

MCH and Power Units

System Basics



Vollrath Dirksen

Strategic Business Development

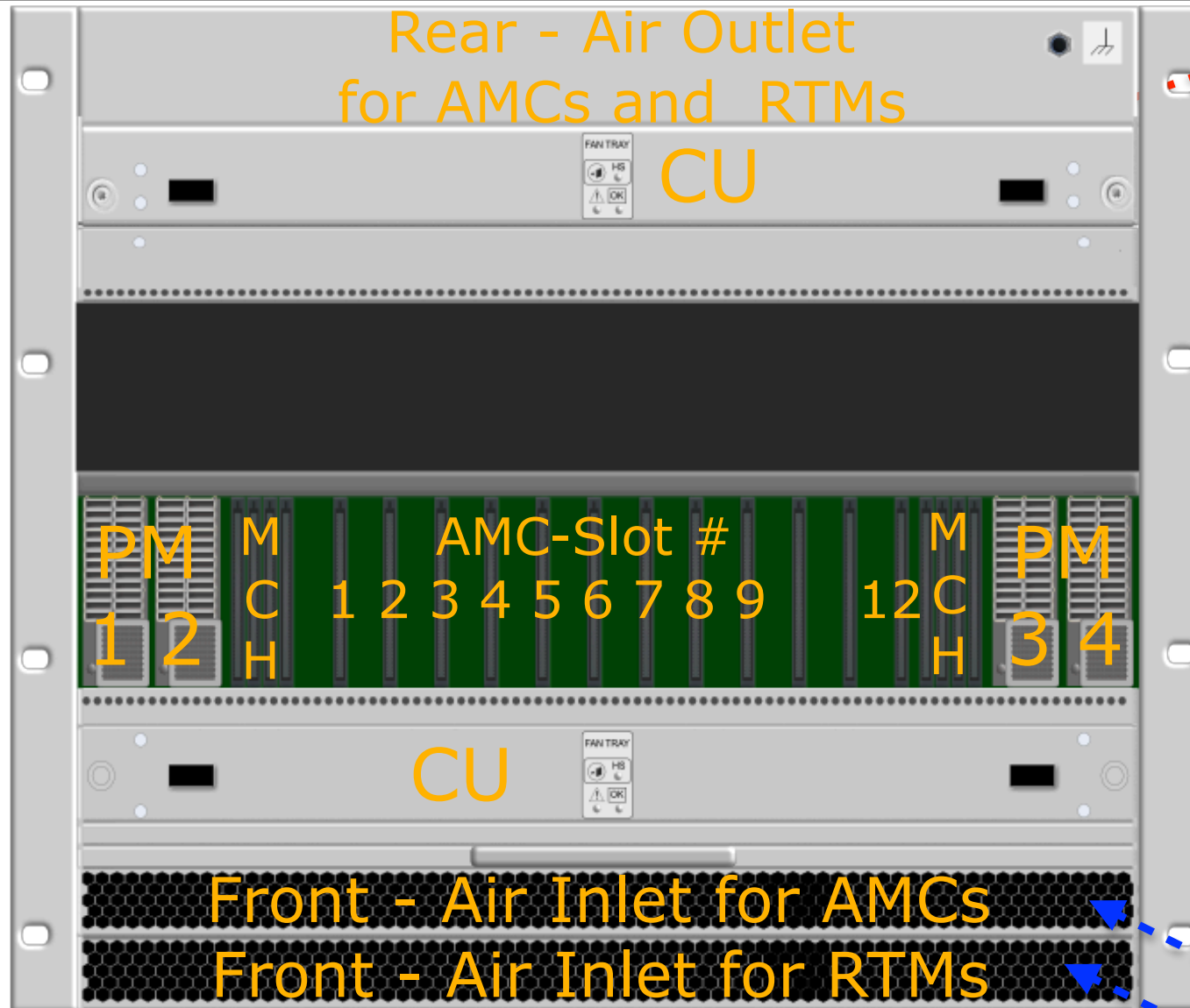
vollrath@nateurope.com



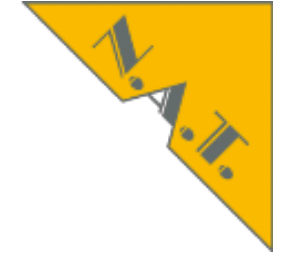
ONE TECHNOLOGY MULTIPLE SOLUTIONS

Backplane Slots

Power Module, MCH, AMCs, Cooling Units



Power Modules for MTCA.0 and MTCA.4



	INPUT	PAYLOAD
• NAT-PM-DC420	DC -48V	420W
• NAT-PM-DC840	DC -48V	840W
• NAT-PM-AC600	AC 110-265	600W
• NAT-PM-AC600D	AC 110-265V	600W (double width)
• NAT-PM-AC1000	AC 110-265V	1000W (double width)
• NAT-RPM-PSC	AC 110-265V	600W (double width)
• NAT-PM-DC600LV	DC 24V	ad: 300W/600W
• NAT-RPM-PSC	AC 110-265V	+/-VV (variable Voltages)



