

MCEToolV1

Isolation Box and IR Download Cable

Description

MCEToolV1 comprises of Isolation Box and IR Download Cable (IRCable). IRCable is used for programming the flash and one time programmable (OTP) memory of 300 Series, 100 Series, 500 Series and 99 Series Digital Control ICs. Isolation box provides UART and JTAG isolation while providing VPP for OTP programming. Following products are supported -

300 Series	100 Series	99 Series	500 Series
IRMCF/K311	IRMCF/K171/K172	IRMCK099	IRMCF588
IRMCF/K312	IRMCF188		
IRMCF/K371	IRMCF143/K143		
IRMCF/K343	IRMCF183		
IRMCF/K371	IRMCK182		

Features

MCETOOLV1

- Isolated signals from PC to target board
- 3.3V power supply current 100mA capability
- Built-in VPP (6.75V) voltage output
- IIC, JTAG, UART interface port
- USB port power supply
- Offline programming device
- 57600 baud rate UART support
- iMotion DCIC programming support
- UART Communication for motor tuning
- LED indicators
- Software support
- USB/DB9 for UART
- Compatible with iMotion Software Tools

Product Summary

- Isolated signal from PC to target board
- USB single supply
- IIC, JTAG and UART interface, opto-isolated
- FR4 based 1oz copper two-layer PCB



Isolation Box



IRCable

25mm x 65mm x90mm

Safety Precautions

In addition to the precautions listed throughout this manual, please read and understand the following statements regarding hazards associated with development system.



ATTENTION: The input to the isolation box through the JTAG and UART is non- isolated and the **ground potential** of the drive connected which to target board is biased to a negative DC bus voltage potential. When measuring voltage waveform by oscilloscope, the scope ground needs to be isolated. Failure to do so may result in personal injury or death. Darkened display LEDs is not an indication that capacitors have discharged to safe voltage levels.



ATTENTION: The target board contains dc bus capacitors which take time to discharge after removal of the main supply. Before working on drive system, wait three minutes for capacitors to discharge to safe voltage levels. Failure to do so may result in personal injury or death. Darkened display LEDs is not an indication that capacitors have discharged to safe voltage levels.



ATTENTION: Only personnel familiar with the drive and associated machinery should plan or implement the installation, start-up, and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.



ATTENTION: The surface temperatures of the drive may become hot, which may cause injury.



ATTENTION: The target board connected through MCEToolV1 contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures,

reference applicable ESD protection handbook and guideline.



ATTENTION: An incorrectly applied or installed drive can result in component damage or reduction in product life. Wiring or application errors such as under sizing the motor, supplying an incorrect or inadequate AC supply, or excessive ambient temperatures may result in system malfunction.



ATTENTION: Remove and lock out power from the drive before you disconnect or reconnect wires or perform service. Wait three minutes after removing power to discharge the bus voltage. Do not attempt to service the drive until bus voltage has discharged to zero. Failure to do so may result in bodily injury or death.



