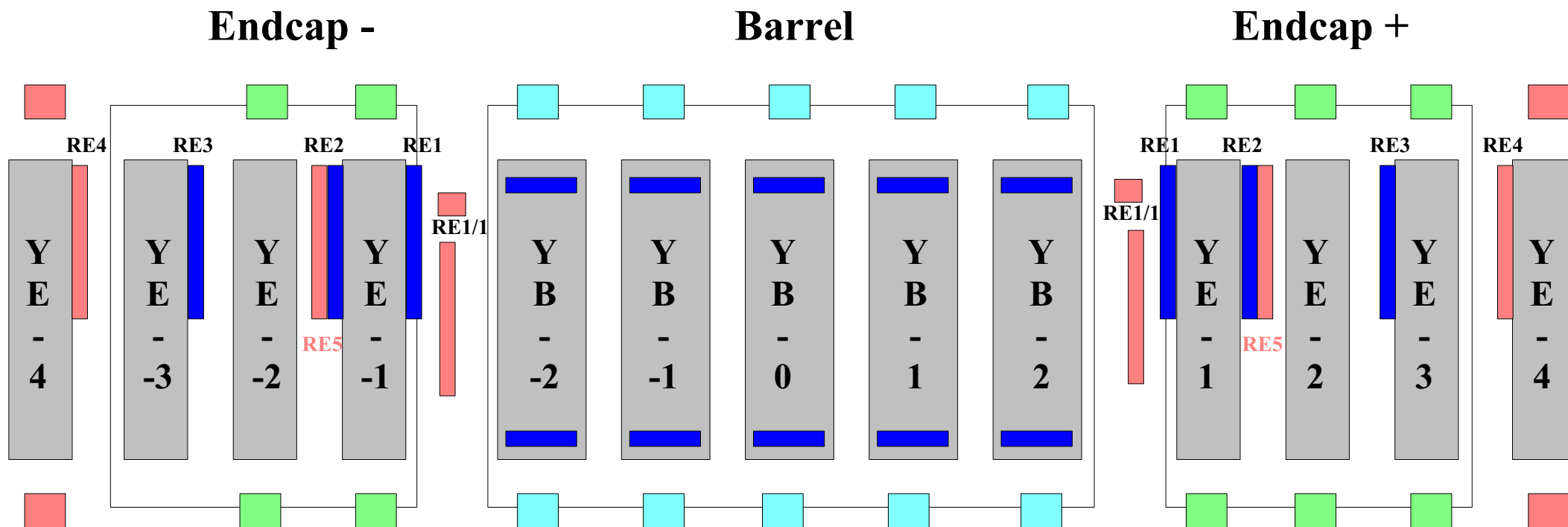


# **RPC Link Box Control**

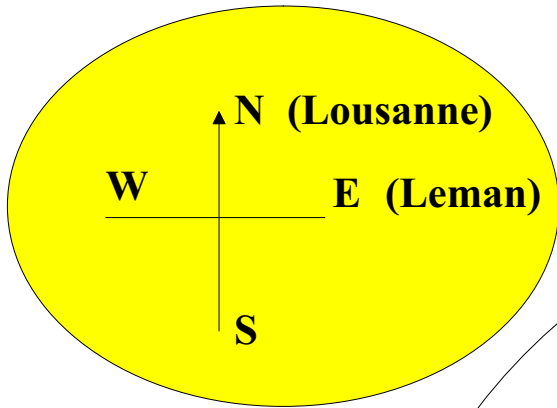


  VME Crates on the towers, patch panels on the bottom of the towers

 RPC chambers constructed for phase 1 of CMS

  this parts will be not build in phase 1 of CMS

- **RPC Control links are built of elements of the tracker digital control system (DOHs, singlemode fibers, CCS), contains 24 redundant rings (from 6 to 12 CCU in ring) ;**
- **RPC Control links goes from Link Board boxes on UXC55 tower racks to the RPC DCS crate in USC55. Trigger fibers routing is preferable but not crucial.**
- **Control ring (redundant) consists of**
  - **2 DOH (+56 cm fibers),**
  - **MU- sMU adapter,**
  - **MU Fanout,**
  - **MFS adapter on the bottom UXC tower rack,**
  - **ribbon (12 fibers)**
  - **multiribbon cable between the patch panels in the UXC and USC (MPO connectors on USC55 side),**
  - **CCS Boards in USC55 (rack**