DC600LV

DC420

DC840

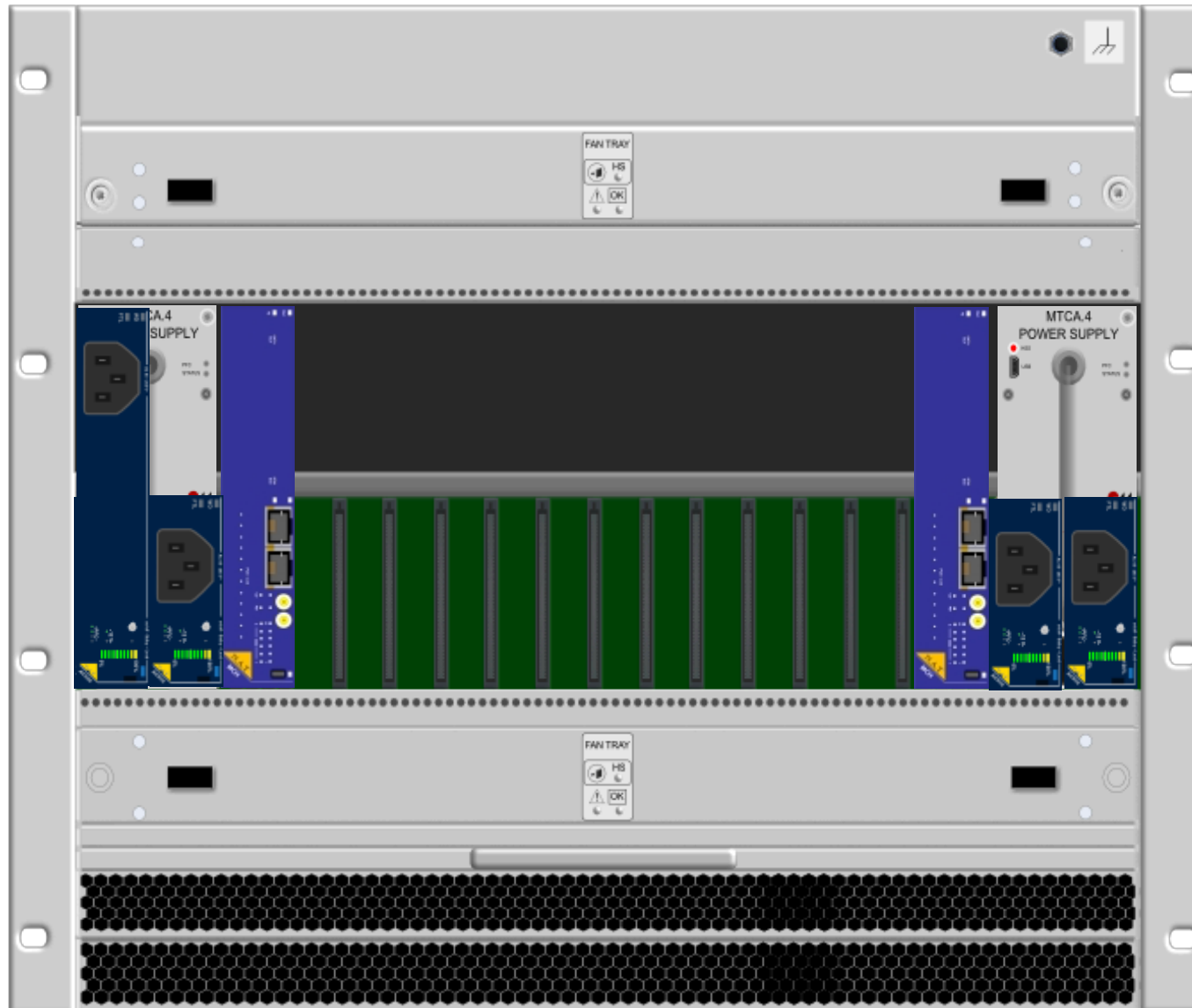
AC600

AC600D

AC1000

Backplanes with 4 Power Module Sites

1, 2, 3, 4 PMs: Redundancy, Load Sharing



9	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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NATView PCM

n+1 Redundancy



Power Configuration Manager

Cancel Quit and Save

Status: **OK**

Power Channel:	1 MCH1	2 MCH2	3 CU1	4 CU2	5 AMC1	6 AMC2	7 AMC3	8 AMC4	9 AMC5	10 AMC6	11 AMC7
Max. Power Output (mA):	7000	7600	7600	7600	7200	7200	7200	7200	7200	7200	720
Required Power (mA):	3500	n/a	7600	7600	n/a	7200	n/a	n/a	n/a	800	n/a

PM enable	PM1 sum : 116200 mA max: 50000 mA primary (0)	PM2 sum : 116200 mA max: 50000 mA primary (0)	PM3 sum : 116200 mA max: 50000 mA primary (0)	PM4 sum : 116200 mA max: 50000 mA secondary (1)
☒	☒	☐	☒	☐
☒	☐	☒	☒	☐
☒	☐	☐	☐	☐
☒	☒	☒	☒	☒



