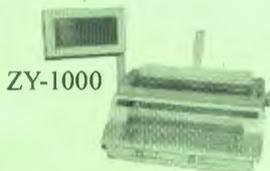# SHARP USERS CLUB

ZY-1000

PC-3201

MZ-3500
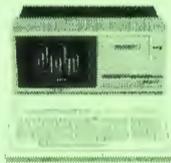
MZ-80A
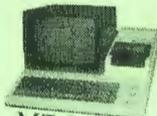
MZ-80B

MZ-5600

MZ-800

MZ-80K

MZ-700

PC-7200

PC-3000

MAY 2015

Volume 35   Number 1

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Codsall
Wolverhampton
West Midlands WV8 2HX   14 May 2015

I am very sorry to have to tell all members of the Sharp Users Club that our beloved editor
Maurice Hawes passed away on the 26 February 2015 after a short illness.
Many of us have lost a dear friend and a helpful colleague. The Club has lost a valuable
source of information to do with all things Sharp. Our sincere condolences go to Maurice's
wife Janet and family in their loss.

I saw Maurice a few days before his passing, and he was the Sharp Users Club to the very
end, giving me instructions as he lay in bed, to what he wanted to be included in the editorial
section of the magazine. The people to contact, where to find files and how to produce the
magazine.

He wished to thank all the committee members, sub editors, librarians and the people who
contributed articles to the magazine for all their efforts in supporting the Club. A special
thank you goes to Andrew Ferguson who was at the rebirth of the Sharp Users Club back in
1985; Andrew has just retired from the post of Club Secretary, due to ill health.

There was also an apology to Ben Coffer for attributing his articles on MZ-80A Graphics to
Ben Donnachie. Maurice said he was truly sorry about the mix-up, and hopes Ben will
forgive him.

In the last editorial that Maurice wrote, and I quote: -

All in all, for a one-make computer club that started in 1980 and still going strong, a pretty
remarkable issue, with a very wide spread of interest, and hardly anything written by yours
truly. Long may this trend continue!

From the topics discussed with Maurice as we walked along the esplanade last October: -
such things as how long will the SUC continue, I replied another year, we have articles from
me and Ben for the next issue and with the Czech's enthusiasm who knows. He also
mentions his old Sharp computers he thought there should be a Sharp museum, he had
already donated his 1936 Rover to a museum (more on this later). I now wonder if he knew
or suspected that all was not well.

* Vol.35 No.2 will appear in October 2015, deadline circa 30/09/2015 *

MZ-80B Librarian ***** **Note New Address & Telephone Number!**
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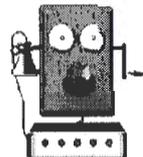Telephone 01229 813578; e-mail: sharp.users.club@mypostoffice.co.uk

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P.S. John is often busy in his garden; if he doesn't answer, LEAVE A MESSAGE!!

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SOME BACK ISSUES OF THIS MAGAZINE ARE STILL AVAILABLE
AND WE NOW HAVE A FEW PACKS OF 'FONTWRITER' RIBBONS (see Vol. 32 No.1 p. 15)

FOR FURTHER DETAILS PLEASE RING   01902 845273

How I first met Maurice Hawes - by John Edwards

A long time ago, in fact a very long time ago back in 1985 when the popular computer magazines of that period had almost stopped or had stopped publishing articles on the Sharp MZ80K, I wrote to the Helpdesk of Personal Computing World (PCW). I asking PCW if there was a Sharp Computer Club, or any computer clubs in my area, I had previously tried to join the Sharp Users Club (based in Yeovil) in 1984 but the club no longer existed. PCW wrote back with two clubs in my area, but none supported the Sharp computers. But within days my copy of PCW came through the post, and there in the Club News section was a short paragraph saying that the Sharp Users Club had just restarted giving Andrew Ferguson contact details.

So I joined the SUC, I think it was £7 for four magazines a year. On receiving my first copy of the magazine I noticed that among the list of Club officials was the Chief Editor Maurice Hawes and he lived a few miles away. I gave him a phone call and said I was a member of the SUC and asked if I could see him as I have never meet another Sharp user before. We agreed to meet that Sunday evening at 7pm. After that we meet almost every Sunday to discuss Sharp computers, hardware and software including a break for Maurice's real ale and my usual cider, I often left his house at 2.30 in the morning. So began a very long friendship.

