XBOX 360 Motherboard Headers and Connector

Version 1.4

Disclaimer

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I do not support piracy or the illegal copying of copyright material. I'm only seeking the ability to run custom software and push the hardware to it's maximum potential. Remember that a profitable game industry will guarantee us all amazing products for the future.

If you notice something incorrect or have any comment, please feel free to contact me.

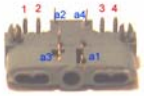
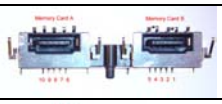
Speedy22

xbox.360@rogers.com

Introduction

Most of the information was based on the top and bottom layers of a dechipped 360 motherboard and decapped chips, I will update the information once I gain full knowledge of the inner layers of the motherboard.
For reference, I have also included some information I have gathered from images of Development Hardware and XDK hardware found on the net.
Please double-check my information, I am human and I do make mistakes. I have also attempted to give credit where credit was due. If you find any errors or omissions, please let me know so that I can correct it on future versions.
Like most, I am doing this as a hobby in my spare time, so I will do my best to keep the information up to date but I can not make any guarantees.

I am currently looking for a supplier/manufacturer for the following components;

	**Controller Headset Port** Both the Male and Female Connector.
	**Memory Card Port** Male Connector (On Memory Card)
	**RF Module Port** Male Connector (On RF Module)
	**Hard Drive Port** Male Connector (On Hard Drive)

My current employment position will be changing in the near future, so I will be open for new opportunities. I am a Canadian citizen living in Waterloo, ON, Canada with a background in Electronics Engineering and Management. Feel free to contact me for more details.

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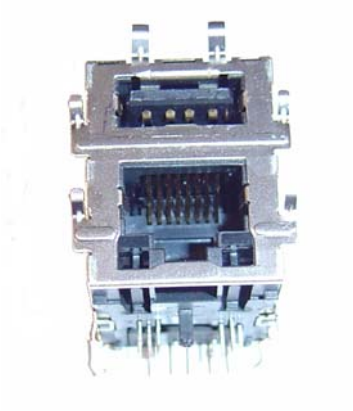
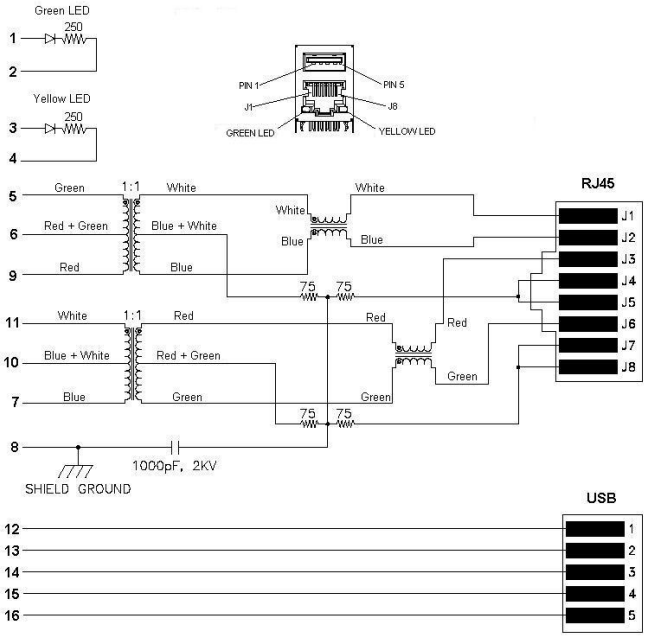
Table of Content

Detailed Motherboard Block Diagram

Not in this Public Release

J1A1
10/100 Base-T Ethernet and USB Port





1	Green LED	**9**	**RD+**
2	Green LED	**10**	**CT**
3	Yellow LED	**11**	**RD-**
4	Yellow LED	**12**	+5 VDC
5	**TD+**	**13**	Data -
6	**CT**	**14**	Data +
7	**TD-**	**15**	GND
8	Shield GND	**16**	**Pin 9 J6G1**

Manufacturer: Bel Stewart Connectors
Product Name and #: Magjack SI-80039-F

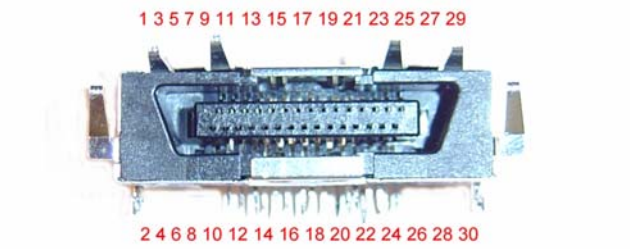
Notes:

Green and Yellow LEDs are not present, but all the connection are available on the 360 Motherboard. (Version 11)

LEDs are present on the 360's XDK motherboard. (Version 9)

Pin 16 connects to Pin 9 of J6G1 the RF Module.

J2A1
Video and Audio Port



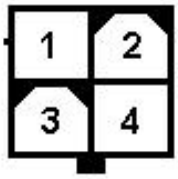
1	Red Gnd	2	Green Ground
3	Red (Cr in HDTV mode)	4	Green (Y in HDTV mode)
5	Composite Gnd	6	Blue Ground
7	Composite (Sync in RGB mode)	8	Blue (Cb in HDTV mode)
9	H-sync Gnd	10	V-sync Gnd
11	H-sync (VGA Mode)	12	V-sync (VGA Mode)
13	Audio-R Gnd	14	Audio-L Gnd
15	Audio-R	16	Audio-L
17	Switching voltage (for SCART pin-8)	18	CBL-ID1
19	Blanking Signal (for SCART pin-16)	20	CBL-ID1.1
21	Unknown	22	CBL-ID2
23	Unknown	24	CBL-ID2.1
25	Optical - Audio (SPDIF)	26	CBL-ID3
27	Optical - Gnd (SPDIF)	28	CBL-ID3.1
29	Optical - +5V	30	See J2B1 or J8C1

