Qty	Name/Value	Description	Vendor	Part Number	Part ID
1	1088 XEL PCB	4-Layer, **2 mm** Board Thickness (**MANDATORY**)	EasyEDA or ALLPCB	Version 1.1	Upload Gerber Files to Website
1	PSU	AC/DC Wall Mount Adapter 5V 10W	Digi-Key	102-4136-ND	Accessory – External to Motherboard
Capacitors					
1	22 pF	Capacitor Ceramic 50V Radial	Digi-Key	BC1034CT-ND	C44
1	56 pF	Capacitor Ceramic 50V Radial	Digi-Key	BC1039CT-ND	C45
1	68 pF	Capacitor Ceramic 50V Radial	Digi-Key	445-4724-ND	C39
1	220 pF	Capacitor Ceramic 50V Radial	Digi-Key	BC2672CT-ND	C38
1	820 pF	Capacitor Ceramic 50V Radial	Digi-Key	BC2693CT-ND	C42
2	.001uF (1000 pF)	Capacitor Ceramic 100V Radial	Digi-Key	445-2622-ND	C36,C37
4	0.047uF	Capacitor Ceramic 50V Radial	Digi-Key	399-4371-ND	C47,C48,C49,C50
1	.01uf (10000 pF)	Capacitor Ceramic 50V Radial	Digi-Key	399-4206-ND	C5
30	0.1 uF	Capacitor Ceramic 50V Radial	Digi-Key	399-9870-1-ND	C4,C10-C12,C14-C35,C40,C41,C43,C46
2	1 uF	Capacitor ALUM 50V Radial (1.5 pitch x 4mm)	Digi-Key	493-10286-1-ND	C6,C7
3	10 uF	Capacitor ALUM 16V Radial (1.5 pitch x 4mm)	Digi-Key	P966-ND	C2,C8,C9
1	330 uF	Capacitor ALUM 10V Radial (3.5 pitch x 8mm)	Digi-Key	1189-2167-ND	C1
1	1000 uF	Capacitor ALUM 6.3V Radial (3.5 pitch x 8mm)	Digi-Key	P5509-ND	C3
Resistors (individual)					Alternate for C11, C12, C14, C15, C16, C17 under Pokey (U5): Digi-Key 1109PHCT-ND
1	27Ω	Resistor 1/4W 5% Axial	Digi-Key	27QBK-ND	R35
1	75Ω	Resistor 1/4W 5% Axial	Digi-Key	75QBK-ND	R48
2	100Ω	Resistor 1/4W 5% Axial	Digi-Key	100QBK-ND	R36,R37
1	150Ω	Resistor 1/4W 5% Axial	Digi-Key	150QBK-ND	R49
3	180Ω	Resistor 1/4W 5% Axial	Digi-Key	180QBK-ND	R10,R46,R47
3	220Ω	Resistor 1/4W 5% Axial	Digi-Key	220QBK-ND	R11,R12,R38
8	390Ω	Resistor 1/4W 5% Axial	Digi-Key	390QBK-ND	R6,R7,R9,R29,R42,R45,R51,R52
1	430Ω	Resistor 1/4W 5% Axial	Digi-Key	430QBK-ND	R39
1	470Ω	Resistor 1/4W 5% Axial	Digi-Key	470QBK-ND	R33
1	680Ω	Resistor 1/4W 5% Axial	Digi-Key	680QBK-ND	R27
10	1K	Resistor 1/4W 5% Axial	Digi-Key	1.0KQBK-ND	R2,R16,R18,R19,R21-R23,R26,R30,R50
1	1.5K	Resistor 1/4W 5% Axial	Digi-Key	1.5KQBK-ND	R40
7	3.3K	Resistor 1/4W 5% Axial	Digi-Key	3.3KQBK-ND	R8,R17,R20,R24,R25,R43,R44
2	4.7K	Resistor 1/4W 5% Axial	Digi-Key	4.7KQBK-ND	R1,R34
1	6.8K	Resistor 1/4W 5% Axial	Digi-Key	6.8KQBK-ND	R32
4	10K	Resistor 1/4W 5% Axial	Digi-Key	10KQBK-ND	R3,R4,R5,R31
1	33K	Resistor 1/4W 5% Axial	Digi-Key	33KQBK-ND	R28
1	100K	Resistor 1/4W 5% Axial	Digi-Key	100KQBK-ND	R13
2	470K	Resistor 1/4W 5% Axial	Digi-Key	470KQBK-ND	R14,R15
1	0.5M	Trimmer Potentiometer 0.2W PC PIN	Digi-Key	3319P-1-504-ND	R41
Resistors (networks)					
1	100Ω	Resistor Network 8 RES Isolated 16DIP	Digi-Key	4116R-1-101LF-ND	RN1
1	220Ω	Resistor Network 8 RES Isolated 16DIP	Digi-Key	4116R-1-221LF-ND	RN5
1	1K	Resistor Network 5 RES Bussed 6SIP	Digi-Key	4606X-1-102LF-ND	RN8

