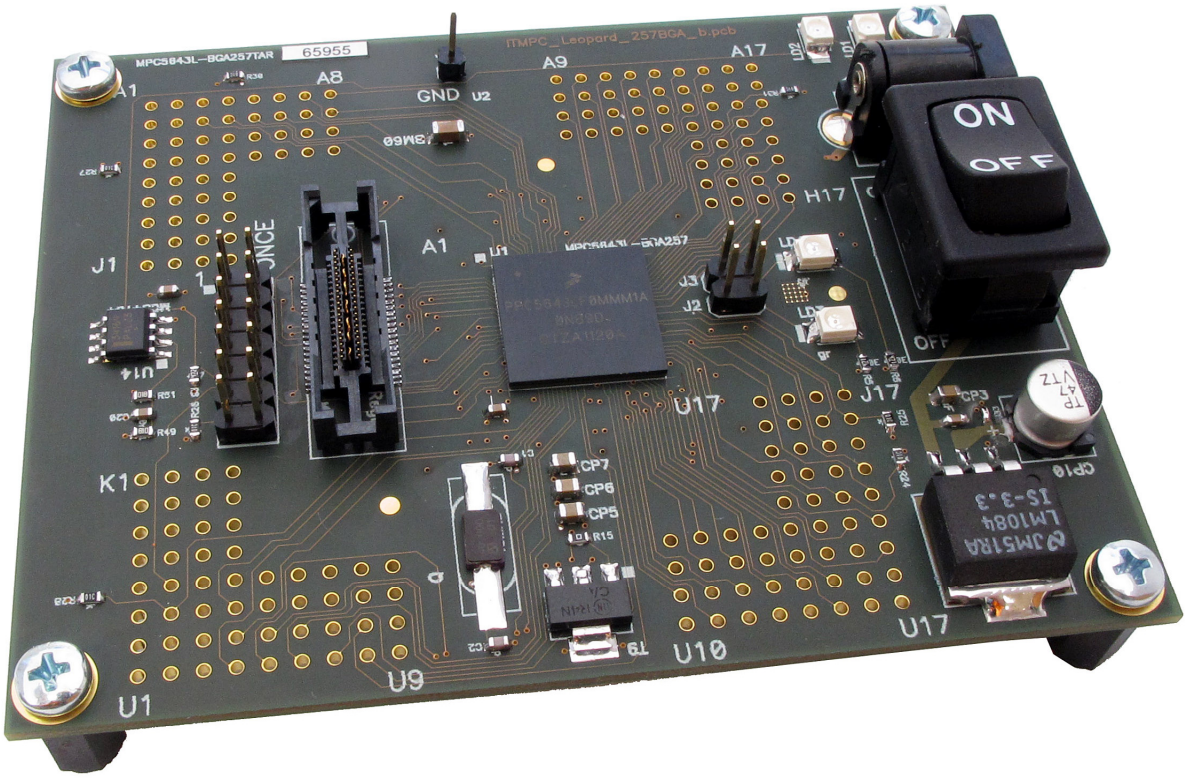
User's Manual

Freescale MPC5643L Target Board

	Ordering code
MPC5643L Target Board	**ITMPC5643L-257**



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Features

This target board is an evaluation and a development system for Freescale MPC5643L microcontroller. The ITMPC5643L package features a target board populated with Freescale MPC5643L CPU in the BGA257 package, ONCE debug and Nexus debug connector. A power supply also comes along with the board. The application under the development or test can run from the internal CPU flash or from the internal SRAM.

Specifications

Clock Speed – up to 120 MHz
Power requirement: 6 - 12V DC, + in the center @ 500 mA
Board Size: 106 mm x 86 mm

EVB-5643L Features

- MPC5643L, BGA257
- 40MHz clock (ext. crystal)
- Power Indicator – Supply voltage indication for 3.3V
- User Indicators – two LEDs connecting to the microcontroller
- Debug connections: ONCE (14-pin 2.54mm connector) and Nexus (Mictor 38-pin connector)

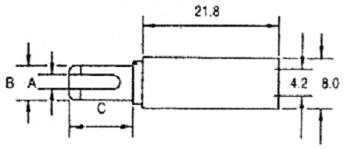
Software Development

The board has been tested with the microcontroller running at maximum frequency (120MHz). Software development can be performed by connecting the development tool to the ONCE (JTAG) or P4 (Nexus) connector. iSYSTEM provides various tools based on the iC5000 or the iC3000 unit. Contact iSYSTEM sales representative for more details on available tool options.

