

KareBlokLab

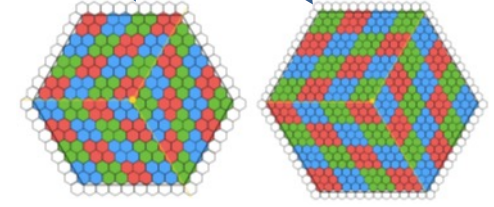
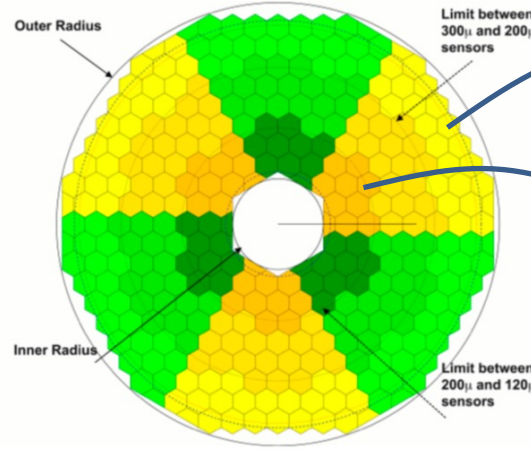
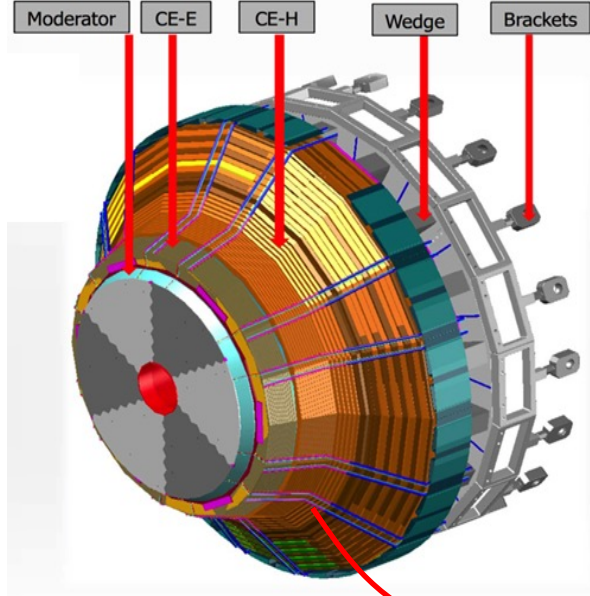
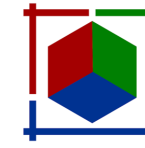
**Silikon modül test ve geçerlemesi için
kullanılacak test sisteminin TÜBİTAK BİLGEM ve
Boğaziçi Üniversitesi Kare Blok Laboratuvarı
tarafından geliştirilmesi ve prototip test
sisteminin Türkiye'de doğrulanması çalışmaları**

**Parçacık Hızlandırıcıları ve Algıcaları Yerel
Altyapı ve Ar-Ge Çalıştayı**

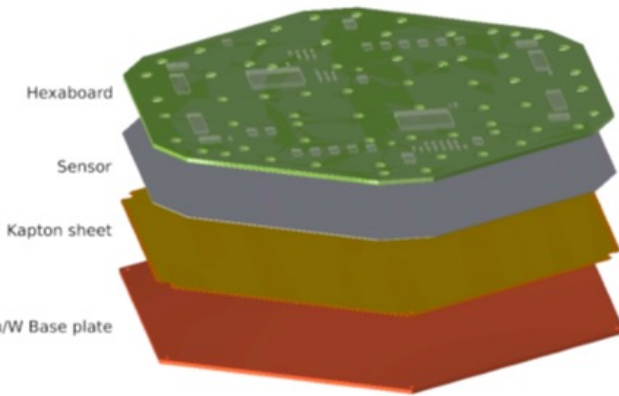
4 Aralık 2022

Kıvanç Nurdan (adına Bora Akgün)

Hedef nedir?

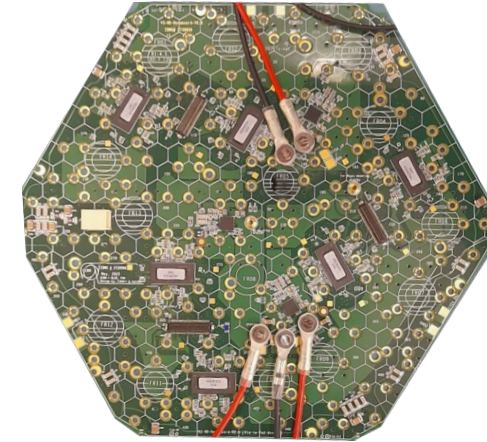


- On binlerce silikon modül 6 farklı üretim merkezinde (ABDx3, Çin, Tayvan ve Hindistan) üretilecek ve test edilecek
- Testleri geçen 30 binden fazla silikon modül detektörde kullanılacak
- Detektörde kullanılacak silikon modüllerin üretimle uyumlu hızda (günde 24 adet) ve detektörde çalışacakları şartlarda (-40°C , 1.28 Gbit/s veri hatları, ...) test edilmeleri gerekmektedir