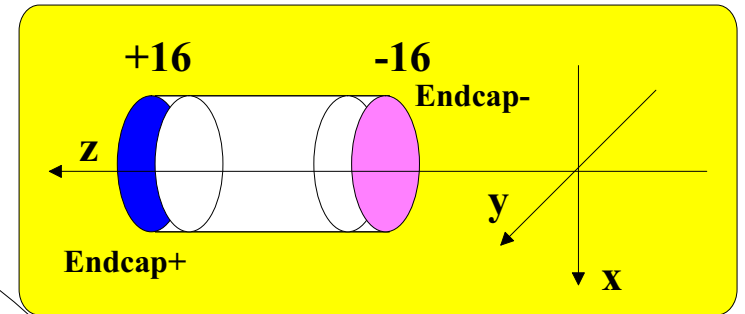


Endcap+      Endcap-

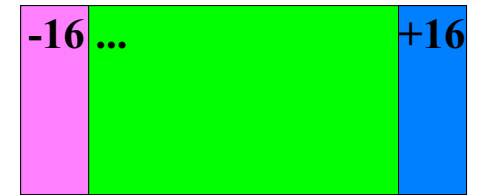
**CMS**

Counting  
Room

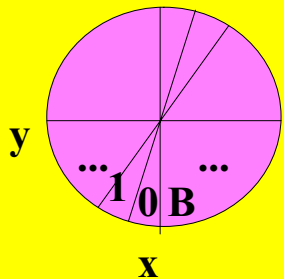
x



**trigger towers**  
(see from Lousanne,  
counting room)



**wedge view**  
(see from Leman)



Counting  
Room

## Space Coordinates: *(as described in CSC notes)*

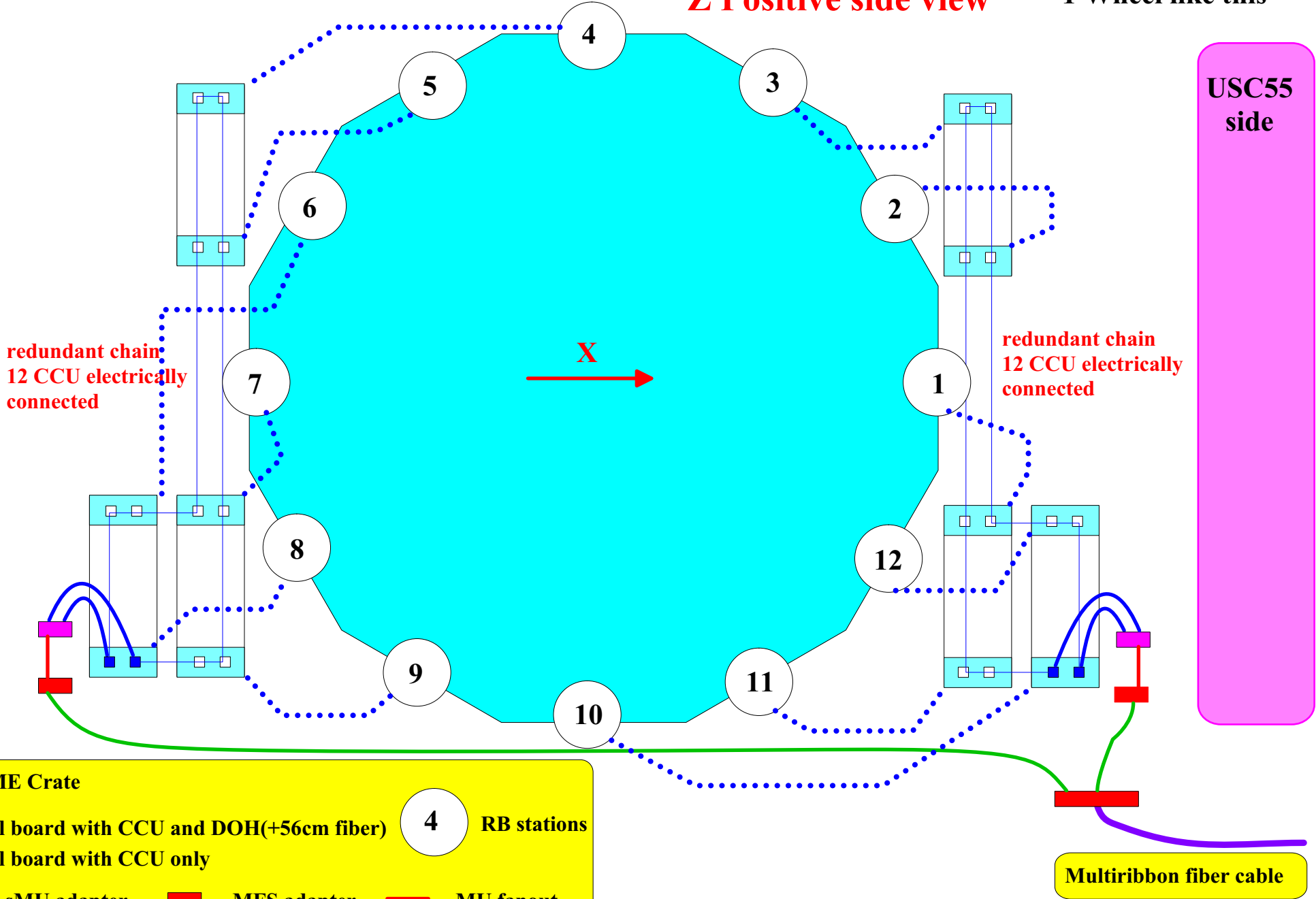
CMS is north of centre of LHC; right handed system with origin in collision point  
 x horizontal SOUTH points to centre of LHC, y vertical upwards,  
 z horizontal pointing to WEST, parallel to beam, parallel to B-field.  
 phi = 0° ... x-axis, phi = 90° ... y axis  
 eta = 0 in xy-plane, eta > 0 ... positive z axis

