

Apricot Monitor connections

~~~~~

+16V Red ? Hsync Vsync

1 2 3 4 5

6 7 8 9

Earth Green Earth Blue

Parallel Centronics Printer Connectors

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Centronics

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<u>Strb</u>	D1	D2	D3	D4	D5	D6	D7	D8	<u>Ack</u>	Busy	PE	+5v 3k3	<u>AF</u>	NC	Sig 0v	Chas Gnd	NC	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
'-----'												<u>Init</u>	<u>Err</u>	Sig 0v	+5v NC	3k3	Sel	
Return												Signal		0v				

IBM 25 pin p

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|             |            |             |     |                 |    |    |    |    |            |      |    |            |
|-------------|------------|-------------|-----|-----------------|----|----|----|----|------------|------|----|------------|
| <u>Strb</u> | D1         | D2          | p3  | D4 <sup>p</sup> | D5 | D6 | D7 | D8 | <u>Ack</u> | Busy | PE | +5v<br>3k3 |
| 1           | 2          | 3           | 4   | 5               | 6  | 7  | 8  | 9  | 10         | 11   | 12 | 13         |
| 14          | 15         | 16          | 17  | 18              | 19 | 20 | 21 | 22 | 23         | 24   | 25 |            |
| <u>AF</u>   | <u>Err</u> | <u>Init</u> | Sel | '-----'         |    |    |    |    |            |      |    |            |
| Return      |            |             |     | Signal          |    | 0v |    |    |            |      |    |            |



IBM Monitor connections

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CGA	Gnd	Gnd	Red	Green	Blue
---	1	2	3	4	5
	6	7	8	9	
	Int	NC	HSync	VSync	

EGA	Gnd	SecR	R	G	B
---	1	2	3	4	5
	6	7	8	9	
	Int/ SecG	SecB	HSync	VSync	

REDIFON MONITOR D-Type INPUT PLUG

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|               |        |   |               |                  |
|---------------|--------|---|---------------|------------------|
|               |        | 1 | green/yellow. | Red.             |
| green         | 9      | 2 | grey/blue     | Green.           |
| brown         | 10     | 3 | white/red     | Blue.            |
| blue          | 11     | 4 | yellow/red    | Comp. Sync.      |
| purple        | 12     | 5 | purple/red    | Fast Blank.      |
| pink          | 13     | 6 | red/black     | Earth.           |
| Audio.        | white  | 7 | red/blue      | Comp. Video out. |
| Audio Screen. | yellow | 8 | grey/black    | Mute.            |

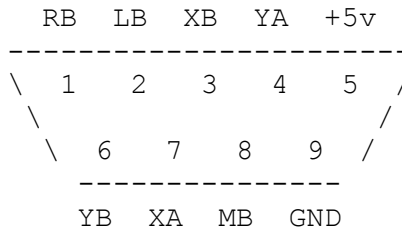
MOUSE CONNECTIONS

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D type Connections

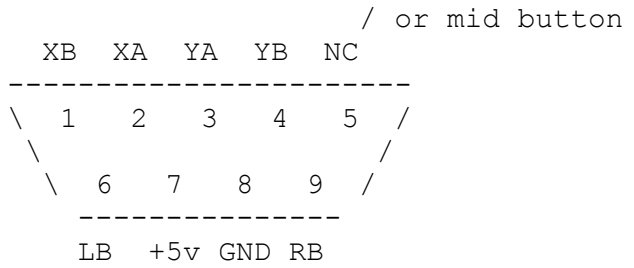
~~~~~

superQboard



p

Atari or Qimi

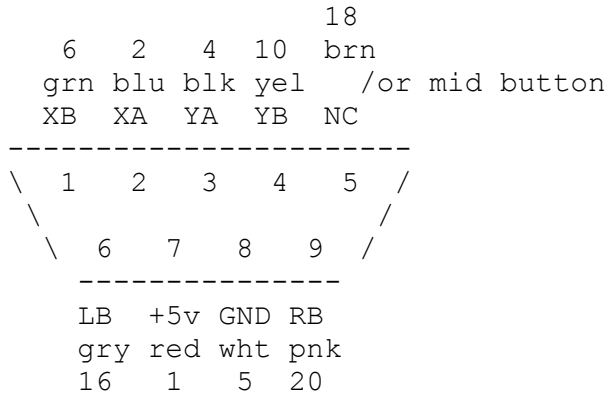


QIMI TO AMX(BBC)