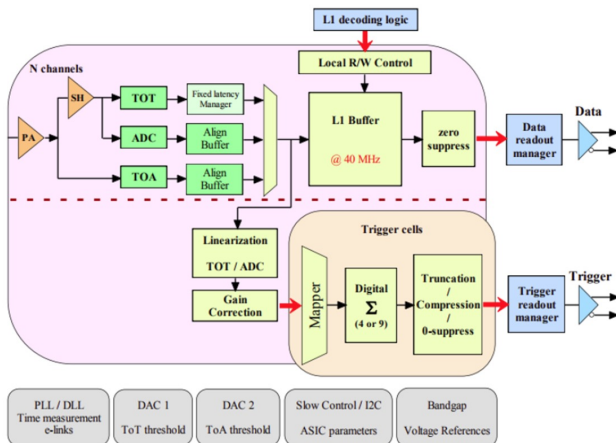


High Density Hexaboard

- 6 × HGCROC
 - 432 kanal

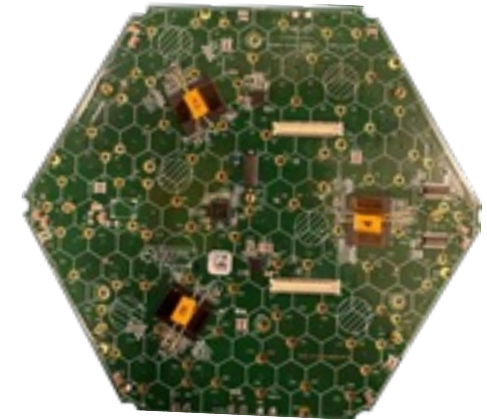


HGCROC- IC



Low Density Hexaboard

- 3 × HGCROC
 - 192 kanal





Kare Blok Laboratuvarı



KareBlokLab

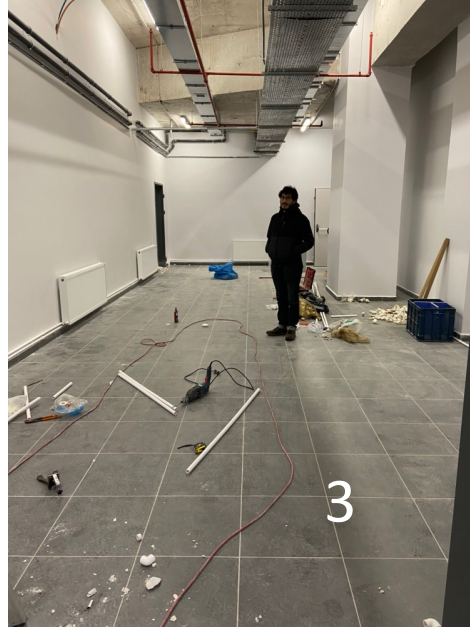
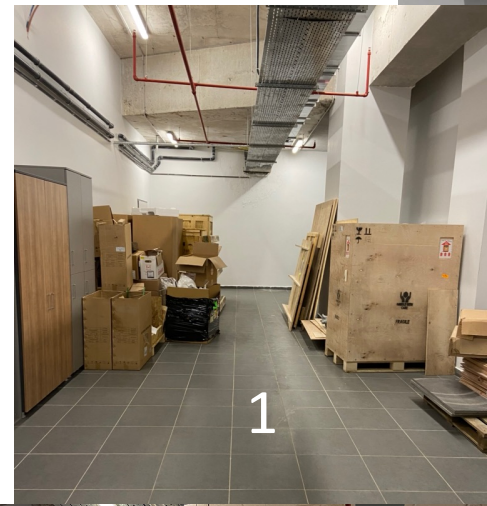
- Boğaziçi Üniversitesi Kandilli Kampüsü
 - Feza Gürsey Binası 2. Kat
 - Bilim Teknoloji Binası -2.Kat



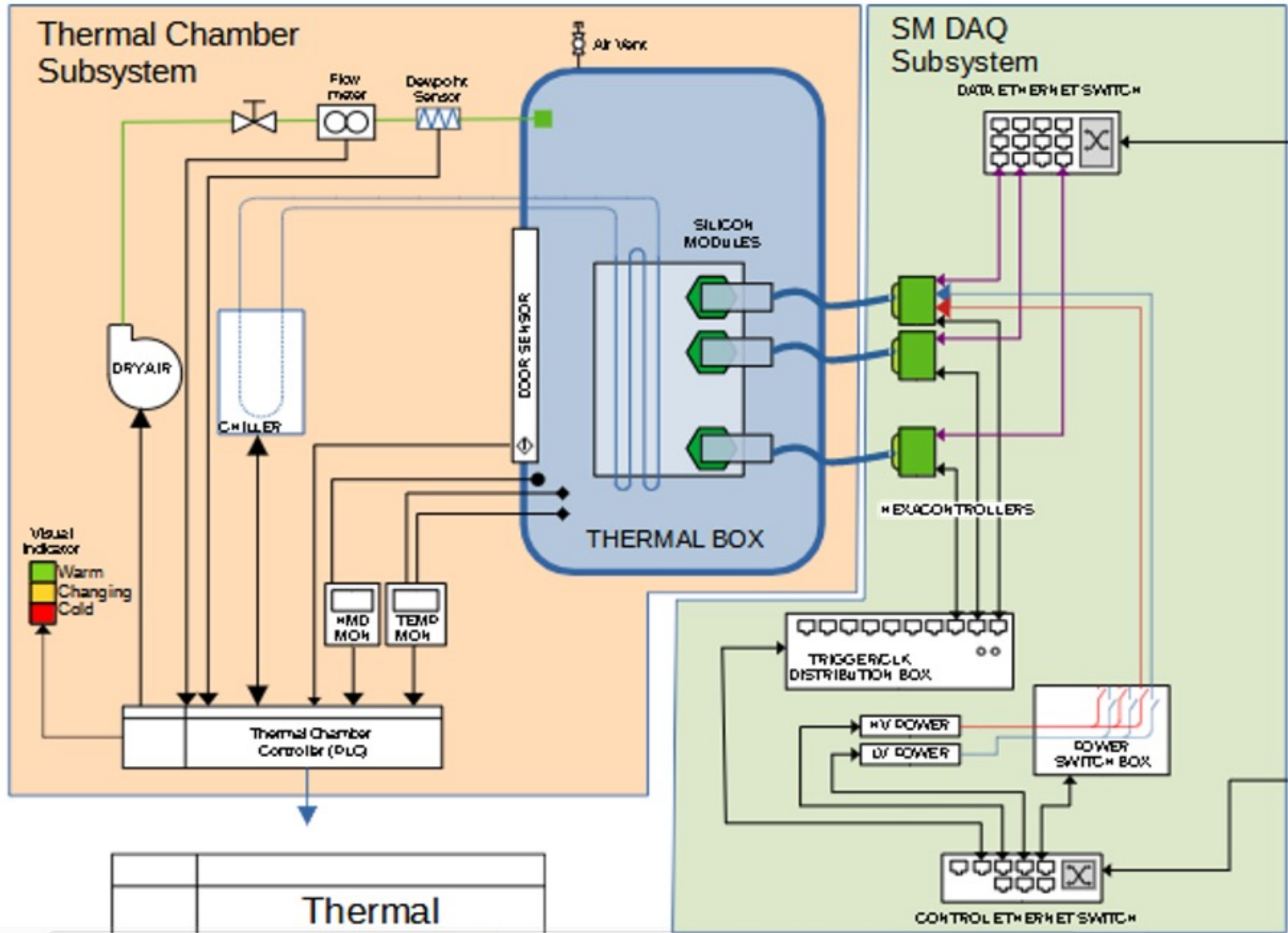
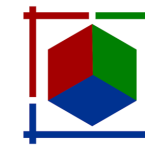
4 Aralık 2022