MCH Command Line Interface

- show_pwrconf
- show_pm
- show_fruinfo 5
- show_sensorinfo 50
- show_sensorinfo 40



```
nat> show_sensorinfo 50
Sensor Information for FRU 50 / PM1
```

=====							
#	SDRType	Sensor Entity	Inst	Value	State	Name	

-	MDevLoc		0x0a	0x61			NAT-PM-AC600D
1	Full	Temp	0x0a	0x61	39 C	ok	T_CPU
2	Full	Temp	0x0a	0x61	52 C	ok	T_XFrm
4	Full	Temp	0x0a	0x61	39 C	ok	T-PSB
5	Full	Temp	0x0a	0x61	51 C	ok	T-PFC
6	Full	Temp	0x0a	0x61	49 C	ok	T-REC
7	Full	Voltage	0x0a	0x61	230 V	ok	VINAC
8	Full	Voltage	0x0a	0x61	386 V	ok	VINDC
9	Full	Voltage	0x0a	0x61	12.4 V	ok	12V
10	Full	Voltage	0x0a	0x61	3.5 V	ok	3.3V
11	Full	Current	0x0a	0x61	11.00 A	ok	I_Sum
12	Compact	Current	0x0a	0x61	3.75 A	ok	I_CH01
13	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH02
14	Compact	Current	0x0a	0x61	0.40 A	ok	I_CH03
15	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH04
16	Compact	Current	0x0a	0x61	0.35 A	ok	I_CH05
17	Compact	Current	0x0a	0x61	0.25 A	ok	I_CH06
18	Compact	Current	0x0a	0x61	1.45 A	ok	I_CH07
19	Compact	Current	0x0a	0x61	2.40 A	ok	I_CH08
20	Compact	Current	0x0a	0x61	1.15 A	ok	I_CH09
21	Compact	Current	0x0a	0x61	1.35 A	ok	I_CH10
22	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH11
23	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH12
24	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH13
25	Compact	Current	0x0a	0x61	0.00 A	ok	I_CH14

