

CMX Parts

Rev: 26-Sep-2012

CMX Card Count	Prototype	Production	Total	
With TP		2	4	6
Without TP		1	14	15
With no FPGA		1	0	1
Total		4	18	22

<-- this table drives the quantity totals below

<-- The cost of the FPGA spared here is not taken out below, but

Parts Common to all CMX

Grouping	Description	Part Number	Manufacturer	Distributor	Estimated Unit Price	Quantity per Board	Cost per Board	Quantity Total	Cost Total
Base CMX FGPA	Vertex 6 LX550T FF1759 package	XC6VLX550T-2FFG1759C	Xilinx	Avnet or Digikey	\$3,454.00	1	\$3,454.00	22	\$75,988.00
Board Support FPGA	Spartan 3	XC3S700A	Xilinx	.e.g. Digikey	\$50.00	1	\$50.00	22	\$1,100.00
Configuration	System ACE	XCCACE-TQG144I	Xilinx	Digikey	\$25.00	1	\$25.00	22	\$550.00
Configuration	50pin Compact Flash Socket	55358-5029	Molex	.e.g. Digikey	\$12.00	1	\$12.00	22	\$264.00
Configuration	Eject Mechanism	55356-0011	Molex	.e.g. Digikey	\$4.00	1	\$4.00	22	\$88.00
Configuration	Crystal ?				\$1.00	1	\$1.00	22	\$22.00
miniPOD	12-line Transmitter	AFBR-811FH1Z	Avago	e.g. Avnet	\$300.00	2	\$600.00	44	\$13,200.00
miniPOD	9x9 MEG Array Plugs	55714-102LF	FCI	e.g. Avnet	\$12.33	5	\$61.65	110	\$1,356.30
Backplane Connect	Z-Pack 2mm Plastic Housing	AMP 100752-1			\$10.00	1	\$10.00	22	\$220.00
Backplane Connect	Power Contact	Tyco 148513-1			\$7.90	2	\$15.80	44	\$347.60
Backplane Connect	Power Contact	Tyco 2-1393589-7			\$18.00	1	\$18.00	22	\$396.00
Backplane Connect	Guide Module	AMP 223979-1			\$6.31	1	\$6.31	22	\$138.82
Backplane Connect	Z-Pack 2mm 5x19 pin connector	AMP 352171-1			\$10.42	6	\$62.52	132	\$1,375.44
Backplane Connect	Z-Pack 2mm 5x25 pin connector	AMP 352069-1			\$11.66	2	\$23.32	44	\$513.04
Power	DC-DC Converter (low current)		Texas Instruments	.e.g. Digikey	\$20.00	4	\$80.00	88	\$1,760.00
Power	DC-DC Converter (high current)		Texas Instruments	.e.g. Digikey	\$40.00	2	\$80.00	44	\$1,760.00
VME	Transceivers	SN74LVT245BDWR	Texas Instruments	.e.g. Digikey	\$1.00	3	3	66	\$66.00
VME	Receivers	SN74LVTH574DWR	Texas Instruments	.e.g. Digikey	\$1.00	3	3	66	\$66.00
VME	Driver	74F38	Texas Instruments	.e.g. Digikey	\$0.50	1	0.5	22	\$11.00
VME	2.5V-3.3V level translator	74 AVCAH 164245	Texas Instruments	.e.g. Digikey	\$4.30	3	\$12.90	66	\$283.80
Cable IO	LVDS transceiver	DS91M040	National Semi	.e.g. Digikey	\$6.12	21	\$128.52	462	\$2,827.44
Cable IO	2.5V-3.3V level translator	74 AVCAH 164245	Texas Instruments	.e.g. Digikey	\$4.30	6	\$25.80	132	\$567.60
CTP output	MDR 68 pin Connector	10268-55H3PC	3M	.e.g. Digikey	\$5.69	2	\$11.38	44	\$250.36
CTP output	LVDS transceiver	DS91M040	National Semi	.e.g. Digikey	\$6.12	18	\$110.16	396	\$2,423.52