Power Supply

Permissible input voltage: 6-12 V DC, **+ in the center.** The required current load capacity of the power supply depends on the specific configuration of the target board. A power supply with a minimum of 500mA is recommended and delivered in the package. Low voltage DC plug must conform to the DIN 45323 standards:

- The hole diameter is 1.95 – 2.5 mm (standard: 2.1 mm)
- The external diameter is 6.2 - 5.5 mm (standard: 5.5 mm)



Dimensions

A	B	C
2.1	5.5	9.5

Switch-on the target board after the AC power supply is plugged into the wall and connected to the target board. Check that power indicator (LD1) lit, indicating that 3.3V voltage is present.

Note: When connecting an external debugger, make sure that the debugger is powered on first, then the target board and vice versa when switching off the system. First, switch off the target and then the emulator.

Settings and Options

Jumpers

Jumper J2 connects user LD4 LED to the MPC5643L pin T14 and jumper J3 connects user LD3 LED to the pin R14.

Status Indicators

LD1 LED indicates a presence of the 3.3 supply voltage. It lits when the power is applied to the evaluation board and the power switch is switched on.

LD2 LED indicates reset line status.

LD3 and LD4 are available for the user.

Component List

Name	Description
U1	Motorola MPC5643L CPU
P4	Nexus debug connector
P3	Power supply connector
ONCE	JTAG debug connector
J2	Connects LD4 to CPU T14
J3	Connects LD3 to CPU R14
J1	Connected to GND
LD1	Power LED 3,3V
LD2	Reset indication LED
LD3	User LED
LD4	User LED
SW1	Power switch

Connectors

14-pin 2.54mm ONCE debug connector

CPU_TDI	**1**	**2**	GND
CPU_TDO	**3**	**4**	GND
CPU_TCK	**5**	**6**	GND
N.C.	**7**	**8**	N.C.
CPU_RESET	**9**	**10**	CPU_TMS
3V3	**11**	**12**	N.C.
N.C.	**13**	**14**	CPU_TRST

Mictor 38-pin Nexus debug connector

Signal	Pin	Pin	Signal
NC	1	2	NC
NC	3	4	NC
MDO9	5	6	NC
NC	7	8	MDO8
RSTIN	9	10	EVTIN
TDO	11	12	VTREF
MDO10	13	14	RDY
TCK	15	16	MDO7
TMS	17	18	MDO6
TDI	19	20	MDO5
NTRST	21	22	MDO4
MDO11	23	24	MDO3
NC	25	26	MDO2
NC	27	28	MDO1
NC	29	30	MDO0
NC	31	32	EVTO
NC	33	34	MCKO
NC	35	36	MSEO1
NC	37	38	MSEO0

Note: External debug tool must connect to one debug connector only! Only Mictor 38-pin connector exposes Nexus debug interface.

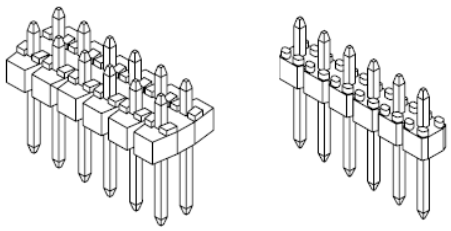
CPU expansion connection

The target board exposes all MPC5643L pins/signals, which allow easy expansion of the development system.

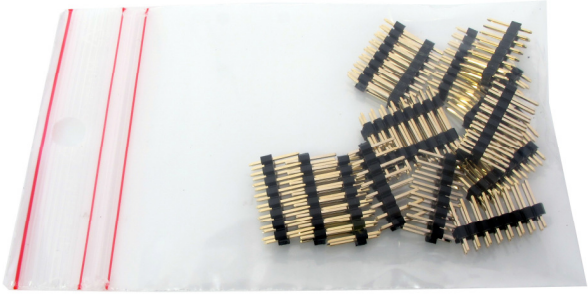
The expansion array uses the same numbering scheme as the original microcontroller in the BGA257 package and also matches with the MPC5643L BGA257 pinout.

By populating the expansion array with 2.54mm pitch headers, the board can be easily connected to another custom tailored board.