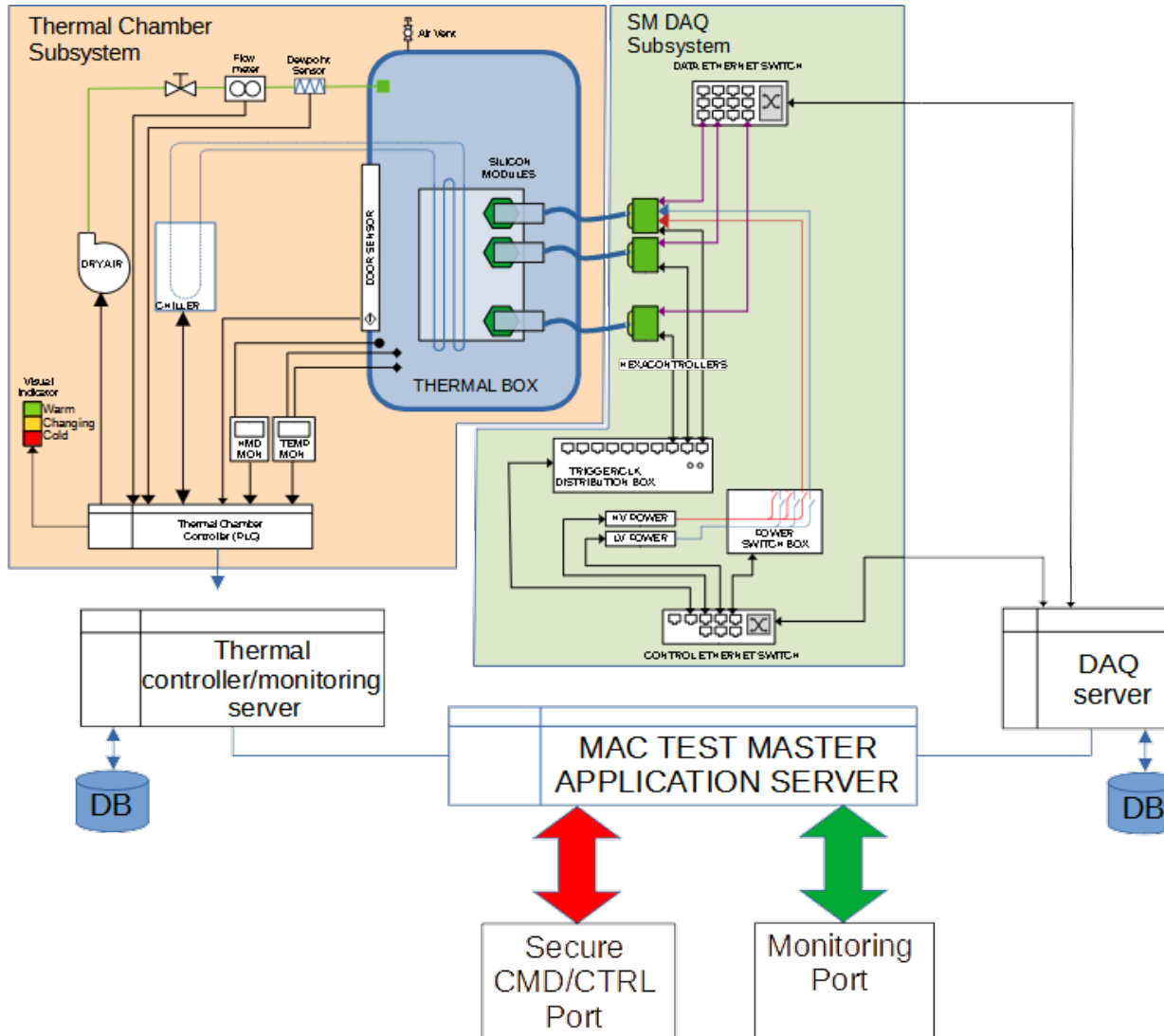
Boğaziçi Üniversitesi Kare Blok Laboratuvarı -
bora.akgun@boun.edu.tr