Qty	Name/Value	Description	Vendor	Part Number	Part ID
1	1.8K	Resistor Network 8 RES Isolated 16DIP	Digi-Key	4116R-1-182LF-ND	RN6
1	3.3K	Resistor Network 4 RES Bussed 5SIP	Digi-Key	4605X-101-332LF-ND	RN9
1	3.3K	Resistor Network 5 RES Bussed 6SIP	Digi-Key	4606X-1-332LF-ND	RN7
1	4.7K	Resistor Network 7 RES Bussed 8SIP	Digi-Key	987-1252-ND	RN2
1	4.7K	Resistor Network 8 RES Bussed 9SIP	Digi-Key	4609X-101-472LF-ND	RN10
2	100K	Resistor Network 3 RES Isolated 6SIP	Digi-Key	4606X-2-104LF-ND	RN3,RN4
Inductors					
1	0.1 uH (100 nH)	Fixed Inductor 1.79A 25mohm	Digi-Key	M10079-ND or DN42075-ND	L2
1	1.5 uH	Fixed Inductor 3.1A 20mohm	Digi-Key	5300-03-RC-ND	L3
1	6.8 uH	Fixed Inductor 1.3A 29mohm	Digi-Key	AIUR-16-6R8K-ND	L1
Semiconductors					
3	1N914	Diode 100V 200ma DO35	Digi-Key	1N914BCT-ND	D1,D2,D3
7	PN2222	Transistor NPN 40V 1A TO-92	Digi-Key	PN2222AD26ZCT-ND	Q2,Q3,Q4,Q6,Q9,Q10,Q11
3	PN2907	Transistor PNP 60V 0.8A TO-92	Digi-Key	PN2907ABUFS-ND	Q5,Q7,Q8
1	NDP6020P	MosFet P-CH 20V 24A TO-220	Digi-Key	NDP6020P-ND	Q1
1	LED (+5VSB indicator)	LED (T1) Yellow Diffused 3MM Round	Digi-Key	160-1145-ND	D5
1	LED (ON indicator)	LED (T1) Green Diffused 3MM Round	Digi-Key	160-1142-ND	D4
Integrated Circuits					
1	SALLY	Atari Custom 6502 CPU	Best or B&C	CO14806	U15
1	ANTIC	Atari Display List Co-Processor	Best or B&C	See Note[1]	U16
1	GTIA	Atari Television Interface Adapter	Best or B&C	See Note[2]	U17
2	POKEY	Atari Pots, Keyboard, SIO	Best or B&C	C012294	U5,U6
1	PIA (R6520)	Atari Peripheral Interface	Best or B&C	C014795	U8
1	74HCT00	Quad 2-Input NAND Gate	Digi-Key	296-1603-5-ND	U12
1	74F08	Quad 2-Input AND Gate (HIGH-SPEED)	Digi-Key	296-3543-5-ND	U11
1	74HCT08	Quad 2-Input AND Gate	Digi-Key	296-1606-5-ND	U18
1	74HCT138	3-8 Line Decoder/DeMux	Digi-Key	296-1608-5-ND	U13
1	74HCT4053	Triple 2x1 Mux/DeMux	Digi-Key	296-2121-5-ND	U9 (74HC4053 substitute: 296-9219-5-ND)
1	74HCT74	Dual D-TYPE Positive Trigger Latch	Digi-Key	296-1625-5-ND	U20
1	LM555	Timer	Digi-Key	LM555CNFS-ND	U4
1	PIC12F1571 (See Note[3])	IC MCU 8BIT 1.75KB FLASH 8DIP	Digi-Key	PIC12F1571-I/P-ND	U19
2	PIC16F1847 (See Note[3])	IC MCU 8BIT 14KB FLASH 18DIP	Digi-Key	PIC16F1847-I/P-ND	U7,U10
1	UM61512AK-15	64K x 8 CMOS Static RAM DIP-32	eBay	UM61512AK-15	U14
Connectors					
1	PWR Jack	Coaxial Power Jack 2 x 5.5 mm	Digi-Key	CP-202A-ND	J2
1	**Standard** SIO Jack	Atari Serial Input Output Jack	?	?	J6
1	**Optional** SIO Jack (S-Drive)	D-Sub Male 15-pos R/A .318" PCB Jack	Digi-Key	AE10976-ND or 18-15ME-ND	J7
1	Stereo Audio Out Jack	3.5mm Stereo R/A Jack (35RAPC4BVN4)	Digi-Key	SC1463-ND	J8
1	RGB Video Out Jack	DIN 13 R/A Jack	Digi-Key	CP-2313-ND	J9

