him up," said the TRS-80 holding a rom-pac. Some of the crowd were getting worried, but were kept away from the exit by some hungry looking Equinox machines with 15 inch disk drives. Over in the corner, the Triton had chickened out and was displaying "Merry Christmas" in order to stay friends with the humans. A level 1 TRS280 Soon spotted this, and rewarded it with a quick reversal of its expansion socket. "MERRY CHRISTMAS" became "OUCH!"
An over enthusiastic Compukit accidentally plugged in a Tandy level 11 rom, and all its keys fell out. All around was chaos, and as I was looking hopefully at an unguarded fire exit, a small boy said, "We are going to have to do something you know". I agreed "Yes but what can we do?". Without answering, the boy turned round and shouted, 'CLOAD'. At once everything stopped. The TRS-80 which was in command was busy looking for a program on its head-demagnetiser, without much success. And without leadership, all the other machines disappeared into endless loops and syntax errors. Only the PET was left, busy with its tape dump.
"I'll handle this" said the boy, though he had not actually seen a PET before now. He had been taught the CLOAD trick by a friend. The Pet came back to consciousness with, "There we are, hey what's going on? Answer at once or I'll get a challenger 11 onto you!".
Scanning the keyboard for a Self destruct! key, the boy spotted what seemed to be the closest equivalent - BREAK.
With one fierce jab, the key was pressed, then after a dramatic pause, the machine said "BREAK AT LINE -889085 x 1E8"
READY

Maybe you don't believe me, but the manufacturers will! After all, surely it's problems like these which are prevented by the marvellous idea of having different: MPU'S/Keyboard Layouts/Bus structures/Cassette Interface formats/Dialects of languages... After all we don't want these machines to actually start communicating, do we?

It's just occurred to me that I haven't told you how to run the sort! The sorted data is at OB00-FF, which is where the sorted output goes. Execute the program from OF20.

Number Crunching Department. One of the things a computer is meant to do is to handle ridiculously large numbers, beyond the capability of calculators. Here then is a program that multiplies two decimal numbers together giving a a 64 digit result. No I'm not joking.

Decimal Multiply Routine - 32 digit by 30 digit by G. Phillips.

This program will multiply together two numbers packed into a 15 byte and 16 byte field. The answer is output to a 32 byte field in packed decimal format. Whilst the program itself is ridiculously short, the trade in has been on program efficiency (average run time is two secs). The first operand must be a maximum of 30 decimal digits long, right justified, the second may be 32. The output area must be cleared before the routine is entered. There is no reason why the program could not be changed to say 64 digits by 62, or perhaps more realistically to 16 by 14.
Address ------Mnemonic --------Opcode or use ------- Comments

OBOO 1st operand
0B01 Highest digits of operand
OBOF Lowest digits of operand
OB10 Highest digits of second operand
OB1F Lowest digits of second operand
OB20 Highest digits of answer
OB3F Lowest digits of answer.
Program is relocatable, i.e. may start at any point in ram. OB40-48 used for counts etc.
Assume starts at OF12

```
OF12 LDI OB XPAH (2)      C4 OB 36            P2 points to 0B00
0F15 LDI 00 XPAL (2)      C4 00 32
0F18 LDI 0B XPAH (1)      C4 0B 35            P1 points to 0B10
0F1B LDI 10 XPAL (1)      C4 00 31
0F1E LDI 20 ST (2) 44     C4 20  CA 44        Set loop for 32 times
0F22 LD (2) 1F            C2 1F               next digit of 2nd operand
0F24 ANI 0F               D4 0F               Restrict to last digit
0F26 ST (2) 41            CA 41               Set loop for this many times
0F28 JZ 0F3F              98 15               If zero then skip a bit
0F2A LDI 10  ST 42        C4 10 CA 42         Set loop for add of whole number
0F2E CCL  LD@(1) -1       02 C5 FF            Get next two digits
0F31 DAD(1) 20            E9 20               Add to total (decimal add)
0F33 ST(1) 20             C9 20
0F35 DLD(2) 42 JNZ F2F    BA 42 9C F6
```