An example of breakaway dual and single row 2.54mm pitch headers, which can be easily stacked side-to-side:

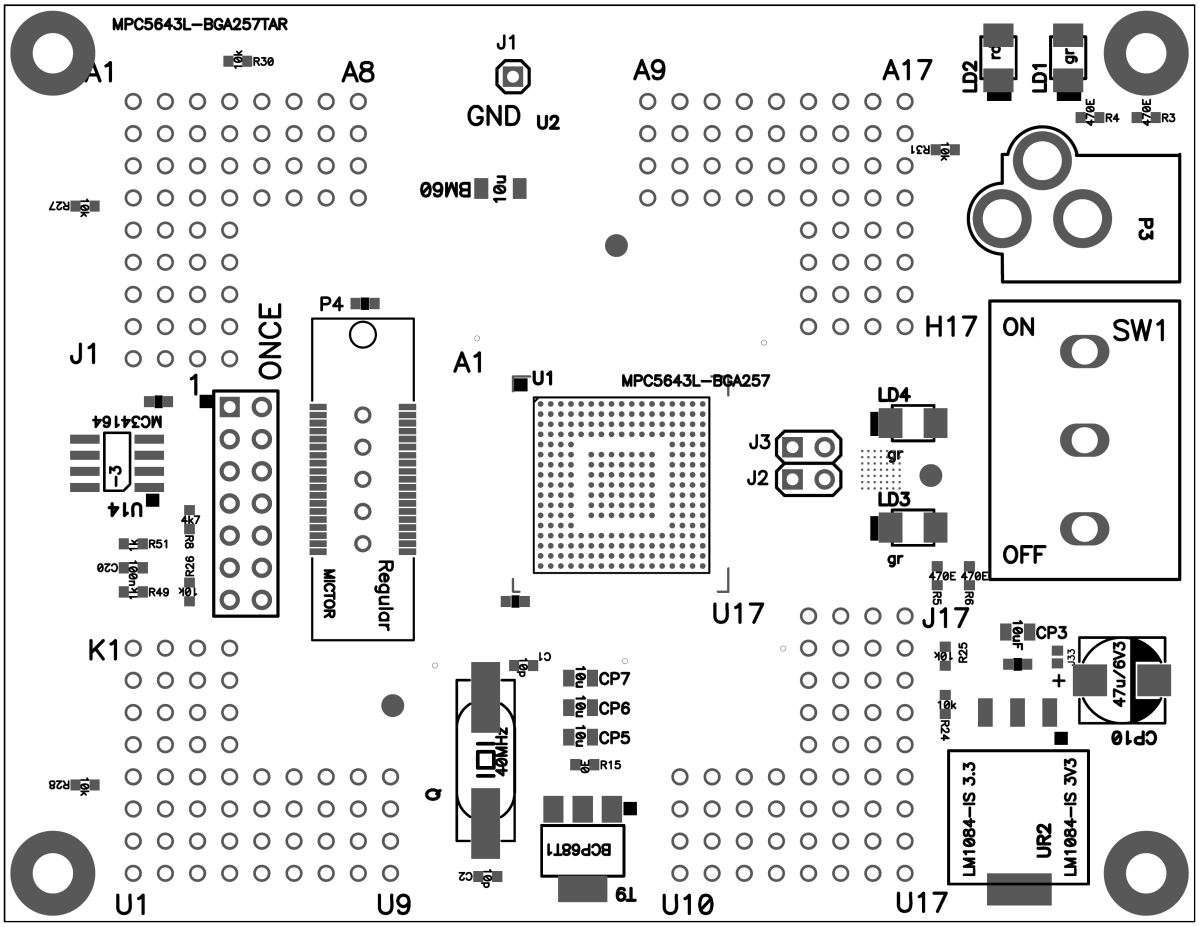


A small plastic bag with headers comes along the target board already.



