

Update on SP02 design

by Victor Golovtsov & Lev Uvarov

**Trigger Meeting at UFL
March 2002**

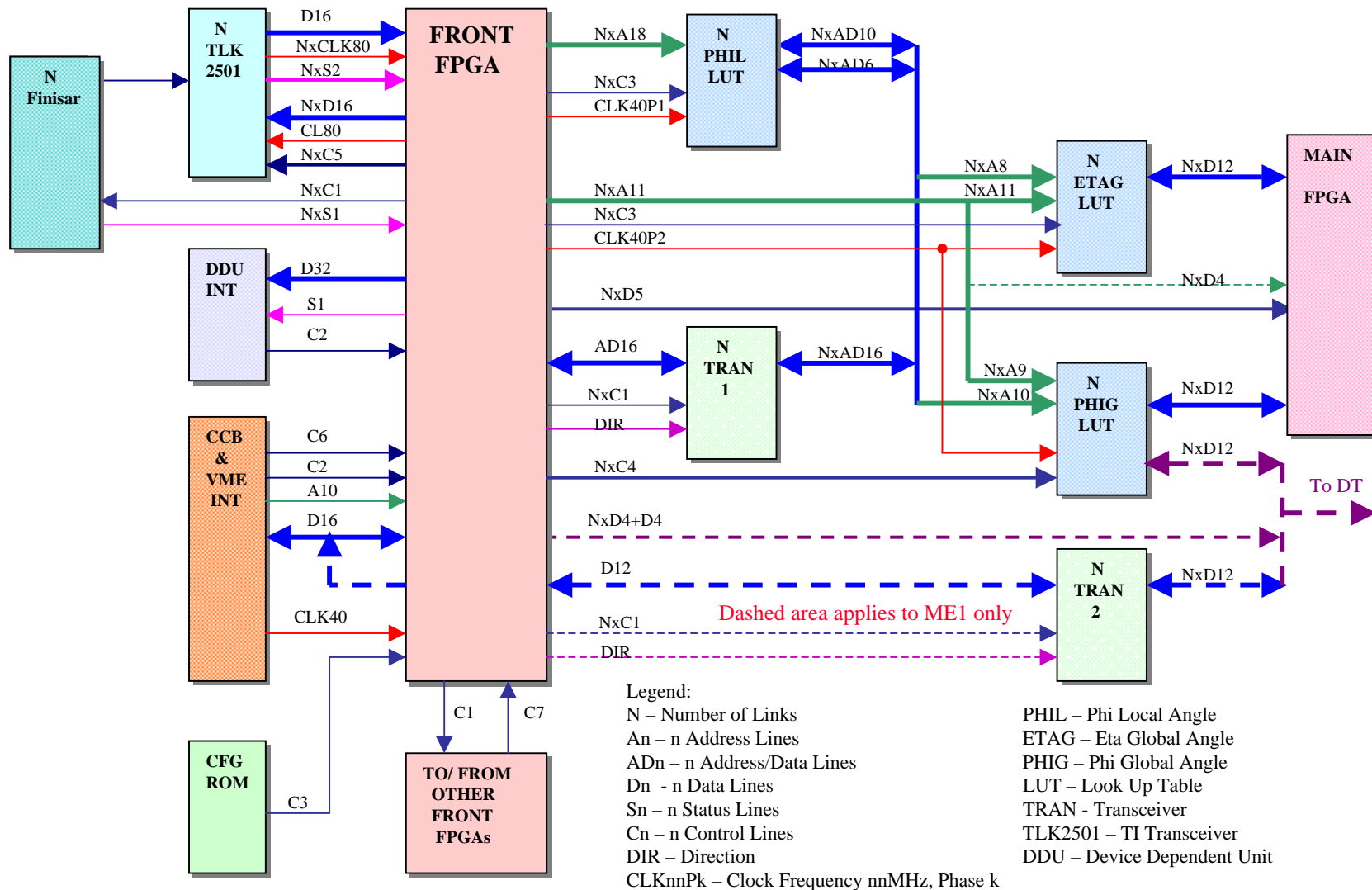


Outline

- **Front FPGA Interfaces**