Laboratuvar Alanı

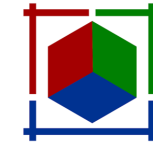


Test Sistemi Yüksek Seviye Tasarım

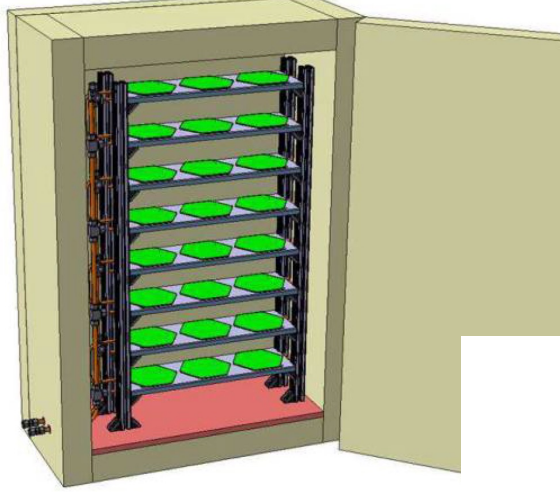




İklİmlendirme Alt-Sistemi - Çizimler -



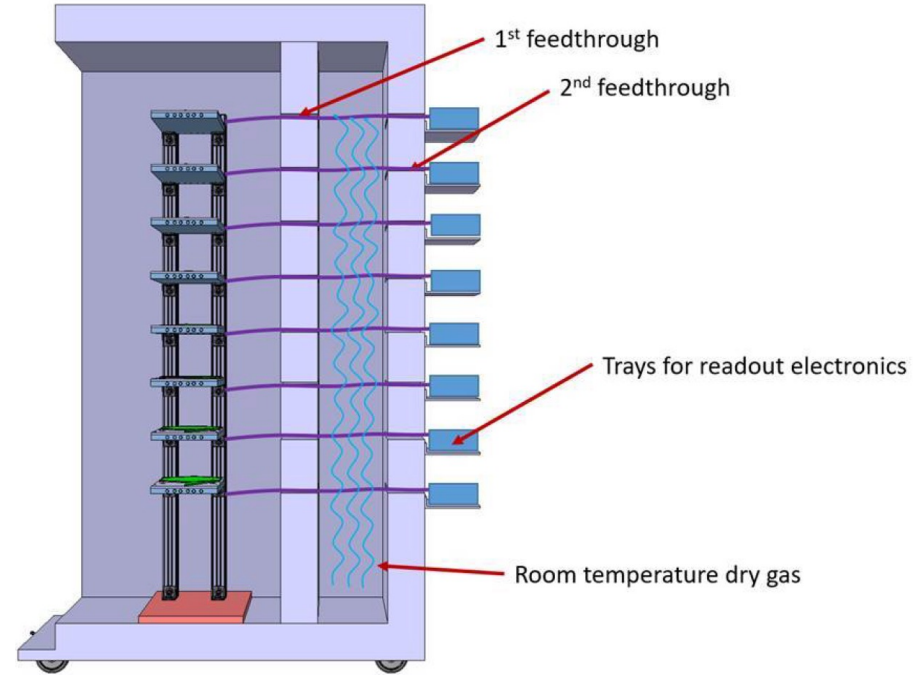
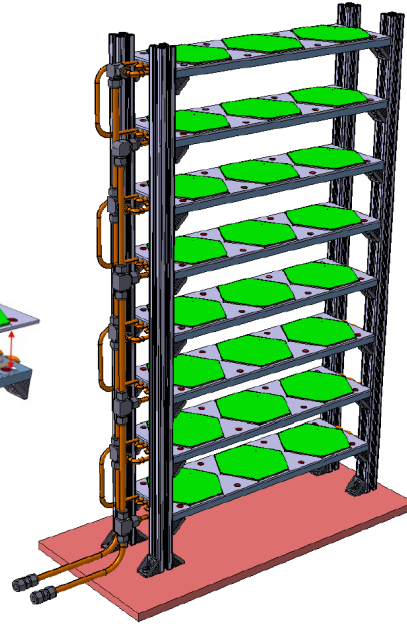
- Soğutucu mekanik iskelete bağlı
- Kutunun içine kuru hava bağlantısı
- Kutunun dış yüzeyinde test elektronikleri



Electromagnets to create good thermal connection

Aluminium plate with modules

Cooling plate



İklimlendirme Alt-Sistemi - Prototip -

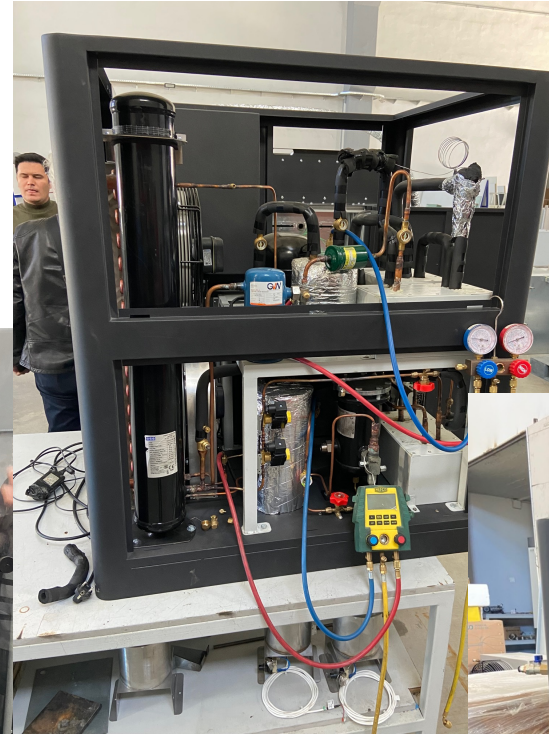


İklimlendirme Kutusu

Soğutucu (- 40°C)



