



Motion Systems Status at SESAME

The 15th International Conference on Accelerator and Large Experimental Physics Control

17th to 23rd October, 2015

Melbourne, Australia

Yazeed Momani

Electronics Group

- Who Am I ?
- SESAME Motion System Starting Point
- Motion Controller Selection Process
- SESAME MSB Prototype 1
- Standard Stepper Driver Selection Process
- Stepper Driver Eurocard Carrier Design
- What is Next ?

Who Am I ?

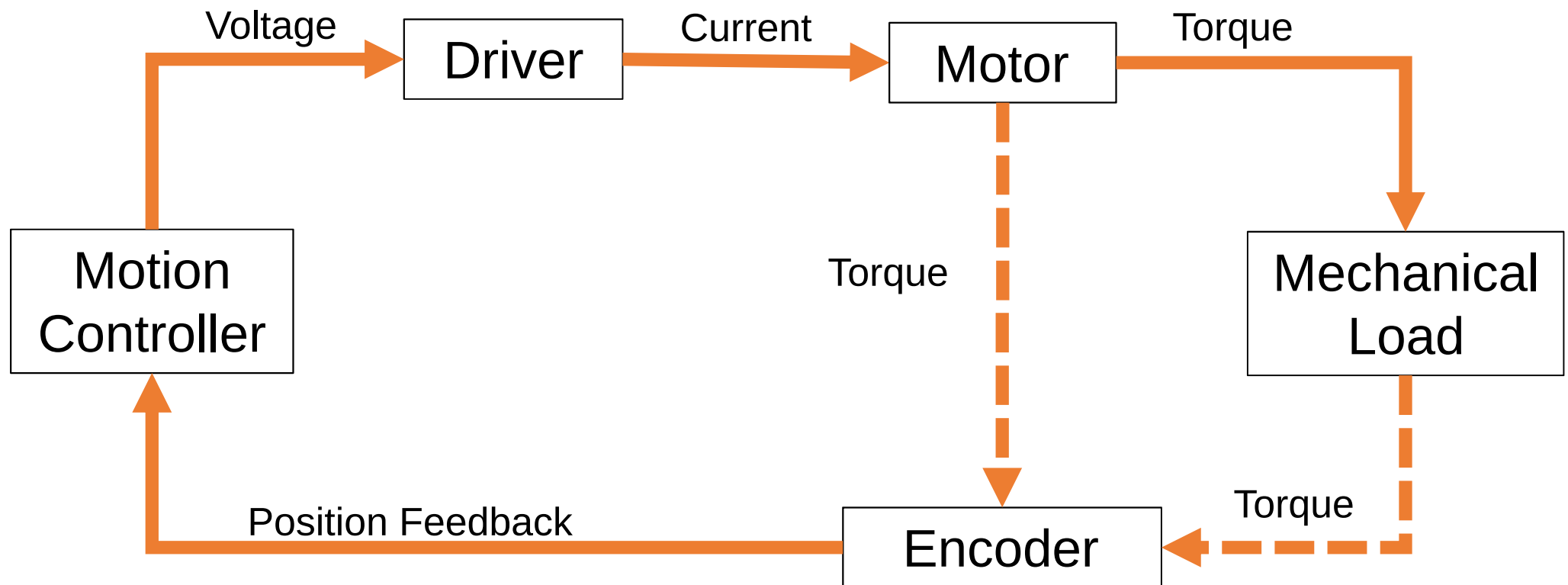
Name: Yazeed Momani

Job Role: Electronics & Instrumentation Engineer

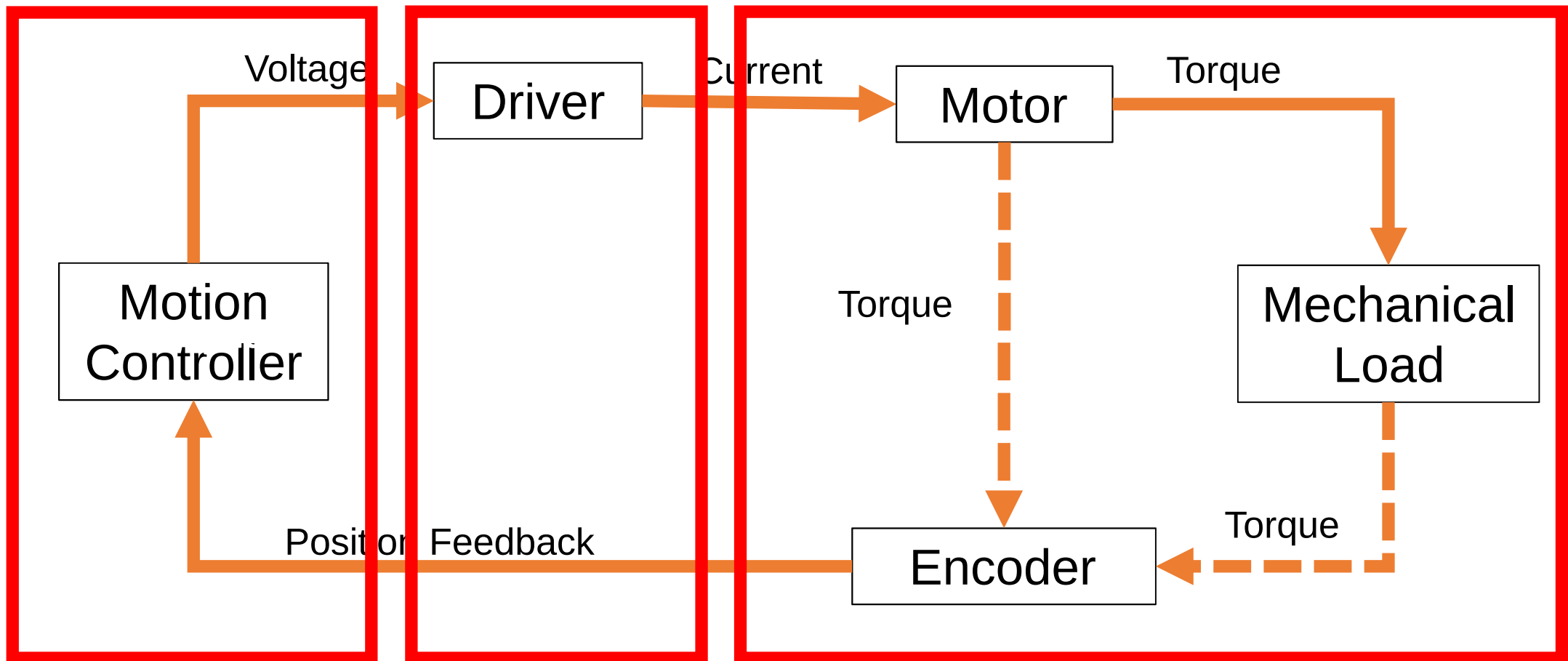
Major : B.Sc. Electronics & Telecommunication Engineering

Experience : Motion Systems Engineer
Telecommunications (Mobile Networks)