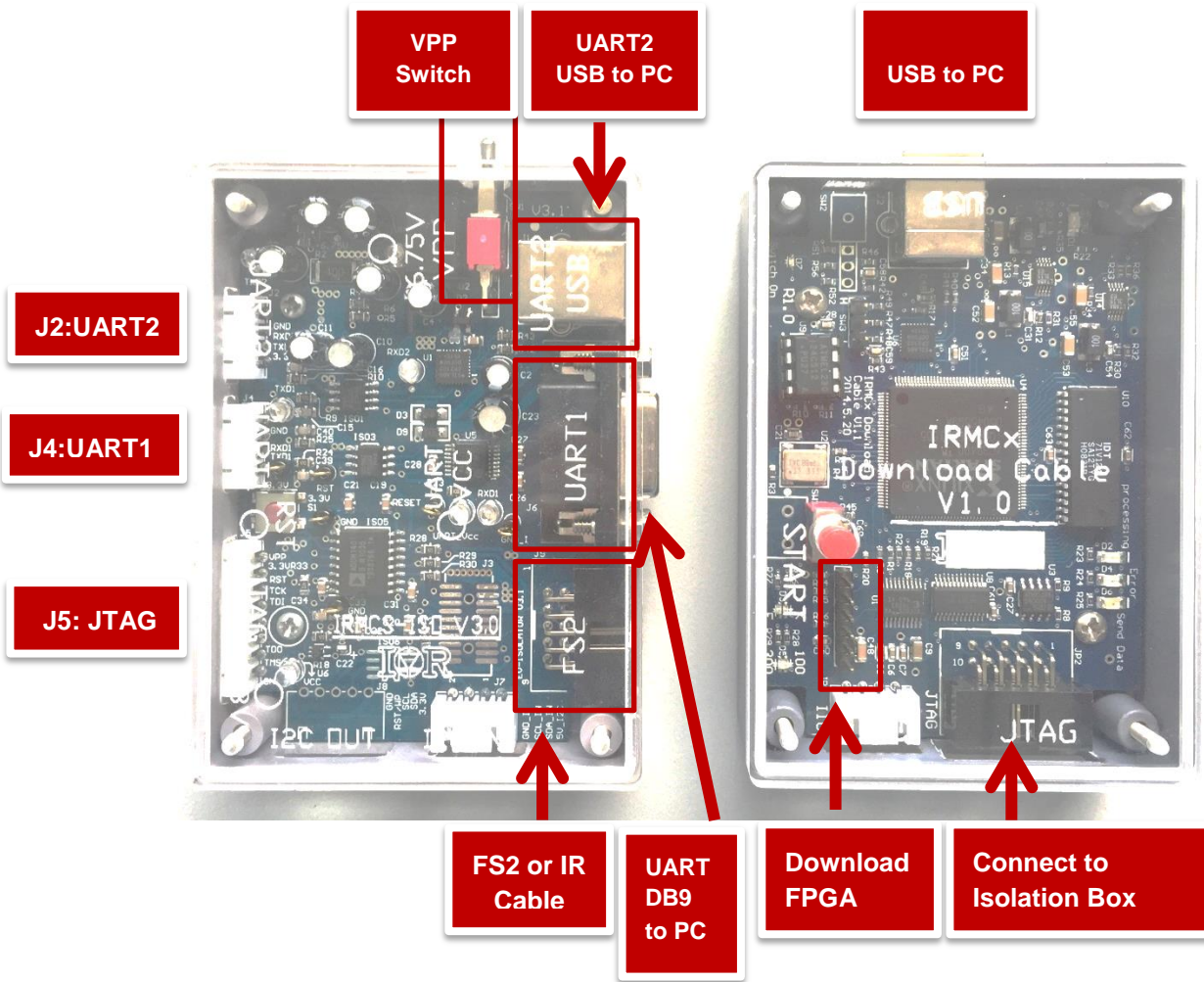
ATTENTION: Do not connect to power when the system is power on, Failure to do so may result in equipment damage or bodily injury.



ATTENTION: Debris When Unpacking
MCETOOLV1 is shipped with packing materials that need to be removed prior to installation. Failure to remove all debris and packing materials which are unnecessary for system installation may result in overheating or abnormal operating condition.

Hardware Description

A top view of the MCETOOLV1 includes Isolation Box and IRCable is shown below. Both of these tools measure 25mm x 65mm x 90mm.



Isolation Boundary

MCEToolV1 is shipped along with ribbon and USB cables, to isolate the UART and JTAG interfaces, so that the user can connect their debugger and computer without isolating the computer. However, the user should keep in mind that most parts of the hardware have negative DC bus ground and it may be necessary to isolate the scope when waveforms are measured.

System Installation and Operation

The software installer can be downloaded from <http://www.irf.com/design-tools/mce>. Click on *Software Updates*, then on the *300/100 Series Design Kit Support* download link.

For information regarding the hardware and software operation, please refer to the IRMCx Download Cable user Manual found in the install directory.

