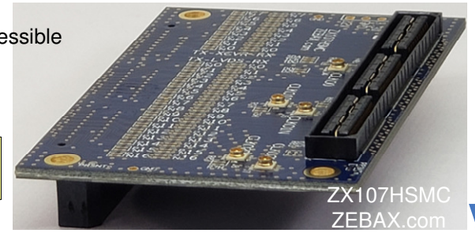
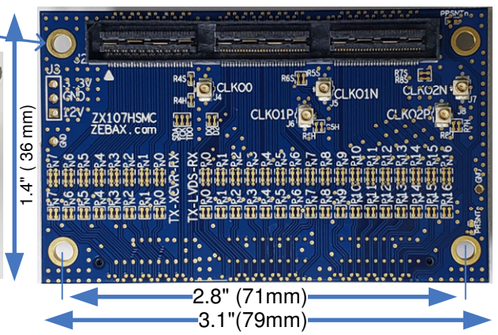
Product Name: **ZX107HSMC Altera High Speed Mezzanine Card , HSMC breakout adapter**

Product Description: Altera High Speed Mezzanine Card, HSMC, breakout adapter provides full access to ALL differential / single ended signals via accessible 0402 SMD landing pads

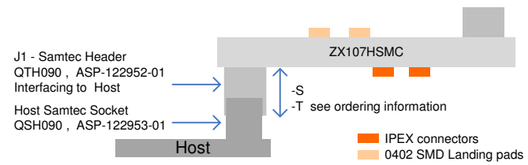
1- Onboard Samtec QTH / QSH (ASP-122952-01 and ASP-122953-01) connectors interfacing with Altera HSMC platform.
2- Full access to ALL differential / single ended signals via accessible shunts landing pads., see **page 4** for details.
3- All clocks are accessible via onboard IPEX connectors, see **page 3** for details.
4- Accessible JTAG, D0, D1, D2, D3, D4 signals via onboard shunts, see **page 2** for details.
5- Accessible +12V, 3.3V and GND signals via onboard 3 pin connector, J3 see **page 2** for details.
6- All traces are designed with 50 Ω Ohms trace impedance. 100 Ω Ohms differential signaling.
7- Designed in **6** layers PCBoard with improved signal integrity and crosstalk.
8- Accessible GND test point, The test point is connected to GND planes and direct interface to the QTH QSH GND blades.
9- Ease of interface with single channel and differential scope probes.
10- Mates with any height and form factor QSH-090 & ASP-122953-01 ASP-122952-01 connectors.
11- ZX107HSMC includes 2pc of IPEX to SMA cable assemblies. See ordering information

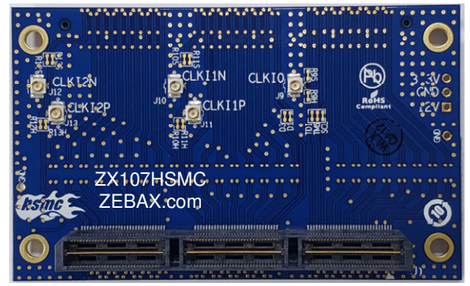
Pages 2, 3, 4 for more Details





ZX107HSMC cross section diagram





Electrical:

Insertion loss > -2dB @3GHz
Trace impedance: 50 Ω
Operating Temperature: -55°C to +125°C
Samtec Connector:
Onboard Connector: QTH-090 (ASP-122952-01) 2rows x 90pins/row
QSH-090 (ASP-122953-01) 2rows x 90pins/row
Pitch: 0.0197" (0.50mm) pin to pin pitch
Plating: Gold Flash
Header:
Pitch: 0.1" (2.54mm) pin to pin pitch
Pin: Square 0.025" (0.635mm)
Height: 0.24" (6mm)
Plating: Gold Flash
Shunt:
Package: 0402 SMD
IPEX MHF 35u gold plating receptacle

Application: Bringup, testing, emulation, development, modular design evaluations

Mates with : Samtec QSH090 QSH060(DP) . Fully compatible with Altera High Speed Mezzanine Card HSMC development platform.
Mates with HSMC Host interfacing ASP-122953-01
Mates with HSMC Mezzanine card, Target interfacing ASP-122952-01