AMC Connector

Protocol Agnostic



- Port is differential receive and differential transmit lines

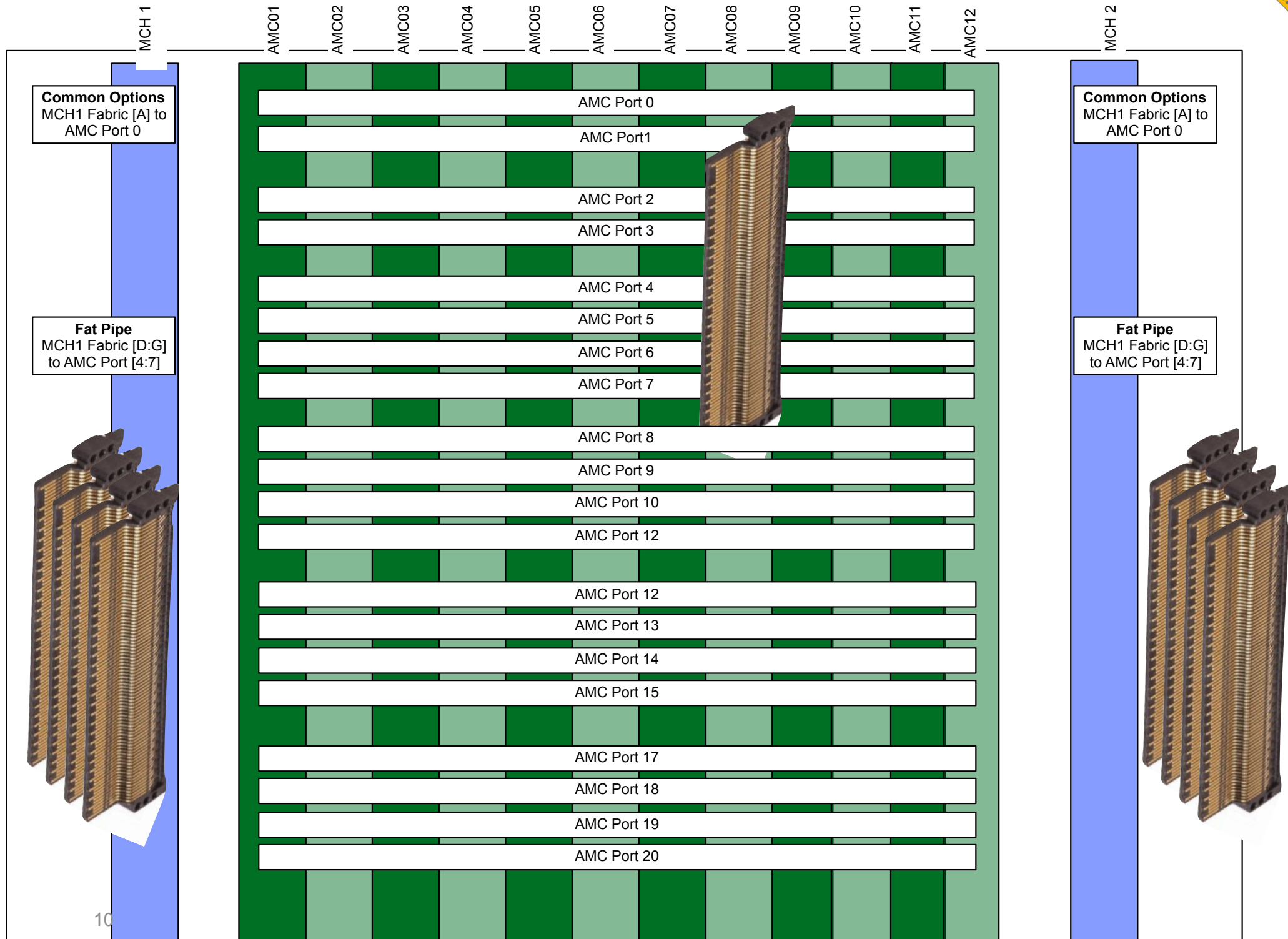
Pin No.	AMC-Signal	AMC-Signal	Pin No.
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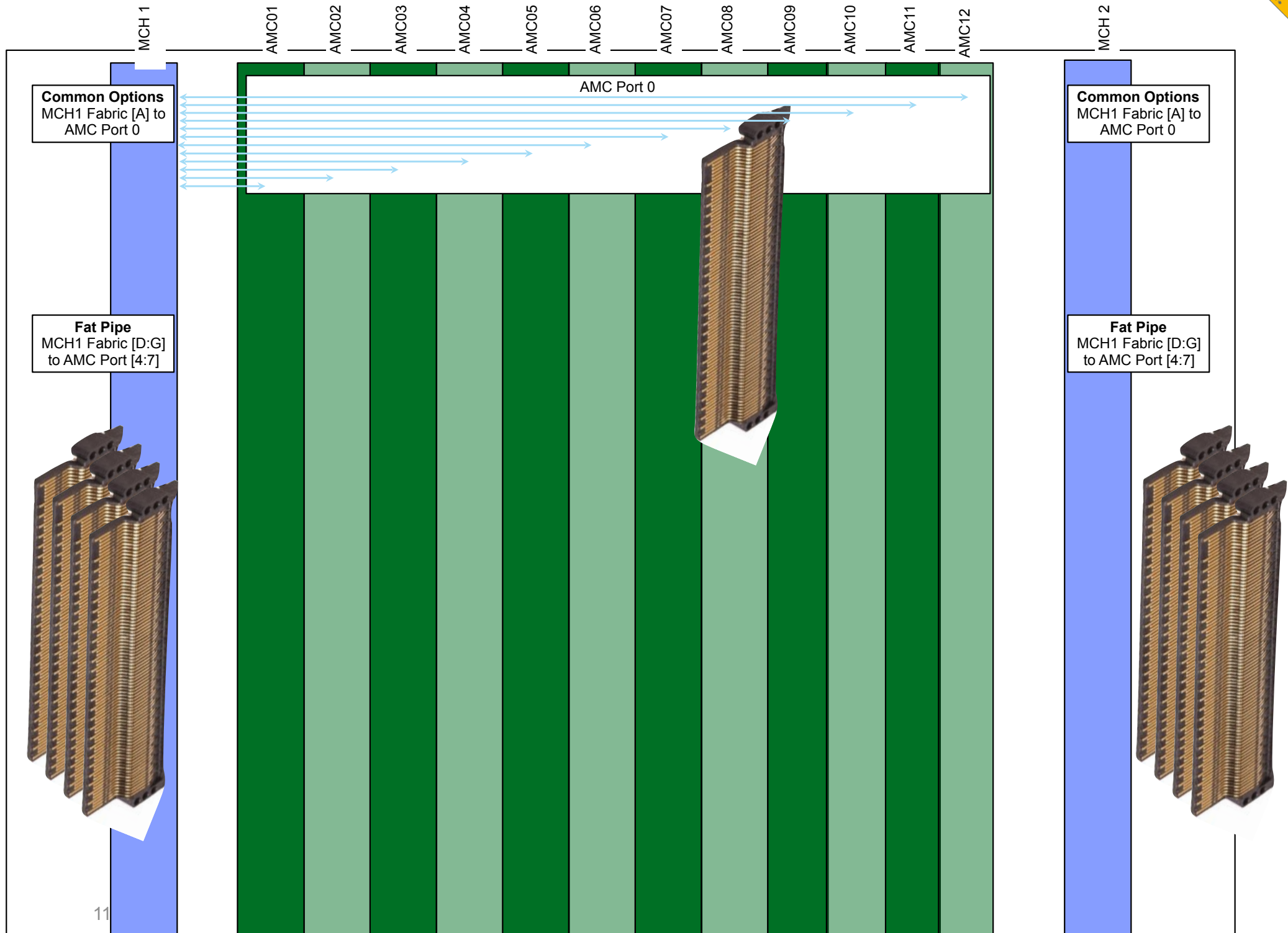
1	GND	GND	170
2	PWR	TDI	169
3	/PS1	TDO	168
4	PWR_IPMB	/TRST	167
5	GA0	TMS	166
6	RESVD	TCK	165
7	GND	GND	164
8	RESVD	Tx20+	163
9	PWR	Tx20-	162
10	GND	GND	161
11	Tx0+	Rx20+	160
12	Tx0-	Rx20-	159
13	GND	GND	158
14	Rx0+	Tx19+	157
15	Rx0-	Tx19-	156
16	GND	GND	155
17	GA1	Rx19+	154
18	PWR	Rx19-	153
19	GND	GND	152
20	Tx1+	Tx18+	151
21	Tx1-	Tx18-	150
22	GND	GND	149
23	RLINK2_P	Rx18+	148
24	RLINK2_N	Rx18-	147