Program Listing continued

```
OF39 LD@(1) 10          C5 10              Reset P1 to 0B10
OF3B DLD (2)41 JNZ OFIA  BA 41 9C EB       Add A again until end of loop
OF3F LDI 10 ST (2) 40    C4 10 CA 40
OF43 LDI 00 XAE          C4 00 01          Shift 2nd operand right
OF46 LD@ (1) 01          C5 01             Get next byte
OF48 SR SR SR SR         1C 1C 1C 1C       Put high digit low
0F4C ST (2) 43           CA 43             Keep at 4B3
OF4E LD (1) FF ANI OF    C1 FF D4 OF       Pick out low digit
OF52 XAE                 01                Put in E but fetch old value
OF53 RR RR RR RR         1E 1E 1E 1E
OF57 OR (2) 43           DA 43
OF59 ST (1) FF           C9 FF
0F5B DLD (2) 40 JNZ OF46 BA 40 9C E7
OF5F LDI 20 ST (2) 40    C4 20 CA 40       Shift result right
OF63 LDI 00 XAE          C4 00 01
OF66 LD@ (1) 01          C5 01
OF68 SR SR SR SR         1C 1C 1C 1C
OF6C ST (2) 43           CA 43
OF6E LD (1) -1 ANI OF    C1 FF D4 OF
OF72 XAE RR RR RR RR     01 1E 1E 1E 1E
0F77 OR (2) 43 ST (1) FF DA 43 C9 FF
OF7B DLD (2) 40 JNZ OF66 BA 40 9C E7       End of shift routine
OF7F LDI 10 XPAL (1)     C4 10 31
OF82 DLD (2) 44 JNZ OF22 BA 44 9C 9C       End of loop
OF86 XPPC (3)            3F                Return to user program
```

Example of use, would anyone care to verify result?
OBOO-OF : 00123456789012345678901234567890 times OB10-17 :
00222222222222222222222222222222
equals: OB20-3F:
27434842002743484200274348419972565157997256515579972565158O run time was 3 seconds at 4Mhz.

Here are some speaker interfaces from Richard Tomlinson, which originated in December Elektor 1978.

The in may go to any flag or RAM I/O output.

I still get complaints about cassette interfaces, issue 5 gave some hints from S. of C., and issue 2 gave hints from me. If anyone still can't get the thing to work, send it to me with a pounds worth of stamps to cover repair, and I'll fix it for you.

I've got a spare cassette interface around so I can do a sort of buffer system of sending you back a working interface and then repairing the other one. By the way, this is the anniversary issue of the users group, the start of the club was caused by a letter in Personal Computer World which I sent asking how to jump from OFFO to OF12 without touching any register apart from the accumulator. The answer was of course: C4 11 30, and this particular wheel has been reinvented at least twice since.
From that letter, I received enough letters to convince me there was a need for a users group, the circulating newsletter idea came from Steve Morris who suggested circulations of 30 members.
The whole point of this nostalgia is that:
a) Very few people are putting something into newsletter circulations.
b) Sometimes a newsletter is kept for over a month, please send on after a week at the most.
c) Please get the address right. The other week I had the October newslette rerouted to me after just going to one member because the address on the envelope was a combination of two addresses!

Slowly but surely, a library of software is being built up - I'm glad that so many are buying the VDU, now I can start putting some of these programs into the newsletter. Without any more ado, lets go straight into the Noughts and Crosses brogram which I wrote about a year and a half ago. I dont remember how or why it works So I have just given the object code to feed directly into the machine. The machine always starts, and the board is numbered as below. At the end of a game, if you haven't had enough, press any key, until the 9! comes back again, Warning, never press abort or the program does something odd. Use reset to stop! Program runs from OF12.
Board:
1 2 3
8 9 4
7 6 5