Pleksi Levha ve
Mekanik Yapı



Kuru Hava
Filtreleri



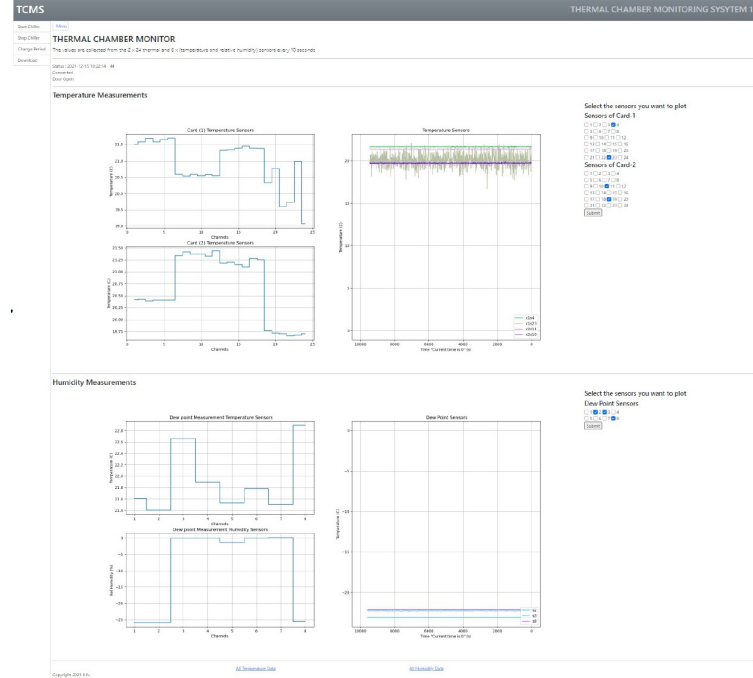


İklimlendirme Alt-Sistemi - Prototip -



KareBlokLab

Video



- Yazılımın ilk versiyonu hazır
 - Python betikleri, PLC kodu ve web ara yüzü

Hexaboard (95 IO)

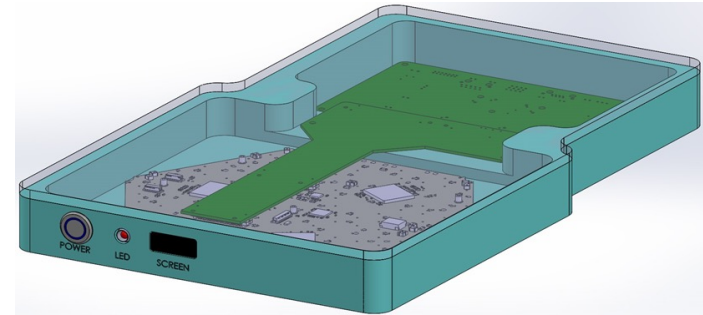
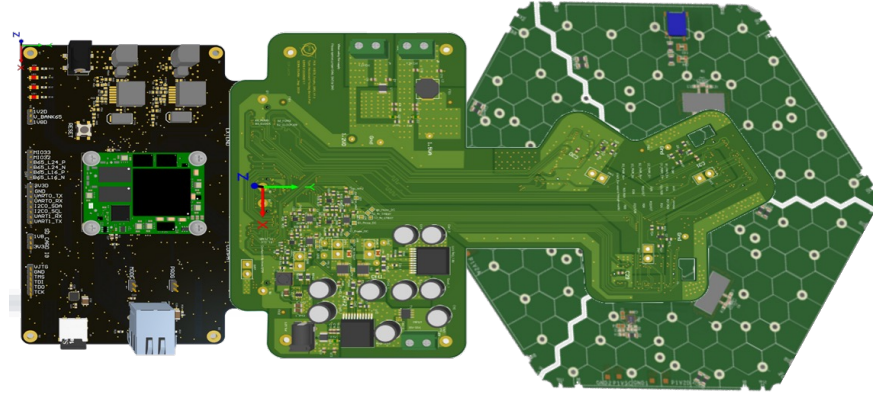
- 25 low speed control lines
- 5 x 2 I²C lines
 - clk, data
- 4 low speed control lines
- 30 high speed differential lines
 - 3x4 data + 3x4 trig + 3 clk320 +3 fcmd