43	GND
44	Tx4+
45	Tx4-
46	GND
47	Rx4+
48	Rx4-
49	GND
50	Tx5+
51	Tx5-
52	GND
53	Rx5+
54	Rx5-
55	GND

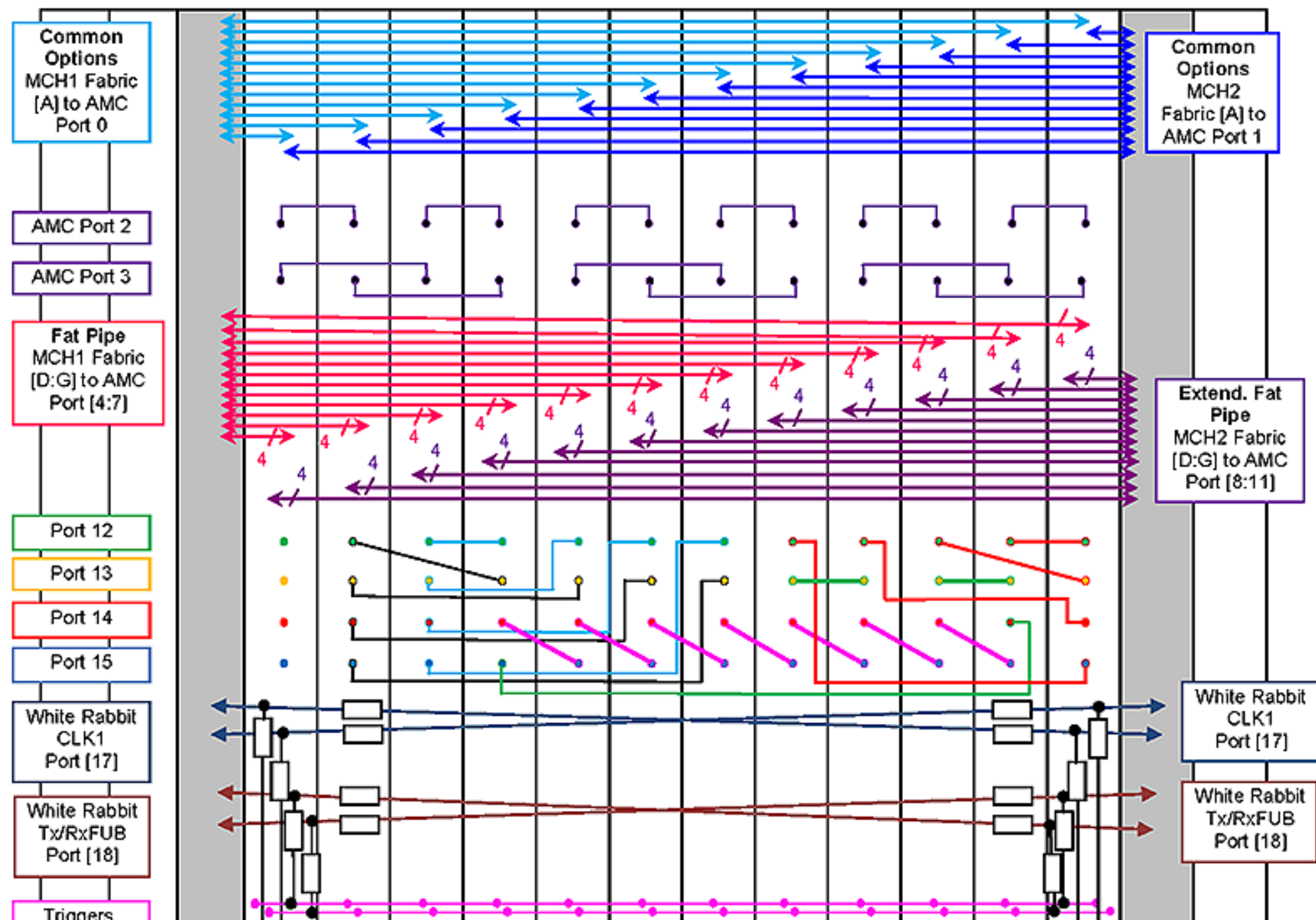
Port 4

Port 5





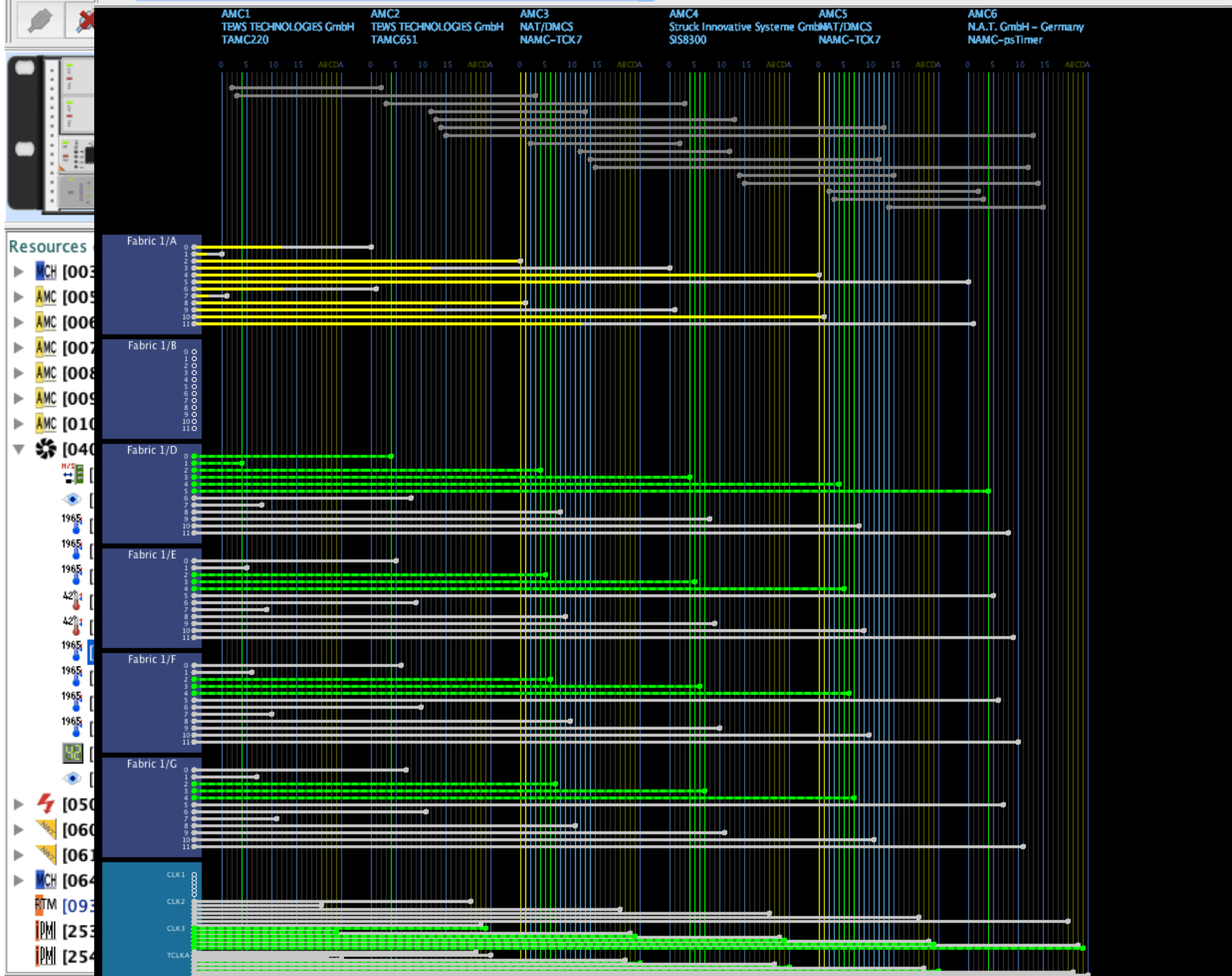
N.A.T. NATIVE-R9 Backplane Topology, 23005-498