Saved from the Skip

I had planned to go and collect the Sharp SUC material from Weymouth in the last week in March, having planed this with my brother Jim and we were to stay overnight.

In the 3rd week of March having received 2 phone calls from Janet saying they (she and her family) were busy boxing up Maurice's computer stuff. I was asked what things they could throw away. I said that I would be going down on the 24th weather permitting, otherwise it would been in April. Janet said April would be too late. She had often said to me while I was on holiday with her and Maurice; if Maurice went first she would have a skip and all his computer junk would go in it. Janet hates computers.

So I saw Jim and changed our plans. The next day started a 4am; we were on the road at 4.35am in fog, which got thicker to the extent we were about to return home when it cleared. We arrived in Weymouth at 8.55am, after a short tea break we began to load the van at 9.30, another tea break at 12, all finishing by 3.0pm thanks to the pre-boxing. We filled a Peugeot Boxer van, yes filled, and even had equipment in the cab. After a short lunch we were back on the road at 3.30pm and got home at 8.45pm.

I have collected most, if not all, of Maurice's Sharp memorabilia. The tapes and disks where boxed and just labelled "Disks", "disk"s, and "more disks". I have not started to look at them yet till I know what is happening with the SUC.

1936 Rover 14 HP Sports Saloon

This car was coach-built by Rover in their Coventry factory. The main body including all four doors and the boot is therefore constructed of aluminium panels on ash frames, and pressed steel is employed only for the front and rear wings, and the bonnet.

The first owner was Lady H. Goldney of Derriads, Nr. Chippenham, and the car was customized for her by Burridge's Motor Works on Station Hill, Chippenham, by fitting an oversize steering wheel and moving the vanity mirror to the driver's side of the car.

First registered in Trowbridge on 4th May 1936, as AAM 775, this attractive and rather rare Rover saloon was owned by Lady Goldney for nearly 25 years. But early in 1961 she decided to part with it, and returned it to Burridge's in part exchange for a new car.

Burridge's kept AAM 775 under a tarpaulin in a dark corner of their showroom on the North side of Station Hill in Chippenham, and on February 28th 1961 it was spotted there and bought for £125 by Maurice Hawes, who thus became its second registered owner.

Maurice kept the car for 53 years, and his children and grandchildren all remember the car with great affection, especially the sliding tool-tray under the glove box, the 'windy windscreen', and the 'advance-retard' lever on the steering wheel, the semaphore indicators, and the sliding roof. Maurice himself also appreciated the Rover Freewheel, the 'other' tool kit in the boot with its specially-designed jack and hub-nut-size socket spanner, and fact that the driver's seat could be slid so far back that he couldn't reach the pedals!

AAM 775 enjoyed life in Chippenham, Marshfield, Edinburgh and Bridgnorth, before settling in Weymouth from 1988 to 2014. Those 26 years in Weymouth were probably the most exciting of all because, shortly after retiring there in 1988, Maurice joined the Weymouth Vehicle Preservation Society (WVPS) and then became the secretary of the sub-committee that organized their annual 'Dorset Tour'. Naturally, AAM 775 became a regular participant in this event, and last appeared at its 25th Anniversary in May 2013.

During the last few years there have been some problems, the worst of which resulted in the engine frequently 'cutting out' for no obvious reason. Early in 2014 this was traced to a cracked rotor arm, and it is hoped that this fault has now been permanently cured.

The original carpets were threadbare when the car changed hands for the only time in 1961, and by 2011 they were so bad that they had to be replaced. Also in 2011, to help solve the 'cutting out' problem, the original AC mechanical petrol-pump was replaced by a modern electric pump. Otherwise the car, especially in its interior, is very original.

AAM 775 was donated to the Atwell-Wilson Museum in September 2014

AAM 775 at Calne on 30th September 2014

Unusual Features of the 1936 Rover 14 HP Sports Saloon

The most unusual feature is that the 12v. D.C. dynamo is driven directly off the timing chain, via a sprocket. Therefore, if one of the dynamo bearings seizes up, the engine cannot turn. In fact, this actually happened to AAM 775 in 1972, and as a result the engine and dynamo were dismantled and completely overhauled in the Motor Vehicle Department of the Technical College at which I was then working.

Another result of this feature is that the fan belt runs on only two pulleys, so the fan belt has to be exactly the right length, no adjustment is possible, and if the fan belt should break it is rather difficult to fit a new one.