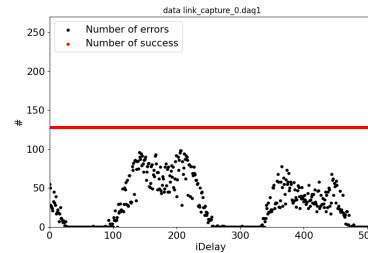
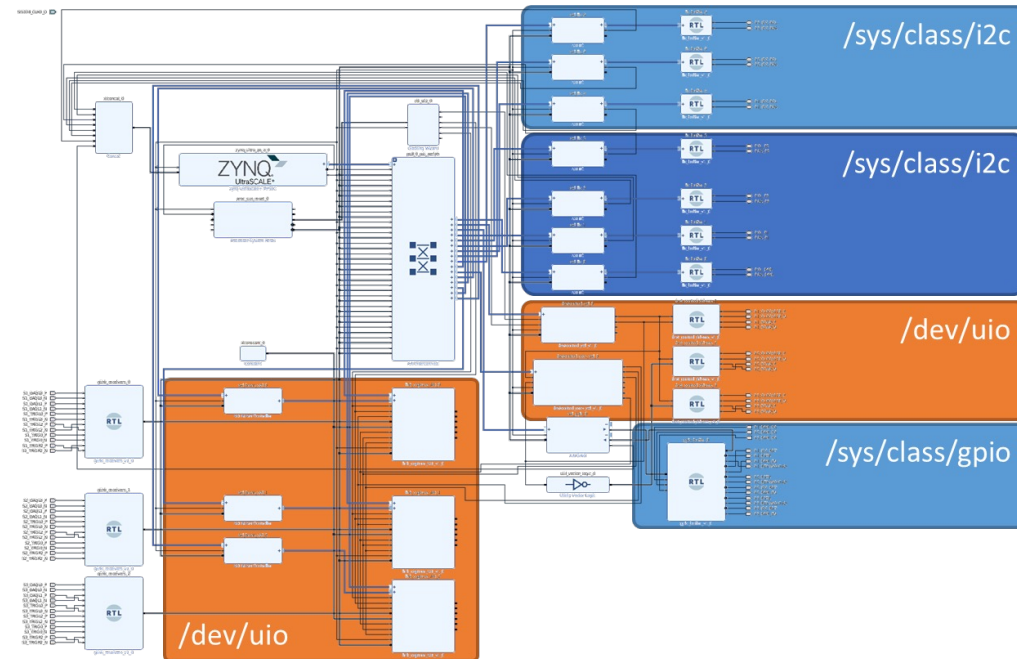
Ext. Trigger: (8 IO)

- 4 x Differential signal on RJ45 connector.

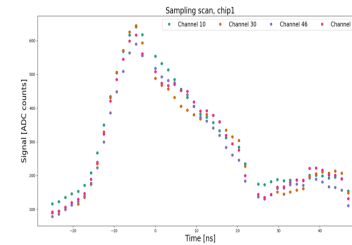
PS Side IO:

- 2 x user IO
- 1 x Serial
- 1 x I²C

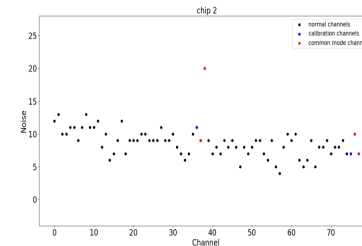




Link alignment

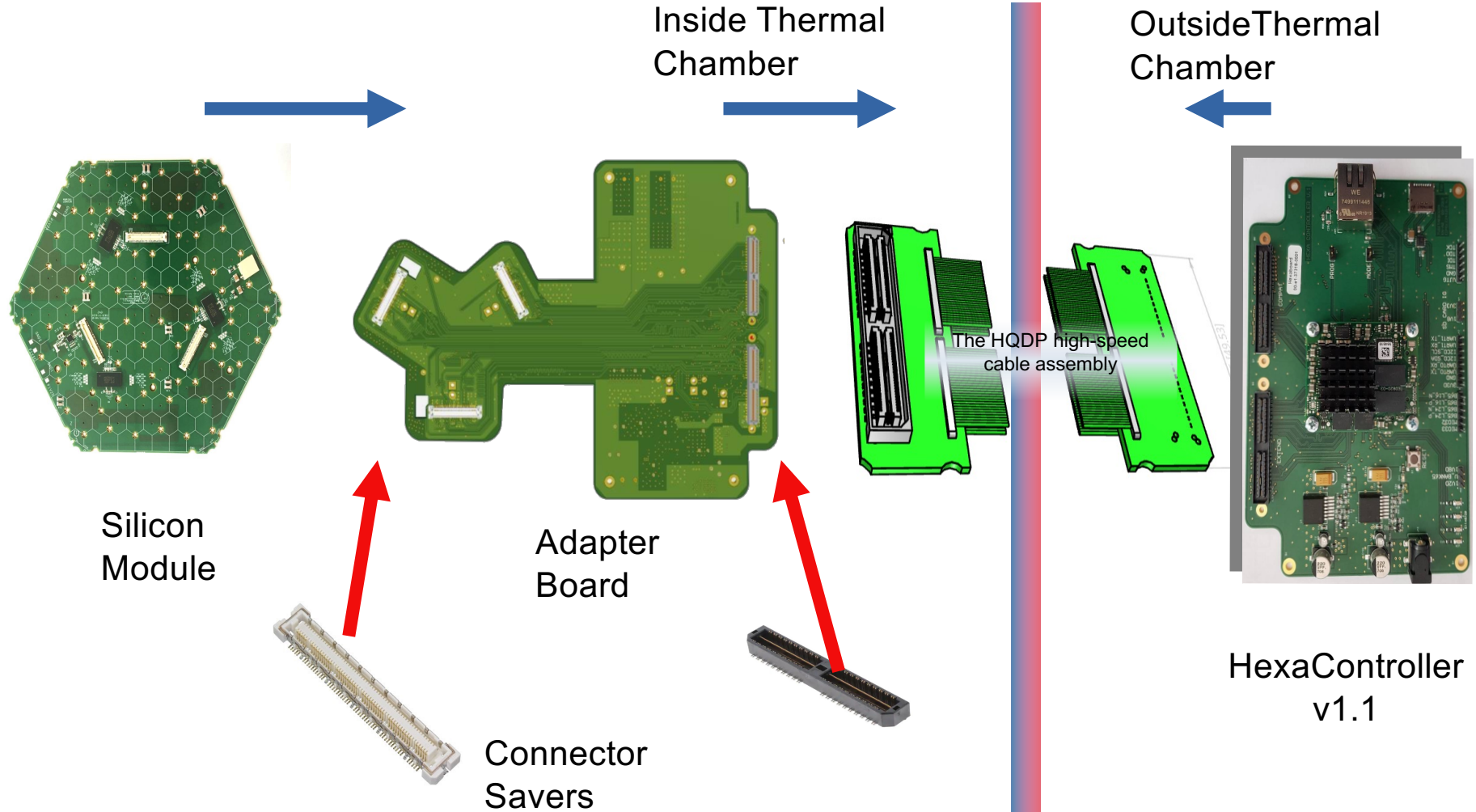
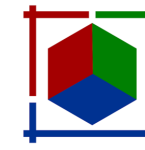