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Atari or Qimi

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ONE PER DESK MONITOR CONNECTIONS

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15 Pin D type
 =====
 View looking into socket

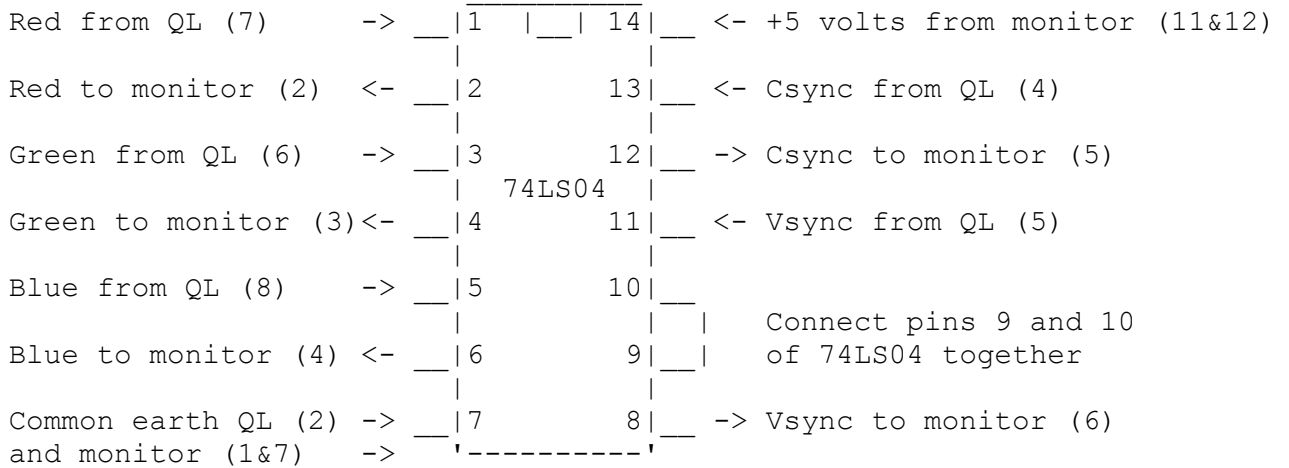
-5v	Earth	Vsync	Csync	Blue	Green	Red	Earth
(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
	(15)	(14)	(13)	(12)	(11)	(10)	(9)
			+12v	+5v	+5v		

QL monitor output 8 pin Din
 =====

		Red (7)		(6) Green
(7) Red		Video mono (3)	(8) Blue	(1) Video PAL
(6) Green	Invert			
(8) Blue		Vsync (5)	(4) Csync	
(4) Csync			(2) Earth	
(5) Vsync	Do not invert			

Circuit to buffer QL outputs and set up for OPD monitor

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QL Expansion Connector

=====

		a' -b.	
GND	1		GND
D3	2		D2
D4	3		D1
D5	4		D0
D6	5		ASL
D7	6		DSL
A19	7		R/WL
A18	8		DTACKL
A17	9		BGL
A16	10		BRL
CLK	11		A15
RED	12		RESETCPUL
A14	13		CSYNCL
A13	14		E
A12	15		VSYNCH
A11	16		VPAL
A10	17		GREEN
A9	18		BLUE
p A8	19		FC2
A7	20		FC1
p A6	21		FC0
A5	22		A0
A4	23		ROMOEH
A3	24		A1
DBGL	25		A2
SP2	26		SP3
DSMCL	27		IPLOL
SP1	28		BERRL
SP0	29		IPLIL
VP12	30		EXTINTL
VM12	31		VIN
VIN	32		VIN
		.--'	
		a	b

QL 64 Way Expansion Connector

=====

		D		R C		V p		R		E																								
		T		E S		S G		O		X																								
		R A		S Y		Y V R B		M		I B I T																								
		P E P I																																
G	A	D	D	C	B	B	A	E	N	N	P	E	L	F	F	F	O	S	L	R	L	N	V	V										
N	D	D	D	S	S	W	K	G	R	1	T	C	C	A	E	U	C	C	C	A	E	A	A	P	O	R	I	T	I	I				
D	2	1	0	L	L	L	L	L	L	5	L	L	E	H	L	N	E	2	1	0	0	H	1	2	3	L	L	L	L	N	p			
b																										b								
		1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3			
											0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	
a																										a								
G	D	D	D	D	D	A	A	A	A	C	R	A	A	A	A	A	A	A	A	A	A	A	A	D	S	D	S	S	V	V	V			
N	3	4	5	6	7	1	1	1	1	L	E	1	1	1	1	1	9	8	7	6	5	4	3	B	P	S	P	P	P	M	I			
D						9	8	7	6	K	D	4	3	2	1	0						G	2	M	1	0	1	1	N					
										C											L	C	2 2											
										P											L													