Motion System

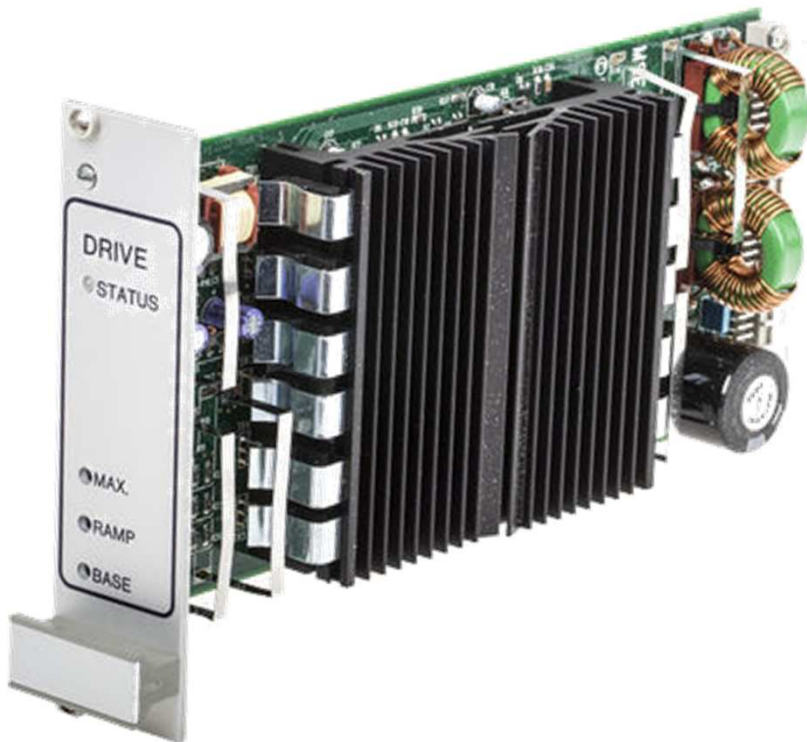


Motion System

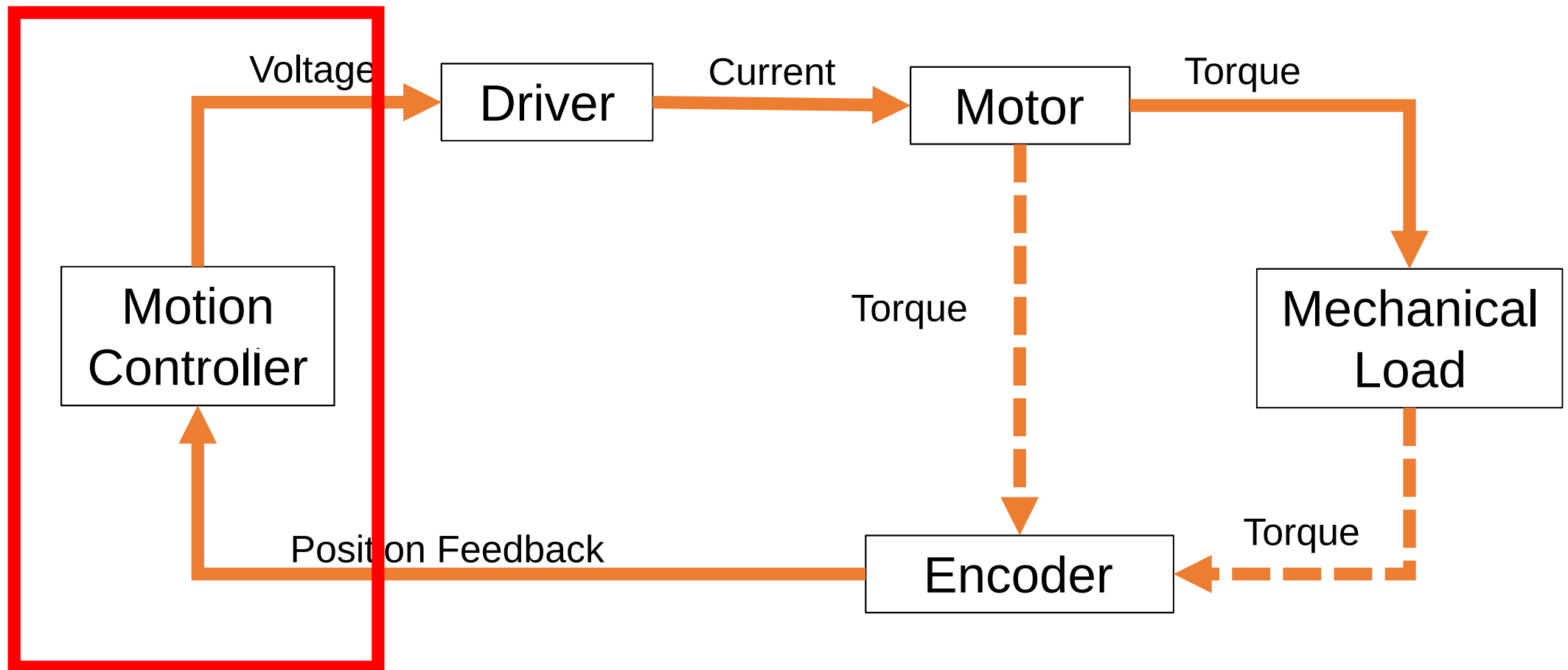


Drivers

- 40 PM542 – 2.0A Bipolar Single Axis Stepper Drive
- 13 PM546 – 6.0A Bipolar Single Axis Stepper Drive
- 14 Pacific Scientific 6410 Stepper Motor Drivers