**CERN**

# Control links - Barrel Central Wheel

Z Positive side view

1 Wheel like this



VME Crate

Control board with CCU and DOH(+56cm fiber)

Control board with CCU only

MU-sMU adapter

MFS adapter

MU fanout

4 fiber cable

ribbon (12 fibers) cable

8 ribbon cable

4

RB stations

Multiribbon fiber cable

# Control links - Barrel not Central Wheels

4 Wheels like this one

Z Positive side view

USC55  
side

redundant chain  
12 CCU electrically  
connected

redundant chain  
12 CCU electrically  
connected

VME Crate

Control board with CCU and DOH(+56cm fiber)

Control board with CCU only

MU-sMU adapter

MFS adapter

MU fanout

4 fiber cable

ribbon (12 fibers) cable

8 ribbon cable

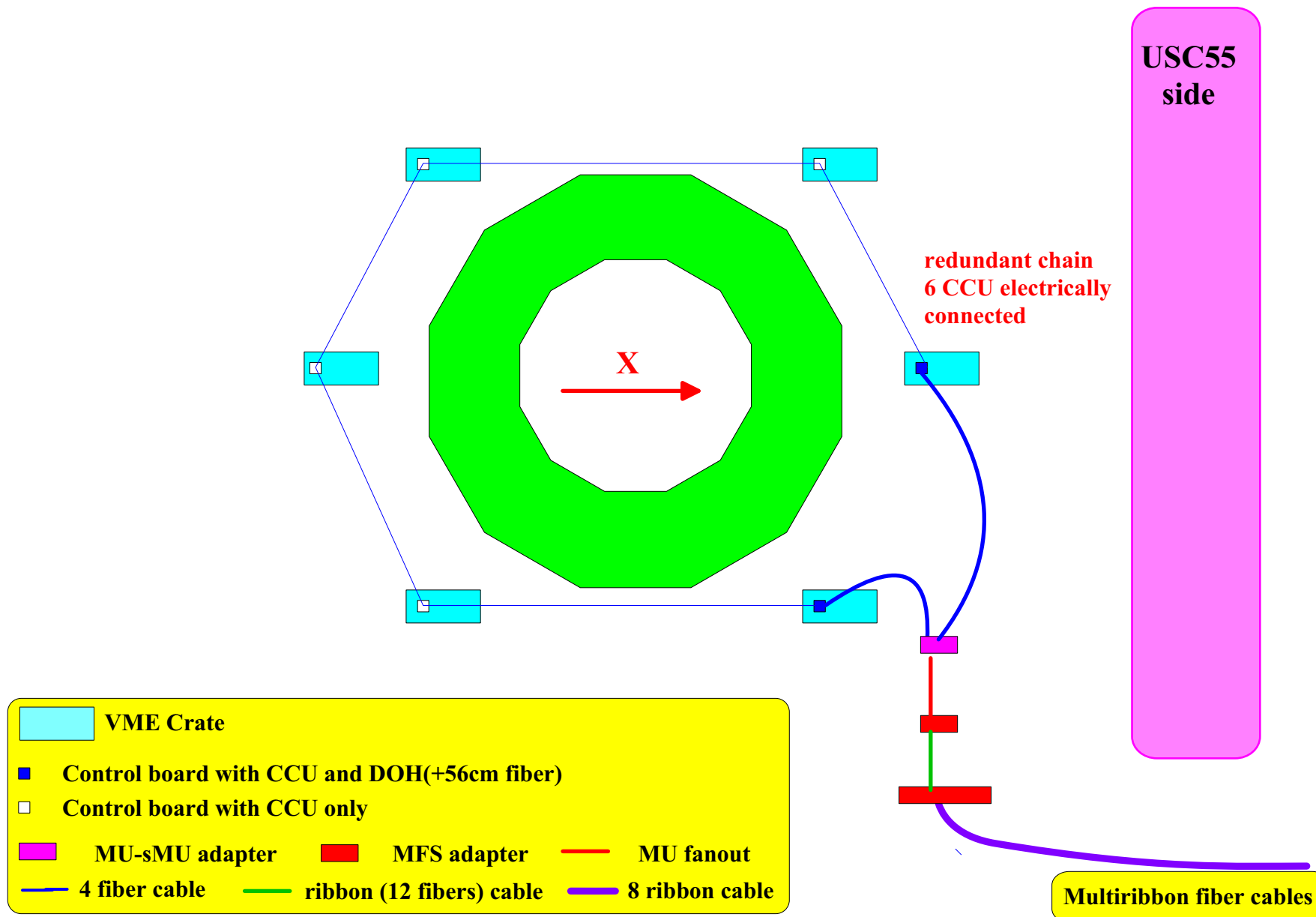
Multiribbon fiber cable

8 ribbons (4 spares)