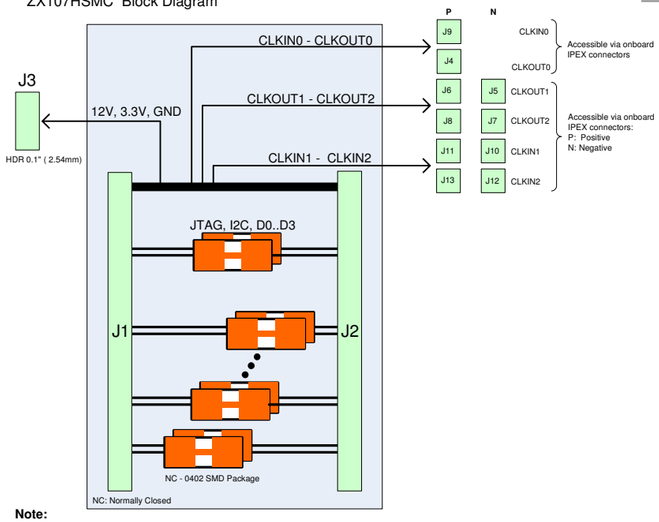
Signal assignments: See **Pages 2 , 3, 4** for Clock, JTAG signal assignment

Ordering options: ZX107HSMC module is available in -S or -T options:

-S option is standard height QTH (ASP-122952-01) connector height.
-T option is 3mm taller

Please see the ZX107HSMC-cross section diagram

ZX107HSMC Block Diagram



Note:
1- All Clocks are accessible via onboard IPEX connectors
2- All Altera HSMC signals from Host (J1) are connected to the daughter card connector J2.
3- PRSNTn, I2C, JTAG, D0..D3 signals are accessible via 0402 SMD landing pads.
4- Designed differentially paired access:
a) XCVR_**TX**[0..7]P/N – XCVR_**RX**[0..7]P/N
b) LVDS_**TX**[0..16]P/N – LVDS_**RX**[0..16]P/N

ZX107HSMC-X-X Package includes:

Part number	Quantity	Description
ZX107HSMC-X-X	1	HSMC breakout adapter
ZX00SMA-IPEX37-X	2	SMA to IPEX-37 cable assembly
ZX00BC2PH1	0	36AWG Bare Copper wire to pin header wire assembly

ZX00SMA-IPEX37-J/P for ordering the SMA-IPEX cable assembly

Ordering INFO:
Part Number
ZX107HSMC-X-X options
J : Jack SMA to IPEX cable assembly
P: Plug SMA to IPEX cable assembly
S : 0.2861"(7.264mm) height QTH (Standard)
T: 0.4043" (10.269mm) height QTH

-S & -T options mate with any height QSH QTH - ASP-122953-01 - ASP-122952-01

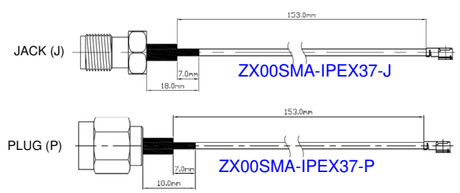
Compliance:

ISO2001 certified
RoHs - Lead Free
EU RoHS2
UL E111594 document
ELV- Vehicle Directive (Directive 2000/EC)
European Union Directive (203/11/EC)
Halogen Free per IEC-61249-2.21 : 2003
RoHs Directive 2011/65/EU
WEEE Directive (2012/12/EU)

Certificate of Compliance for Radioactive substances
Certificate of Compliance for Asbestos
Certificate of Compliance for Ozone Depleting Substances, ODS
Certificate REACH SVHC
Certificate of Compliance RoHS_EN_CoC

Zebax offers the following cable assemblies complementing the ZX107HSMC:

Part number	Description
ZX00SMA-IPEX37-J	SMA-Jack to IPEX coax cable assembly
ZX00SMA-IPEX37-P	SMA-Plug to IPEX coax cable assembly



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SPECIFIED DIMENSIONS ARE INCHES (MM).
ROHS COMPLIANT

ASSEMBLY DRAWING

ITEM: ZX107HSMC-X-X

DESCRIPTION: Altera High Speed Mezzanine card, HSMC breakout adapter test module

CHECKED: M. MARINA
DRAWN: SLAVIK
REVISION: 1.0
SHEET: 1 OF 4

Product Name: **ZX107HSMC Altera High Speed Mezzanine card , HSMC test / breakout module**

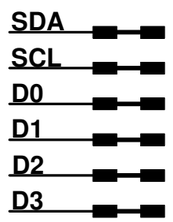
Shunt accessible signals: Table below lists the Altera HSMC accessible signals via onboard shunts. The shunts are standard 0402 SMD package where it can be accessed by any scope probe or probing wire with pin header such as ZX00BC2PH1, see ordering information for details.