QL Expansion Connector

=====

	a	b
GND	1	GND
D3	2	D2
D4	3	D1
D5	4	D0
D6	5	ASL
D7	6	DSL
A19	7	R/WL
A18	8	DTACKL
A17	9	BGL
A16	10	BRL
CLK	11	A15
RED	12	RESETCPUL
A14	13	CSYNCL
A13	14	E
A12	15	VSYNCH
A11	16	VPAL
A10	17	GREEN
A9	18	BLUE
A8	19	FC2
A7	20	FC1
A6	21	FC0
A5	22	A0
A4	23	ROMOEH
A3	24	A1
DBGL	25	A2
SP2	26	SP3
DSMCL	27	IPLOL
SP1	28	BERRL
SP0	29	IPLIL
VP12	30	EXTINTL
VM12	31	VIN
VIN	32	VIN

QL 64 Way Expansion Connector

=====

	D T R A A D D C B B A E N																R C V S G O I B I T																E X
	R A S Y Y V R B M P E P I																																
G	A D D C B B A E N																N P E L F F F O S L R L N V V																
N	D D D S S W K G R 1 T C																C A E U C C C A E A A P O R I T I I																
D	2 1 0 L L L L L L 5 L L E H L N E 2 1 0 0 H 1 2 3 L L L L N N																																
b	-----																																b
	1 2 3 4 5 6 7 8 9 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 3 3 3																																
	0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2																																
a	-----																																a
	G D D D D D A A A A C R A A A A A A A A A A A D S D S S V V V																																
	N 3 4 5 6 7 1 1 1 1 L E 1 1 1 1 1 9 8 7 6 5 4 3 B P S P P P M I																																
	D 9 8 7 6 K D 4 3 2 1 0																G 2 M 1 0 1 1 N																
	C																L C 2 2																
	P																L																

REDIFON MONITOR D-Type INPUT PLUG

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|               |        |   |               |                  |
|---------------|--------|---|---------------|------------------|
|               |        | 1 | green/yellow. | Red.             |
| green         | 9      | 2 | grey/blue     | Green.           |
| brown         | 10     | 3 | white/red     | Blue.            |
| blue          | 11     | 4 | yellow/red    | Comp. Sync.      |
| purple        | 12     | 5 | purple/red    | Fast Blank.      |
| pink          | 13     | 6 | red/black     | Earth.           |
| Audio.        | white  | 7 | red/blue      | Comp. Video out. |
| Audio Screen. | yellow | 8 | grey/black    | Mute.            |