Motion System

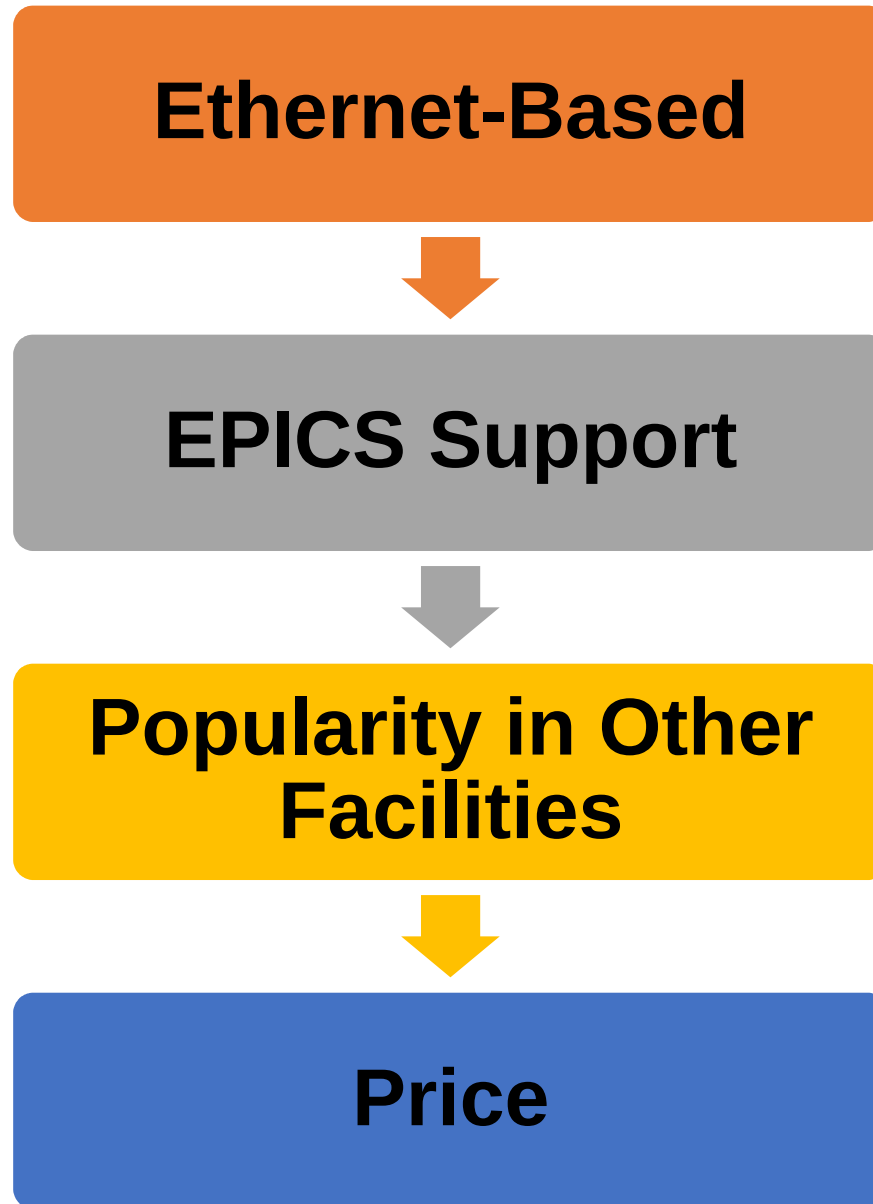


Controller Selection

VME-Based, PLC-Based or Ethernet-based?

Why Ethernet-based?

Controller Selection - Required Specs



Controller Selection - Candidates



DELTA TAU
Data Systems, Inc.

NEW IDEAS IN MOTION ...



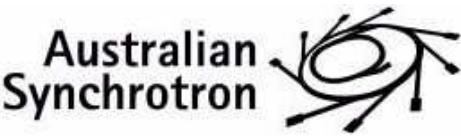
GALIL

WE MOVE THE WORLD



 DELTA TAU Data Systems Inc.	 GALIL WE MOVE THE WORLD	 midi ingénierie	 Newport. Experience Solutions
UMAC	DMC-21x3	BMAC	XPS-Q8
✓	✓	✓	✓