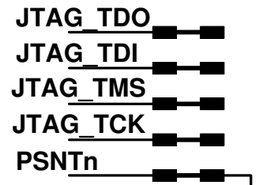
Typical signal connection:
0402 SMD Package

Typical signal connection:
Shunt 0402 SMD Package

Break signal path:

Accessible signals via onboard Shunts





The PSNTn is driven by host.
It is connected to GND via
0402 SMD placement.

Clocks: All Altera HSMC clocks are routed to onboard IPEX connectors as listed in the Figure below. The Table below lists the cross matrix clocks vs single ended signals for reference.

Cross Matrix Clocks vs Single ended				
Differential	**Single**		**Single**	**Differential**
CLKOUT1P	D36		D37	CLKIN1P
CLKOUT1N	D38		D39	CLKIN1N
CLKOUT2P	D76		D77	CLKIN2P
CLKOUT2N	D78		D79	CLKIN2N

Supply Voltage Connector: J3 connector provides access to Altera HSMC 12V, 3.3 and GND signals. J3 is 0.1" (2.54mm) pitch connector. Table below lists the J3 signal assignments.

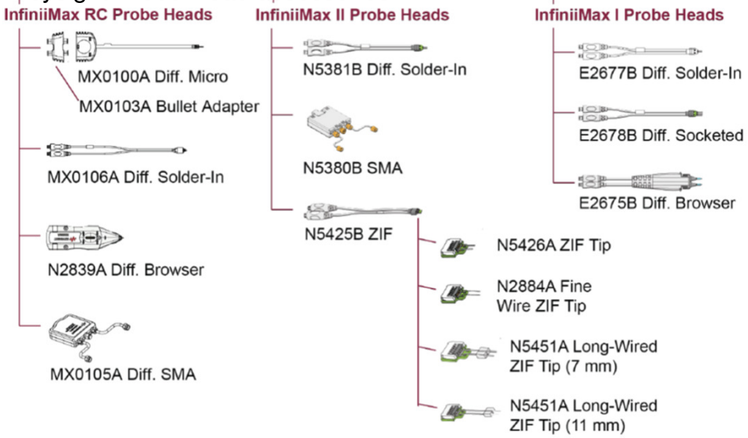
J3	
Pin	Assigned
1	12.0V
2	GND
3	3.3V

Scope Probe wire Installation: ZX107-HSMC is designed for use with both differential as well as single ended probes. Keysight & Tektronix offer variety of single ended as well as differential probes along with their accessories, below are few probes from each vendor:

a) Keysight differential probe or similar N2795A, N2796A, 1168V, 1135B along with E2677B differential Solder-in probe, N5426A ZIF Tip, N2884A Fine Wire ZIF Tip and more – See the figure “probe head accessories”.

b) Tektronix offers several single-ended as well as differential probes such as : P6245, P6248, P6247, P6246 or any of TDP7000 series and more.

Keysight Probe Head assessories



Clocks and Signal listings: Please refer to **Pages 3 , Page 4** for details.

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ASSEMBLY DRAWING

ITEM: ZX107HSMC-X-X

DESCRIPTION: Altera High Speed Mezzanine card, HSMC breakout adapter test module

CHECKED: M. MARINA

DRAWN: SLAVIK

REVISION: 1.0

Product Name: **ZX107HSMC Altera High Speed Mezzanine card , HSMC test / breakout module**