Setting Cable ID:
ID1-1.1 = VGA mode enabled
ID2-2.1 and ID3-3.1 = RGB (SCART) mode enabled
ID3-3.1 = HDTV (Y/Cb/Cr) mode enabled
ID2-2.1 = Composite (TV) mode enabled

Manufacturer: Unknown
Product: Unkown

Note:
Source: www.free60.org (corrected Pin#s and added pin 30)

J3A1
Fan Connector



Female Connector
(360 Motherboard)

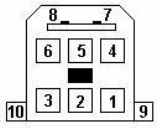
Male Connector
(Fans)

1	GND	Blue
2	V+	Brown
3	GND	Black
4	V+	Red

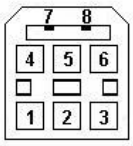
Manufacturer: Foxconn
Product:

Note:
V+ Starts at +5.4 VDC and climbs to +11.8 VDC within 30 sec of power on.

J9A1
DC Power Port



Female Connector
(360 Motherboard)



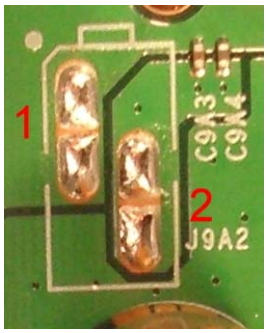
Male Connector
(Power Supply)

1	GND	6	+12 VDC
2	GND	7	Power Enable
3	GND	8	+5 VDC (Standby)
4	+12 VDC	9	Shield (GND)
5	+12 VDC	10	Shield (GND)

Note:
Pin 7 Turns Pins 4, 5, 6 on when it is tied to ground.

Power Supply is difficult to open up. I would not recommend it.
1) Remove rubber feet (they are glued in place). This will probably destroy them.
2) Dig out all the glue, including the glue in the head of the philips screws.
3) Remove the 4 screws.
4) Remove bottom cover.
5) Remove the two philips screws. One on each side of the heat sink.
6) Gently wiggle circuit board out of the top cover. The DC supply side should lift up first. Heat sink grease is preventing the easy removal of the circuit board. Continue to wiggle the circuit board until the grease bond is broken.

J9A2
XDK DC Power



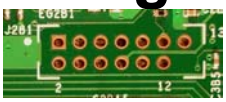
1	+5 VDC (Standby)	2	GND

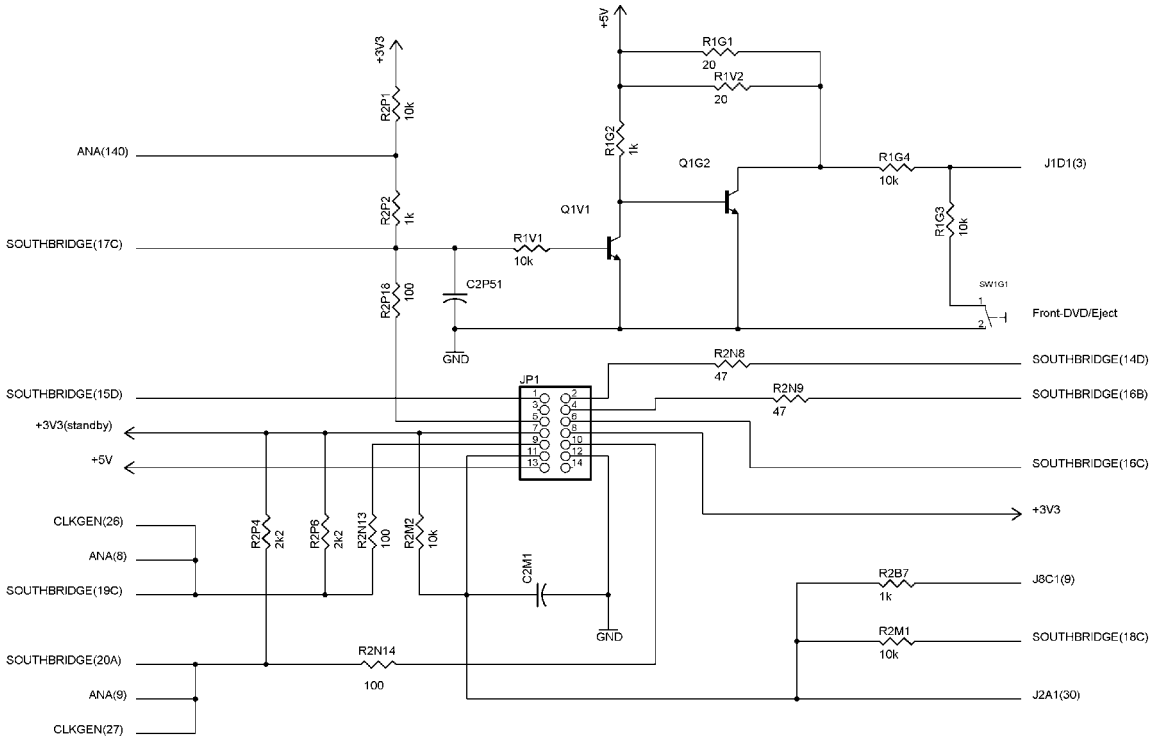
Manufacturer: Unknown
Part #: Unknown

Note:
This connector is used to supply power to the extra circuitry used in the XDK (motherboard version 009).
The circuitry is located in the "Sidecar" that attaches to the hard drive side of the

xbox 360.