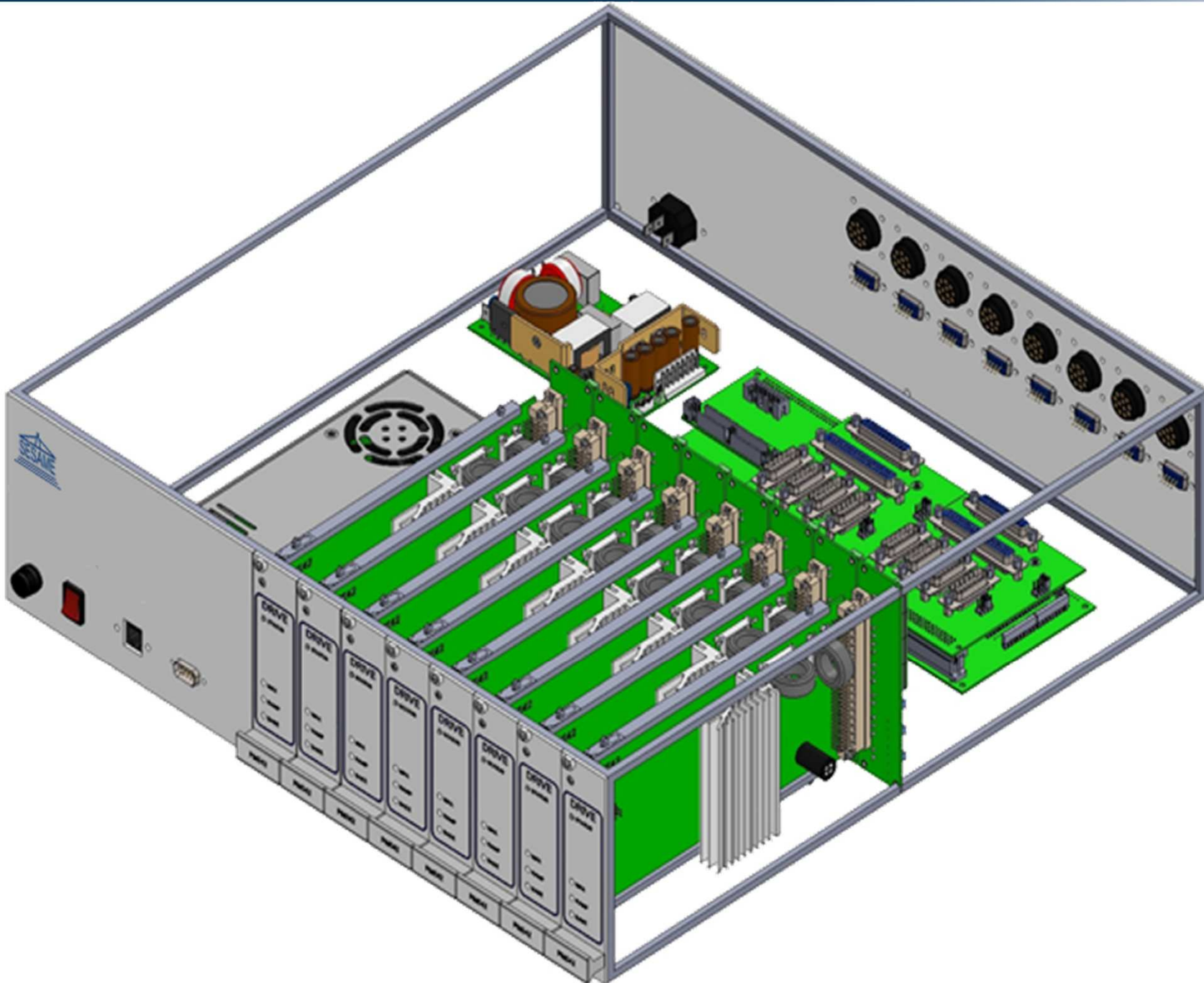
Controller Selection – Popularity

 DELTA TAU Data Systems Inc.			
			
			
			
			