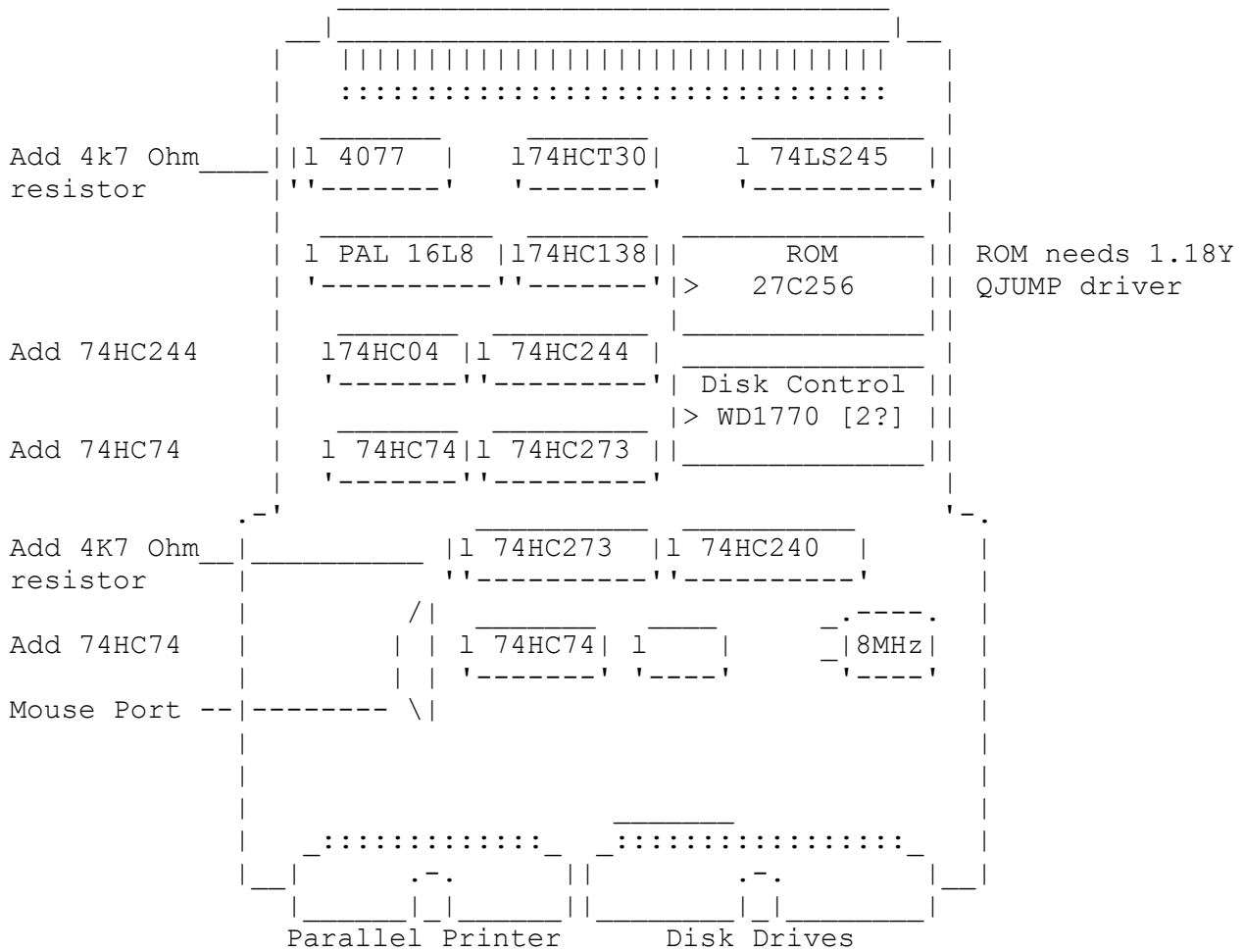
RS232 25 Pin D-Type Connector

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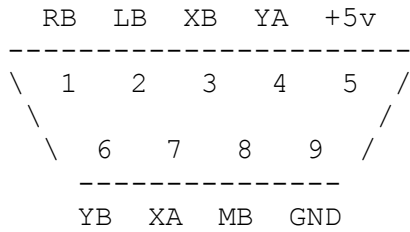
		1	PGND		1	CD	
		14		DSR	6		
		2	TD			2	RD
TxCLK	15	3	RD		7	RTS	
	16	4	RTS		8	CTS	
RxCLK	17	5	CTS		9	RI	
	p	6	DSR			5	SGND
	18	7	SGND				
	19	8	CD				
DTR	20	9	+12v				
	21	10	-12v				
RI	22	11					
	23	12					
	24	13					
	25						

Sandy Super Q Board Mouse [Issue 3]

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 Modifications to add Mouse Port
 ~~~~~



D type Connections superQboard



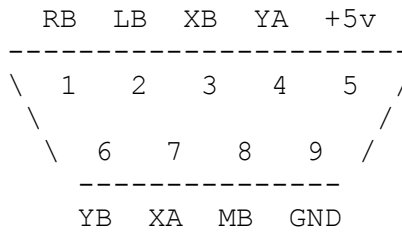
Atari or Qimi / or mid button



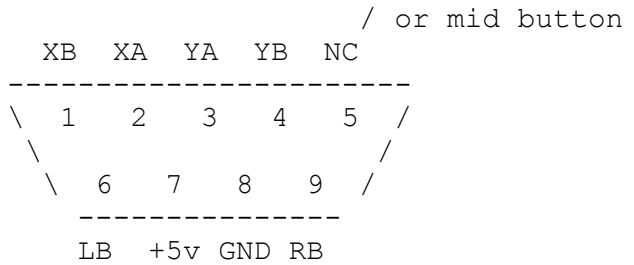
MOUSE CONNECTIONS

D type Connections  
 ~~~~~