J2B1
XDK Debug Header



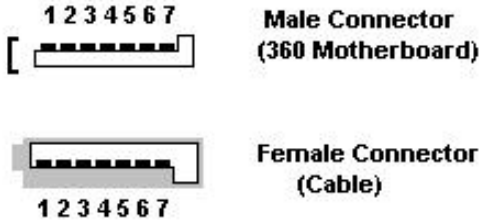


		Power ON	Power Off	Data Present
1	RX - U2C1 pin 15D[1]	+3.3 VDC	0	No
2	TX- U2C1 pin 14D[1]	+3.3 VDC	0	No
3	NC	0	0	No
4	Connects to U2C1 pin 16B	+3.3 VDC	+3.3 VDC	No
5	Eject[2]	+3 VDC	0	No
6	Connects to U2C1 pin 16C	0	0	No
7	+3.3 VDC (Standby)	+3.3 VDC	+3.3 VDC	No
8	+3.3 VDC	+3.3 VDC	0	No
9	SDA	+3.3 VDC	+3.3 VDC	Yes
10	SCL	+3.3 VDC	+3.3 VDC	Yes
11	See Schematics	+3.3 VDC	+3.3 VDC	No
12	GND	0	0	No
13	+5 VDC (Standby)	+3.3 VDC	+5 VDC	No

Note:

1) Speculation: Document posted on xboxhacker.net and free60.org suggests that these pins are UART operating at 115000 bps.
2) Quick pulse Ejects, otherwise 360 immediately shuts down.

J1C1
DVD SATA Connector

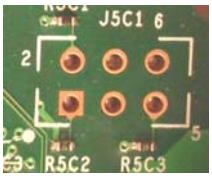


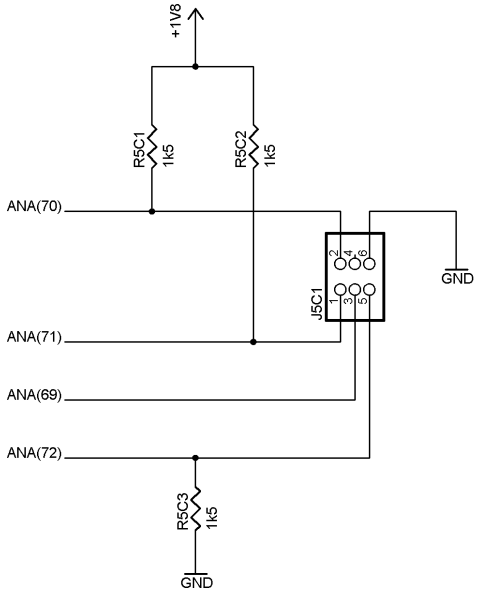
1	GND
2	A+
3	A-
4	GND
5	B-
6	B+
7	GND

Manufacturer: Tyco
Part #: Unkown

Note:
Standard SATA interface.
Each DVD drive has a unique ID key. (source: www.xboxhacker.net)

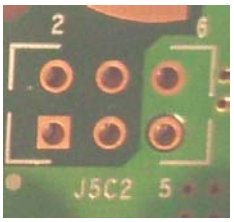
J5C1
ANA Header

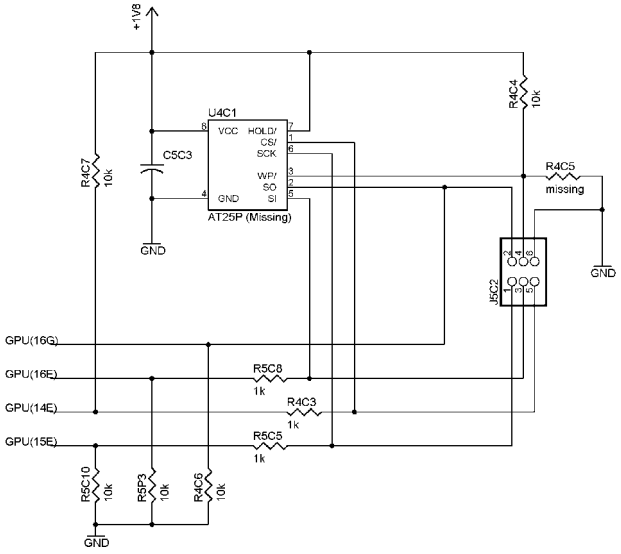




		Power ON	Power Off	Data Present
1	Connects to Pin 71 of U4B1	+1.8 VDC	+1.8 VDC	No
2	Connects to Pin 70 of U4B1	+1.8 VDC	+1.8 VDC	No
3	Connects to Pin 69 of U4B1	0	0	No
4	Unknown	0	0	No
5	Connects to Pin 72 of U4B1	0	0	No
6	GND	0	0	No

J5C2
GPU SPI EEPROM Header

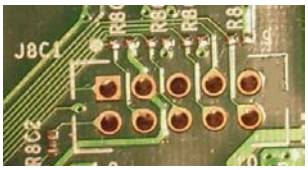


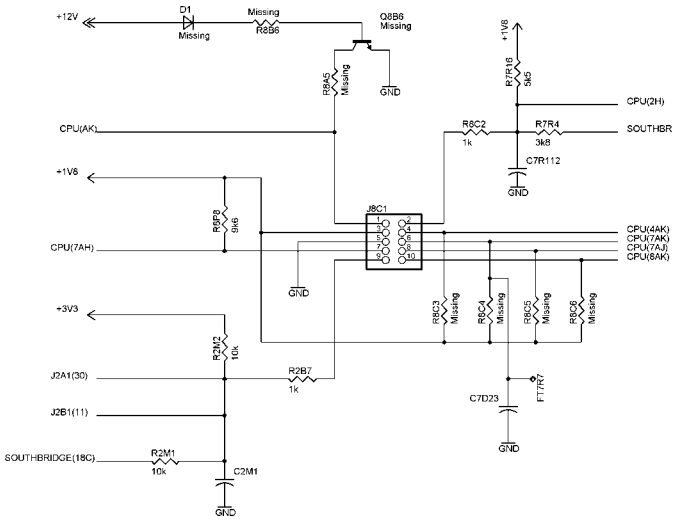


		Power ON	Power OFF	Data Present
1	SCK	0	0	high on startup
2	SO	0	0	
3	SI	0	0	
4	/WP	+1.8 VDC	+1.8 VDC	
5	/CS	+1.8 VDC	+1.8 VDC	brief activity at startup
6	GND	0	0	