Connector definition

Isolation Box

J5 – JTAG

Pin	Name	Description
1	GND	Ground
2	TMS	TMS (test mode)
3	TDO	TDO (data output)
4	TDI	TDI (data input)
5	TCK	TCK (clock)
6	RESET	Reset to IC
7	+3.3V	On board 3,3V power (see Specification for max current)
8	VPP	OTP programming voltage supplement

J4 – UART1

Pin	Name	Description
1	+3.3V	On board 3.3V supply
2	TXD1	Input, Receive data to IRMCx Device
3	RXD1	Output, Transmit data from IRMCx Device
4	GND	Ground

J2 – UART2

Pin	Name	Description
1	+3.3V	On board 3.3V supply
2	TXD1	Input, Receive data to IRMCx Device
3	RXD1	Output, Transmit data from IRMCx Device
4	GND	Ground

J7 – IIC

Pin	Name	Description
1	5V	On board 5V supply
2	SDA	Input, Receive/Transmit data to F300 boot EEPROM
3	SCL	Output, Transmit clock to F300 boot EEPROM
4	GND	Ground

IRCCable

JP1 – IIC

Pin	Name	Description
1	3.3V	On board 3.3V supply
2	IICSDA	Input, Receive/Transmit data to F300 boot EEPROM
3	IICSCL	Output, Transmit clock to F300 boot EEPROM
4	GND	Ground