 - ME1 SR LUT
 - ME2/ME3/ME4 SR LUT
- **Main FPGA Interfaces**
 - PT LUT & MUX
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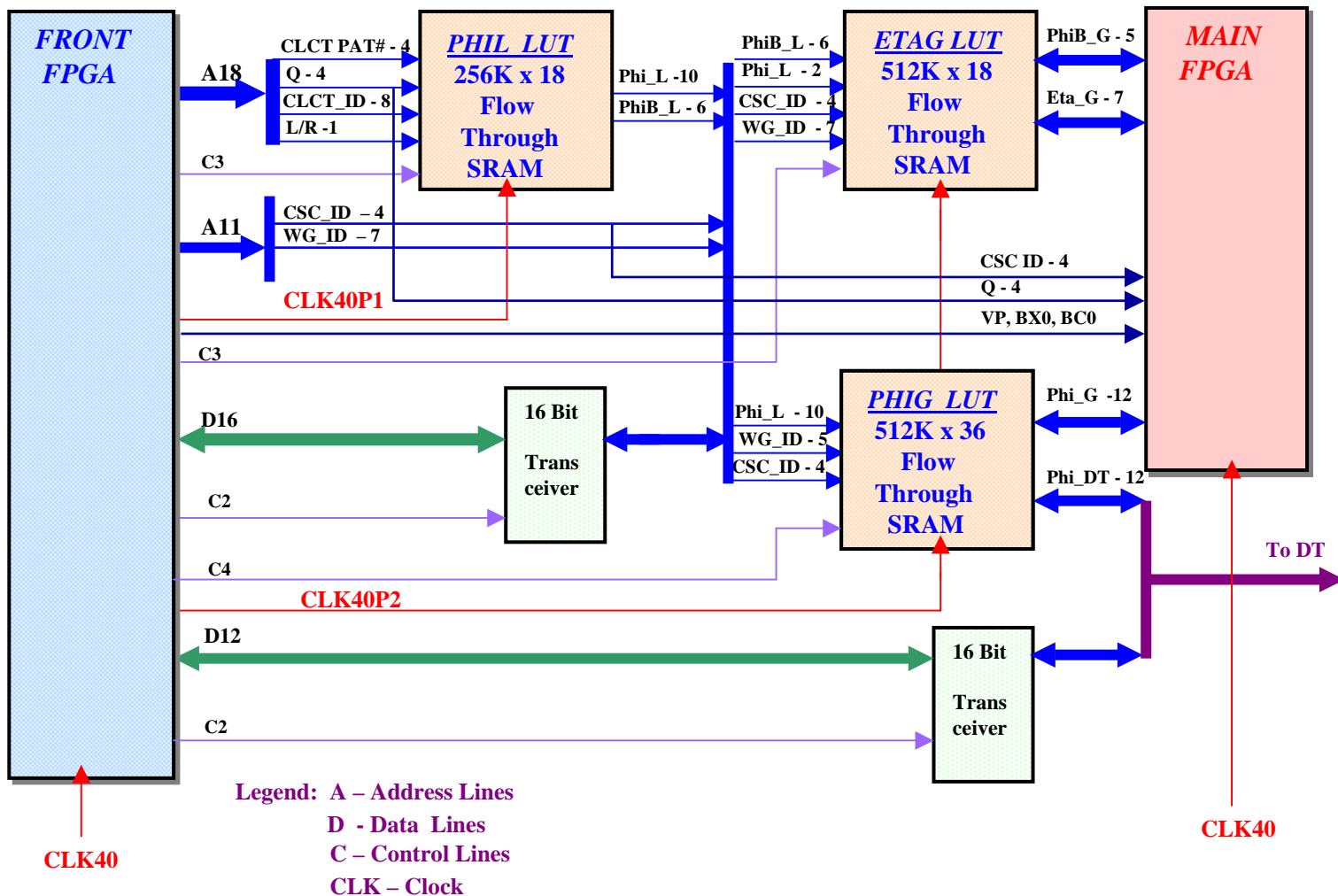