Note:

J8C1
CPU JTAG Header

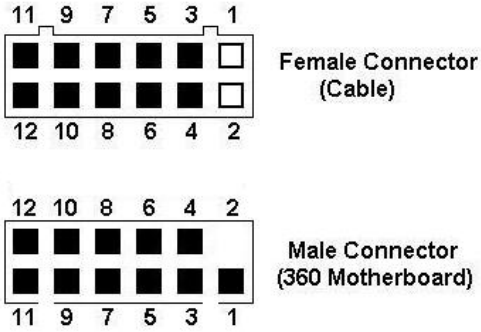




		Power ON	Power OFF	Data Present
1		0	0	No
2		+1.1 VDC	0	No
3	+1.8 VDC	+1.8 VDC	0	No
4		+1.8 VDC	0	No
5	GND	0	0	No
6		+1.8 VDC	0	No
7		+1.8 VDC	0	No
8		+1.8 VDC	0	No
9		+3.3 VDC	+3.3 VDC	No
10		+1.8 VDC	0	No

Note:
Images indicate this port was used during hardware development.
Pin 9 was not used in HDK image.
The pin header is also present on the XDK version 9 motherboard.
Speculation: GPULDBG, Inputs - TDI, TMS, TCK, Output -TDO, and RESET

J1D1
DVD Power Connector

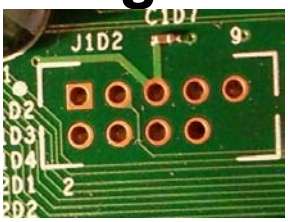


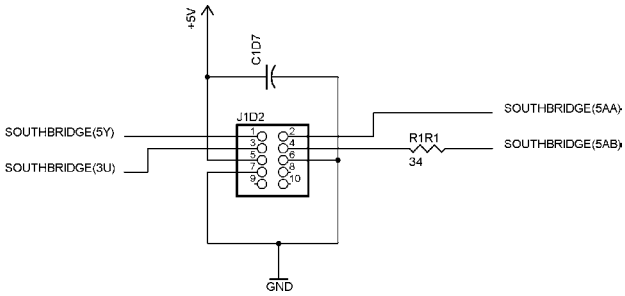
1	NC	7	GND
2	NC	8	+5 VDC
3	Open/Close	9	GND
4	Tray Status	10	+12 VDC
5	GND	11	GND
6	+3.3 VDC	12	+12 VDC

Manufacturer:
Part #:

Notes:
Open/Close: momentary tied to gnd to open/close drive door.
Tray Status: +3.3 VDC tray is open. 0 v tray is closed.
Source: www.xboxhacker.net

J1D2
XDK Debug Header #2

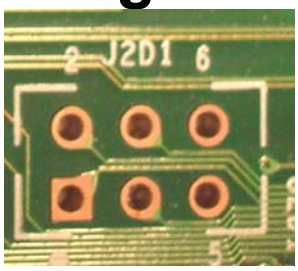


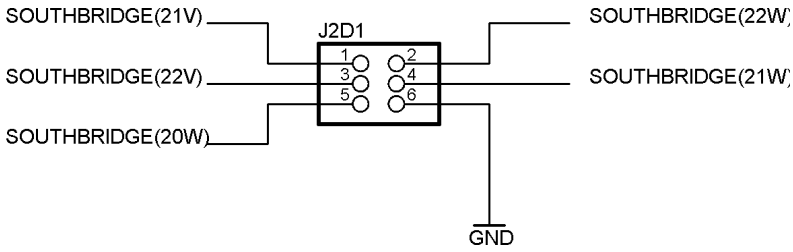


		Power ON	Power OFF	Data Present
1	Connects to U2C1 pin 5Y	0	0	No
2	Connects to U2C1 pin 5AA	+3.3 VDC	+3.3 VDC	No
3	Connects to U2C1 pin 3U	0	0	No
4	Connects to U2C1 pin 5AB	+3.3 VDC	+3.3 VDC	No
5	+5 VDC (Standby)	+5 VDC	+5 VDC	No
6	GND	0	0	No
7	GND	0	0	No
8	Unknown	0	0	No
9	Unknown	0	0	No

Note:
This port is used in the XDK version 9 motherboard. The connector is routed into the XDK "Sidecar" expansion module.