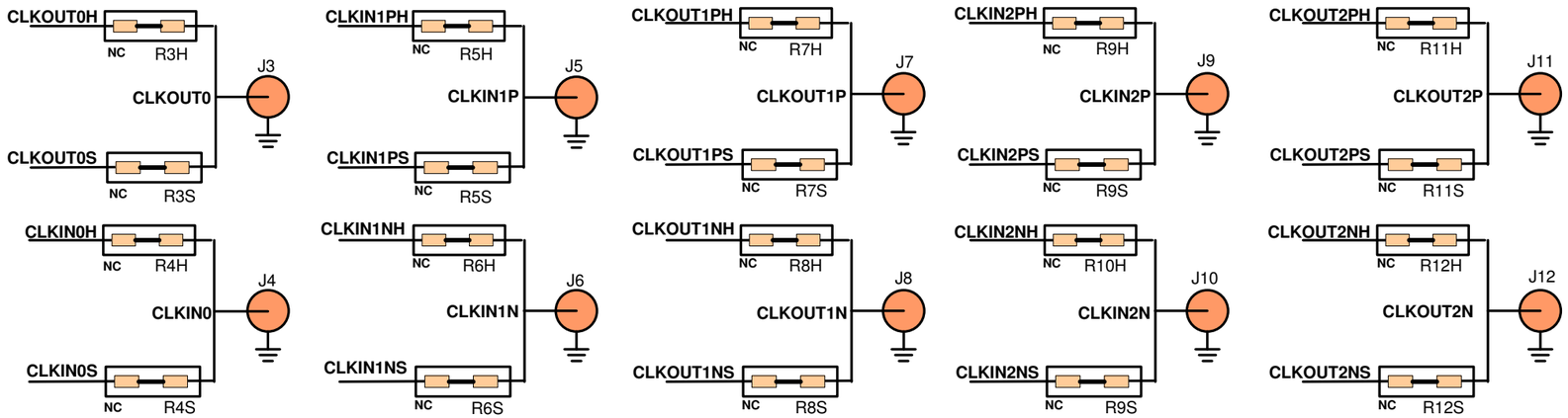
Clocks: The ZX107HSMC breakout adapter provides multiple options accessing clocks. Each IPEX connector provides option of 2 clock sources via onboard shunts. This clock sourcing method enables users to test and measure the required clock source. In addition, user is provided option to inject system with external clock source for purpose of test and measurements.

IPEX clocks are sourced from HSMC Host or Mezzanine card (Any clock's name ending with "S" is sourced to/from HSMC Mezzanine Card).
User may provide external stimulus (or scope) by soldering wire to the designated clock's via onboard shunts.
Default connection is Host to/from Mezzanine card – The link can be disconnected by cutting the trace between the shunt's landing pads.
NC: Normally Connect **NO**: Normally OPEN

CLKINx input to host FPGA x=0, 1, 2 Any Clock name ending with **"H"** (CLKOUT0**H**) is connected to Header Samtec Connector, J1.
CLKOUTx output from host FPGA x=0, 1, 2 Any Clock name ending with **"S"** (CLKOUT0**S**) is connected to Socket Samtec Connector, J2.

Trailing "P" and "N" on any clock name refers to Polarity of the clock.

IPEX Clock assignments



Signal listings: See **page 4** for list of signal listings

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ASSEMBLY DRAWING

ITEM: ZX107HSMC-X-X

DESCRIPTION: Altera High Speed Mezzanine card, HSMC breakout adapter test module

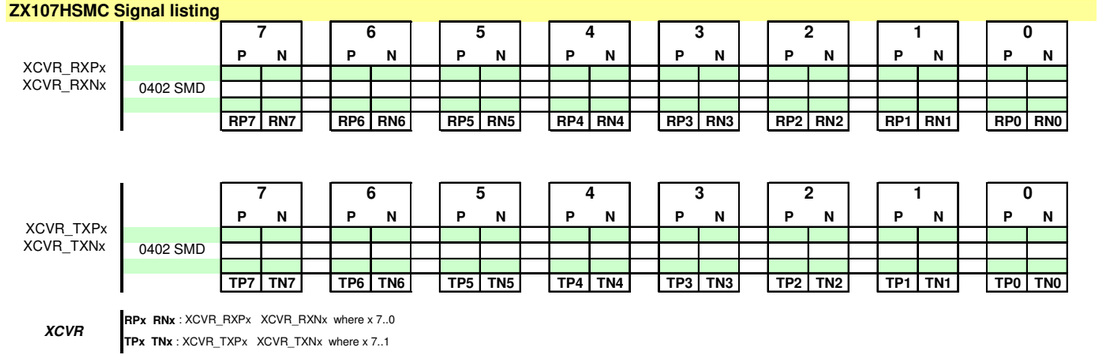
CHECKED: M. MARINA
DRAWN: SLAVIK
REVISION: 1.0
SHEET: 3 OF 4

Product Name: **ZX107HSMC Altera High Speed Mezzanine card , HSMC test / breakout module**

Signal listings: Signal listing of the ZX107HSMC is listed in 3 groups:

1- TX-XCVR-RX Listing of differential signal pairs
2- TX-LVDS-RX Listing of LVDS signal pairs
3- Clock vs Single ended - List of the single ended signals associated with the clocks. The clocks are accessible via IPEX connectors.