CTP output	2.5V-3.3V level translator	74 AVCAH 164245	Texas Instruments	.e.g. Digikey	\$4.30	10	\$43.00	220	\$946.00
							\$0.00	0	\$0.00
TTCRx	2x30pin SMT Double Row Conn	QSH-030-01-L-D-A	Samtec	e.g Digikey	\$9.00	2	\$18.00	44	\$396.00
TTCRx	Clock Receiver and PLL				\$20.00	1	\$20.00	22	\$440.00
TTCRx	Clock Buffer				\$20.00	1	\$20.00	22	\$440.00
On board Clock	Crystal custom 40.08 MHz				\$40.00	1	\$40.00	22	\$880.00
G-Link	SFP Transceiver (LC Conn)	V23818-M305-B57	Infineon	obsolete?	\$70.00	2	\$140.00	44	\$3,080.00
G-Link	SFP cage and connector	SFPK-SL?	Samtec	e.g Digikey	\$6.00	4	\$24.00	88	\$528.00
CANbus	Dual CAN microcontroller	MB90F594	Fujitsu		\$20.00	1	\$20.00	22	\$440.00
CANbus	crystal 4 MHz				\$1.00	1	\$1.00	22	\$22.00
CANbus	Quad 2-INPUT Mux	74FCT157T			\$1.00	1	\$1.00	22	\$22.00
CANbus	RS232 interface (for progr)	SP232A	Exar	e.g Digikey	\$1.00	1	\$1.00	22	\$22.00
CANbus	CAN Interface (to backplane)	PCA82C250	NXP (Philips)	e.g Digikey	\$1.75	1	\$1.75	22	\$38.50
CANbus	Remote Temp monitor (SMBus)	MAX1668	maxim	e.g Digikey	\$10.00	1	\$10.00	22	\$220.00
CANbus	Temperature Sensor	LM35DZ	National Semi	e.g Digikey	\$1.50	2	\$3.00	44	\$66.00
CANbus	Octal 3-state Buffer	74HCT244	NXP, Fairchild	e.g Digikey	\$0.50	1	\$0.50	22	\$11.00
CANbus	Octal 3-state TransX	74LVT245	NXP, TI, Fairchild	e.g Digikey	\$0.50	1	\$0.50	22	\$11.00

- still missing capacitors
- still missing fuses
- still missing LEDs
- still missing resistors
- still missing front panel
- still missing stiffening bars
- still missing test connectors and headers

Total parts							\$5,142.61		\$113,137.42
							\$4,402.61 <-- Total assembly parts (i		
							\$5,142.61 <-- Total Parts per board fr		\$113,137.42

Circuit Board	Tooling (Non Recurring Costs)	Prototype	ADCO		\$5,064.00	0		1	\$5,064.00
Circuit Board	Manufacturing	Prototype			\$1,440.00	1	\$1,440.00	4	\$5,760.00
Circuit Board	Assembly	Prototype	estimated for a TP CMX -->		\$4,544.00	1	\$4,544.00	4	\$18,176.00

\$11,126.61 <-- Total for 1x prototype

Circuit Board	Tooling (Non Recurring Costs)	Production			\$0.00	0		1	\$0.00
Circuit Board	Manufacturing	Production			\$948.00	1	\$948.00	18	\$17,064.00
Circuit Board	Assembly	Production	estimated for a TP CMX -->		\$3,552.00	1	\$3,552.00	18	\$63,936.00

\$9,642.61 <-- Total for 1x production

\$223,137.42

Additional parts for TP CMX

Grouping	Description	Part Number	Manufacturer	Distributor	Estimated Price	Quantity per Board	Cost per Board	Quantity Total	Cost Total
TP CMX FGPA	Vertex 6 LX550T FF1759 package	XC6VLX550T-2FFG1759C	Xilinx	Avnet or Digikey	\$3,454.00	1	\$3,454.00	6	\$20,724.00
miniPOD	12-line receiver	AFBR-821FH1Z	Avago	e.g. Avnet	\$200	3	\$600.00	18	\$3,600
G-Link	SFP Transceiver (LC Conn)	V23818-M305-B57	Infineon		\$70.00	2	\$140.00	12	\$840.00
							\$7,856.61 <-- Total assembly parts (i		
							\$9,336.61 <-- Total Parts per board fr		
									\$25,164.00
									\$138,301.42
Circuit Board	Incremental Tooling	Prototype			\$0.00	0		1	\$0.00
Circuit Board	Incremental Assembly	Prototype			\$0.00	1	\$0.00	2	\$0.00
							\$4,194.00 <-- Incremental cost for ac		
							\$15,320.61 <-- Total for 1x prototype		
Circuit Board	Incremental Tooling	Production			\$0.00	0		1	\$0.00
Circuit Board	Incremental Assembly	Production			\$0.00	1	\$0.00	4	\$0.00
							\$4,194.00 <-- Incremental cost for ac		
							\$13,836.61 <-- Total for 1x production		
									\$25,164.00
									\$248,301.42

fabrication	(edmunds email 2012.09.19)	NRE	\$8,000	quantity 4	bare pcb	assembly	total	quantity 18	bare pcb	assembly
	vender		unit cost					unit cost		
	ADCO		\$5,064	\$13,984	\$1,440	\$4,544	\$4,544	\$12,500	\$948	\$3,552