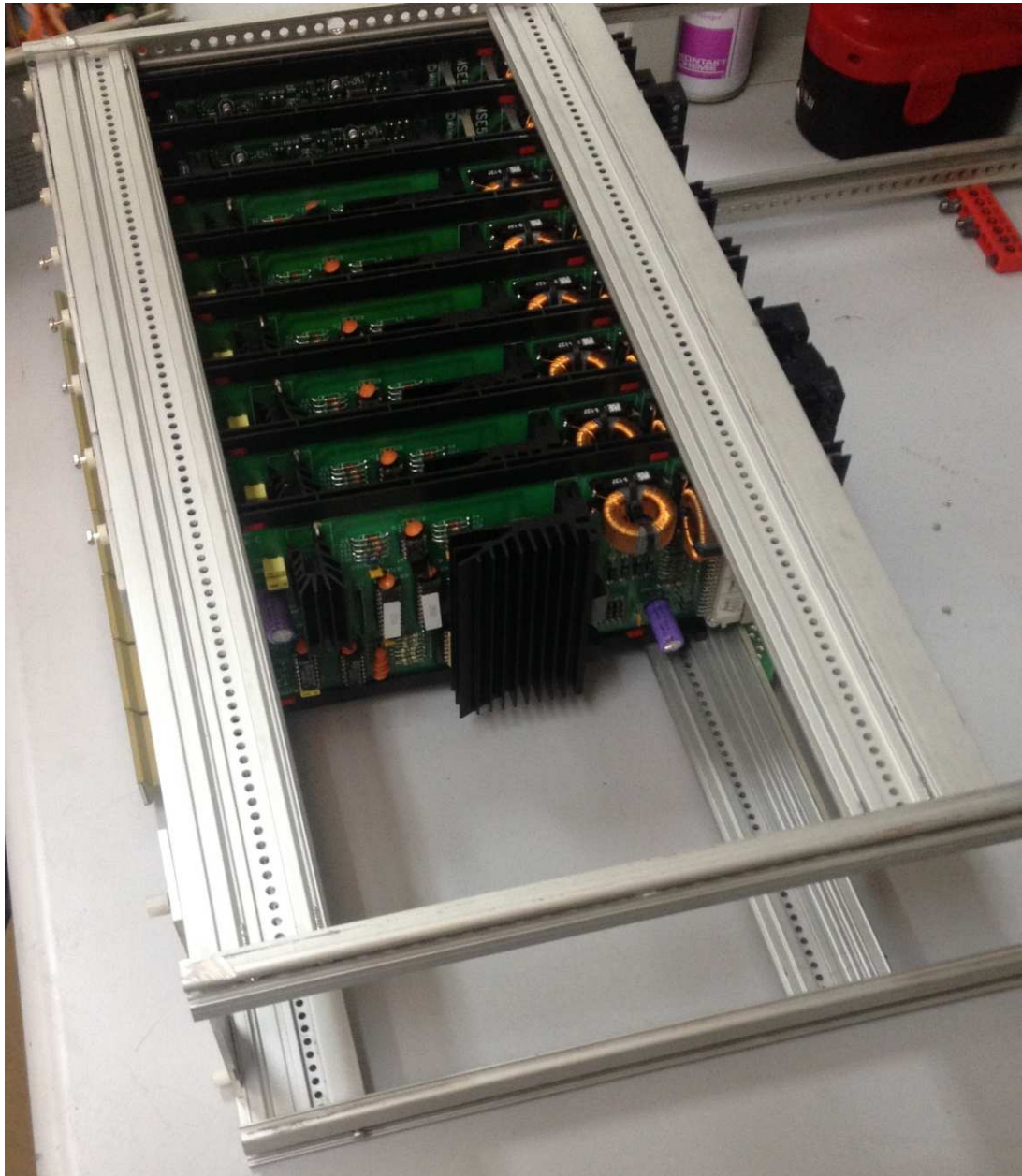
Controller Selection - Price

Manufacturer	 DELTA TAU Data Systems Inc.	 GALIL WE MOVE THE WORLD	 midi ingénierie  GROUPE NEXEYA	 Newport Experience Solutions
Model	UMAC	DMC-2183	BMAC	XPS-Q8
Controller Price	\$7,013	\$1,666.50	\$10,595	\$14,470
Drivers, PSUs, Connectors, etc.	\$2,629	\$4,000	\$0	\$0
Price/Axis	\$1,534	\$700	\$1,325	\$1,809