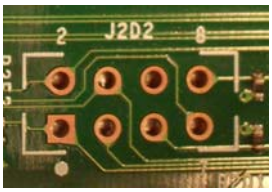
J2D1
Southbridge Header

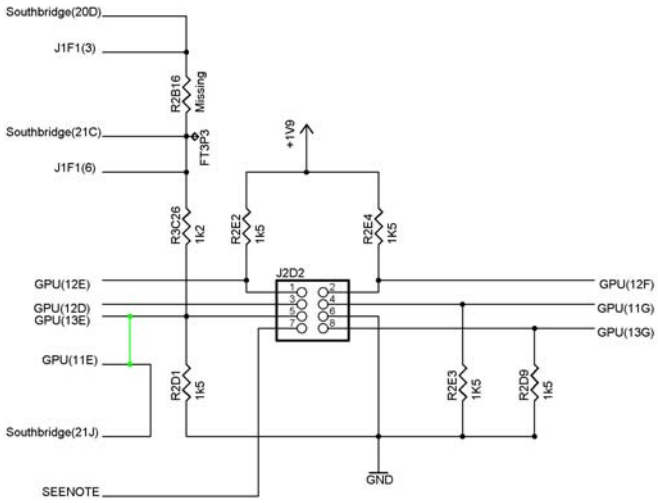




		Power ON	Power OFF	Data Present
1	Connects to U2C1 pin 21V	+1.8 VDC	0	No
2	Connects to U2C1 pin 22W	+1.8 VDC	0	No
3	Connects to U2C1 pin 22V	0	0	No
4	Connects to U2C1 pin 21W	0	0	No
5	Connects to U2C1 pin 20W	0	0	No
6	GND	0	0	No

J2D2
GPU Header

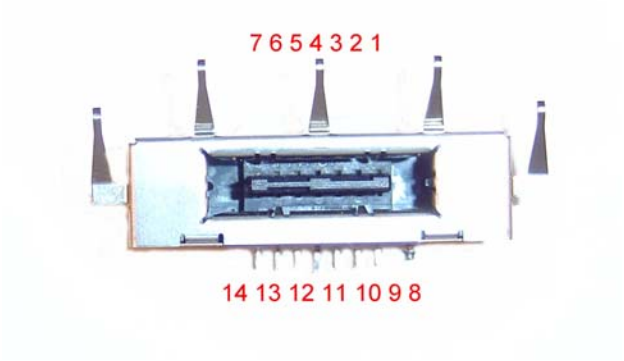




		Power ON	Power OFF	Data Present
1	Connects to U4D1 pin 12E	+1.9 VDC	0	No
2	Connects to U4D1 pin 12F	+1.9 VDC	0	No
3	Connects to U4D1 pin 12D	0	0	No
4	Connects to U4D1 pin 11G	0	0	No
5	Connects to U4D1 pin 13E	0	0	No
6	GND	0	0	No
7	See Note	+1.9 VDC	0	No
8	Connects to U4D1 pin 13G	0	0	No

Note:
There are images of a XDK motherboard (version 9) on the Internet that shows a green wire connecting Pin 5 to the Southbridge(21J).
Pin 7 - still working on it.

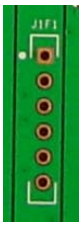
J1E1
Hard Drive SATA Connector

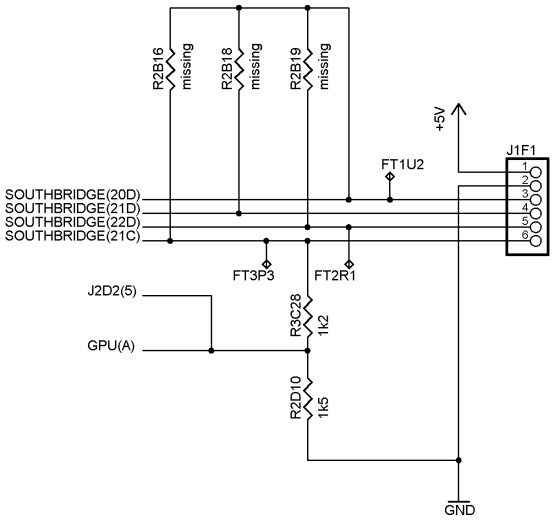


1	GND	8	GND
2	A+	9	GND
3	A-	10	GND
4	GND	11	+5 VDC
5	B-	12	+5 VDC
6	B+	13	+5 VDC
7	GND	14	+5 VDC (standby)

Manufacturer: Unknown-Made in China
Part #: XB00351-002

J1F1
Southbridge LED Header

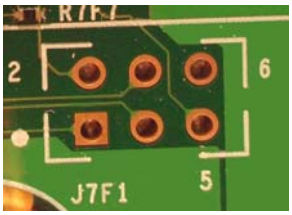


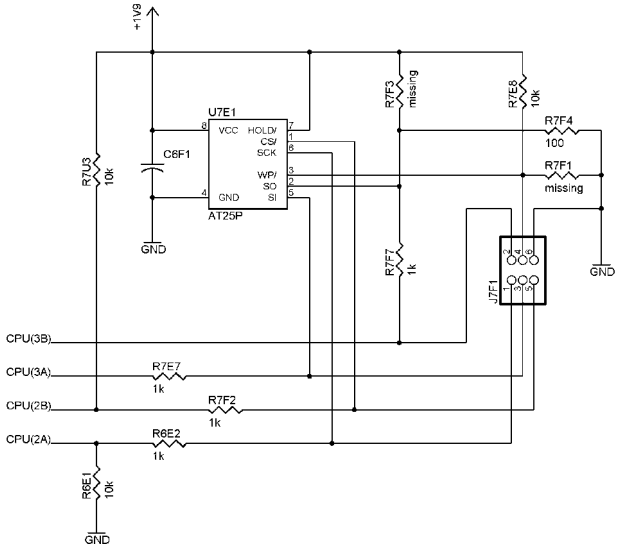


		Power ON	Power OFF	Data Present
1	+5 VDC	+5 VDC	0	No
2	GND	0	0	No
3	Connects to U2C1 pin 20D	+3.3 VDC	0	No
4	Connects to U2C1 pin 21D	0	0	No
5	Connects to U2C1 pin 22D	+3.3 CLK	+3.3 CLK	OFF- 1.25 hz ON - Activity
6	Connects to U2C1 pin 21C	0	0	No

Note:
Some images of the pre version 9 360 motherboard show LEDs connected to this Port.