superQboard

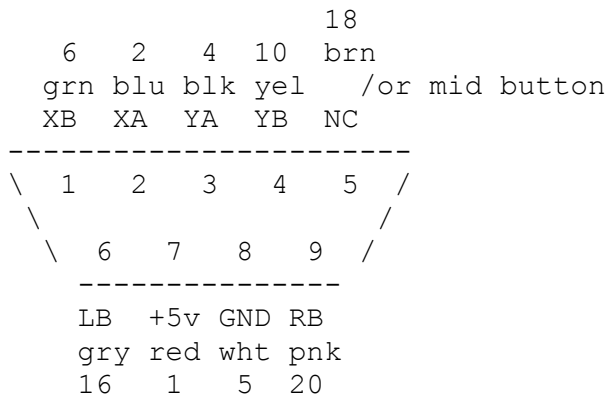


Atari or Qimi

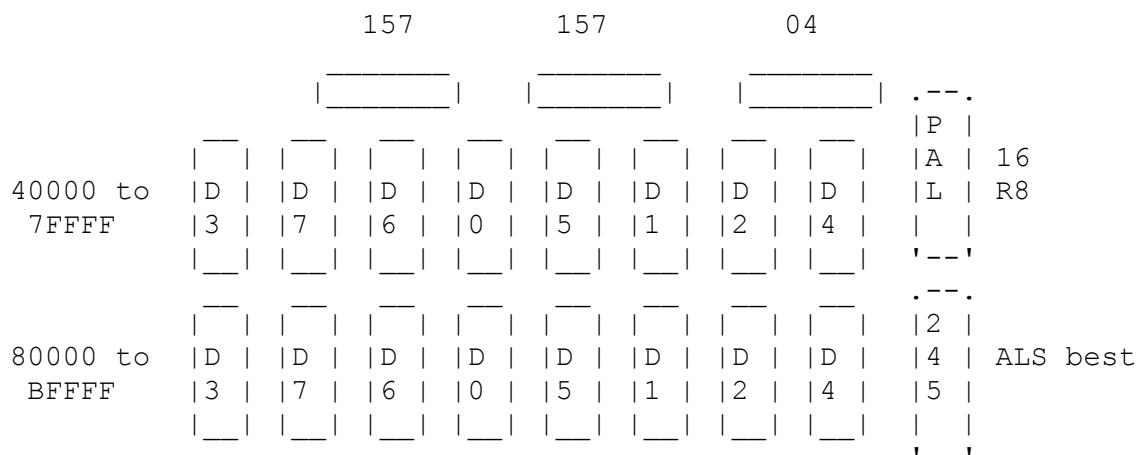


QIMI TO AMX
 ~~~~~

Atari or Qimi  
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Sandy superQboard pickyback memory



CONVERTING ISSUE 1 SUPER Q BOARD TO 256 K ROM

- 1) Cut tracks between pins 27 and 28 of ROM on both sides of board. NOTE: Difficult on upper surface because of socket. BEWARE! ROM faces in opposite direction to all other chips on board, and socket may not be marked!
- 2) Cut track on underside of board which goes to pin 14 of 74HC03 where it runs alongside pins 13 and 12.
- 3) Connect pin 28 of ROM (5v) to pin 14 of 74HC03.
- 4) Connect pin 27 of ROM to A14 line (pin 11 of TMS4500 is nearest).
- 5) Cut A14 line to 74LS266 pin 9 just beside pin 9 on upper side of board. Tricky due to tight packing of chips. (Too many elephants in a Mini!)
- 6) Join pins 8 and 9 of 74LS266.
- 7) Fit 27C256 ROM with Sandy code in lower 16K and TK2 in upper 16K.
- 8) SEND ROYALTY TO QJUMP IF YOU DON'T ALREADY HAVE TK2 FOR THE SAME MACHINE.

CONVERTING ISSUE 3 SUPER Q BOARD TO 512K ROM

- 1) Cut 5v line to pin 1 of ROM on upper surface of board.
- 2) Connect pin 1 of ROM to A15 line; B11 on expansion socket.
- 3) Cut line from A15 to pin 1 of 4077 quad exclusive nor.
- 4) Join pins 1 and 2 of 4077.
- 5) Fit 512K ROM, preferably in socket, with your own code in upper 32K.

Keith Mitchell Oct 1990.

Title: SuperQboard mouse GAL equations.  
 Rev: 2.0  
 Source: AKM.  
 Date: 17/2/92.

; Sandy superQboard Mouse Issue 3.

CHIP SQBmouse GAL16V8

;Conversion from PAL.

; PAL 16L8

|                     |    |    |                            |          |
|---------------------|----|----|----------------------------|----------|
| ; ASL               | 1  | 20 | Vcc                        |          |
| ; 4077 pin 3        | 2  | 19 | DTACKL Open collector      |          |
| ; A18               | 3  | 18 | 4077 pin 11(Used as Input) |          |
| ; A19               | 4  | 17 | 4077 pin 10(Used as Input) |          |
| ; Print Busy        | 5  | 16 | ROM EN L. (ROM pin 20)     | Outputs. |
| ;1770 PIN 28.INTERQ | 6  | 15 | NC                         |          |
| ;244 pin 2. ?Ms Int | 7  | 14 | EXTINTL Open collector     |          |
| ;244 pin 11.?Ms Int | 8  | 13 | NC                         |          |
| ; 273 pin 19.       | 9  | 12 | BUS EN L. (245 pin 19)     |          |
| ; Ground            | 10 | 11 | 273 pin 16 ?Disk interrupt |          |

|    |    |    |    |    |    |    |    |    |     |
|----|----|----|----|----|----|----|----|----|-----|