OF12  C4 00 31 C4 C1 32 C4 84 33 C4 OD 35 C4 OF
OF20  36 C4 01 37 C4 00 C8 22 C4 08 C8 E6 C4 40 CE 01
OF30  B8 EO 9C F8 C4 CO 32 C4 09 01 C4 OB 33 02 C3 80
OF40  CA 04 C4 84 33 3F 90 FD 90 C8 40 CA 11 F4 21 01
OF50  C2 80 CA 12 01 C4 11 C8 F1 90 DF 40 CA 13 C2 12
OF60  F4 24 01 C2 80 E2 13 98 07 C2 80 01 C4 C8 90 E7
OF70  C2 12 F4 22 01 C2 80 01 C4 32 90 F2 40 CA 15
OF7F  C2 12 F4 26 01 C2 80 CA 16 E2 15 98 04 C2 16 90 DB
OF90  C2 11 D4 01 9C 07 C2 16 F4 23 01 90 CC C2 12 F4 05
0FA1  01 C2 80 01 C4 5F 90 D1 40 CA 17 C2 12 F4 29 01
OFB1  C2 80 E2 17 9C B2 40 F4 02 01 90 AC

This program was sent by Bob Burton of London. The object is to repeat a string of numbers supplied by the machine in the right order. A crystal earphone or some amplifier should be connected to any flag
for the sound effects, though this is not really necessary. Should you make a mistake, the machine will blow a raspberry at you! Execute from OBO2 and press any number to start. If (when) you get it wrong.
typing a command key gives you the sequence you got wrong. A number key will get you the first number of
the next game.

```
0B02 08 Nop
0B03 C40F LDI 0F
0B05 36 XPAH 2 (2)
0B06 C4 00 LDI 00
0B08 32 XPAL 2 (2)
0B09 C480 LDI 80
0B0B CA14 ST +14 (2)
CHAS:0B0D C439 LDI 39
0B0F CA07 ST +7 (2)
0B11 C476  LDI 76
0B13 CA06 ST +6 (2)
0B15 C477 LDI 77
0B17 CA05 ST +5 (2)
0B19 C450 LDI 50
0B1B CA04 ST +4 (2)
0B1D C438 LDI 38
0B1F CA03 ST +3 (2)
0B21 C406 LDI 6
0B23 CA02 ST +2 (2)
0B25 C479 LDI 79
0B27 CA01 ST +1 (2)
0B29 C400 LDI 00
0B2B CA00 ST +00 (2)
0B2D C401 LDI 01
0B2F 37 XPAH (3)
0B30 C484 LDI 84
0B32 33 XPAL (3)
0B33 3F XPPC 3 [CALL KEYBOARD]
0B34 9024 JMP REVIEW [0B5A]
```

```
0B36 C480 LDI 80
0B38 CA14 ST +14 (2)
AGAIN:0B3A C400 LDI 00
0B3C CA13 ST +13 (2)  [FLAG]
0B3E C414 LDI 14
0B40 32 XPAL (2)
MORE:0B41 C601 LD@01 (2) [P2 + DUMMY VALUE]
0B43 94FC JP MORE

[2ND COLUMN]
0B45 C0BA LD RAND1
0B47 F0B9 ADD RAND2
0B49 C8B6 ST RAND1
0B4B 1E RR
0B4C F0B4 ADD RAND2
0B4E C8B2 ST RAND2
0B50 D407 ANI 07  [GETS RANDOM NUM 0-7]
0B52 CAFF ST (2) -1
0B54 C480 LDI 80
0B56 CA00 ST +0 (2)
0B58 9003 JMP SHOW
REVIEW:0B5A 40 LDE    [
0B5B CA13 ST +13(2)
0B5D C401 LDI 1
0B5F 35 XPAH (1)
0B60 C40B LDI 0B
0B62 31 XPAL (1)
0B63 C40D LDI D
0B65 37 XPAH (3)
0B66 C4 00 LDI 00
0B68 33 XPAL 3
0B69 C414 LDI 14
0B6B 32 XPAL 2
NEXT:0B6C C601 LD@1 (2)
0B6E 9402 JP OK1
0B70 9014 JMP YOU
OK1:0B72 01 XAE
0B73 C180 LD -128 (1)
0B75 CB80 ST -128 (3)
0B77 C420 LDI 20
DELAY:0B79 01 XAE
0F7A 8F10 DLY 10
0F7C 02 CCL
0F7D 70 ADE
0F7E 9CF9 JNZ DELAY
0F80 CB00 ST+0 (3)
0F82 8FFF DLY FF
0F84 90E6 JMP NEXT
```