J7F1
CPU SPI EEPROM Header





1	SCK	4	/WP
2	SO	5	/CS
3	SI	6	GND

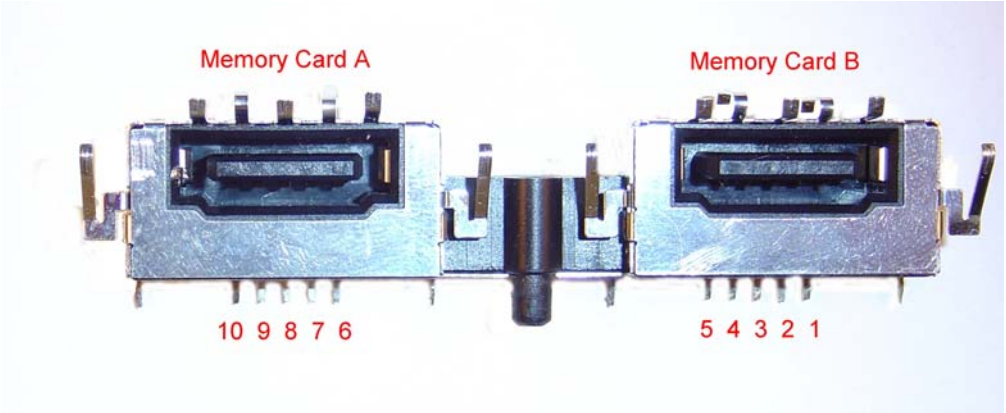
Note:

Header and eeprom is present on 360's XDK (Version 9)

Eeprom is missing on some Version 11 motherboards.

Connects to the SPI serial eeprom (AT25020) then it probably connects to the Misc I/O bus on the CPU.

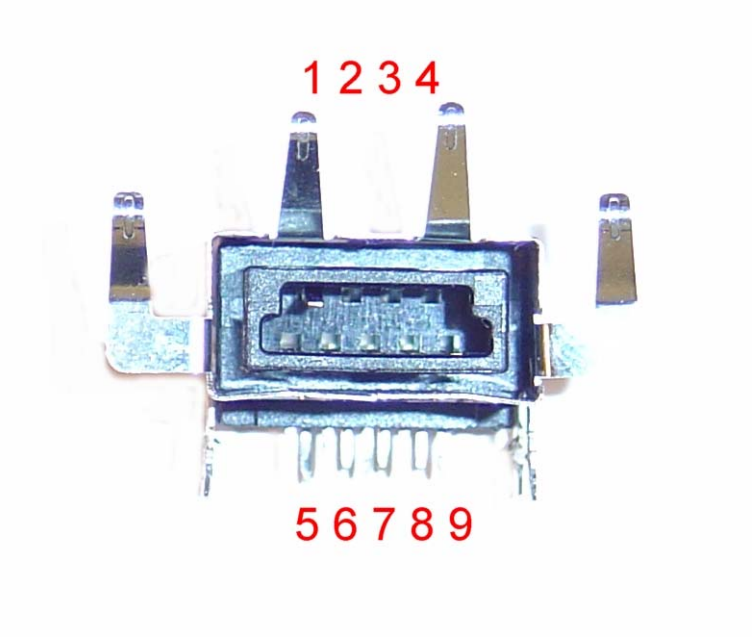
J3G1
Front Memory Card A & B Connector



A		B	
6	GND	1	GND
7	+3.3 VDC	2	+3.3 VDC
8	USB Data -	3	USB Data -
9	USB Data +	4	USB Data +
10	GND	5	GND

Note:
USB is 3.3 VDC, Same as RF Module.

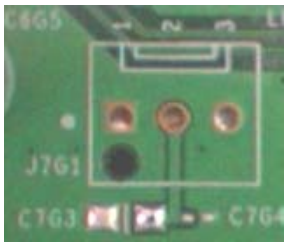
J6G1
RF Module Connector



1	+3.3 VDC	5	See Note
2	USB Data -	6	Serial Data
3	USB Data +	7	Serial CLK
4	GND	8	GND
		9	See Note

Note:
USB is 3.3 VDC, same as memory card port
Pin 5 Power ON/OFF (momentary tied to gnd to power ON/OFF)
Pin 5 goes to southbridge 21E
Pin 9 goes to Pin 16 of J1A1 (extra pin on the back USB port) but is not connected to anything on the RF Module.

J7G1
Aux Power Header



1	GND	2	+12 VDC[1]	3	GND

Note:
1) This port is not active. A resistor or jumper needs to be added to the bottom side of the motherboard were R7V7 should be.

Header missing on 360 XDK motherboard Version 9.

Header missing on 360 Retail motherboard Version 11.

J7G2
VID Port

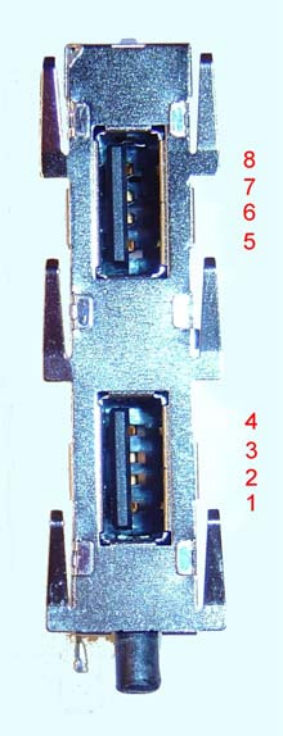
1	VCC	8	VID1
2	VID4	9	PWM1
3	FBRTN	10	VID0
4	VID3	11	PWM2
5	PWRGD	12	VID5
6	VID2	13	PWM3
7	EN	14	GND

Note:
Pure Speculation

The Voltage Identification (VID) port was present on early version(s) of the 360 motherboard. (pre Version 9)