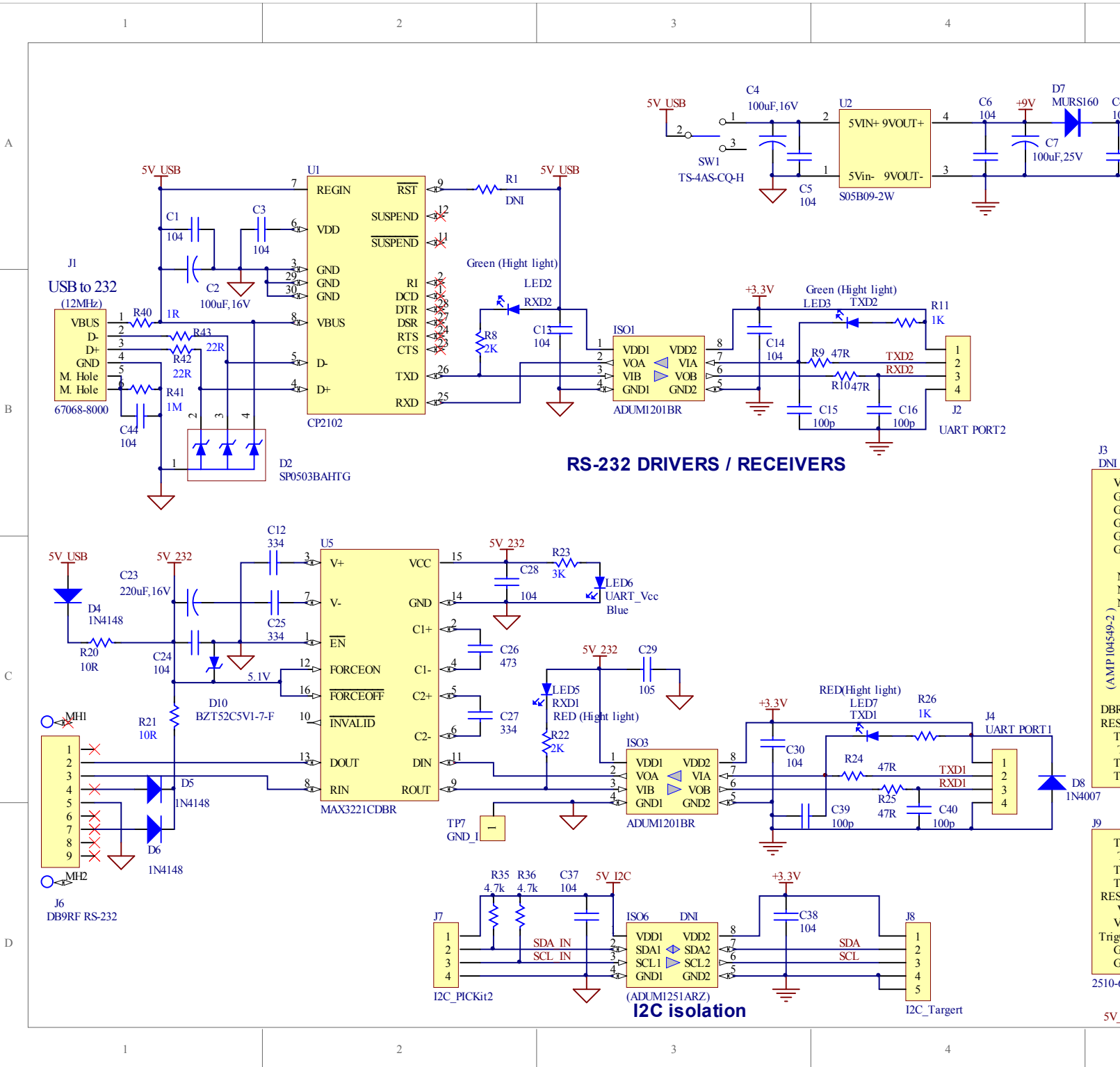
Specifications

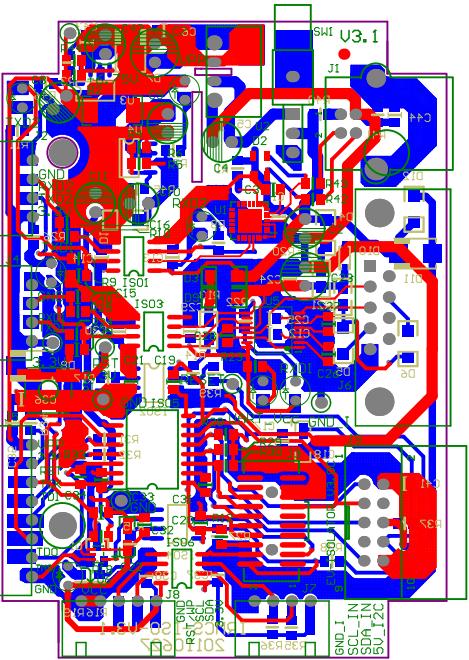
Parameters	Values	Conditions
Host interface (Isolated)		
USB to UART		
Programming	256 kbps	MCEProgrammer support
USB to UART		
Debugging	57.6 kbps	MCEDesigner support
DB9		
Debugging	57.6 kbps	MCEDesigner support
Host interface (Non isolated)		
UART(TXD, RXD)	3.3V	Typical 57.6 kbps, single ended
JTAG interface		
TMS, TDI, TCK, TDO	3.3V	Interface with FS2 or IRCable
IIC		
SDA,SCL	3.3V	Typical 100kbps
Current		
3.3V Current supply	100mA	Can supply target board 3.3V within this range
VPP current supply	50mA	
Protection		
Isolator IC		
3.3V reverse connection		
Power Device		
USB 5V		
On board power supply		
3.3V	3.3V+/-5%, Max 50mA	
Box		
Material	Plastic	
Dimension	25mm x 65mm x 90mm	
System environment		
Ambient temperature	0 to 70°C	95% RH max. (Non-condensing)

Revision History

International
 Rectifier

Data and Specifications are subject to change without notice
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Visit us at www.irf.com for sales contact information