Recent History

From February 2010 until June 2011 the car was 'away from base' undergoing a major overhaul at a garage recommended by the Rover Sports Register. In the course of this overhaul the following work was completed, in the order shown below:-

Flywheel fitted with new ring gear, clutch overhauled and parts renewed as necessary
Gearbox and engine mountings renewed
Front axle spring shackle bushes renewed
Shock absorbers removed, refurbished by a specialist, and replaced
Worn front axle completely replaced, complete with new king-pins & bushes
Rear axle disassembled and new oil seals fitted
Brake system completely overhauled
Running-boards removed and all supports replaced by new ones
Running-boards renewed and fitted with new (but identical) rubber covers
All wooden floorboards renewed
All 4 wings removed, refurbished, repainted and replaced
Fuel Tank removed, drained, steam cleaned and refitted
Complete new stainless steel exhaust system fitted
Wood and metal supports for rear wheel arches and the boot renewed as necessary
New wiring loom fitted, with semaphores retained & new flashing indicators added
New electric petrol pump fitted
New carpets fitted throughout

Given that I had specified that the 'feel' of the car should not be 'modernized', I was reasonably happy with the way most of the above work was done. But the electrician seemed to leave a few loose ends - for example, the interior light and the fog lamp do not work, and the petrol gauge is still unreliable. And the carpet fitter did a very poor job, using tintacks to fit the front carpets in place and thereby making it very difficult to gain access to the gearbox, to check the oil level and top up as required. And worst of all, the engine is still not running properly, even after replacing the faulty rotor arm!

AAM Log Book Side 1.

AAM Log Book Side 2

Expanding the Boundaries of MZ-80A Graphics (Part 3)

By Ben Coffer

Welcome back again to my series of articles related to controlling the MZ-80A's screen. I write this in the sad knowledge of our loss of Maurice who has been at the helm of the club for many years and I dedicate this article to him and to all the help he gave me over the years.

The last articles have mainly focused on effects that are achievable on a static screen. By static, I mean screens where no 'action' is taking place, e.g. title screens. None of the code I have presented so far would be workable in a game as you would never be able to ensure all your game code is accurately timed enough to complete all its operations before the start of the next screen frame has begun (unless it was an incredibly simple game).

There is, however, a way to ensure that our effects happen at exactly the right points of the screen whilst a game is playing. We must employ a Z80 interrupt to do this. We are very lucky on the MZ-80A to have a single interrupt available to us which we can re-program for our own needs. The interrupt I am referring to is that of the Real Time Clock. The 80A is equipped with a clock which counts down for 12 hours after the machine is first switched on. When the 12 hours are up it causes a switchover in the Monitor from AM to PM (or vice versa). This switchover is handled by an interrupt. If we abandon the need for the RTC then we can commandeer this interrupt for our own purposes.

What is it that causes the interrupt to occur? It is the Intel 8253 chip present inside all the MZ-80As. This chip is a simple counter chip which counts down to zero (in certain modes). In actual fact it is host to three separate counters. In the 80A one of the counters is used for producing square waves for sound production. The other two counters are used for our interrupt.

Why are there two counters used for one single interrupt? This simply comes down to the fact that Sharp intended for these only to be used for the Real Time Clock. To achieve an RTC you need two counters. One counter divides the 8253 chip's input clock (a clock of 31.5 KHz) down to 1Hz to achieve a 1 second clock. The other counter takes the first of the two counter's output (the 1 second clock) as its own input and counts down from 43500 (the number of seconds in twelve hours) down to zero and then triggers the interrupt. So, you have 1Hz counter triggering a 12 hour countdown to zero.

Hopefully that makes sense. Now, because these two counters are hardwired in this particular configuration (one counter always outputting to the other) you cannot get around this and cannot use one of the counters without using the other.

Different home computers of the '80s handled their screen-related interrupts in different ways. We're lucky to have an interrupt on the MZ-80A but we're not as lucky as the owners of some of the other machines. For instance, the Amstrad CPC which has six known positions on the screen where an interrupt always occurs. The Spectrum has an interrupt that is always tied in with the Vertical Blanking period. Our poor 80A has an interrupt but it bears no relation to the screen hardware whatsoever. This can make coding interrupt-driven screen effects on our machine a bit of a headache. But it is possible.