I have speculated what the connections were.
To learn more download the datasheet for the ADP3188. (Analog Devices)

J9G1
Front Dual USB Port



Bottom Port		Top Port	
1	+5 VDC	5	+5 VDC
2	USB Data -	6	USB Data -
3	USB Data +	7	USB Data +
4	GND	8	GND

Appendix

Document Version

Version 1.0	**Dec 15, 2005**	**Just Pinouts**
Version 1.1	**Dec 30, 2005**	**Added Photos & Diagrams**
Version 1.2	**Jan 6, 2006**	**Changed Format**
Version 1.3	**Feb 2, 2006**	**Added Schematics** **Private Release**
Version 1.4	**Feb 15, 2006**	**Corrected Schematics** **Added Appendix** **Added Block Diagram** **Current Document**

Unique Per Console Numbers

L = Production line in the factory
NNNNNN = Xbox in the week
Y = Year (last digit)
WW = week of the year *
FF = Factory # (05 & 06 are China, 05 appears to supply Europe and 06 supplies North America)
MM = Month
X = unknown at this time
" " = Actual Text

*** Factory 05 is a week ahead of factory 06 for the 2005 year. This means any 360 made during the last week of December 2005 should have a WW=53 in the serial #.**

Serial Number = LNNNNNNYWWFF (Source: www.xbox-linux.org)

Product ID = XXXXXXXXLNNNNNNYWWFF

Motherboard = XXXXXXXXXXXXYWWX

Console ID = XXXXXXXXXXXX

Wired MAC = Unique 12 digit (hex, meaning each digit has the possibility of being a value of 0-F)

RF Module = XXXXXXXXXXYWW

DVD Serial # (Hitachi-LG) = YMM"HG"XXXXXX

DVD Serial # (Toshiba- Samsung) = X"RCY"XXXXXX

Retail Motherboard Differences

Motherboard Version 011
CPU SPI eeprom: Present or Absent
CPU: Engraved "Canada" or "Taiwan"
Tilt Switch: Surface Mount or Thru Hole Mount
Bios Label: Present or Absent
10/100 base-TX Ethernet Transceiver: "Big" or "Small"
Header Holes: Filled in with solder, partially filled or not filled.

Bios/Kernel Versions and Updates

Displayed in the dashboard.
D: = Dashboard
K: = Kernel
BK: = (Backup Kernel, Bios Kernel, Base Kernel, etc) - Not sure

2.0.0198.0
First image of a XDK Launcher Screen. Show version in the right hand corner.
I'm guessing it's an Alpha. (Source Image: I forget)

2.0.1232.0 Alpha 2
Image of a XDK Launcher Screen. Alpha 2 is displayed beside version #.
(Source Image: I forget)

2.0.1839.2
XeDK release Dashboard. (smartxx images)

2.0.1888.0
Sept-Oct Production Line for Retail Release

2.0.2241.0
Late Oct-Early Nov Production Line, Nov 22 available over xbox live.
* Unknown

2.0.2255.0
Jan 30 production line, Jan 30 available over xbox live
* Improved logic around deciding if saved games should be deleted and offer the option to only delete the profile and to leave all save data.
* Users reporting blank Friends List on the Xbox 360 dash after muting a friend while playing a game in Backwards Compatibility mode.
* Improved synching of games played to Web and in console.
* Network settings: keyboard does now allow entry of - (dash) character in the keyboard.
* Improvements to the Xbox Guide.
* Increased accuracy of "last time played."
* Network configuration improvements for Xbox Live members in the Netherlands.
* More detailed messaging for unreadable disk or region errors.
* Blocked the Kiosk Disc from being recognized when inserted into the DVD tray.
(Source: I forget, so let me know so I can provide proper credit)

System Requirements

Absolute Minimum

Motherboard, Power Supply (12 volt 16amp, 5 volt 1amp), Video Cable, and a momentary pushbutton switch (for power on/off).

I have tested this with dashboard 1888 and 2241. A dashboard update could change this.

Absolute Minimum to play games or DVDs

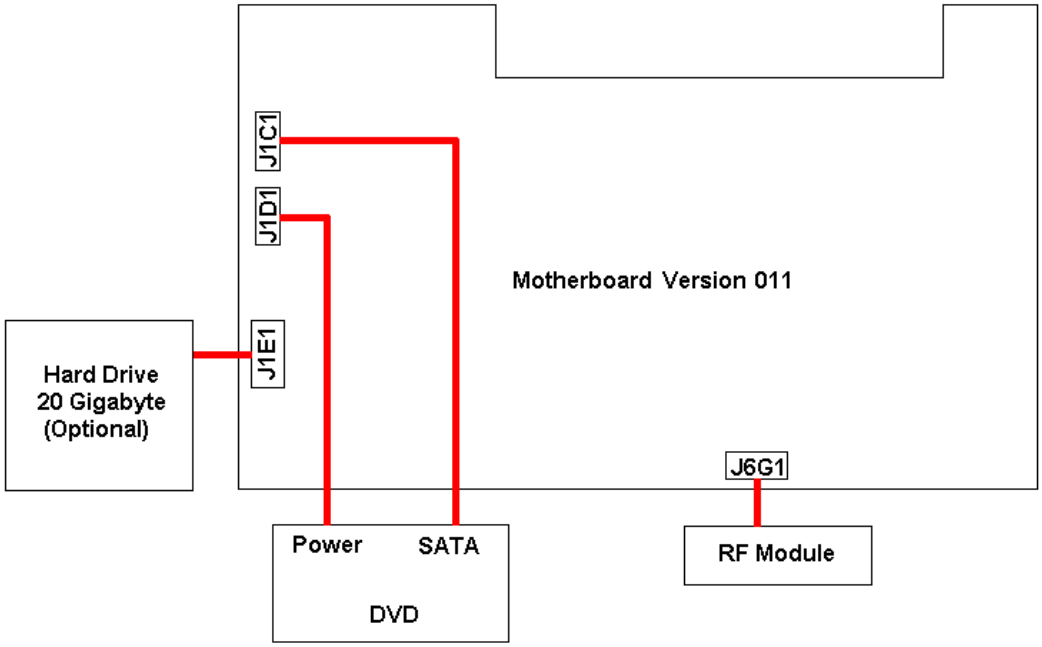
As above, but subtract the push button and add the DVD player and a wired controller.