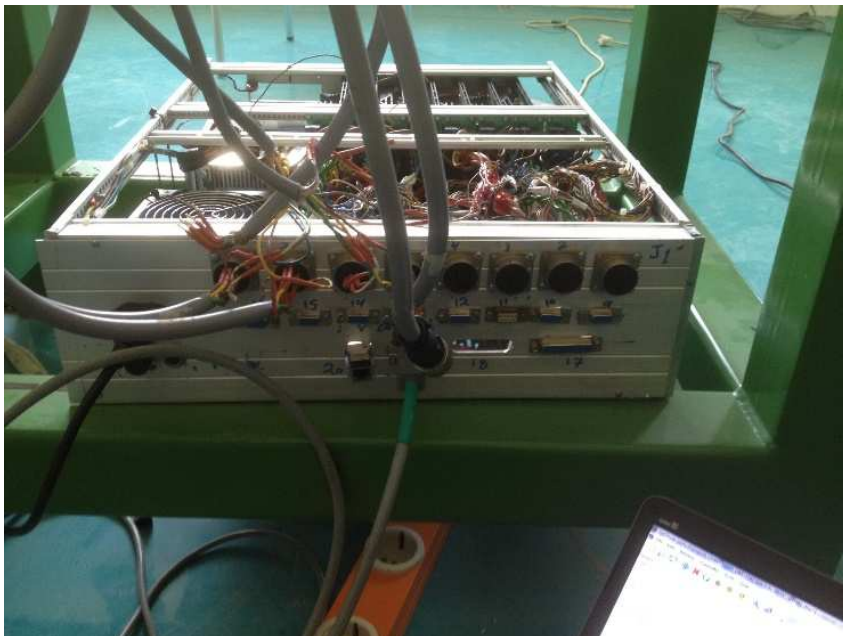
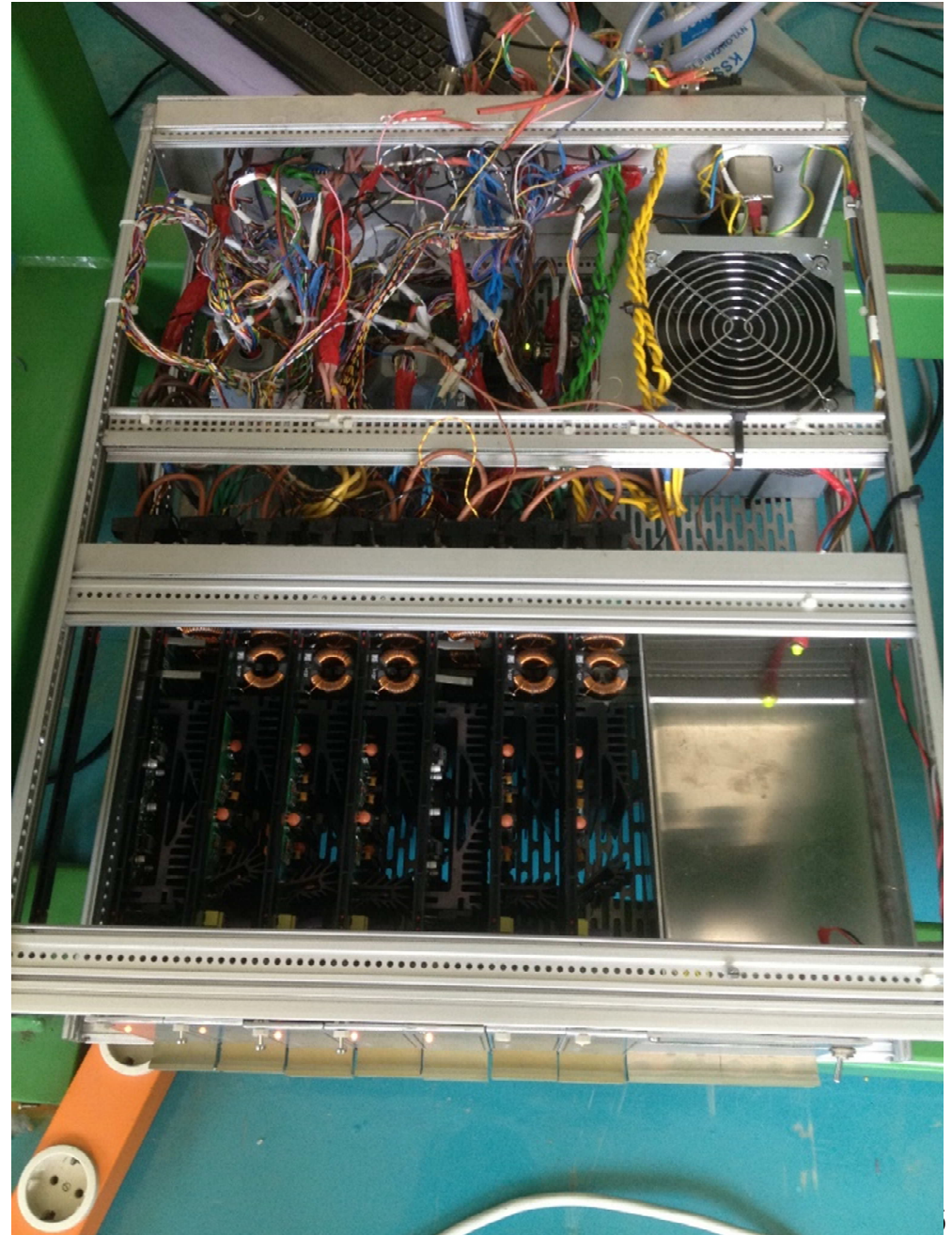
SESAME MSB - Prototype 1



SESAME MSB - Prototype 1



SESAME MSB - Prototype 1



SOLEIL Visit



McLennan Drivers

Step Resolution	Up to 1/2
Minimum Current	500mA
Min. Current Increments	200mA
Current Reduction	Up to 25%



New Stepper Driver Specs

Bus Voltage	24-48 VDC
Current	0.1-5.0 A Adjustable from front Panel
Micro-Stepping	Up 51200 Steps/Rev Adjustable from front Panel
Logic Signals	Step, Direction & Enable, Opto-isolated & TTL
Current Reduction	Up to 90% of set current
Protection	Over-Voltage Protection Short-Circuit Protection on Motor Outputs Over-Temperature Protection
LED Indicators	1.Enabled/Disabled 2.Motor Running/Stopping 3.Fault
Mechanical Form Factor	Standard Eurocard 3Ux7E

Driver Selection - Candidates





midi ingénierie



Minimum Current	0.5A	0.25A	0.0A	0.0A	0.13A
Current Reduction	Up to 50%	Up to 44%	Up to 50%	Up to 90%	Up to 75%
Form Factor	Eurocard	Eurocard	Eurocard	Box	Box
Price	530 USD	510 USD	500 USD	170 USD	280 USD