I'm going to leave the more complicated and in-depth explanations to another issue of the magazine but I will say that you will need more than one or two interrupt handlers (the code that is executed when the interrupt occurs) to carry out even the smallest of effects on our 80A. The first of your interrupt handlers is the one which will always need to be tied to the VSync. This is how we ensure that the effects always have the right timings to occur at the same point on the screen when every screen frame is drawn.
I will also say that any changes you make to the 8253 counters do not occur immediately. It takes one clock cycle for any changes to the counter values to take place.

You may remember the final screenshot from the last issue of the club magazine. It showed the SA-5510 BASIC screen having loaded a program and then executed that program. Then a machine language routine was called (using the USR command). The keen eyed amongst us will have noticed that at the top of the screen there was an inverse bar (8 pixels high) highlighting the top line of the display. This was achieved through use of the interrupt and about five separate interrupt handlers. As a reminder, here is that screenshot again:
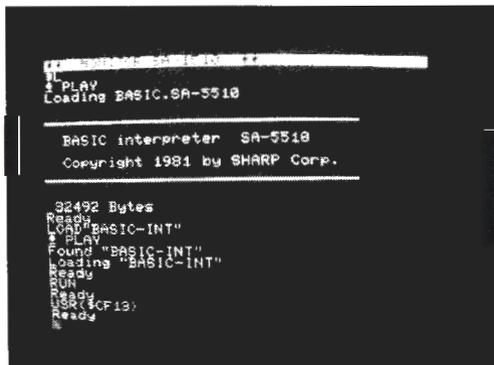
I will leave the full explanation of how this works, along with the Zen-compatible Assembly language listing to the next issue as it is quite long and space in the mag is limited. Suffice to say that this code runs in BASIC and you can continue to use BASIC while it is running. I will now give you the BASIC listing for this effect below:

```
5 LIMIT $CF12
10 FOR A=53011 TO 53247
20 READ B
30 POKE A,B
40 NEXT A
50 END
60 DATA 243,33,57,16,17,48,207,115,35
70 DATA 114,33,7,224,54,116,54,176
80 DATA 43,54,1,54,0,43,54,2
90 DATA 54,0,251,201,245,197,213,229
100 DATA 221,229,253,229,33,2,224,126
110 DATA 23,56,252,58,21,224,33,57
120 DATA 16,17,97,207,115,35,114,33
130 DATA 6,224,54,1,54,0,43,54
140 DATA 63,54,0,253,225,221,225,225
150 DATA 209,193,241,251,201,245,197,213
160 DATA 229,221,229,253,229,6,22,0
170 DATA 16,253,58,20,224,33,57,16
180 DATA 17,144,207,115,35,114,33,6
190 DATA 224,54,1,54,0,43,54,101
```

```
200 DATA 54, 0,253,225,221,225,225,209
210 DATA 193,241,251,201,245,197,213,229
220 DATA 221,229,253,229,33,57,16,17
230 DATA 183,207,115,35,114,33,6,224
240 DATA 54,1,54,0,43,54,2,54
250 DATA 0,253,225,221,225,225,209,193
260 DATA 241,251,201,245,197,213,229,221
270 DATA 229,253,229,33,57,16,17,222
280 DATA 207,115,35,114,33,6,224,54
290 DATA 1,54,0,43,54,2,54,0
300 DATA 253,225,221,225,225,209,193,241
310 DATA 251,201,245,197,213,229,221,229
320 DATA 253,229,33,57,16,17,48,207
330 DATA 115,35,114,33,6,224,54,1
340 DATA 54,0,253,225,221,225,225,209
350 DATA 193,241,251,201
```

When this code is run you can then make the USR call to the machine language routine. This routine sets up the appropriate interrupt handlers and values for the 8253 chip and returns control to BASIC. You can then continue to use BASIC with a bar highlighting the top line of the display in inverse. You can LIST the program again and watch as the listing scrolls up the screen with the inverse bar never moving and highlighting each line as it passes through it. There is probably some impact on the speed of BASIC but it is hardly noticeable. The reason for this is that each interrupt handler has been timed in a way such that it takes the least amount of processing time away from the currently running program (BASIC being the currently running program in this case). More on this in the next issue of the magazine. I hope this has been interesting so far but I feel I'm getting somewhere in achieving some effects that are brand new to this machine.