Applicati

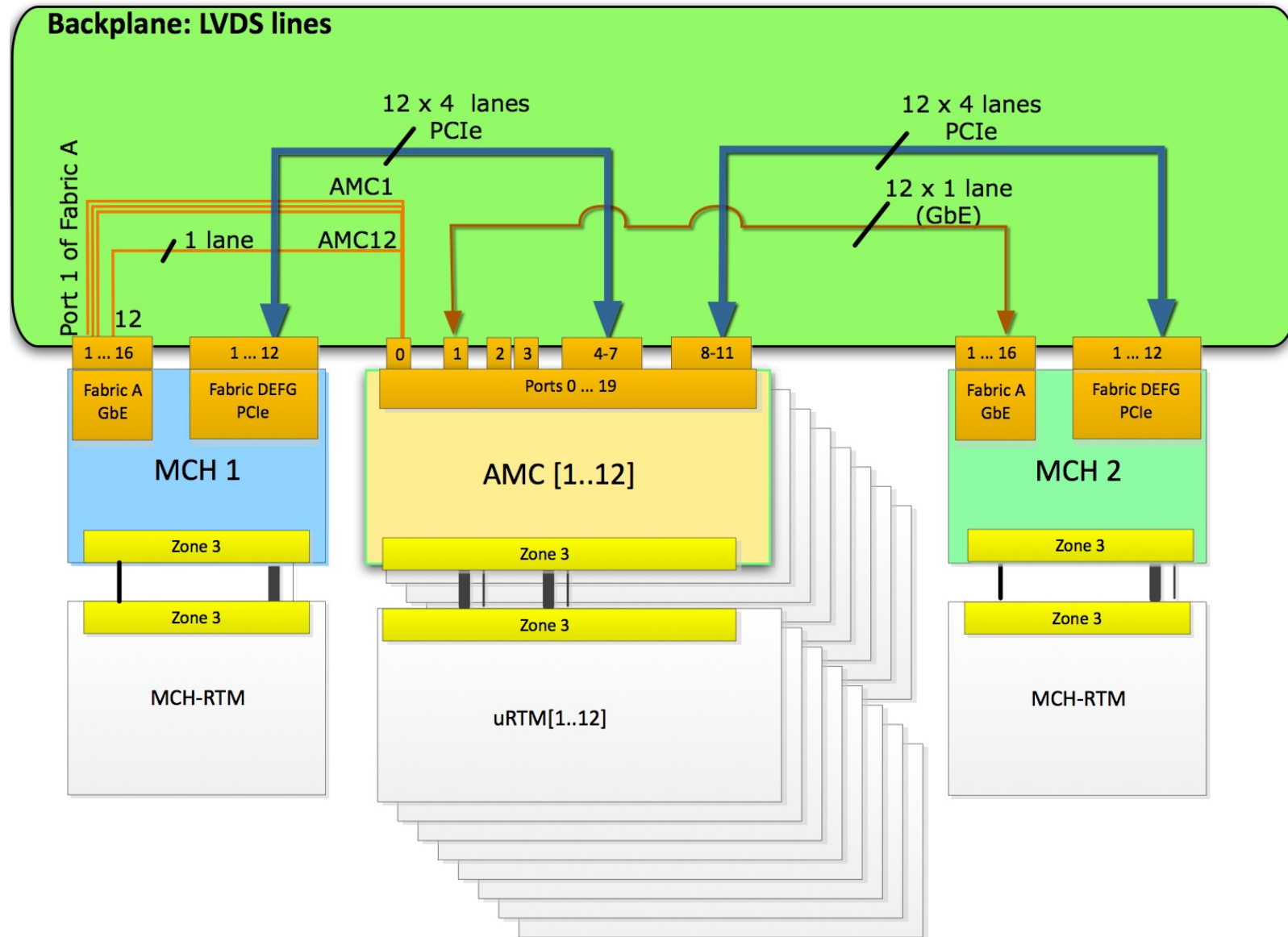
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Zoom: 75 %



MTCA.4.1

Interconnection



NAT-MCH

Web Interface for Data Connections



MCH Configuration

mcsnmchdev2.desy.de/index.asp

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NAT-MCH by N.A.T.

Setup

Base Configuration
JSM

Switch **BASE 1GbE**

Age Time
Port on/off
Port VLAN
802.1Q VLAN
802.1X
802.1p
Port Mirroring
Jumbo Frame
Link Aggregation
Rapid Spanning Tree
Serdes/SGMII

Link Status

Switch PCIe x48
PCIe Virtual Switches
Error Counters

Maintenance

Script Management
Board Information
System Information
Reboot NAT-MCH
Update MCH
Change Password
N.A.T. Webpage
Home

Link States of Ethernet Connections

Slot	A M C 1	A M C 2	A M C 2	A M C 3	A M C 3	A M C 4	A M C 4	A M C 5	A M C 5	A M C 6	A M C 7	A M C 7	F R T 1	F R T 2	U P D B	R T M B	C P U 1
Port	0	0	1	0	1	0	1	0	1	0	0	1	-	-	-	-	-
Links	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	EN	DIS	EN	EN	EN

	- Link is up
	- Link is down
"EN"	- Interface is enabled
"DIS"	- Interface is disabled

NAT-MCH

Web Interface for Data Connections



MCH Configuration

mcsrmchdev2.desy.de/index.asp

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NAT-MCH by N.A.T.