Applied Motion ST5-S



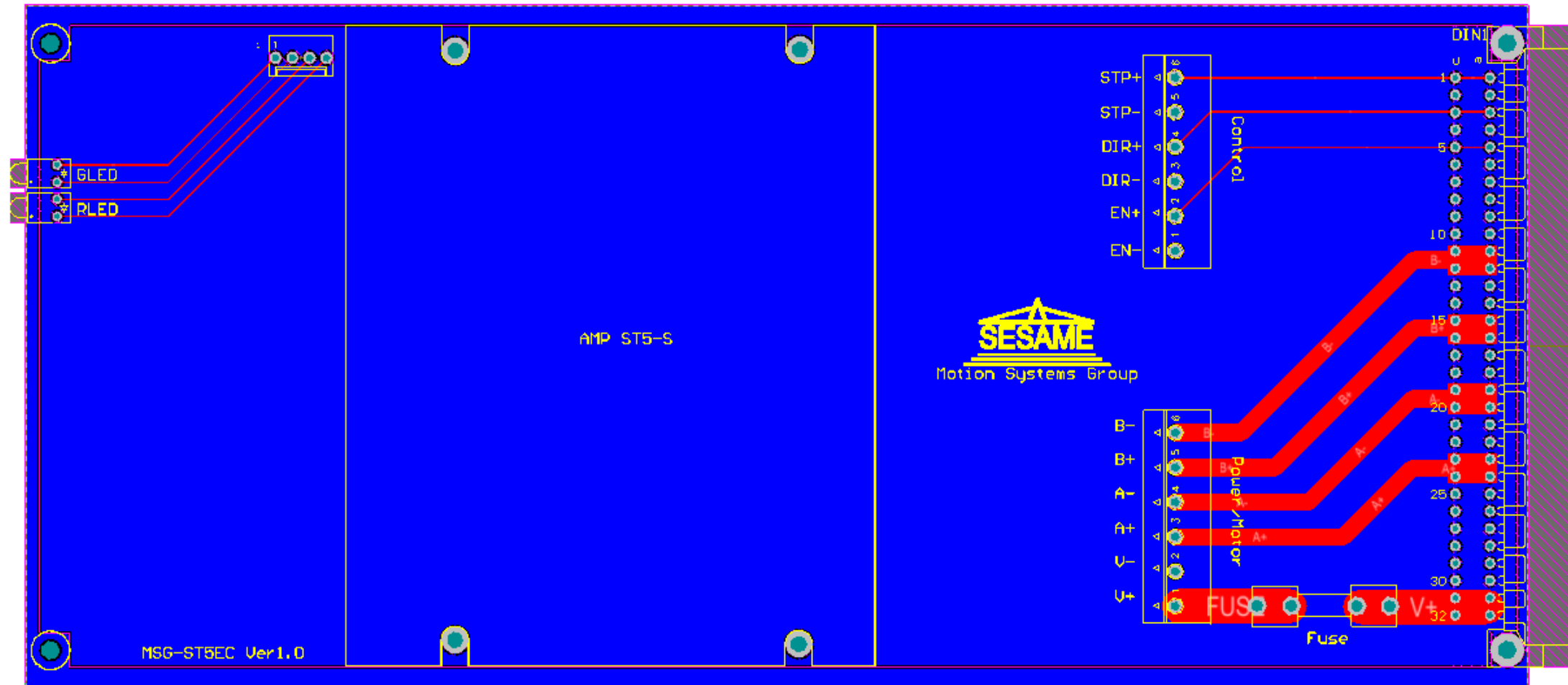
AMP ST5-S Technical Specs

Bus Voltage	24-48 VDC
Current	0.1-5.0 A (0.01A increments)
Micro-Stepping	Up 51200 Steps/Rev (2 Steps/Rev increments)
Logic Signals	1.Step Opto-isolated TTL 2MHz 2.Direction Opto-isolated TTL 3.Enable Opto-isolated TTL or CMOS
Standstill Current Reduction	Up to 90% of set current (after a delay in ms)
Mechanical Form Factor	Box (93 x 77 x 29)

ST5-S Eurocard Carrier



ST5-S Eurocard Carrier



What is Next ?

- Order ST5-S
- Design and Manufacture MSB Backplane
- Manufacture PCB Carrier
- Select Servo Motors Standard Drive
- Test the Piezo and Pico motors, drivers and controller

New Focus 8732 Pico Motor Driver



PI E-500 Modular Piezo Controller

- 1 E-516 Computer Interface/Display Module
- 2 E-507 Piezo Amplifier Module
- 1 E-509 Piezo Servo Controller



Acknowledgments

Farouq Al-Omari

SESAME

Akrum Homoud

SESAME

Control Group

SESAME

Pascale Betinelli

CEA/SOLEIL

ECA Group

SOLEIL

Dominique Corruble

SOLEIL

Alessandro Abrami

Elettra

Mark Heron

Diamond

Brian Nutter

Diamond

Mark Clift

Australian Synchrotron

Robin C. Riley

Galil MC

Question?

Thank You