# Control links - Endcap RE1/1 "nose" (RE-1/1)

2 Locations like this one

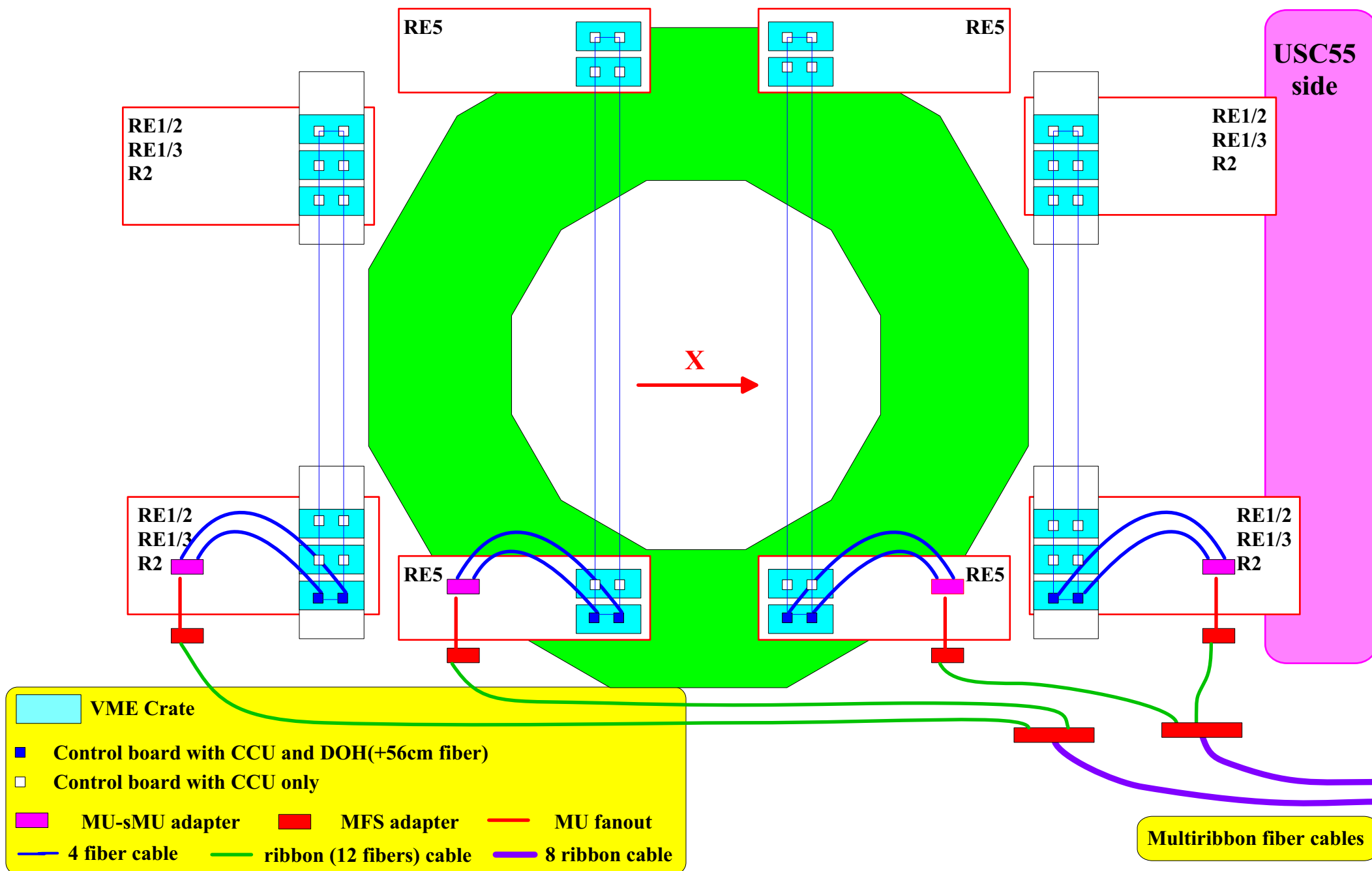
Z Positive side view



# Control links - Endcap YE-1 (YE--1)

Z Positive side view

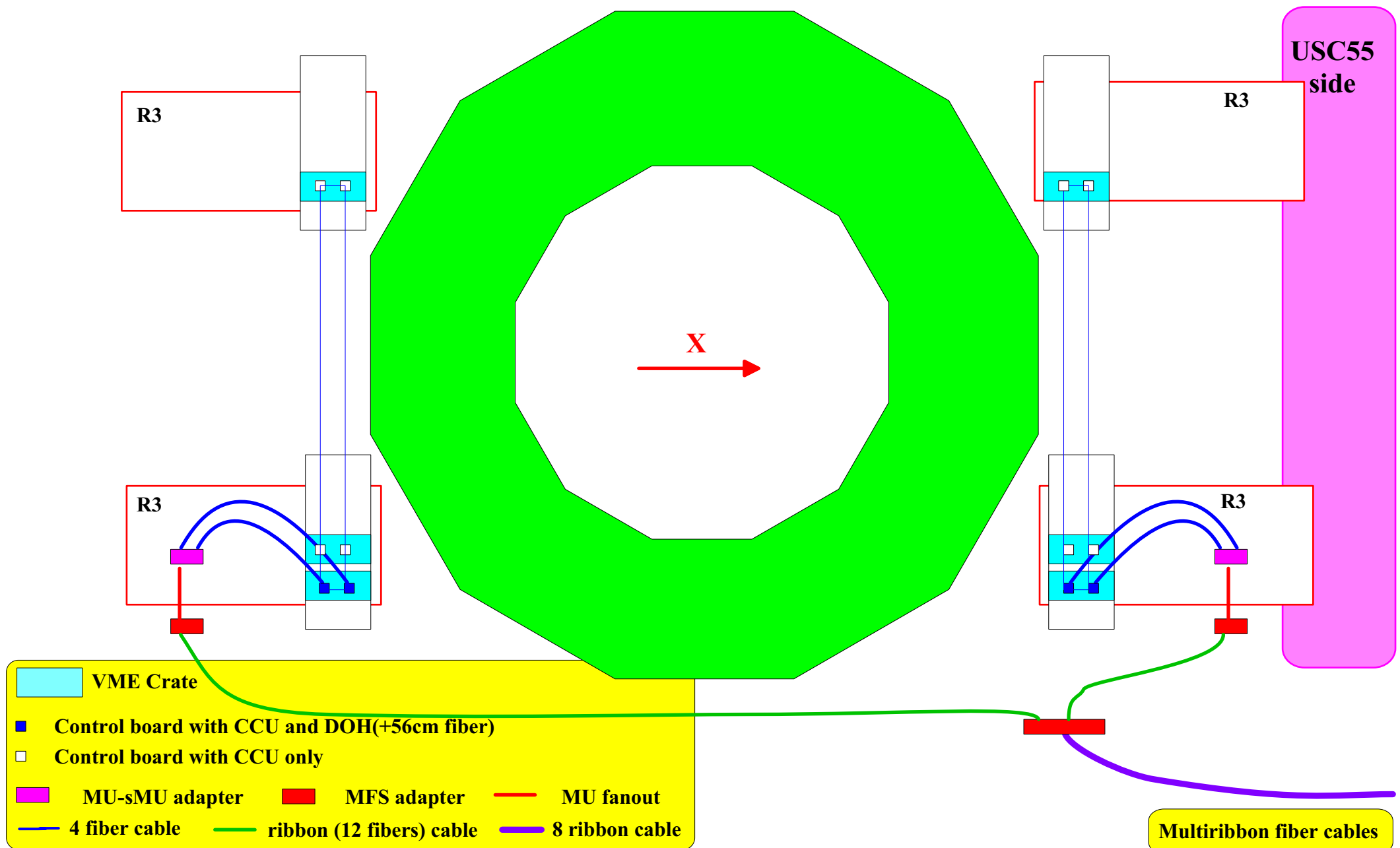