MZ-700 80 Column Kit by John Edwards

Back in the mid-80s, while having my usual cider with Maurice in the local pub in Bridgnorth, Maurice said that he had seen an 80 column MZ80K. A few weeks earlier I had got a copy of the MZ80K Service Manual from Maurice and I thought I have a look at this (I was interested in digital electronics). 2 weeks later I took my new 80 column MZ80K to show Maurice. The modification included adding extra screen memory (1 Kbyte) to give a continuous 2 Kbyte block, a small T shaped board that that held the electronics to extend the screen address range, increase the screen reset counter, and generate the 16 MHz clock. The 16 MHz clock did not use an expensive crystal but just a 2 input XOR gate. The K's 8 Mhz clock being fed to both inputs, but one of the input signal was delayed by 3 invert gates (the propagation delay thought the 74 Series of digital chips was 9 nano seconds) giving a delay of 27 nsec, almost half of the 16Mhz period 62.5 nsec required, thus I generated 2 27nsec pluses every 125nsec with a mark space ratio of 27/35.

On explaining how I had done the conversion and how it worked, Maurice told me that the Xtal's MZ-80K conversion, (which I believed cost over £100), used a split screen with block A at $D000 and block B at $D400 and interlaced them. With the first character at $D000 the 2nd at $D400 the 3rd at $D001, the 4th atD401 and so on.

So when I designed the MZ-700 80-column screen, having no access to the screens reset counter, (all the screen electronics are held in a large-scale integrated chip). I used the Xtal's approach: - in the time frame that the screen memory address lines are stable (the period of 1 40 column character), generating 2 load pulses and bank switching the screen memory for the second load pulse. The first design worked OK except for a major fault: - the first character on the screen was partly missing. The first 3 columns of the 7 x 5-character matrix were missing. I put this down to the delay in the signals caused by the extra circuitry.

What to do? I could not speed up the signals, but having work for a Japanese company for 11 years, I use reverse logic and slow them even more and lost the 1st character completely. My screen places 1st character into $D000, the 2nd character into $D401, the 3rd into $D001, the 4th into $D402, and so on, and not $D000, $D400, $D001, $D401 as for Xtal's MZ-80K's screen.

One problem I discovered with a new batch of 74 series ICs chips which I purchase (about 8 years after the first lot) was that the propagation was no longer 9 nsec and the 16MHz clock was no longer a 27/35 but more like 5/95 mark space ratio. As a result the characters consisted of very fine dots and unusable. The solution was to add a small capacitor to the delayed 8MHz signal. Later chips required 2 capacitors. The capacitors were added by trial and error when I tested the boards in my MZ-700 machine.

Sharp Users Club hardware sheet 1 August 1990

Reprint of the MZ-700 40/80 Column conversion instructions

I wish to thank you for purchasing this conversion board, the monies raised will help to support the SUC and fund other projects.

Every board made has been fitted to my own MZ-700 and tested. At this point I would like to say that I cannot be held responsible for any damage caused to the MZ-700 by fitting this conversion module.

40/80 SCREEN DETAILS

Switching between 40 and 80 columns is achieved by loading any address in the range $E00C - $E00F with 40 ($28) OR 80 ($50). In order to make use of the 80 columns the operating system need to be changed, this is no real problem as the 700's system is normally in RAM, and I have already started modifying CP/M (the main application for the 80 column mod.)

The screen is handled similar to Xtal's MZ80K conversion i.e. it is split into 2 halves, interlaced together, block A is $D000 - $D3E7, and block B is $D401 - $D401 - $D7E8. The first character on the screen goes into location $D000, the second character into $D401, the third into $D001, the 4th into $D402, and so on.

I will not have time to convert all MZ-700 software to work with 80 columns, so if you succeed in converting a program please send the Club a copy together with an assembly listing of the code changes. Maurice and I are incorporating the numbers '78' in all MX-700 80-column software (e.g. WDPRO 782.34, CPM780.COM). I would like to suggest that you do the same.

Sharp Users Club hardware sheet 2 August 1990

MZ-700 40/80 Column instructions

Tools required are a small tipped soldering iron not more than 15 watts, wire cutters, a Stanley knife, and fine emery paper.

The most difficult part of the installation is the rectification of a possible design error on the MZ-700 board. This involves cutting the leg of pin 10 of the 74s165 chip labeled "AC" close to the board, bending the leg up and joining it to pin 8 of the same IC. (Done this way because the track happens to be under the IC, and it cannot be reached to be cut). Be careful not to damage the board when cutting the leg free, (I used a set of miniature wire cutters). With is mod. Done your MZ-700 should still work as normal, please check that it does. This is important: without this modification the 80-column kit will not work.