Front FPGA Interfaces



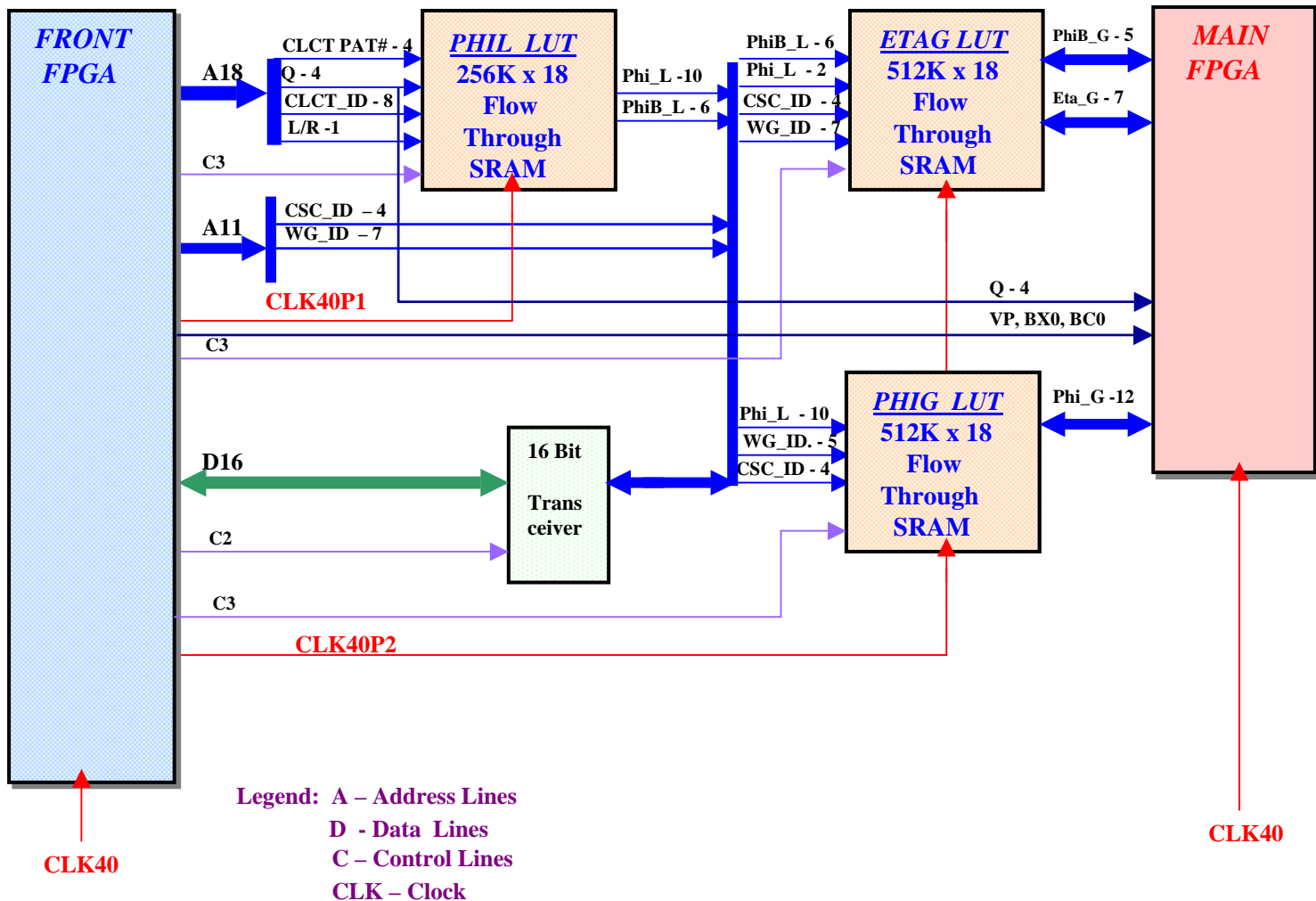


ME1 SR LUT



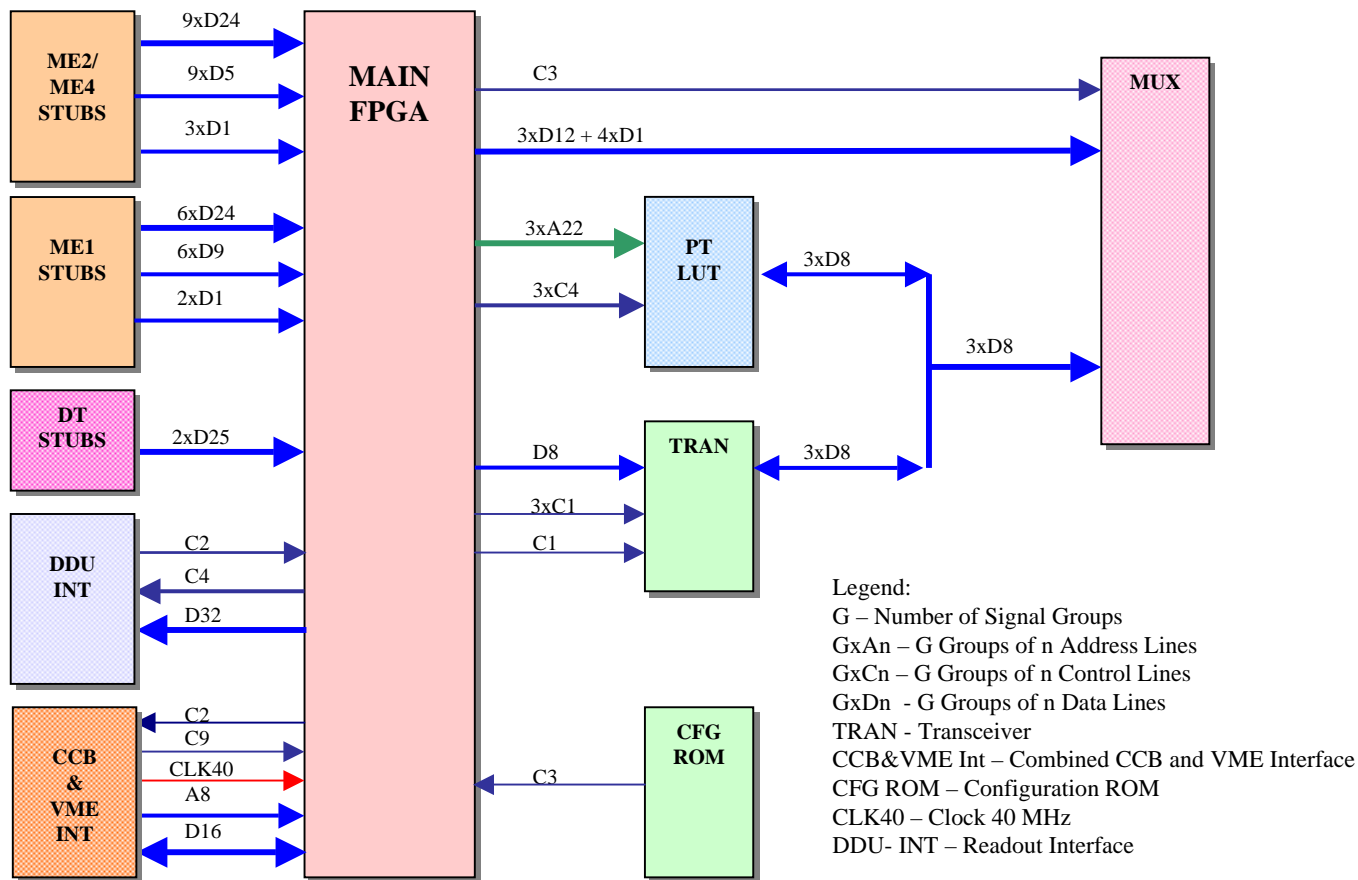


ME2/ME3/ME4 SR LUT