2 Disks like this one





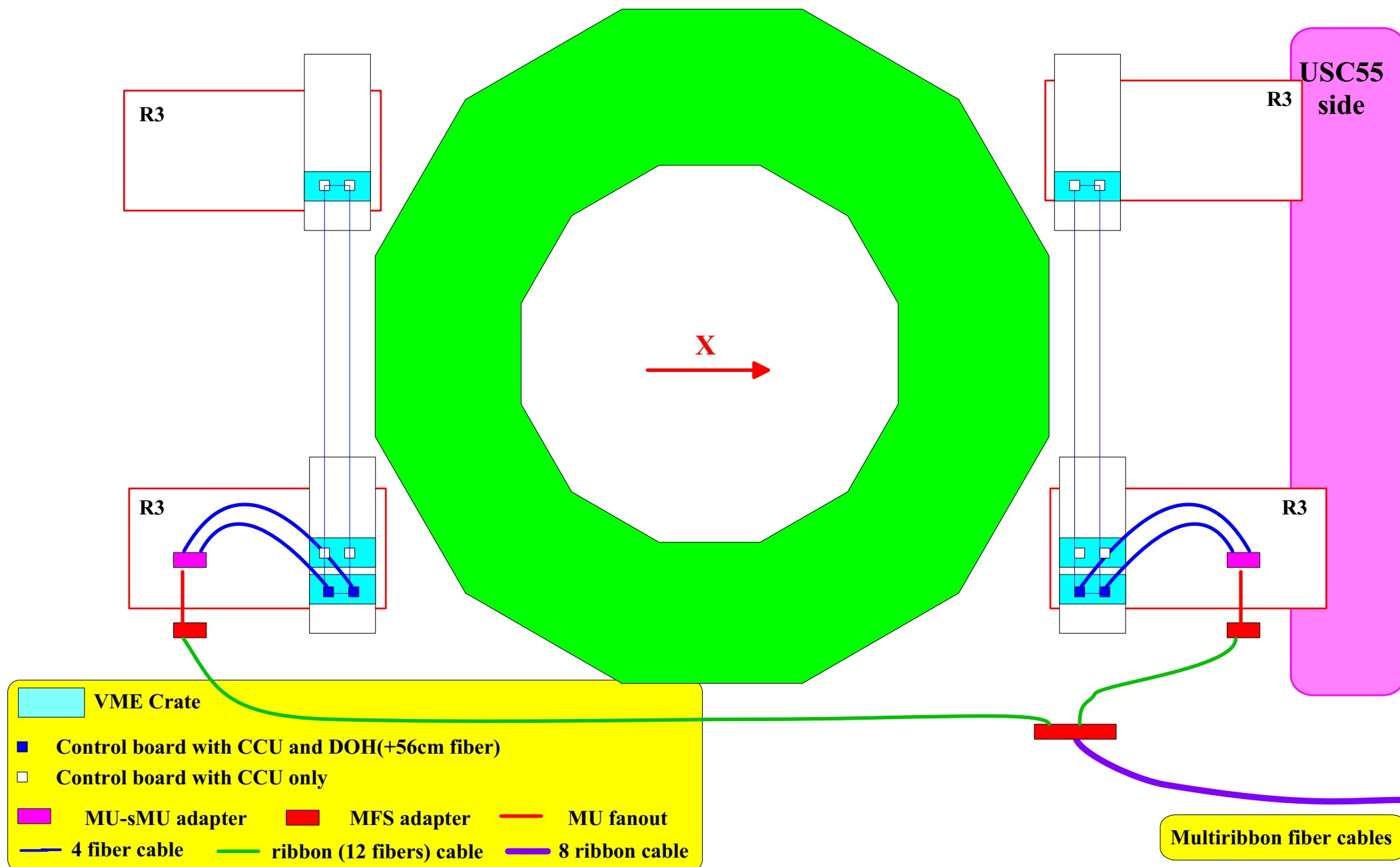
### Control links - Endcap YE-3 (YE--3)

## 2 Disks like this one



## Control links - Endcap YE-4 (YE--4)

## 2 Disks like this one



## RPC Control link multiribbon fiber cables (~100m)

<b>Barrel wheel</b>	<b>1</b>
<b>Barrel all wheels</b>	<b>5</b>
<b>Endcap YE1 (-1)</b>	<b>2</b>
<b>Endcap RE1/1 (-1)</b>	<b>1</b>
<b>Endcap YE3 (-3)</b>	<b>1</b>
<b>Endcap YE4 (-4)</b>	<b>1</b>
<b>Endcap all</b>	<b>10</b>
<b>All RPC</b>	<b>15</b>