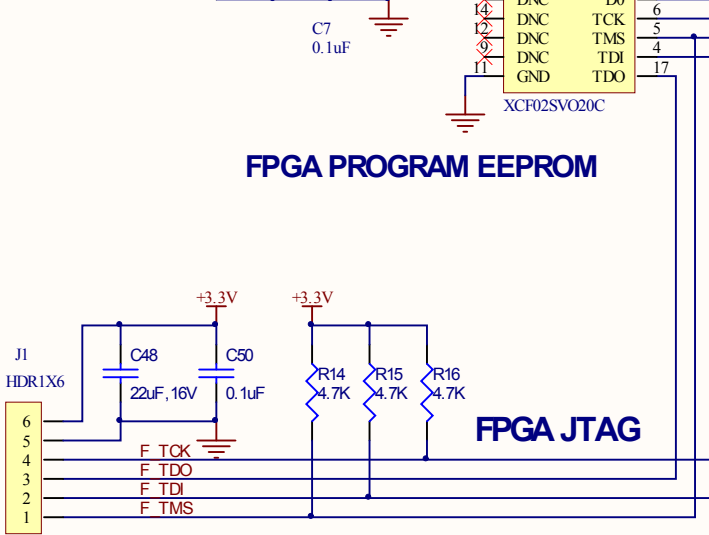




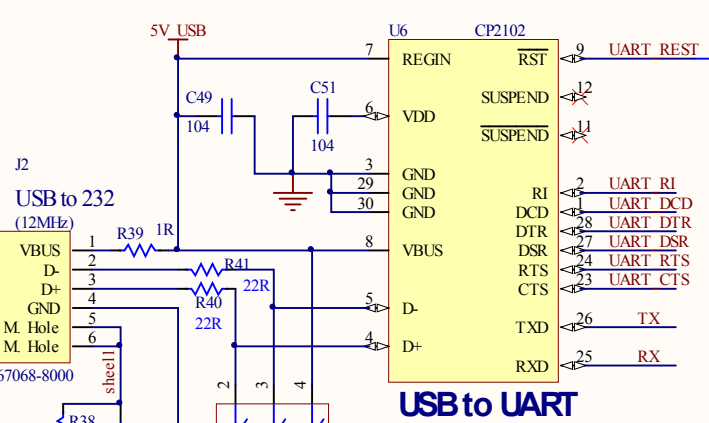
Comment	Description	Designator	Footprint	LibRef	Quantity
104		C1, C3, C5, C6, C13, C14, C17, C19, C20, C21, C24, C28, C30, C31, C32, C33, C35, C36, C37, C38, C43, C44	C0805		22
100uF,16V		C2, C4, C8, C9, C11, C42	C1/2		6
100uF,25V		C7	C1/2A		1
100uF,10V		C10	C1/2		1
334		C12, C25, C27	C0805		3
100p		C15, C16, C39	C0805		4
10uF,10V		C18, C22	C3216		2
220uF,16V		C23	C1/2A		1
473		C26	C0805		1
105		C29	C0805		1
103		C34	C0805		1
0.1uF,16V		C41	C0805		1
BAV19W		D1, D3, D9	D1206		3
SP0503BAHTG		D2	SOT-143		1
1N4148		D4, D5, D6	D1206		3
MURS160		D7	SMA/KA		1
1N4007		D8	SMA/KA		1
BZT52C5V1-7-F		D10	SOD-123		1
11DQ10		D11	SMA/KA		1
DNI		D12	D1206		1
ADUM1201BR		ISO1, ISO3, ISO4	SO-8		3
DNI		ISO2, ISO6	SO-8		2
ADUM1401CRW		ISO5	SO-16W		1
67068-8000		J1	USB_CONN		1
UART PORT2		J2	A2501WVR-4P		1
DNI		J3	CONN_AMP1045 49-2		1
UART PORT1		J4	A2501WVR-4P		1
JTAG		J5	A2501WVR-8P		1
DB9RF RS-232		J6	DB-9RA/F		1
I2C_PICKit2		J7	A2501WVR-4P		1
I2C_Targert		J8	A2501WVR-5P		1
2510-6002UB		J9	2510-		1
VPP		LED1	LED_3MM_1		1
RXD2		LED2	LED_3MM_1		1
TXD2		LED3	LED_3MM_1		1
VCC		LED4	LED		1
RXD1		LED5	LED_3MM_1		1
UART_Vcc		LED6	LED_3MM_1		1
TXD1		LED7	LED_3MM_1		1
MMBT3904LT1		Q1	SOT23-BCE		1
DNI		R1, R17, R39	R0805		3
1.2K, 1%		R2	R0805		1
270R, 1%		R3	R0805		1
10R		R4	R2512		1
510R, 1%		R5	R0805		1
240R, 1%		R6	R0805		1
1K		R7, R11, R12, R15, R19, R26,	R0805		7