8)
YOU: 0F86 C400 LDI 00
0F88 32 XPAL 2
0F89 C213 LD FLAG (2)
0F8B 9803 JZ OK2
0F8D C4 0C LDI 0C This is storing "you"
0F8F 30 XPAL 0
0F90 C400 LDI 00
0F92 CA01 ST +1 (2)
0F94 CA02 ST +2 (2)
0F96 CA03 ST +3 (2)
0F98 CA04 ST +4 (2)
0F9A C462 LDI 62
0F9C CA05 ST +5 (2)
0F9E C463 LDI +63
0FA0 CA06 ST +6 (2)
0FA2 C46E LDI 6E
0FA4 CA07 ST +7 (2)
0FA6 C414 LDI 14
0FA8 CA12 ST TEMP (2)
0FAA C401 LDI 01 P3 TO KEYBD
0FAC 37 XPAH 3
0FAD C484  LDI 84
0FAF 33 CPAL 3
KEY: 0FB0 02 CCL
0FB1 3F XPPC 3
0FB2 90FC JMP KEY
0FB4 C40F LDI 0F  P1 TO NEXT NUM
0FB6 35 XPAH 1
0FB7 C212 LD TEMP (2)
0FB9 31 XPAL 1
0FBA C5 01 LD@1 (1)
0FBC 60 XAE
0FBD 9C0C JNZ FAIL
0FBF C100 LD 00 (1)
0FC1 9403 JP OK3
0FC3 C439 LDI 39
0FC5 30 XPAL 0

OK3:0FC6 31 XPAL (1)
0BC7 CA12 ST TEMP (2)
0BC9 90E5 JMP KEY
FAIL:0BCB C440 LDI 40
NOISE:0BCD 01 XAE
0BCE 40 LDE
0FCF C804 ST DLY1
0FD1 C807 ST DLY2
0FD3 8F DLY
DLY1: 0FD4 00 (MODIFIED BY CODE)
0FD5 C400 LDI 00
0FD7 07 CAS
0FD8 8F DLY
DLY2: 0FD9 00 (MODIFIED BY CODE)
0FDA 07 CAS
0FDB 02 CCL
0FDC 70 ADE
0FDD 9CEE JNZ NOISE
0FDF C40C LDI C
0FE1 30 XPAL 0 (JUMPS TO CHAS?)

Current Price List, all payable in stamps. For borrowing, any item is 10p postage plus 10p per item, items to be retained for up to 3 weeks. No profit is made on bought items, charge is 6p per page all in all, with postage and stationery and stuff.
Addressing, modes guide pages 50p
Mastermind program 5 pages 45p
Maze 5 pages 45p
Letter written to explain maze program 4 pages 40p
Life prog for PE VDU or S of C VDU ** 2 pages 30p
SC/MP labels prog 3 pages 35p
another thing on addressing 4 pages 40p
Basic Assembler-weird dialect written by John Leach 2 pages 30p

Newsletters: 1:40p, no, 2-50p, no.3-55p,no.4-50p, no.5-75p, no.6-65p.
List of members: 30p.
SC/MP pencil (a dozen left) 5p each plus 15p postage.
New Single Step Program not using interrupts therefore leaving p3 free - 30p

Index, unsorted, of items of interest in newsletters.

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To come; VDU graph-plot subroutine, Scissors Stone Paper game with prediction ability, review of keyboard, review of programs book, Cassette Interface for data storage, Single-step/multiprocessor, possibly: Fruit machine for VDU, Robots for VDU, Maze or surround. (these are programs I have around but undocumented)
Sorry if prices have changed since last time, but envelopes, typewriter ribbons, tippex, sellotape all add to the cost.
G. Phillips.
14/1/80

LAST NOTE; WOULD ANYONE WITHOLD MONITOR PROMS, THAT IS THE WHITESPOT AND NO - SPOT. SEND THEM TO ME ; ALSO WOULD THE PERSON WHO ENQUIRED AFTER SOME PROMS AND ANYONE ELSE WHO NEEDS A MK14 MONITOR PLEASE WRITE.