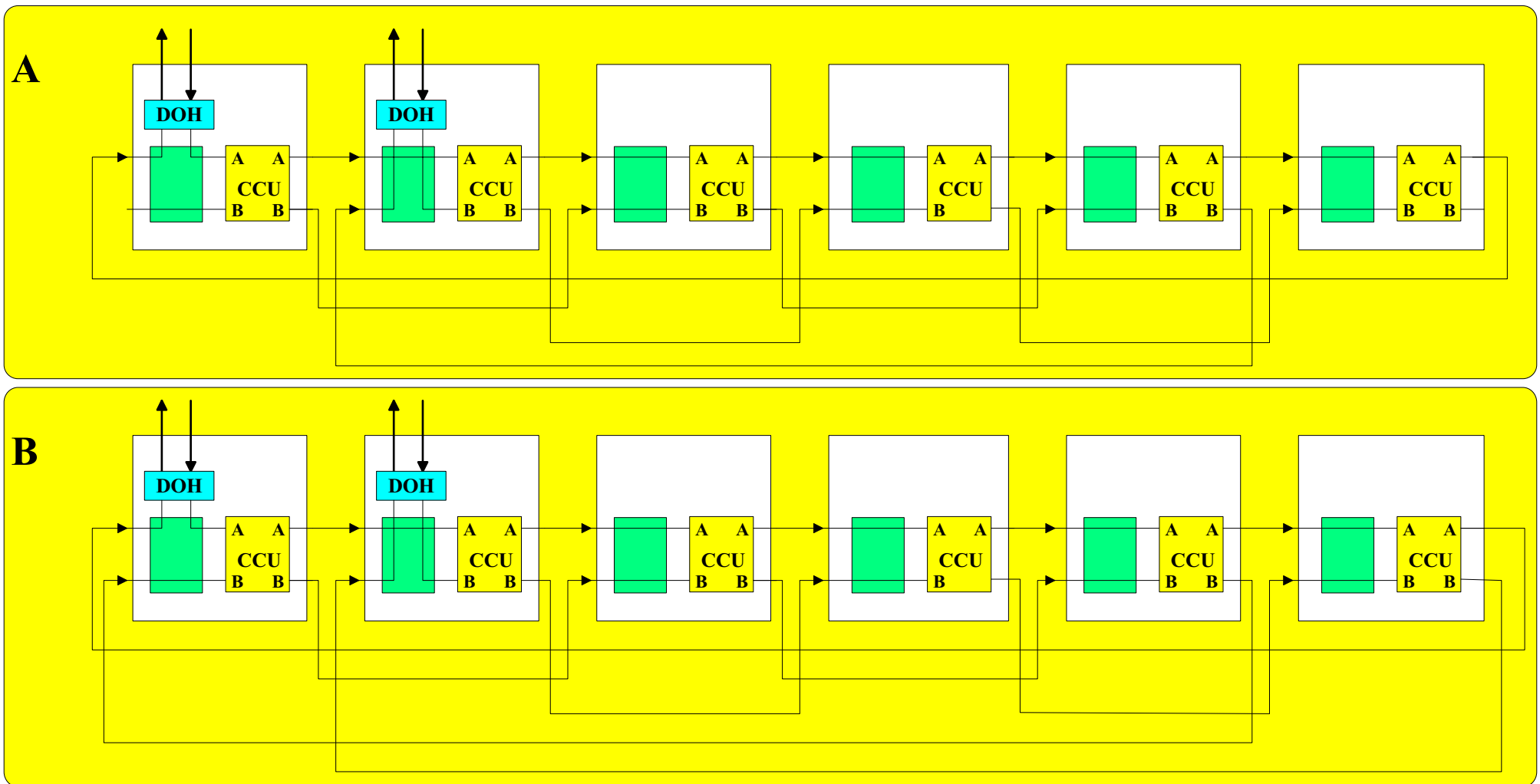
Spare ribbons in multiribbon cables, no spare multiribbon cables

## **RPC Control link all elements**

**RPC Control system contains 24 redundant rings**

<b>CCU</b>	<b>276</b>
<b>DOH</b>	<b>48</b>
<b>MU-sMU adapter (12 channel)</b>	<b>24</b>
<b>sMU Fanout</b>	<b>24</b>
<b>MFS adapters (4 channel)</b>	<b>24</b>
<b>ribbon cable with MFS connector (~20m)</b>	<b>24</b>
<b>96 fiber cable (8 x 12 fiber ribbons)*</b>	<b>15</b>
<b>CCS (8 FECs each)</b>	<b>3</b>

**\*Long multiribbon fibber is placed between patch pannel on the bottom of the detector tower and CCS modules in USC55 (rack S1D05) (no patch panel needed on the USC side)**