Sampling Scan



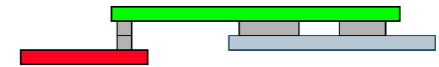
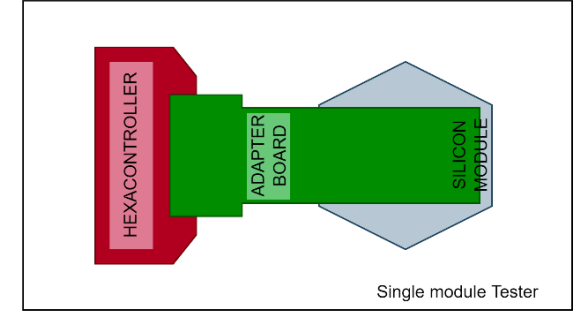
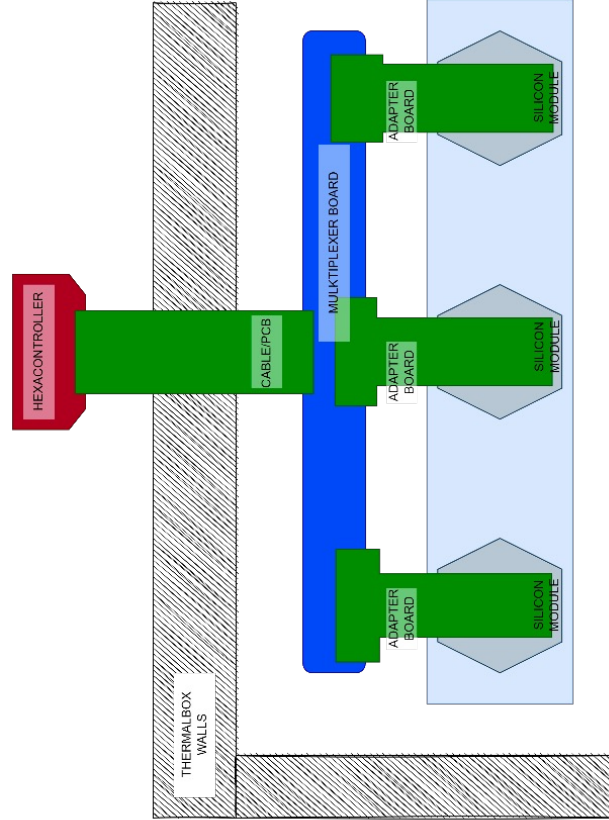
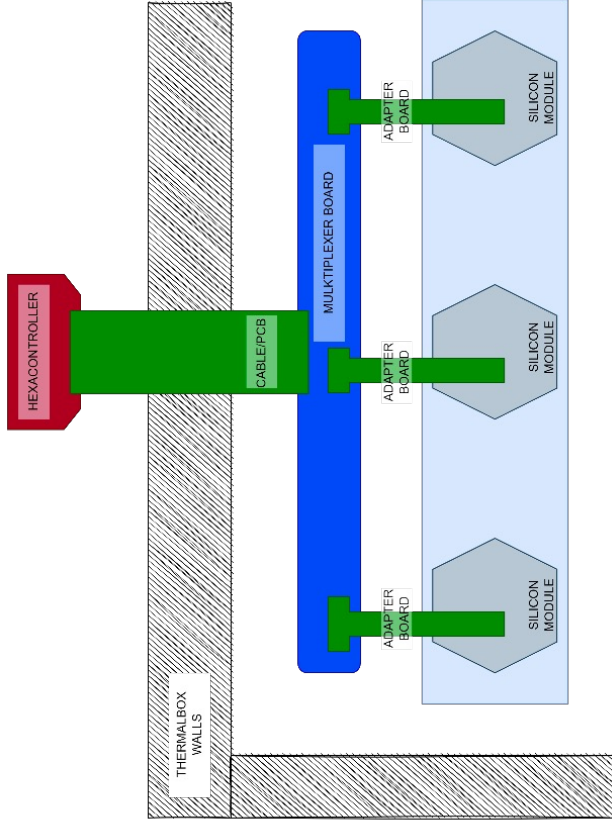
Noise Measurement