| 1  | 2  | 3  | 4  | 5  | NC | 7  | 8  | 9  | gnd |
| 11 | 12 | 13 | 14 | NC | 16 | 17 | 18 | 19 | vcc |

@UES SQBM

EQUATIONS

; Board select and DTACKL

; Pins 17 and 18 are feedback outputs used as inputs,  
 ; so the output buffers have to be set at high impedance.  
 ; Pin 16 feedback input is probably used to disable pin  
 ; 19 output when high, thus simulating an open collector  
 ; output on pin 19.

; Pin 19 is open collector DTACKL.  
 ; Pin 16 is ROM enable L.  
 ; Pin 12 is databus enable L.

/16 = 2 \* 3 \* 4 \* 17 \* 18  
 16.TRST = VCC

/12 = /1 \* /16  
 12.TRST = VCC

/19 = /16  
 19.TRST = /16

```
; Interrupt Control.

; Pin 14 is open collector EXTINTL.
; Pin 13 is not connected on board,
; and is probably used to disable
; pin 14 output when high.
; Pin 6 input is the interrupt request
; line from the disc controller, but does
; not seem to be used.

/13 = /5 * 11
      + 7 * 9
      + 8 * 9
13.TRST = VCC

/14 = /13
14.TRST = /13

; END.
```

## Adding a Mouse to an Issue 3 SuperQboard

~~~~~

I have now managed to add the extra bits to my Issue 3 super-Qboard to get the mouse working.

It needs two 74HC74s in the spare 14 pin spaces, and a 74HC244 in the 20 pin space. A 9 pin D type plug fits by the 74HC74 at the power supply end of the board, and a 4K7 ohm pull up resistor has to be fitted near the pin 1 end of the 4077 IC (it has no connection with the IC). The ICs fit in the same direction as all the others on the board, but some boards have extra holes at the ends of the ICs where decoupling capacitors have been left out, so the IC position should be checked with its power supply pin positions. A different version of the ROM is required, and I can provide this for a small fee for QJUMP's copyright. The latest version of the pointer interface software from QJUMP should be used, and not the ROM resident code in the superQboard. If this ROM is fitted without the mouse components present, the QL will 'freeze' on initialisation. The cure is to fit the 74HC74 at the power supply end of the board, or tie the 5 and 9 pin positions of this IC space to earth.

If you fit a board mounted plug you will need to rewire the Atari mouse socket to suit, as Sandy didn't use the same pinout as on the QIMI, but I can provide a copy of the connections. I rescrambled the lead to my plug so as to be compatible with my QIMI set up.

Keith Mitchell
14 Palmer Close
Storrington
Pulborough
West Sussex
RH20 3HN

Telephone: 0903) 742263.

TRUTH TABLES FOR PAL IN SUPERQBOARD Issue 1 & 2 512K RAM.

In the SuperQBoard the PAL pins 1 - 9 and 11 are inputs, pins 12 - 19 are outputs. Pin 10 is ground and pin 20 is +Vcc.