Qty	Name/Value	Description	Vendor	Part Number	Part ID
1	CVSB & S-Video Out Jack	Stacked R/A MDIN-4 & RCA	eBay (arihavelectronics)	2PJ-AV18-001	J10
1	PS2 Keyboard & Mouse Jack	Stacked R/A MDIN-6	eBay	1734021-4	J11
1	CART	0.1” 30-pos Card Edge Connector	Morlinkom Centronic	ECS30SB1A1-B (240-30)	J13a (Alternate: Digi-Key A31715-ND)
1	ECI	0.1” 14-pos Card Edge Connector	Morlinkom Centronic	ECS14SB1A1-B (240-14)	J13b

Headers

0.03	SYNC	0.1” SIL 1-pin Male Header	Digi-Key	S1011EC-40-ND	J27
0.15	STEREO & VGATE Led, OSC Select	0.1” SIL 2-pin Male Header	Digi-Key	S1011EC-40-ND	J12, J19, J20
3	5V ACC-PWR	0.1” SIL 2-pin Latched Male Header	Digi-Key	WM2700-ND	J22,J23,J24
1	PSU	0.1” SIL 3-pin Latched Male Header	Digi-Key	WM2701-ND	J1
1	SIO-AUX	0.1” SIL 5-pin Latched Male Header	Digi-Key	WM2703-ND	J5
0.08	PAL/NTSC Select	0.1” SIL 3-pin Male Header	Digi-Key	S1011EC-40-ND	J21
0.38	AUD-AUX, PS2-AUX, VID-AUX	0.1” SIL 5-pin Male Header	Digi-Key	S1011EC-40-ND	J25,J26,J28
0.18	MOUSE SELECT	0.1” SIL 7-pin Male Header	Digi-Key	S1011EC-40-ND	J14
0.20	PWR CTRL	0.1” SIL 8-pin Male Header	Digi-Key	S1011EC-40-ND	J3
0.08	SIO2PC-USB Handshake Select	0.1” DIL 3+3 Male Header (un-shrouded)	Digi-Key	S2011EC-40-ND	J4
0.13	RGB-THRU	0.1” DIL 5+5 Male Header (un-shrouded)	Digi-Key	S2011EC-40-ND	J18
2	JOY1, JOY2	0.1” DIL 5+5 Box Header	Digi-Key	1175-1609-ND	J15, J16
1	MPBI	0.1” DIL 17+17 Male Box Header	Phoenix Enterprises	HWS1945	J17
3	2-pin Jumper Block	0.1” Jumper Shorting Gold Flash	Digi-Key	S9001-ND	J4,J20,J21

