

MICHIGAN STATE
UNIVERSITY

National Superconducting Cyclotron Laboratory



CoBo Specifications

Version 1.1
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CoBo Specification

Introduction

CoBo: **C**oncentration **B**oard, is a custom printed circuit board (PCB), firmware, and embedded software for the GET (General Electronics for time projection chamber (TPC)) project. CoBo, intelligently, reads, reduces, and concentrates the high data throughput of TPC detectors.

A GET system consists of five major hardware components: a TPC **detector**, **AGET** chips which are hosted on an **Asad** PCB, **CoBo** cards, and **Mutant** card.

TPC analog signals are passed to AGET chips (designed at CAE) where they are conditioned and compared, then they are converted to the digital domain using the ADCs (Analog-to-Digital-Convert) on the Asad board (designed at CENBG) and communicated to CoBo. Multiple CoBo board are orchestrated by the Mutant (Multiplicity and Trigger board designed at GANIL) via the MicroTCA backplane to concentrate and readout the data.

Services offered

Delivery (via VadaTech) of functional CoBo 1.0v PCB preloaded with firmware and embedded software.

Specifications

Major components and services:

#	Description	Remarks	Part #
1	14-Layer PCB	(Pb Free)	
2	FPGA/SoC	Xilinx Virtex-5	XC5VFX100T-1FFG1136C
3	DDR2 Memory	Micron 256MB	(2) MT47H64M16HR-3:H TR
4	Flash Memory	Micron 32MB NOR	PC28F256P30TFE
5	Mutant Interface	Single	
6	Asad/AGET Interface	4 Asads (16 AGETs total)	
7	MicroTCA Interface		Based on VadataTech VT026
8	MicroTCA.0 compliance	Electrical & Mechanical	
9	Testing	Electrical & Functional	Done by VadaTech
10	Firmware	Preloaded -- Binary	
11	Embedded Software	Preloaded	

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Purchasing Information

- Agreement between MSU/NSCL and VadaTech has been reached and signed on **July 15th 2013**
- CoBo 1.0v can be purchased from VadaTech, URL: <http://vadatech.com/>
- Part Numbers:

Party	Part Number	Qty	Unit Price	Minimum Qty
Collaborators*	CM044-000-000-001	1	5,000 USD	10
Non-Collaborators	CM044-000-000-002	1	6,000 USD	10

Collaborators* are:

- 1- Michigan State University
- 2- Grand Accelérateur National d'Ions Lourds
- 3- Institut de Recherche sur les lois Fondamentales de l'Univers
- 4- Centre d'Etudes Nucleaires de Bordeaux Gradignan
- 5- Western Michigan University
- 6- Notre Dame University
- 7- Lawrence Livermore National Laboratory
- 8- Saint Mary's University, Nova Scotia, Canada
- 9- Ernest Orlando Lawrence Berkley National Laboratory

Point of Contact:

- Sales:
 - Immediate assistance
 - Email: Sales-Team@VadaTech.com
 - Don Fenyk (Regional Sales Manager)
 - Voice: +1-973-845-6555
 - Fax: +1-973-845-6556
 - Cell: +1-201-572-1290
 - Email: don@vadatech.com
 - Paul Kuepfer (Managing Director -- VadaTech Asia-Pacific Branch Office)
 - Taipei Office: +886-2-2627-7655
 - Mobile Taiwan: +886 963 690 901
 - UK office: +44 2380 381982
 - Email: paul.kuepfer@vadatech.com
 - Ian Shearer, CEng MIEE (Managing Director -- EU)
 - Office: +44 2380 381982
 - Mobile: +44 7738 773192

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- Fax: +44 2380 381983
- Email: ian.shearer@vadatech.com
- Support (support_team@vadatech.com)

Privacy statement

Purchase orders and records will be published and distributed to collaborators via email/wiki.

Ownership

The design, hardware, firmware and/or software are copyright protected and are proprietary property of Michigan State University. (TEC2011-0083)

Disclaimer

MSU/NSCL will not be responsible for typographical or other errors or omissions regarding prices or other information.

All sales are subject to VadaTech's Standard Sales Terms and Conditions.

Indemnity

Failure to properly operate Cobo could result in property damage, personal injury or death. MSU/NSCL cannot be held responsible for any and all claims, damage, loss, cost, expense or other liability for property damage, personal injury, wrongful death or any other claim resulting from the operation of CoBo.

Notes:

- Minimum lot order of 10 required per run.
 - VadaTech may take orders of less than 10, but this incur additional costs.
 - An order of less than 10 boards can be placed at the regular price if the total number of boards purchased at the same period of time by multiple groups is greater than 10. For example, GANIL purchases 20 boards and IRFU purchases 2 boards -- at the same time.
 - Labs/Institutions need to organize with each other (using eDoc or mailing list) if they plan to purchase less than the minimum requirement. NSCL is not responsible for coordinating orders.
- Standard lead-time after initial order will be 6-8 Wks. ARO
- VadaTech offers the following quantity price breaks:
 - 1-99 – List
 - 100-999 - 5% Off

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- 1000-2499 - 10% Off
- 2500-4999 - 15% Off
- Orders will be shipped directly from VadaTech:
 - VadaTech is responsible for testing the boards before shipping.
 - VadaTech has a limited warranty i.e. faulty hardware e.g. PCB assembly issues.
- CoBo Technical support:
 - VadaTech will not provide technical support for CoBo.
 - NSCL will provide limited support e.g. eDoc documentation.
 - NSCL will provide one-on-one support for an additional cost. The price estimate is \$1,250/month for 8 hours of engineering support.
- CoBo documentation is/will be provided on eDoc/wiki.
- CoBo binary firmware is/will be provided on eDoc/wiki. Firmware is not redistributable.
- For the complete MicroTCA system (GET compatible) the following items are needed:

#	Quantity	Part Description	Part Number
1	1	MicroTCA Chassis	VT893-123-000-000
2	1	1KW Power Supply*	UTC010-200-000-010
3	1	Single Width Full Height filler panel	AMC999-003-000-000
4	1	Double Width Full height filler panel	AMC999-103-000-000
5	1	MCH	UTC002-210-400-010
6	1	(Optional) Full Height JTAG Module (JSM)**	UTC008-003-000-000

* An additional redundant power supply can be purchased if needed.

** If JTAG Module is not purchased. It is highly recommended purchasing an additional Single Width Full Height filler panel (Part# AMC999-003-000-000)