Appendix A

View of the ITMPC5643L

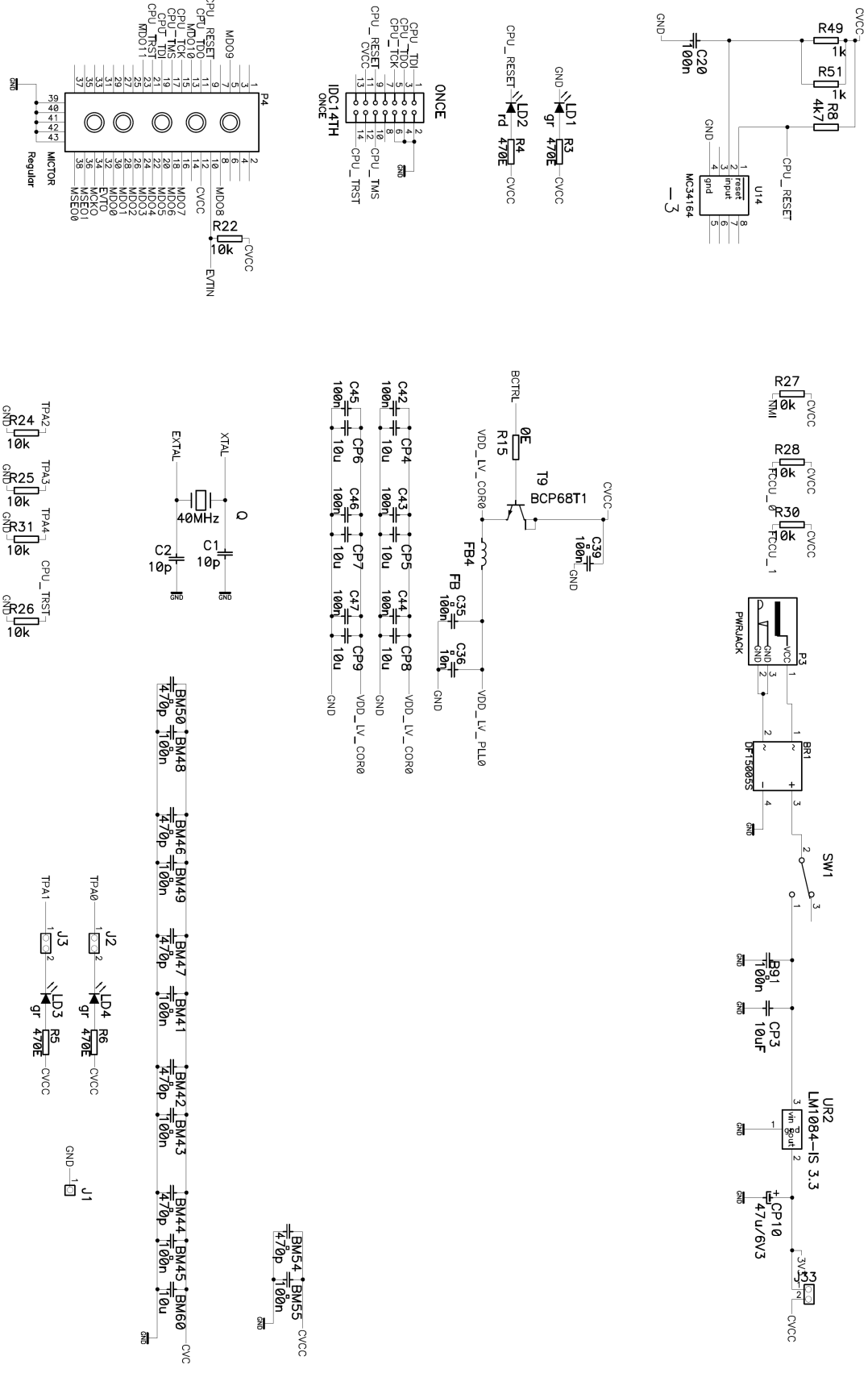


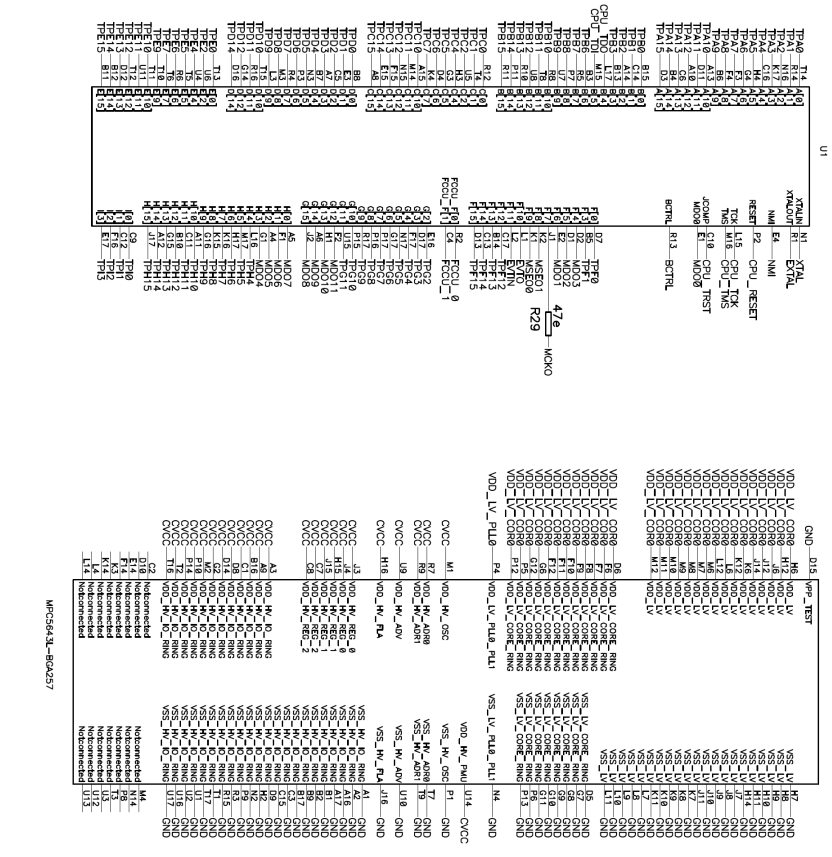
Note: A designation on *Figure 4* stands for A1 designation on the above ITMPC5643L view, B stands for B1, etc.