The next step is to remove the capacitor C39 by cutting it away from pin 2 IC 6D, and from the 0V track.

Now carefully bend over the resistance R88 and the capacitor C44, so that the board rests flat on top of ICs 6D, 6C, 7D, 8D and 8C. The board is fitted with the end having my name on closest to the LSI chip 7A and is fixed into place with double sided tape.

After the board is secure, prepare the main board by cutting the following tracks on the topside: -
     a) Track to pin 2 of IC AC
     b) Track to pin 45 of the LSI, between the 2 pads.
     c) Track to pin 57 of the LSI, near pad close to IC AA.
     d) Locate the group of 5 pads next to the 10K resistor pack; cut the track 2nd from the
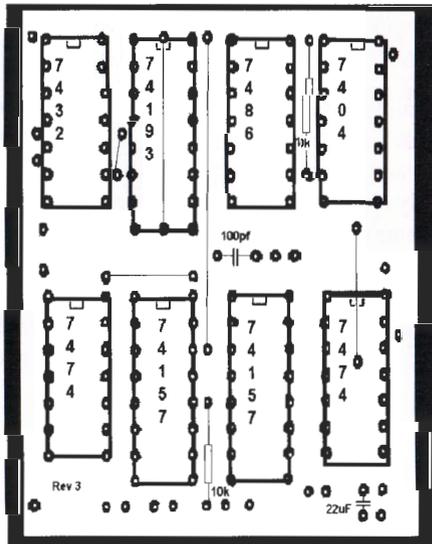   left (close to pin 4 of the resistor pack).

The last stage is to connect up all the leads from the small PCB to the correct pick up points on the main PCB. I have used coloured cables to help in this matter, but you will need to refer carefully to the diagrams supplied. I recommend that all pins and tracks that are to be soldered should be meticulously cleaned with fine emery, as this will ensure that soldering can be done quickly without damaging components.

BEFORE SWICHING ON YOUR WONDERFUL NEW MZ-700 (WE CALL IT THE MZ-780) recheck all the connections, especially the 0V and 5V supplies. I do hope you are successful in completing this conversion, but if you do have any difficulties please contact me.
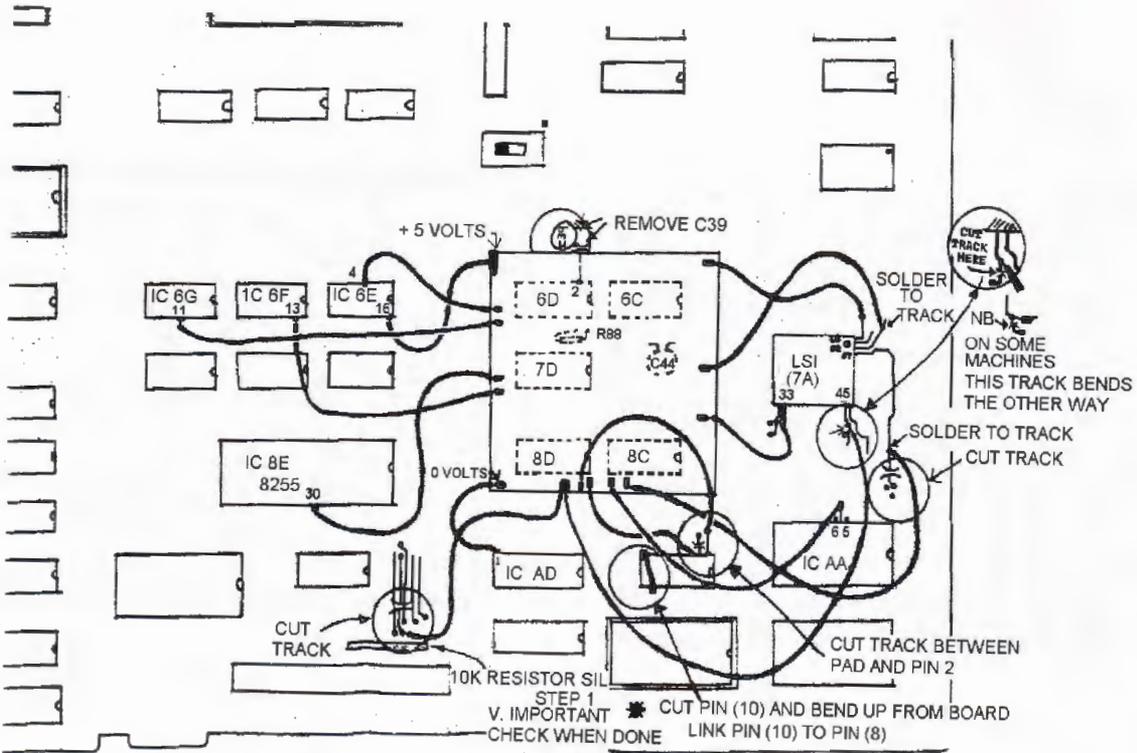
SHARP MZ-700 80-COLUMN PCB FUNCTIONS OF EXTERAL CONNECTIONS   (VIEW ON PARTS
                                                                   SIDE)