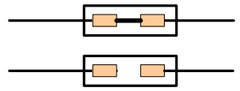
ZX107HSMC Signal listing



XCVR

RPx RNx : XCVR_RXPx XCVR_RXNx where x 7..0
TPx TNx : XCVR_TXPx XCVR_TXNx where x 7..1

Shunts 0402 SMD Package



NC (Normally Closed) configuration

NO (Normally Open) configuration

LVDS

TX -Listed Silk		Differential	Single		Single	Differential	RX- Listed Silk	
0	P	TP0	D4		D5	RP0	P	0
	N	TN0	D6		D7	RN0	N	
1	P	TP1	D8		D9	RP1	P	1
	N	TN1	D10		D11	RN1	N	
2	P	TP2	D12		D13	RP2	P	2
	N	TN2	D14		D15	RN2	N	
3	P	TP3	D16		D17	RP3	P	3
	N	TN3	D18		D19	RN3	N	
4	P	TP4	D20		D21	RP4	P	4
	N	TN4	D22		D23	RN4	N	
5	P	TP5	D24		D25	RP5	P	5
	N	TN5	D26		D27	RN5	N	
6	P	TP6	D28		D29	RP6	P	6
	N	TN6	D30		D31	RN6	N	
7	P	TP7	D32		D33	RP7	P	7
	N	TN7	D34		D35	RN7	N	
8	P	TP8	D40		D41	RP8	P	8
	N	TN8	D42		D43	RN8	N	
9	P	TP9	D44		D45	RP9	P	9
	N	TN9	D46		D47	RN9	N	
10	P	TP10	D48		D49	RP10	P	10
	N	TN10	D50		D51	RN10	N	
11	P	TP11	D52		D53	RP11	P	11
	N	TN11	D54		D55	RN11	N	
12	P	TP12	D56		D57	RP12	P	12
	N	TN12	D58		D59	RN12	N	
13	P	TP13	D60		D61	RP13	P	13
	N	TN13	D62		D63	RN13	N	
14	P	TP14	D64		D65	RP14	P	14
	N	TN14	D66		D67	RN14	N	
15	P	TP15	D68		D69	RP15	P	15
	N	TN15	D70		D71	RN15	N	
16	P	TP16	D72		D73	RP16	P	16
	N	TN16	D74		D75	RN16	N	

RPx RNx : LVDS_RXPx LVDS_RXPx where x 16..0
TPx TNx : LVDS_TXPx LVDS_TXPx where x 16..1

Single-Ended Host pin assignments - **D0 .. D75**

XCVR signal assignment

TX -Listed Silk		Differential		Differentia	RX- Listed Silk	
7	P	TP7		RP7	P	7
	N	TN7		RN7	N	
6	P	TP6		RP6	P	6
	N	TN6		RN6	N	
5	P	TP5		RP5	P	5
	N	TN5		RN5	N	
4	P	TP4		RP4	P	4
	N	TN4		RN4	N	
3	P	TP3		RP3	P	3
	N	TN3		RN3	N	
2	P	TP2		RP2	P	2
	N	TN2		RN2	N	
1	P	TP1		RP1	P	1
	N	TN1		RN1	N	
0	P	TP0		RP0	P	0
	N	TN0		RN0	N	

RPx RNx : XCVR_RXPx XCVR_RXNx where x 7..0
TPx TNx : XCVR_TXPx XCVR_TXNx where x 7..1

Notice

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ASSEMBLY DRAWING

ITEM: ZX107HSMC-X-X

DESCRIPTION: **Altera High Speed Mezzanine card, HSMC breakout adapter test module**

CHECKED: M. MARINA
DRAWN: SLAVIK
REVISION: 1.0
SHEET: 4 OF 4