2K		R8, R22	R0805		2
47R		R9, R10, R24,	R0805		4
10R		R13, R20, R21	0805		3
4.7k		R14, R18, R27, R28, R29, R30, R31, R32, R33, R35, R36	R0805		11
10k		R16	R0805		1
3K		R23	R0805		1
1R		R34, R40	R0805		2
0		R38	R0805		1
1M		R41	R0805		1
22R		R42, R43	R0805		2
270K		R44	R0805		1
5.1K, 1%		R45	R0805		1
DNC		R46	R0805		1
KT11P4JM34LFS		S1	KT11P3JM		1
TS-4AS-CQ-H		SW1	SW_WO		1
+6.75V		TP1	TP_5002		1
3.3V		TP2	TP_5002		1
RST		TP3	TP_5002		1
RESET		TP4	TP_5002		1
GND		TP5, TP6	TP_5002		2
GND_I		TP7	TP_5002		1
CP2102		U1	QFN-28		1
S05B09-2W		U2	DC-DC5S9		1
IRU1208CS		U3, U4	SO-8		2
MAX3221CDBR		U5	SSOP-16		1
SN74LVC1G14DC		U6	DCK		1

FPGA PROGRAM EEPROM

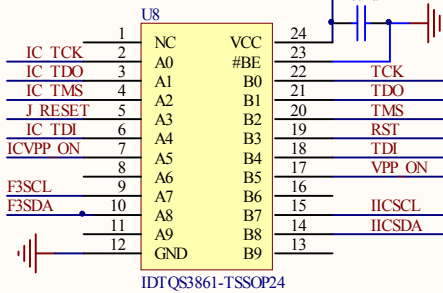
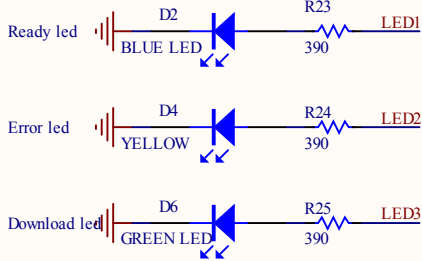


FPGA JTAG



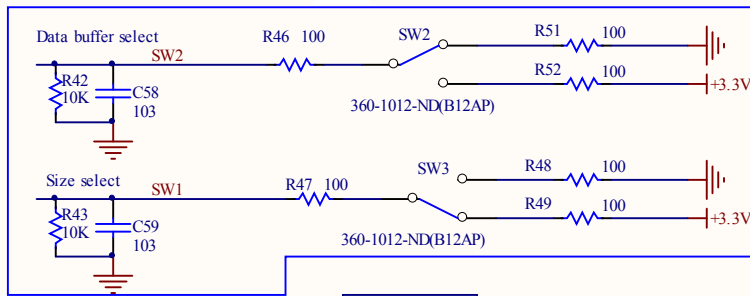
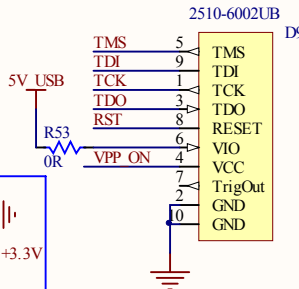
USB to UART

State LED



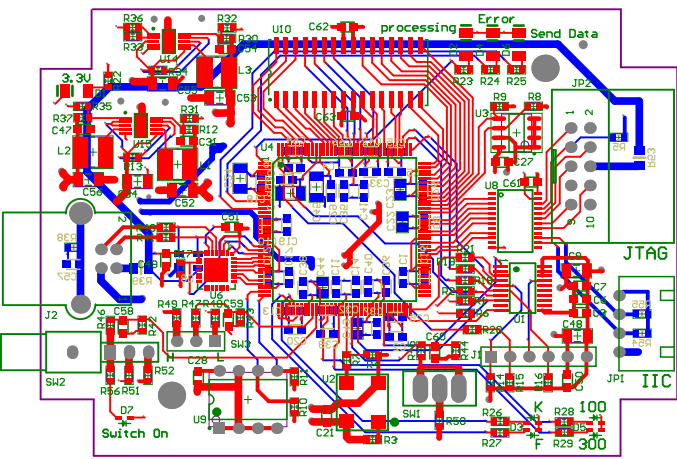
Target JTAG

(Pin6 used to power Isolation Box V3.1)
(Isolation box: JTAG Pin6 VIO is input for FS2)