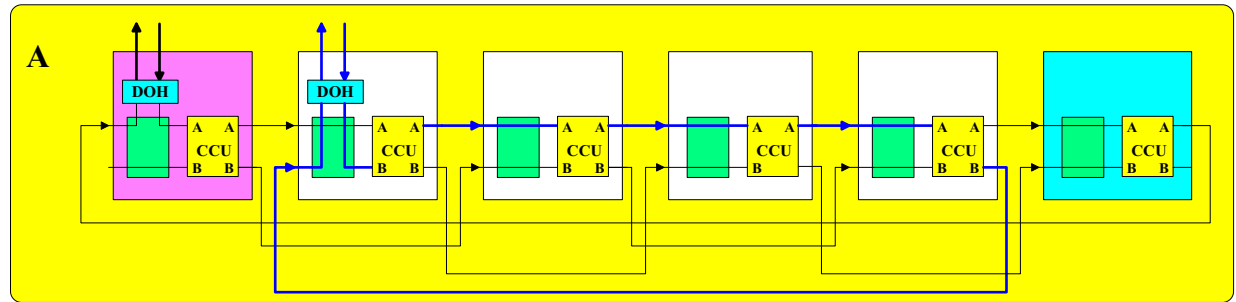


**Only configuration A is presented in CCU docs and presentations**

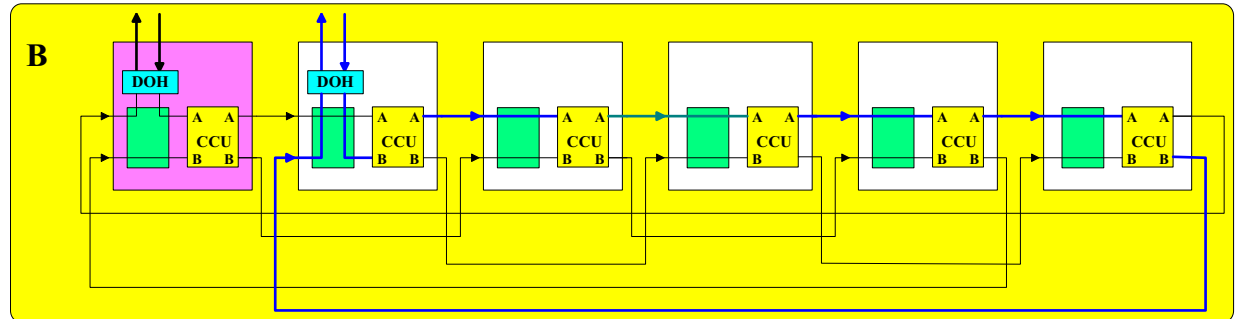
**Question: is configuration B possible?**

**Advantage of configuration B is that in case when board 1 is faulty only node 1 is not available. When configuration A is used both node 1 and 6 are not available. See next page case 1 and 2.**

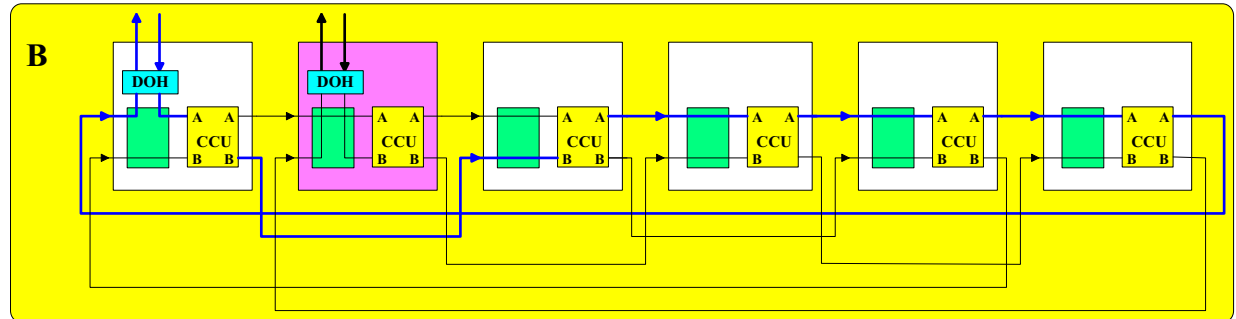
1



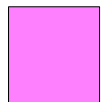
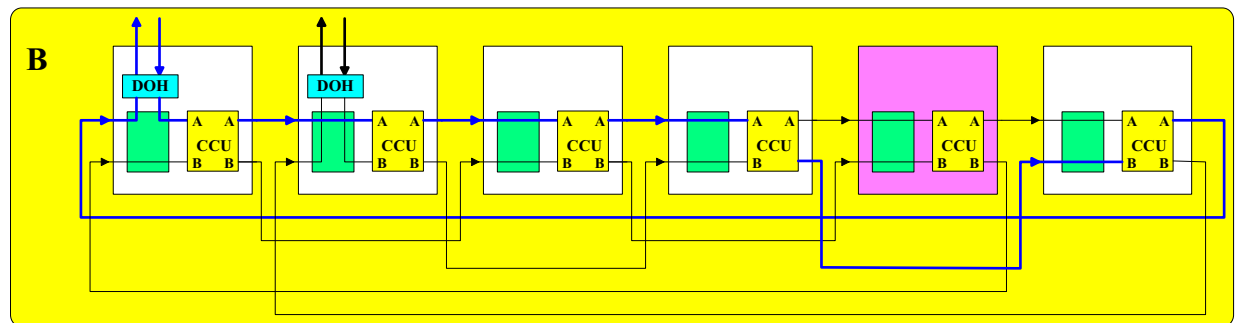
2



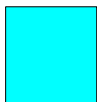
3



4



Faulty node



not available node