Here are the truth tables:

Output pin 12:

7	6	5	3	12	<-- PAL pin No.-->
0	0	0	0	0	
0	0	0	1	0	
0	0	1	0	1	
0	0	1	1	1	
0	1	0	0	0	
0	1	0	1	0	
0	1	1	0	1	
0	1	1	1	1	
1	0	0	0	0	
1	0	0	1	0	
1	0	1	0	1	
1	0	1	1	1	
1	1	0	0	0	
1	1	0	1	0	
1	1	1	0	1	
1	1	1	1	0	

Output pin 13:

7	6	3	2	13
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

Output pin 14:

7	6	5	3	14	<-- PAL pin No. -->
0	0	0	0	0	
0	0	0	1	0	
0	0	1	0	1	
0	0	1	1	1	
0	1	0	0	0	
0	1	0	1	0	
0	1	1	0	1	
0	1	1	1	1	
1	0	0	0	0	
1	0	0	1	0	
1	0	1	0	1	
1	0	1	1	1	
1	1	0	0	0	
1	1	0	1	0	
1	1	1	0	1	
1	1	1	1	0	

Output pin 15:

7	6	3	15
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

Output pin 16:

Output pin 17:

7	6	3	16	<-- PAL pin No. -->	11	9	4	1	17
0	0	0	0		0	0	0	0	0
0	0	1	0		0	0	0	1	0
0	1	0	1		0	0	1	0	0
0	1	1	1		0	0	1	1	0
1	0	0	1		0	1	0	0	0
1	0	1	1		0	1	0	1	0
1	1	0	0		0	1	1	0	0
1	1	1	1		0	1	1	1	1
					1	0	0	0	1
					1	0	0	1	1
					1	0	1	0	1
					1	0	1	1	0
					1	1	0	0	1
					1	1	0	1	1
					1	1	1	0	1
					1	1	1	1	1

Output pin 18:

Output pin 19:

8	7	6	18	<-- PAL pin No. -->	8	7	6	19
0	0	0	1		0	0	0	1
0	0	1	0		0	0	1	1
0	1	0	0		0	1	0	0
0	1	1	1		0	1	1	1
1	0	0	1		1	0	0	1
1	0	1	1		1	0	1	1
1	1	0	1		1	1	0	1
1	1	1	1		1	1	1	1

Output pin 14 is not connected anywhere in the board.
Output pin 12 is OPEN COLLECTOR.

TRUTH TABLES FOR SANDY SUPERQBOARD Issue 1 & 2 0K RAM

Only output pins 12 - 16 are used.

Output pin 12:

7	6	3	12	<-- PAL pin No. -->
0	0	0	1	
0	0	1	1	
0	1	0	1	
0	1	1	1	
1	0	0	1	
1	0	1	1	
1	1	0	1	
1	1	1	0	

Output pin 13:

7	6	3	2	13
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

Output pin 14:

7	6	3	14	<-- PAL pin No. -->
0	0	0	1	
0	0	1	1	
0	1	0	1	
0	1	1	1	
1	0	0	1	
1	0	1	1	
1	1	0	1	
1	1	1	0	

Output pin 15:

7	6	3	15
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

Output pin 16:

7	6	3	16	<-- PAL pin No.
0	0	0	0	
0	0	1	0	
0	1	0	0	
0	1	1	0	
1	0	0	0	
1	0	1	0	
1	1	0	0	
1	1	1	1	

Output pin 14 is not connected anywhere in the board.

Output pin 12 is OPEN COLLECTOR.

□ A K Mitchell Oct 1990.

Sandy superQboard Mouse Issue 3.

PAL 16L8

ASL	1	20	Vcc	
4077 pin 3	2	19	DTACKL Open collector	
A18	3	18	4077 pin 11(Used as Input)	
A19	4	17	4077 pin 10(Used as Input)	
Print Busy	5	16	ROM EN L. (ROM pin 20)	Outputs.
1770 PIN 28.INTERQ	6	15	NC	
244 pin 2. ?Ms Int	7	14	EXTINTL Open collector	
244 pin 11.?Ms Int	8	13	NC	
273 pin 19.	9	12	BUS EN L. (245 pin 19)	
Ground	10	11	273 pin 16 ?Disk interrupt	

TRUTH TABLES FOR SANDY SUPERQBOARD MOUSE PAL TYPE 16L8
Issue 3 board.

Board select and DTACKL

Pins 17 and 18 are feedback outputs used as inputs,
so the output buffers have to be set at high impedance.