Setup

- Base Configuration
- JSM
- Switch **BASE 1GbE**
- Age Time
- Port on/off
- Port VLAN
- 802.1Q VLAN
- 802.1X
- 802.1p
- Port Mirroring
- Jumbo Frame
- Link Aggregation
- Rapid Spanning Tree
- Serdes/SGMII
- Link Status
- BCM5396 counters
- Switch PCIe x48
- PCIe Virtual Switches
- Error Counters
- Link Status**

Maintenance

- Script Management
- Board Information
- System Information
- Reboot NAT-MCH
- Update MCH
- Change Password
- N.A.T. Webpage
- Home

PCIe Link Status Menu

	AMC1	AMC2	AMC3	AMC4	AMC5	AMC6	AMC7	AMC8	AMC9	AMC10	AMC11	AMC12
	4..7	4..7	4..7	4..7	4..7	4..7	4..7	4..7	4..7	4..7	4..7	4..7
	x4	x1	-	x4	-	-	-	-	-	-	-	-
Link Speed	8 GT/s	2.5 GT/s	-	2.5 GT/s	-	-	-	-	-	-	-	-

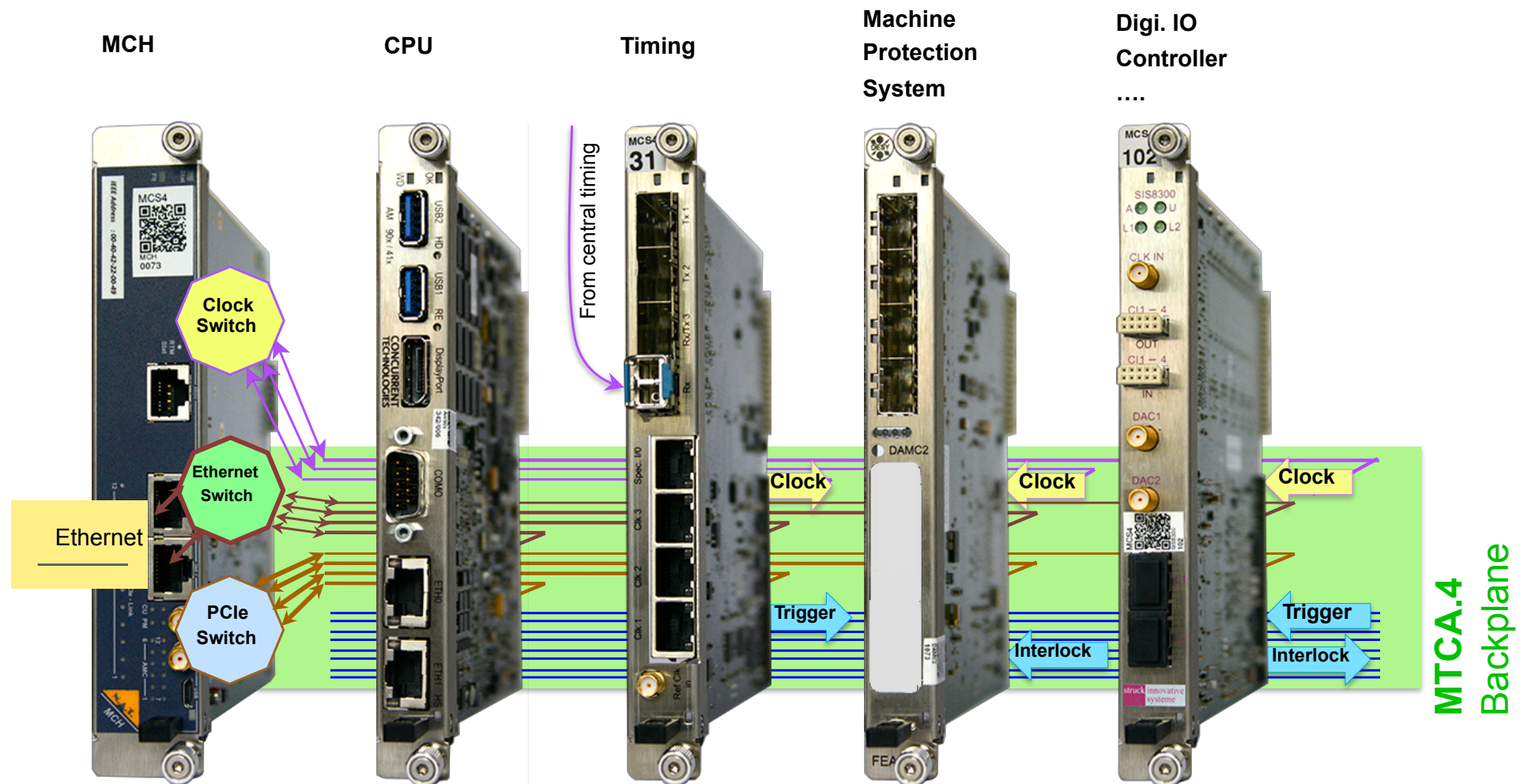
Summary: Backplane

Saves a lot of interconnection Cables



Common modules

Application modules



Source: Kay Rehlich, IEEE RTC Williamsburg, 9. June 2018, MicroTCA Workshop Tutorial