1	**SIO2PC-USB MODULE**	FTDI Break-Out Board	Digi-Key (SparkFun)	BOB-12731	U1
↳	Serial Port Headers	0.1” SIL 9-Pin (2 each) Break-Away Male Header Note: solder both sides (XEL and FTDI side)	Digi-Key	S1011EC-40-ND QTY 0.45	
1	**U1MB MODULE**	1 MB Ram, SDX, RT8, Multiple OS & Languages	Lotharek	U1MB w/Vert Headers	U2
↳	Control Port Header	0.1” DIL 5+5 Tall Female Header	Digi-Key (SparkFun)	1568-1462-ND PRT-14017 QTY 2	Buy two of the SparkFun Headers to make the 3 required individual connectors to mate with the U1MB.
↳	MMU Port Header	0.1” DIL 10+10 Tall Female Header			
↳	OSROM Port Header	0.1” DIL 15+15 Tall Female Header			
1	**UAV MODULE**	Ultra Video Daughter Board (S-Video & CVSB)	Bryan	UAV w/Vert Headers	U3
1	**PRIMARY CLOCK CRYSTAL**				X1 (socketed --- 3 pos of: 952-2538-ND)
↳	NTSC	3.579545Mhz	Digi-Key	X1085-ND	Choose crystal to match desired TV standard (NTSC or PAL).
↳	PAL	3.546894Mhz	Best	CO16112	
1	PAL Color Burst Crystal	4.433618Mhz	Digi-Key	X1047-ND	X2 (soldered)

IC Sockets

2	8-pin IC socket	0.3 width, dual wipe, IC socket	Digi-Key / Jameco	AE9986-ND / 112206	U4,U19
4	14-pin IC socket	0.3 width, dual wipe, IC socket	Digi-Key / Jameco	AE9989-ND / 112214	U11,U12,U18,U20
2	16-pin IC socket	0.3 width, dual wipe, IC socket	Digi-Key / Jameco	AE9992-ND / 112222	U9,U13
2	18-pin IC socket	0.3 width, dual wipe, IC socket	Digi-Key / Jameco	AE9995-ND / 112231	U7,U10
1	32-pin IC socket	0.3 width, dual wipe, IC socket	Jameco / Phoenix Ent	137621 / HWS10030	U14
7	40-pin IC socket	0.6 width, machined pin, IC socket	Digi-Key / Jameco	AE10018-ND / 41136	U5,U6(x2),U8,U15,U16,U17
1	16-pin IC socket	0.3 width, machined pin, IC socket	Digi-Key / Jameco	AE10013-ND / 37402	U3 (Use 6 pos of: 952-2538-ND for SIL)

Note[1] NTSC ANTIC C012296 or C021697
PAL ANTIC C014887 or C021698

Note[2] NTSC GTIA C014805
PAL GTIA C014889

Note[3] Requires programming of chip prior to use in order to become TK-II, Mousetari, or Vgate.
Firmware available at: www.AtariBits.com Requires TK-II OS V2.0 or Later Firmware

Board Assembly Notes

It is assumed that the assembler of this board is at an expert level concerning soldering skills, with previous board assembly experience, and has a good foundation in electronic trouble-shooting. This is not a project meant to be taken on by an amateur.

Order of assembly

- All axial components (individual resistors/diodes)
- All resistor networks
- All non-electrolytic capacitors
- All transistors and LED's
- IC socket U7
- All other IC sockets
- All electrolytic capacitors
- MosFET Q1
- Crystal X2
- All headers and connectors

Ultimate 1 Meg and UAV Installation

When installing the extra-tall female headers for the Ultimate 1 Meg (U1MB) board, it is essential that they stay perpendicular to the motherboard. The best way to do that is to first mount them to U1MB, and then as an assembly, stuff and solder that into the board. A similar approach should be taken when installing the precision machine-pin sockets for the UAV.

Edge Card Connector Installation

The CART (J13a) and ECI (J13b) edge card connectors need to be aligned with each other. The best way to do that is to plug in a PBI device, and then stuff that as an assembly into the motherboard and solder the connector pins. In the absence of a PBI device, centering each connector in the box outline shown on the silkscreen will also maintain proper alignment.