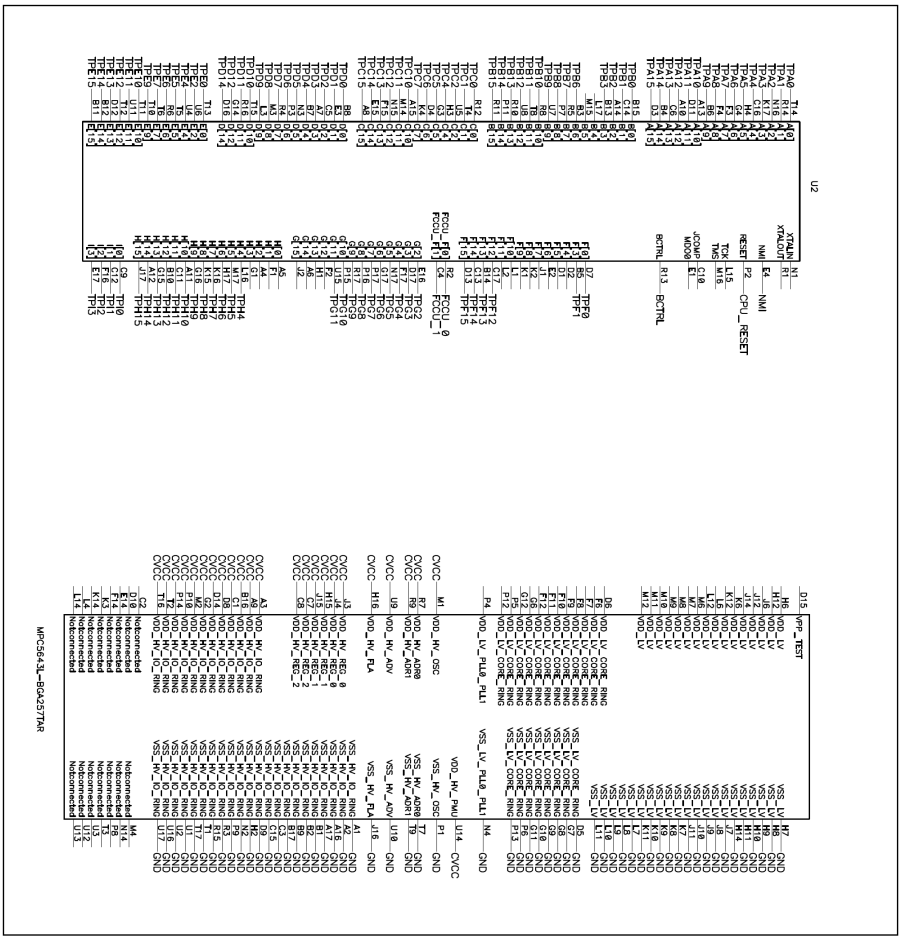
Expansion Connection as seen from the top.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	V_{SS}	V_{SS}	V_{DD_HV}	H[2]	H[0]	G[14]	D[3]	C[15]	V_{DD_HV}	A[12]	H[10]	H[14]	A[10]	B[2]	C[10]	V_{SS}	V_{SS}
B	V_{SS}	V_{SS}	B[6]	A[14]	F[3]	A[9]	D[4]	D[0]	V_{SS}	H[12]	E[15]	E[14]	B[3]	F[13]	B[0]	V_{DD_HV}	V_{SS}
C	V_{DD_HV}	NC[1]	V_{SS}	FCCU_F[1]	D[2]	A[13]	V_{DD_HV}	V_{DD_HV}	I[0]	JCOMP	H[11]	I[1]	F[14]	B[1]	V_{SS}	A[4]	F[12]
D	F[5]	F[4]	A[15]	C[6]	V_{SS}	V_{DD_LV}	F[0]	V_{DD_HV}	V_{SS}	NC	A[11]	E[13]	F[15]	V_{DD_HV}	V_{PP_TEST}	D[14]	G[3]
E	MDO0	F[6]	D[1]	NMI										NC	C[14]	G[2]	I[3]
F	H[1]	G[12]	A[7]	A[8]										NC	C[13]	I[2]	G[4]
G	H[3]	V_{DD_HV}	C[5]	A[6]										D[12]	H[13]	H[9]	G[6]
H	G[13]	V_{SS}	C[4]	A[5]										V_{SS}	V_{DD_HV}	V_{DD_HV}	H[6]
J	F[7]	G[15]	V_{DD_HV}	V_{DD_HV}										V_{DD_LV}	V_{DD_HV}	V_{SS}	H[15]
K	F[9]	F[8]	See note[2]	C[7]										NC	H[8]	H[7]	A[3]
L	F[10]	F[11]	D[9]	NC										NC	TCK	H[4]	B[4]
M	V_{DD_HV}	V_{DD_HV}	D[8]	NC										C[11]	B[5]	TMS	H[5]
N	XTAL	V_{SS}	D[5]	$V_{SS\_LV\_PLL}$										NC	C[12]	A[2]	G[5]
P	V_{SS}	$\overline{RESET}$	D[6]	$V_{DD\_LV\_PLL}$	V_{DD_LV}	V_{SS}	B[8]	NC	V_{SS}	V_{DD_HV}	B[14]	V_{DD_LV}	V_{SS}	V_{DD_HV}	G[10]	G[8]	G[7]
R	EXTAL	FCCU_F[0]	V_{SS}	D[7]	B[7]	E[6]	$V_{REFP\_HV\_AD0}$	B[10]	$V_{REFP\_HV\_AD1}$	B[13]	B[15]	C[0]	BCTRL	A[1]	V_{SS}	D[11]	G[9]
T	V_{SS}	V_{DD_HV}	NC	C[1]	E[5]	E[7]	$V_{REFN\_HV\_AD0}$	B[11]	$V_{REFN\_HV\_AD1}$	E[9]	E[10]	E[12]	E[0]	A[0]	D[10]	V_{DD_HV}	V_{SS}
U	V_{SS}	V_{SS}	NC	E[4]	C[2]	E[2]	B[9]	B[12]	V_{DD_HV}	V_{SS}	E[11]	NC	NC	V_{DD_HV}	G[11]	V_{SS}	V_{SS}
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Schematic