Hughes

\$3,190

\$2,581

\$1,690

Circuit Board
Circuit Board

Manufacturing
Assembly

Prototype
Prototype

(ADCO)
(ADCO)

1
1

\$4,544.00
\$0.00

3
3

\$13,632.00
\$0.00

\$9,608.00 <-- Total for 1x prototype

Circuit Board
Circuit Board

Manufacturing
Assembly

Production
Production

(ADCO)
(ADCO)

1
1

\$3,552.00
\$0.00

3
3

\$14,750.61
\$23,138.61
\$37,889.22
\$10,656.00
\$0.00

\$3,552.00 <-- Total for 1x production

BASE
ONLY

\$10,656.00
\$25,406.61
\$256,000.00

but the cost of making 3 species is not added either

outstanding

cost total **Notes**

\$75,988.00

\$0.00

\$1,100.00 a conservative guess

\$0.00 ** already purchased **

\$264.00

\$88.00

\$22.00

\$0.00

\$13,200.00 Do we need to populate all miniPOD sites?

\$1,356.30 populate all MEG array sites

\$0.00

\$0.00 ** already purchased **

\$0.00 ** already purchased **

\$0.00 ** already purchased **

\$0.00 ** already purchased **

\$0.00 ** already purchased **

\$0.00 ** already purchased **

\$0.00

\$1,760.00

\$1,760.00

\$0.00

\$66.00

\$66.00

\$11.00

\$283.80

\$0.00

\$2,827.44 cheaper for Q=1,000 ->\$4.90/each. We may be close

\$567.60

\$0.00

\$250.36

\$2,423.52

\$946.00
\$0.00
\$396.00
\$440.00 total guess
\$440.00 total guess
\$880.00 total guess
\$0.00
\$3,080.00 CMM G-link transX can probably be reused
\$528.00
\$0.00
\$440.00 from CMM
\$22.00 from CMM
\$22.00 from CMM
\$22.00 from CMM
\$38.50 from CMM
\$220.00 from CMM
\$66.00 from CMM
\$11.00 from CMM
\$11.00 from CMM

\$109,596.52

i.e. no miniPOD, no G-link) for one Base-only CMX
or one Base-only CMX

<-- Total parts for all boards as Base-Only CMX

calculated as $13,984 - 8,000 - 1,440 = 4,544$

Base-Only CMX board (ignoring tooling)

This assumes no change between proto and prod

calculated as $12,500 - 8,000 - 948 = 3,552$

Base-Only CMX board (ignoring tooling)

<-- Total cost for all CMX boards if built as Base-only

Notes

Do we need to populate all miniPOD sites?

CMM G-link transX can probably be reused

i.e. no miniPOD, no G-link) for one TP CMX
or one TP CMX

<-- Total incremental parts for all TP CMXs (*)

<-- Total parts all CMX boards of all types (*)

This assumes no cost difference between CMX types

This assumes no cost difference between CMX types

Adding TP functionality to 1x prototype CMX board
1 CMX board with **Base & TP** functionality

This assumes no cost difference between CMX types

This assumes no cost difference between CMX types

Adding TP functionality to 1x production CMX board
1 CMX board with **Base & TP** functionality

<-- Incremental cost for adding TP functionality
to some (*) of the CMX boards

<-- Total for **all CMX boards**, prototype&production,
most Base-only and some (*) with TP functionality

(*) = cf. table at top with card types and quantity

total

\$4,500

** largest unknown **

** largest unknown **

Base-Only CMX board

<-- Total Prototypes Base-Only CMX

<-- Total Prototype TP CMX

TOTAL PROTOTYPE

** largest unknown **

** largest unknown **

Base-Only CMX board

<-- Total cost for production CMX boards

<-- Total cost for production + prototypes CMX boards

budgeted