Elektronik Alt-Sistem - Bağlantılar v1 -



LD Silikon Modül

HD Silikon Modül

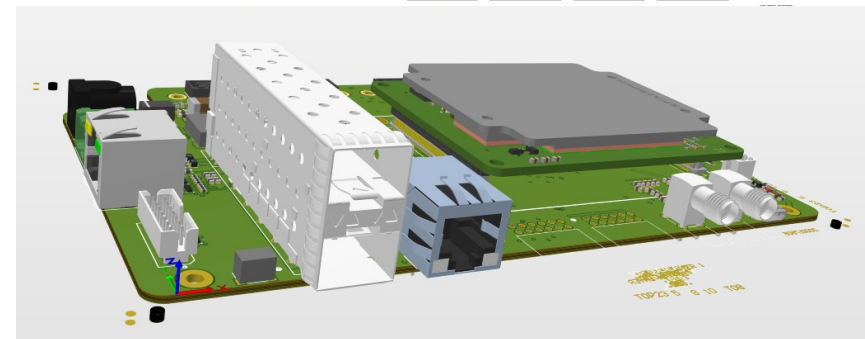
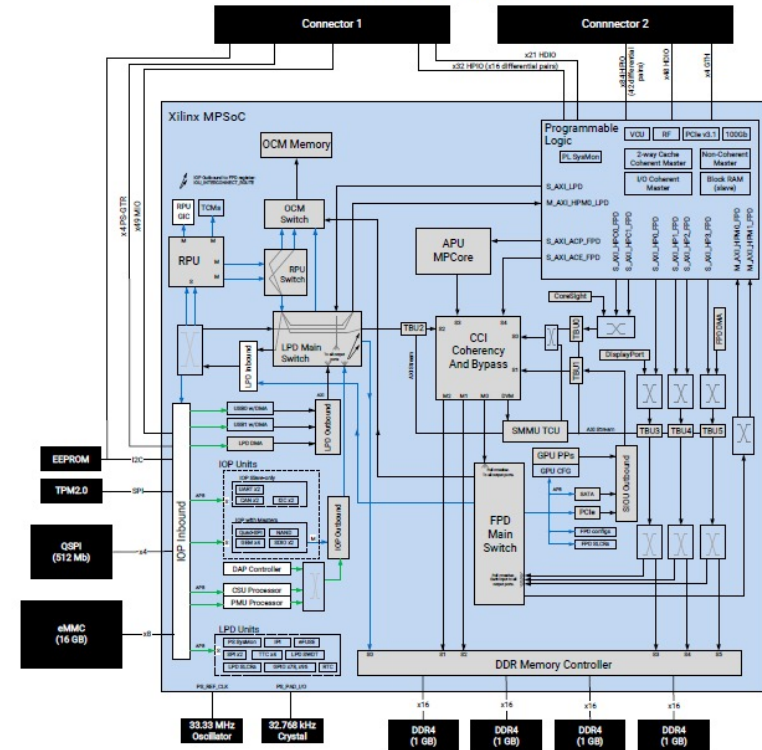
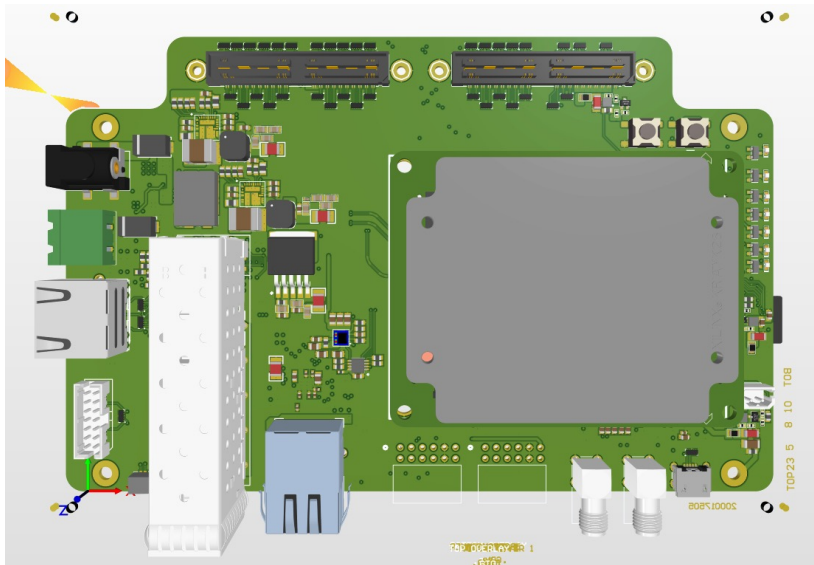


General PS Connectivity

GTR 6Gb/s Transceivers (PCIe@x4, 2x USB3.0, SATA 3.1, 4x Gbit Eth, Display port)	4
Low Speed IO : PS MIO (1.8V)	49

General PL Connectivity

PL High-density (3 Banks (HD) I/O (1.2V to 3.3V) Speed < 250Mbps)	69
PL High-performance 3 Banks (HP) I/O (1.0V to 1.8V) (Speed < 2.5Gbps) 116 (58 diff)	116
GTH 12.5Gb/s Transceivers (PCIe Gen3 x4, SLVS-EC, HDMI 2.0, DisplayPort 1.4)	4

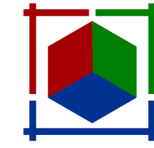


Silikon Modül Test Uygulaması

- İklimlendirme ve elektronik alt-sistemlerinden oluşan bir test sistemi tasarlanmış ve ilk prototipi üretilmiştir
- Seri üretime geçilmeden önce iklimlendirme ve elektronik alt-sistemleri bir bütün olarak Boğaziçi Üniversitesi Kare Blok Laboratuvarında test edilecektir
- Test sonuçlarının isterleri karşılması durumunda test sistemi farklı ülkelere ihraç edilecektir

Diğer Uygulamalar

- İklimlendirme alt-sistemi farklı iklim koşullarında (-40°C, kuru hava, ...) test yapabilme yeteneğine sahiptir
- Elektronik alt-sistemi farklı detektör tiplerini (silikon, sintilatör, gazlı, ...), küçük modifikasyonlarla, okuma ve kontrol için kullanılabilir
- PCB tasarımı, petalinux ve gömülü sistem tasarımı (yazılım-donanım iletişimi), firmware ve yazılım geliştirilmesi konularındaki uzmanlıkların çeşitli uygulama alanları mevcuttur



KareBlokLab

Ekler