(NUMBERS IN BACKETS TO IC PINS)
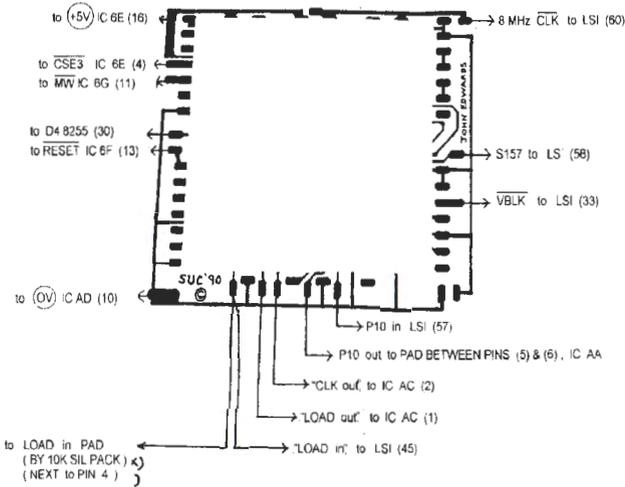
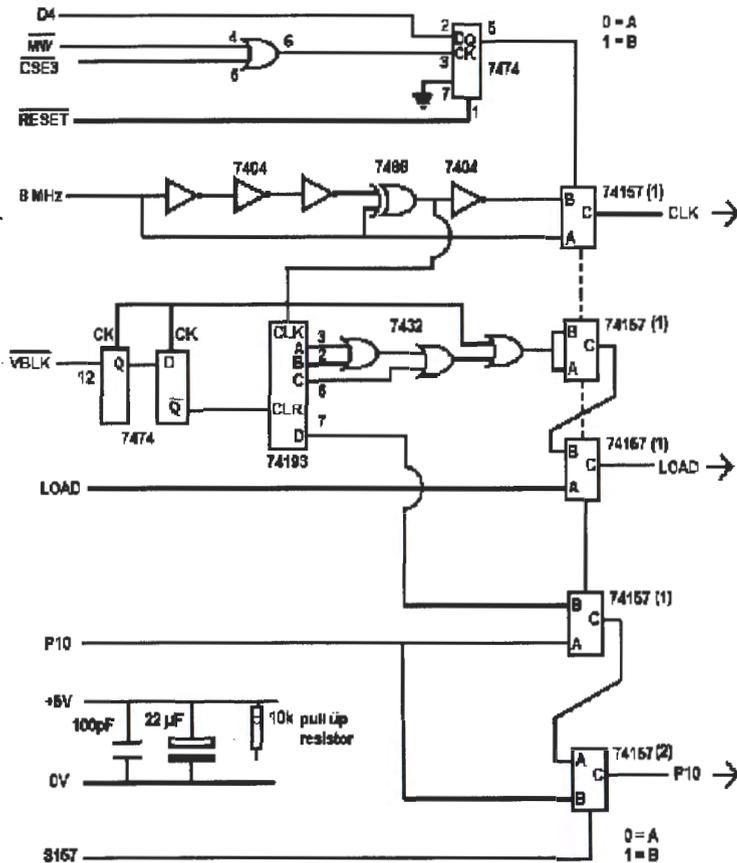PCB Layout showing chip placement, links and other components