Pin 16 feedback input is probably used to disable pin
19 output when high, thus simulating an open collector
output on pin 19.

Input Pin No.	Output Pin No.	
1 2 3 4 17 18	12 16 19	
0	1 1 1	Pin 19 is open collector DTACKL.
0 0 0 0 0 1	1 1 1	Pin 16 is ROM enable L.
0 0 0 0 1 0	1 1 1	Pin 12 is databus enable L.
0 0 0 0 1 1	1 1 1	
1	1 1 1	
0 0 0 1 0 0	1 1 1	
0 0 0 1 0 1	1 1 1	
0 0 0 1 1 0	1 1 1	
0 0 0 1 1 1	1 1 1	
2	1 1 1	
0 0 1 0 0 0	1 1 1	
0 0 1 0 0 1	1 1 1	
0 0 1 0 1 0	1 1 1	
0 0 1 0 1 1	1 1 1	
3	1 1 1	
0 0 1 1 0 0	1 1 1	
0 0 1 1 0 1	1 1 1	
0 0 1 1 1 0	1 1 1	
0 0 1 1 1 1	1 1 1	
4	1 1 1	
0 1 0 0 0 0	1 1 1	
0 1 0 0 0 1	1 1 1	
0 1 0 0 1 0	1 1 1	
0 1 0 0 1 1	1 1 1	
5	1 1 1	
0 1 0 1 0 0	1 1 1	
0 1 0 1 0 1	1 1 1	
0 1 0 1 1 0	1 1 1	
0 1 0 1 1 1	1 1 1	
6	1 1 1	
0 1 1 0 0 0	1 1 1	
0 1 1 0 0 1	1 1 1	

	0	1	1	0	1	0		1	1	1
	0	1	1	0	1	1		1	1	1
7	0	1	1	1	0	0		1	1	1
	0	1	1	1	0	1		1	1	1
	0	1	1	1	1	0		1	1	1
	0	1	1	1	1	1		0	0	0
8	1	0	0	0	0	0		1	1	1
	1	0	0	0	0	1		1	1	1
	1	0	0	0	1	0		1	1	1
	1	0	0	0	1	1		1	1	1
9	1	0	0	1	0	0		1	1	1
	1	0	0	1	0	1		1	1	1
	1	0	0	1	1	0		1	1	1
	1	0	0	1	1	1		1	1	1
A	1	0	1	0	0	0		1	1	1
	1	0	1	0	0	1		1	1	1
	1	0	1	0	1	0		1	1	1
	1	0	1	0	1	1		1	1	1
B	1	0	1	1	0	0		1	1	1
	1	0	1	1	0	1		1	1	1
	1	0	1	1	1	0		1	1	1
	1	0	1	1	1	1		1	1	1
C	1	1	0	0	0	0		1	1	1
	1	1	0	0	0	1		1	1	1
	1	1	0	0	1	0		1	1	1
	1	1	0	0	1	1		1	1	1
D	1	1	0	1	0	0		1	1	1
	1	1	0	1	0	1		1	1	1
	1	1	0	1	1	0		1	1	1
	1	1	0	1	1	1		1	1	1
E	1	1	1	0	0	0		1	1	1
	1	1	1	0	0	1		1	1	1
	1	1	1	0	1	0		1	1	1
	1	1	1	0	1	1		1	1	1
F	1	1	1	1	0	0		1	1	1
	1	1	1	1	0	1		1	1	1
	1	1	1	1	1	0		1	1	1
	1	1	1	1	1	1		1	0	0

Interrupt Control.

	Input Pin No.	Output Pin No.	
	5 6 7 8 9 11	13 & 14	
0	0 0 0 0 0 0	0	Pin 14 is open collector EXTINTL. Pin 13 is not connected on board, and is probably used to disable pin 14 output when high. Pin 6 input is the interrupt request line from the disc controller, but does not seem to be used.
	0 0 0 0 0 1	1	
	0 0 0 0 1 0	0	
	0 0 0 0 1 1	0	
1	0 0 0 1 0 0	1	
	0 0 0 1 0 1	0	
	0 0 0 1 1 0	0	
	0 0 0 1 1 1	0	
2	0 0 1 0 0 0	1	
	0 0 1 0 0 1	0	
	0 0 1 0 1 0	0	
	0 0 1 0 1 1	0	
3	0 0 1 1 0 0	1	