Absolute Minimum to play just DVDs

As above, but the remote can be used instead of the wire controller.

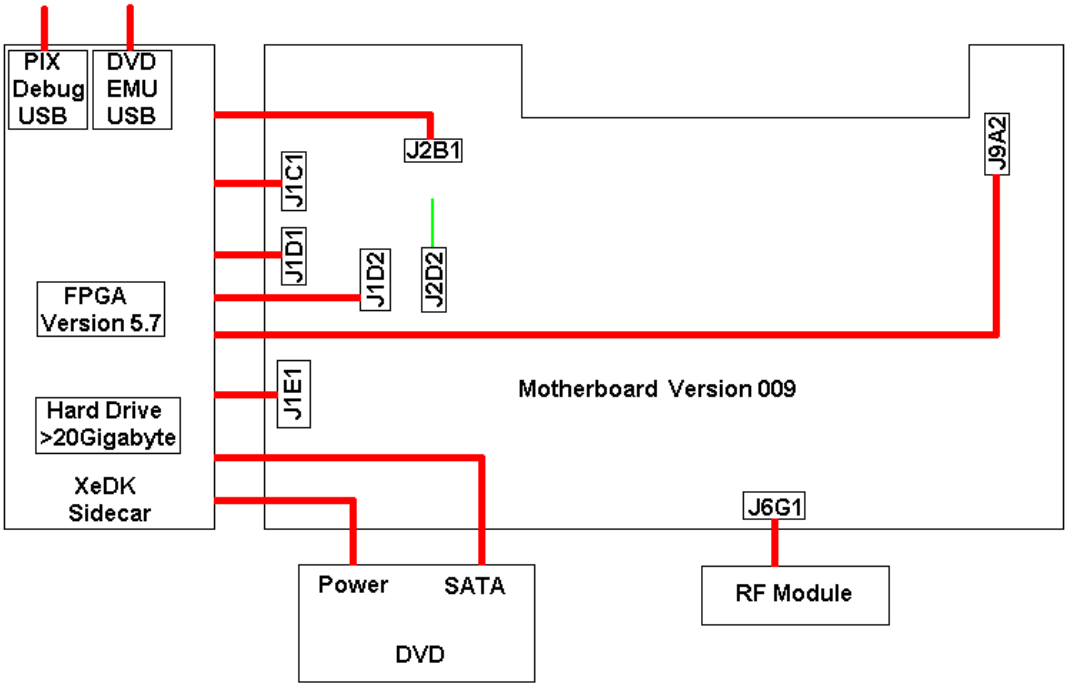
Remember that this could change with a dashboard update.

Retail



Note:
Flash Bios Version 2.0.1888.0

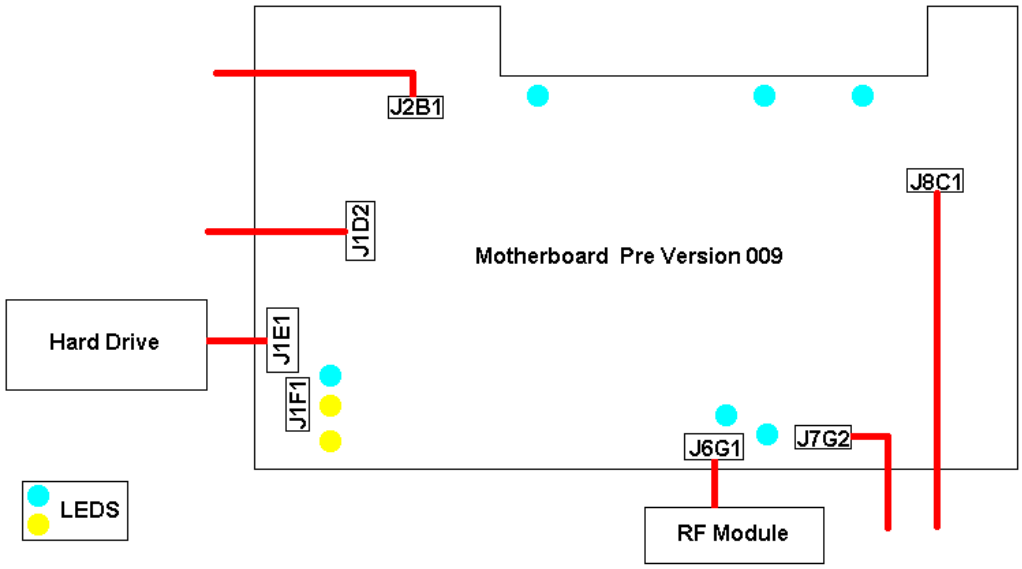
XeDK



Note:
Appears to be a final version of the XeDK.
Flash Bios Version 2.0.1839.2
Also known as XDK.
Used in conjunction with the SDK (Software Development Kit).
Most likely, the XeDK is also connected to a network with various PCs running SDK.

Source: www.smartxx.com

HDK



Note:

No DVD connected.
Source: www.xavbox.com

Memory Map

Not in this Public Release

CPU Pinout

Not in this Public Release

GPU Pinout

Not in this Public Release

Southbridge Pinout

Not in this Public Release

Left Blank