BOB-12731 FTDI (SIO2PC) Installation

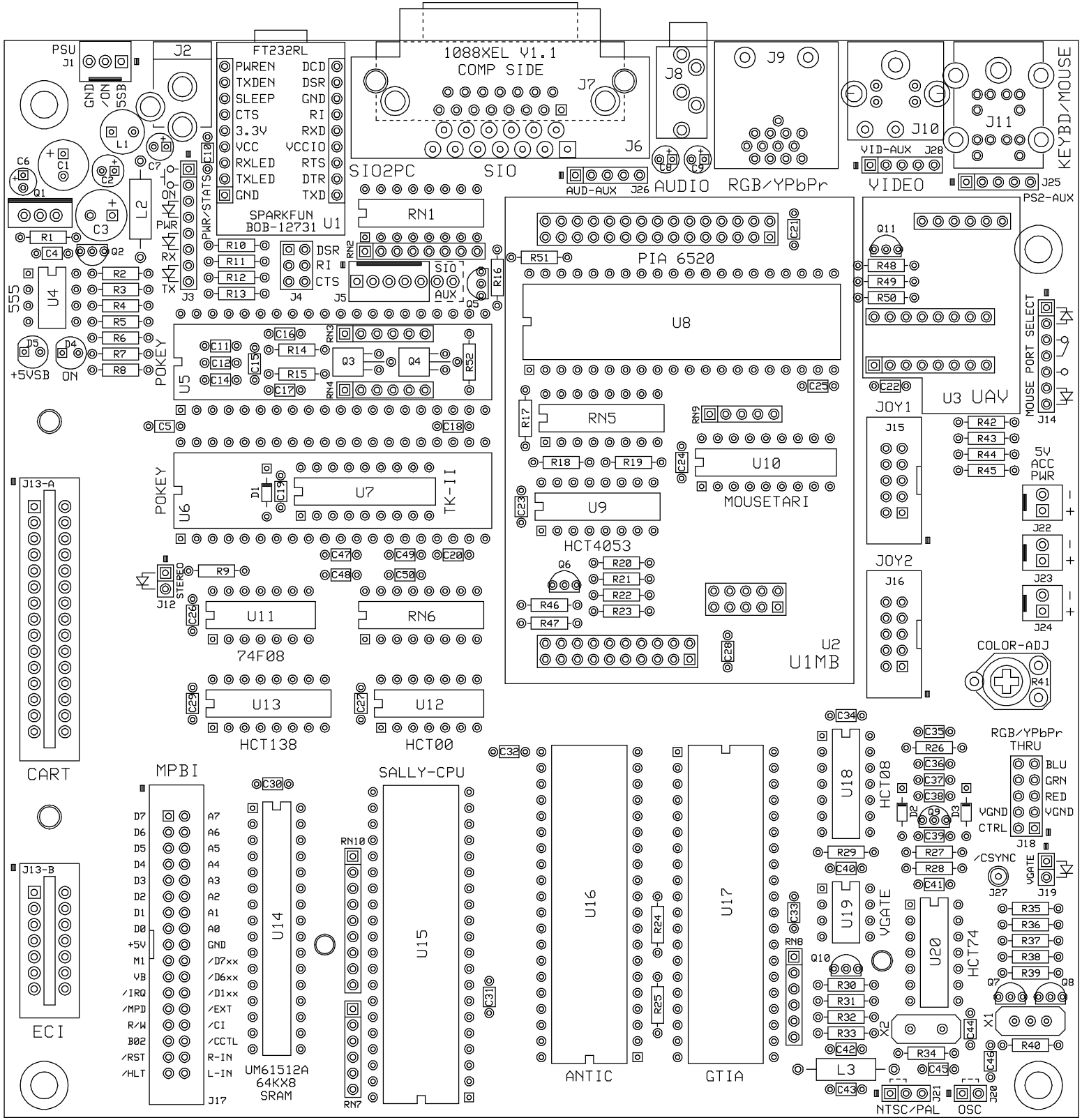
When installing the BOB-12731 FTDI break-out board, it will require two 9 pin 0.1" male headers. These will get soldered to both the BOB board as well as into the motherboard. It is best to do this as a complete assembly by dropping the headers into the motherboard, and then sliding the BOB board on top prior to doing any soldering. It is also recommended that the the entire assembly be pushed back towards the rear of the motherboard to take up any slack in the pad holes before executing the soldering process.