CVCC
R49
1k
R51
1k
R8
4k7
CPU_RESET
U14
MC34164
reset
input
gnd
GND
C20
100n
LD1
gr
R3
470E
LD2
rd
R4
470E
ONCE
IDC14TH
CPU_TDI
CPU_TDO
CPU_TCK
CPU_RESET
CPU_TMS
CPU_TRST
P4
MICTOR
Regular
MD09
MD08
MD07
MD06
MD05
MD04
MD03
MD02
MD01
MD00
EVTO
MSEO0
MSEO1
EVTIN
R22
10k
R27
0k
NMI
R28
0k
FCCU_0
R30
0k
FCCU_1
PWRJACK
P3
BR1
DF1500S3S
SW1
B91
100n
CP3
10uF
UR2
LM1084-IS 3.3
CP10
47u/6V3
3V3
BCTRL
R15
0E
T9
BCP68T1
C39
100n
VDD_LV_CORE
FB4
FB
C35
100n
C36
10n
VDD_LV_PLL
C42
100n
CP4
10u
C43
100n
CP5
10u
C44
100n
CP8
10u
C45
100n
CP6
10u
C46
100n
CP7
10u
C47
100n
CP9
10u
VDD_LV_CORE
XTAL
EXTAL
Q
40MHz
C1
10p
C2
10p
TPA2
R24
10k
TPA3
R25
10k
TPA4
R31
10k
CPU_TRST
R26
10k
BM50
BM48
BM46
BM49
BM47
BM41
BM42
BM43
BM44
BM45
BM60
BM54
BM55
470p
100n
10u
TPA0
J2
LD4
gr
R6
470E
TPA1
J3
LD3
gr
R5
470E
J1
GND


CPU
U1
MPC5643L—BGA257
47e
R29
MCKO


connector
U2
MPC5643L—BGA257TAR