SHARP MZ-700 80-COLUMN PCB - LAYOUT OF CONNECTIONS TO MAIN PCB
(CIRCLES INDICATE WHERE CUTS ARE TO BE MADE)
(COMPONENTS SHOWN DOTTED ARE ON MAIN PCB, UNDER 80-COLUMN PCB)
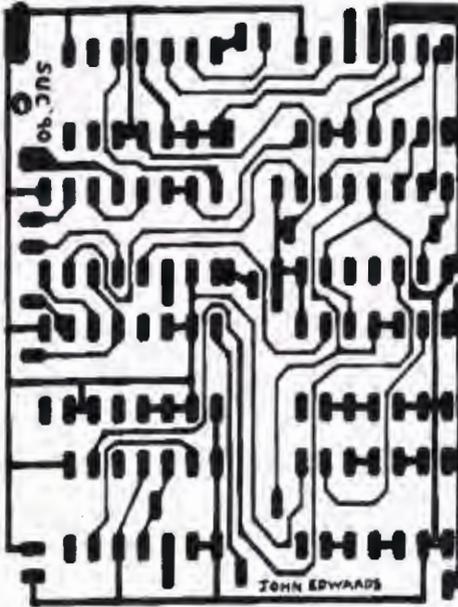
MZ-700 80 Column Kit

Schematic diagram version 1 1990

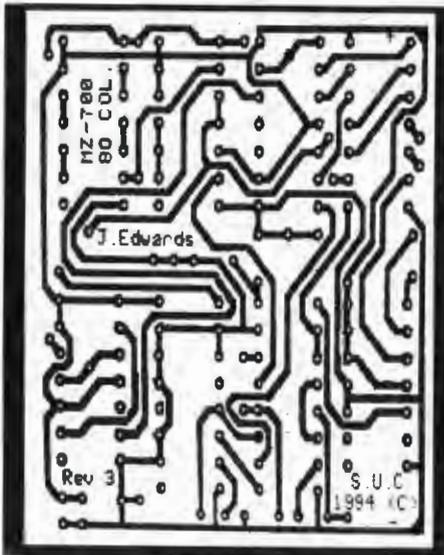MZ-700 80-COLUMN CURCUIT DIAGRAM 1990

PCB Art Work Version 1 1990

PCB Art Work Version 3 1994

Martin Lukasec informs me that the SHARP MZ-700 NOBOMI Unicard Mk3c is undergoing final testing.

Stan Gibbs has informed me that he requires good homes for his Sharp and other computer items because he is no longer able to access them due to ill health. List of items to follow.

What is the future of the Sharp Users Club?

The Club having lost its anchor man, helmsman and an instant source of Sharp knowledge. Maurice had an array of working Sharp computers, both hardware and software in his crowded specially built large computer room and the knowledge to where all things where. I have already said that I have collected most, if not all, of Maurice's Sharp memorabilia; tapes and disks are in boxes with labels like "Disks", "disks", and "more disks".

At the moment they are stored in not ideal conditions, on 48ft of racking and on 3 palettes in 2 bays of one of my brother's old pig units (out of the rain at least). I have not started to look at them yet till I know what is happening with the SUC. Sorting through the tapes and disks will take months, and where to store the hardware,   (29 computers, 15 monitors, and 11printers). Yes we did fill a Peugeot Boxer van.

I agreed with Maurice to take on the K library, a position which should have been mine in the first place, but Maurice took it on for me, and was also the ghost writer for my articles because I was busy working 12 hour days for a Japanese company; But which boxes contain the K material I do not know.

I don't know how many members of the Sharp Users Club still run Sharp computers,

(I have not switched on one of my MZs for at least 10 years), but I still support the Club.

The Club Secretary position is now vacant, and I am, temporarily, Chief Editor.

Is this to be the last issue of the Sharp Users Club magazine?

That decision rests with yourself and fellow members of the Club.

If you wish to be considered for the role of Secretary or Chief Editor for the Club, please contact me (John Edwards), see page 3 for contact details.

The views and opinions of all members, regarding the future existence and scope of the 'Sharp Users Club' would be most welcome and appreciated.

A final decision will be reached based on the feedback we receive in the coming weeks, so please respond as soon as possible.

We will all miss Maurice, more than we think.

John Edwards

Maurice (with pipe) and fellow members, manning the
Sharp Users Club stand at the PCW Annual Computer
Show held in the Barbican Exhibition Hall London
circa October 1983.

SHARP USERS CLUB