Nested Components – Inner Area under both Pokey Chips

Nested transistors Q3 and Q4 have their leads bent at a 90 degree angle so that the flat part of the plastic body sits flush against the motherboard. Other nested components that sit inside either Pokey socket need to be kept to as low of a profile as possible to allow the Pokey to be plugged in, while still clearing the tops of the inner components. Pokey U6 will need one extra precision socket stacked on top to allow clearance for the TK-II programmed PIC chip destined to be plugged in underneath. All 40 pin sockets associated with the Pokey chips need to have the plastic cross bars removed prior to installation (use sharp diagonal cutters to snip them flush to the inside of the plastic socket pin carrier.

Rear Connector Installation

Since uniformity is especially important concerning all rear facing connectors due to future alignment of the connector's access holes with a rear bezel plate (if installed), special attention must be paid to insure that these connectors are completely flush with the motherboard prior to soldering.


1088XEL V1.1
COMP SIDE
PSU
J1
J2
GND
/ON
5SB
L1
C1
C2
C3
C6
C7
C10
Q1
Q2
R1
C4
555
U4
R2
R3
R4
R5
R6
R7
R8
D5
D4
+5VSB
ON
FT232RL
PWREN
TXDEN
SLEEP
CTS
3.3V
VCC
RXLED
TXLED
GND
DCD
DSR
GND
RI
RXD
VCCIO
RTS
DTR
TXD
SPARKFUN
BOB-12731 U1
PWR/STATS
RX
TX
J3
R10
R11
R12
R13
DSR
RI
CTS
J4
J5
SIO
AUX
SIO2PC
SIO
J6
J7
J8
J9
AUDIO
RGB/YPbPr
AUD-AUX J26
VID-AUX J28
VIDEO
J10
J11
KEYBD/MOUSE
J25
PS2-AUX
RN1
RN2
R16
C5
C18
POKEY
U5
C11
C12
C13
C14
C16
C17
R14
R15
RN3
RN4
Q3
Q4
R52
C8
C9
PIA 6520
U8
R51
C21
C25
R17
RN5
R18
R19
U9
HCT4053
RN9
U10
MOUSETARI
C23
C24
Q6
R20
R21
R22
R23
R46
R47
C28
U2
U1MB
Q11
R48
R49
R50
C22
U3 UAY
JOY1
J15
JOY2
J16
R42
R43
R44
R45
MOUSE PORT SELECT
J14
5V
ACC
PWR
J22
J23
J24
COLOR-ADJ
R41
J13-A
CART
J13-B
ECI
POKEY
U6
D1
C19
U7
TK-II
C47
C48
C49
C50
C20
R9
STEREO
J12
C26
U11
74F08
RN6
C29
U13
HCT138
C27
U12
HCT00
MPBI
D7
D6
D5
D4
D3
D2
D1
D0
+5V
M1
VB
/IRQ
/MPD
R/W
B02
/RST
/HLT
A7
A6
A5
A4
A3
A2
A1
A0
GND
/D7xx
/D6xx
/D1xx
/EXT
/CI
/CCTL
R-IN
L-IN
J17
C30
U14
UM61512A
64KX8
SRAM
SALLY-CPU
RN10
U15
RN7
C31
C32
U16
ANTIC
U17
GTIA
C33
RN8
R24
R25
U18
HCT08
C34
C35
R26
C36
C37
C38
C39
R29
C40
R27
R28
C41
U19
VGATE
U20
HCT74
Q10
R30
R31
R32
R33
X2
C44
C42
R34
C45
L3
C43
C46
X1
R40
Q7
Q8
R35
R36
R37
R38
R39
NTSC/PAL
J21
OSC
J20
RGB/YPbPr
THRU
BLU
GRN
RED
YGND
CTRL
YGND
J18
/CSYNC
VGATE
J27
J19