Button & switch

36	IO_L01N
63	IO_L27P
105	SRAM A16
108	SRAM A14
112	SRAM D4
113	SRAM A12
116	SRAM A11
IO	
1	IO_L01P
2	IO_L01N
4	IO_VREF
5	IO_L20P
6	TX
7	IO_L20N
8	IO_L21P
10	IO_L21N
10	UART RI
11	UART DCD
12	UART DTR
13	UART DSR
14	UART RTS
15	UART CTS
17	UART REST
18	IO_L40P
20	IO_L40N
21	IO_L40N
23	LEDK
24	IO_L24P
25	LEDF
26	IO_L23P
27	LED1x
28	IO_L23N
30	LED3x
31	IO_L21P
32	F3SCL
33	F3SDA
35	IO_L20P
40	IO_L01P
41	IO_L01N
141	IO_L01N
140	IO_L01P
137	IO_L27N
135	IO_L27P
132	IO_L30N
131	IO_L30P
130	IO_L31N
129	IO_L31P
128	GCLK7
127	SRAM D5
125	SRAM D6
124	SRAM D7
123	SRAM A1
122	SRAM OE
119	SRAM A0
118	SRAM A13
104	SRAM A10
IO_L20P	



Comment	Description	Designator	Footprint	LibRef	Quantity
0.47uF		C1, C5, C11, C17, C18, C19, C20, C25, C30, C39, C40, C41, C42, C64, C66	C0603		15
47nF		C2, C4, C8, C10, C12, C13, C14, C15, C16, C26, C29, C32, C33, C35, C36, C37, C38, C65	C0603		18
0.1uF		C3, C6, C7, C21, C27, C28, C50, C61, C62, C63	C0603		10
22uF, 16V		C9, C24, C45, C46, C48	C1206		5
4.7uF		C22, C23, C43,	C0805		4
22pF		C31, C47, C54	C0603		3
10uF		C34, C52, C53, C55, C56	C1206		5
104		C49, C51	C0603		2
103		C57, C58, C59,	C0603		4
RED LED		D1	L1206-1		1
BLUE LED		D2	L1206-1		1
LED_3		D3, D5	LED_PAN_LNJ_A RA		2
YELLOW		D4	L1206-1		1
GREEN LED		D6	L1206-1		1
GREEN LED		D7	LED-0603		1
SP0503BAHTG		D8	SOT-143		1
HDR1X6		J1	HDR1X6		1
67068-8000		J2	USB_CONN		1
4 HEADER		JP1	A2501WVR-4P		1
2510-6002UB		JP2	2510-		1
10uH		L1, L2, L3	INDP4540X32L		3
4.7K		R1, R2, R3, R4, R5, R8, R9, R10, R11, R14, R15, R16, R36, R54, R55	J1-0603		15
330		R6	J1-0603		1
22		R7	J1-0603		1
750K		R12	J1-0603		1
100K		R13, R34	J1-0603		2
2K		R17	J1-0603		1
68		R18, R19, R20	J1-0603		3
0		R21, R33	J1-0603		2
390		R22, R23, R24, R25, R26, R27, R28, R29, R56	J1-0603		9
910K		R30	J1-0603		1
240K		R31	J1-0603		1
200K		R32	J1-0603		1
620K		R35, R37	J1-0603		2
1M		R38	J1-0603		1
1R		R39	R0805		1
22R		R40, R41	J1-0603		2
10K		R42, R43, R44	J1-0603		3
100		R45, R46, R47	J1-0603		3

47		R48, R49, R50, R51, R52	J1-0603		5
0R		R53	R0805		1
A9		SW1	3296		1
360-1012- ND(B12AP)		SW2	SW_WO		1
DIP3		SW3	HDR1X3		1
XCF02SVO20C		U1	TSSOP-20		1
CSX750PCC33.33 30MT		U2	CSX-750P		1
AT24C02		U3	8S1_L		1
XC3S200- 4TQG144C_2		U4	TQFP-144_20X20		1
CP2102		U6	QFN-28		1
IDTQS3861- TSSOP24		U8	TSSOP-24		1
AT24C512B-PU25		U9	DIP-8		1
71V124SA10TY8		U10	PJ32		1
LTC3407-11PIN		U14, U15	LTC3407		2

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