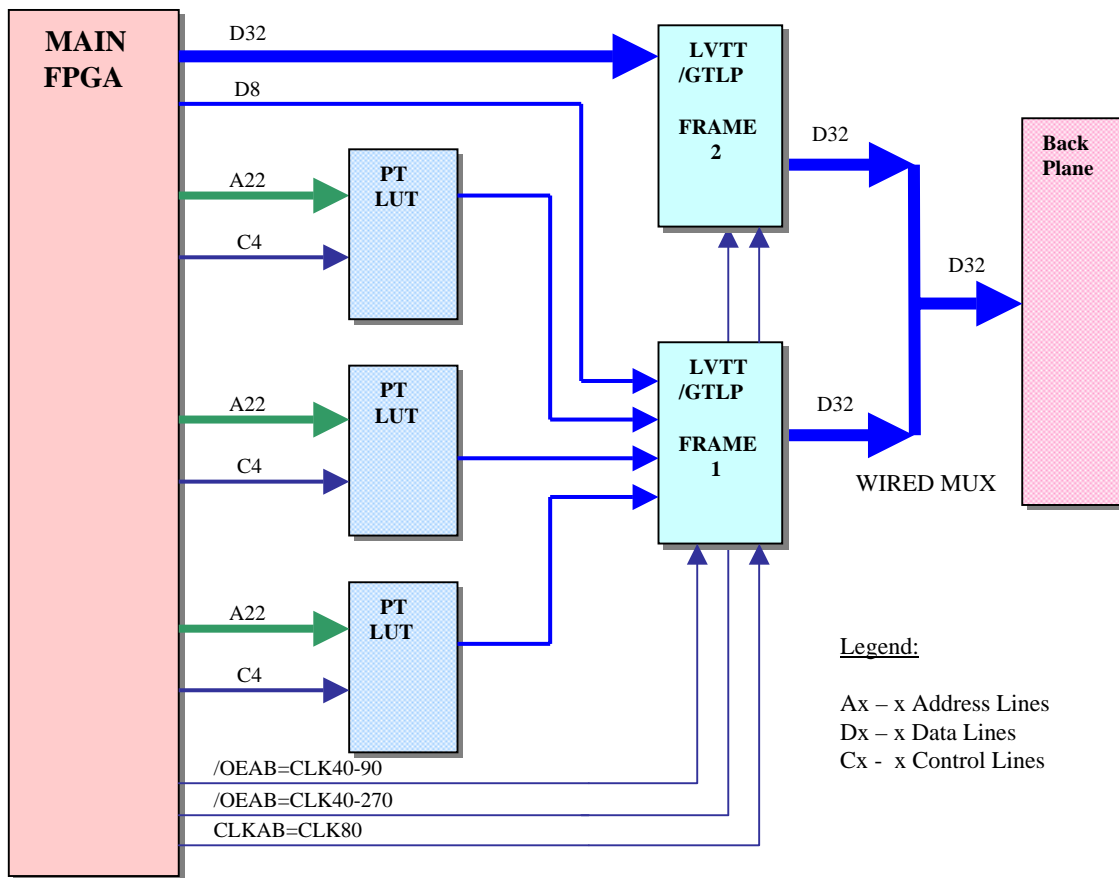


Main FPGA Interfaces



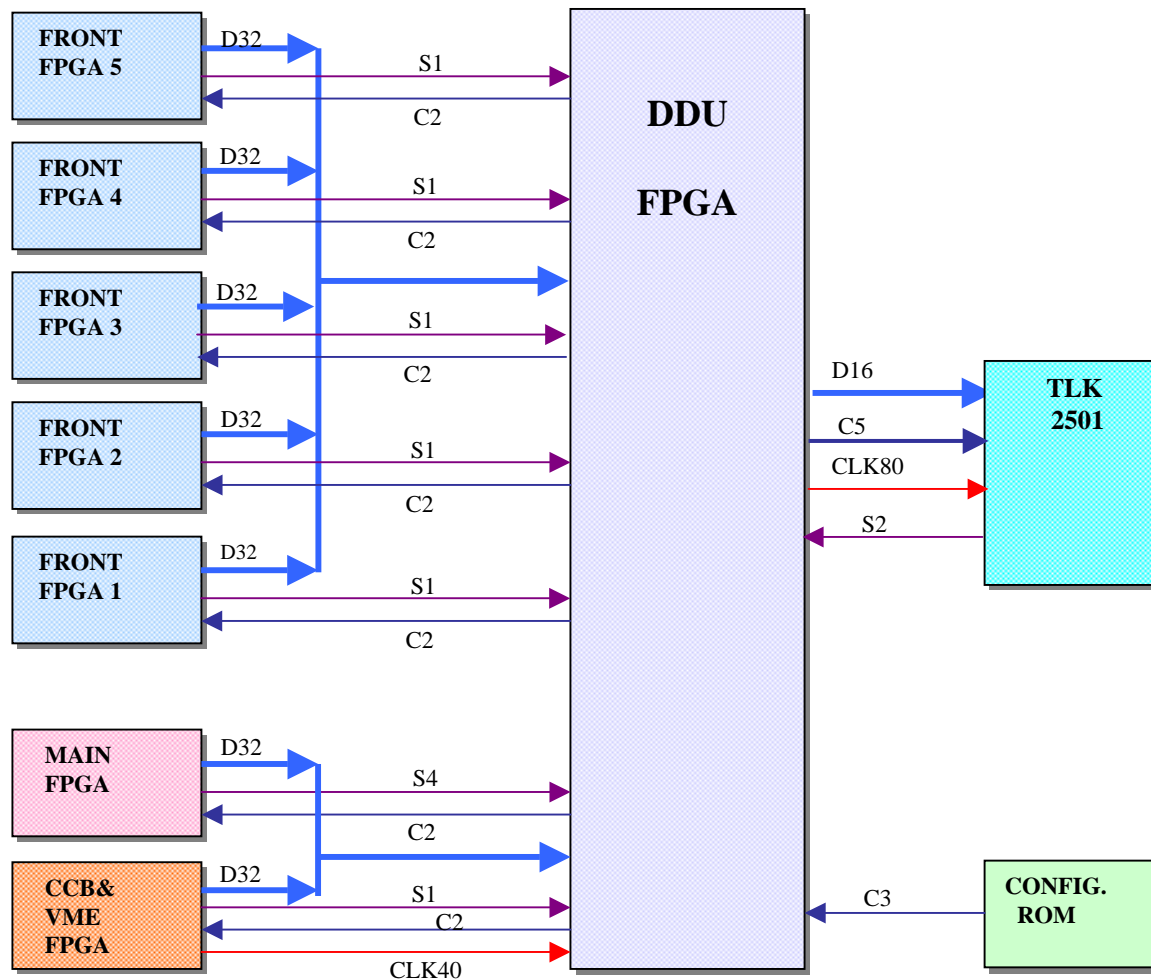


PT LUT & MUX





DDU FPGA Interfaces





FPGA Choice

Front FPGA (3 Muons per FPGA)

- Interfaces require at least 365 I/Os
 - Choice => XC2V1000-?FF896C with 432 user I/Os

Main FPGA

- Interfaces require at least 716 I/Os
 - Choice => XC2V4000-?FF1152C with 824 user I/Os

VME&CCB FPGA

- Interfaces require at least 150 I/Os
 - Choice => XC2V250-?FG456C with 200 user I/Os

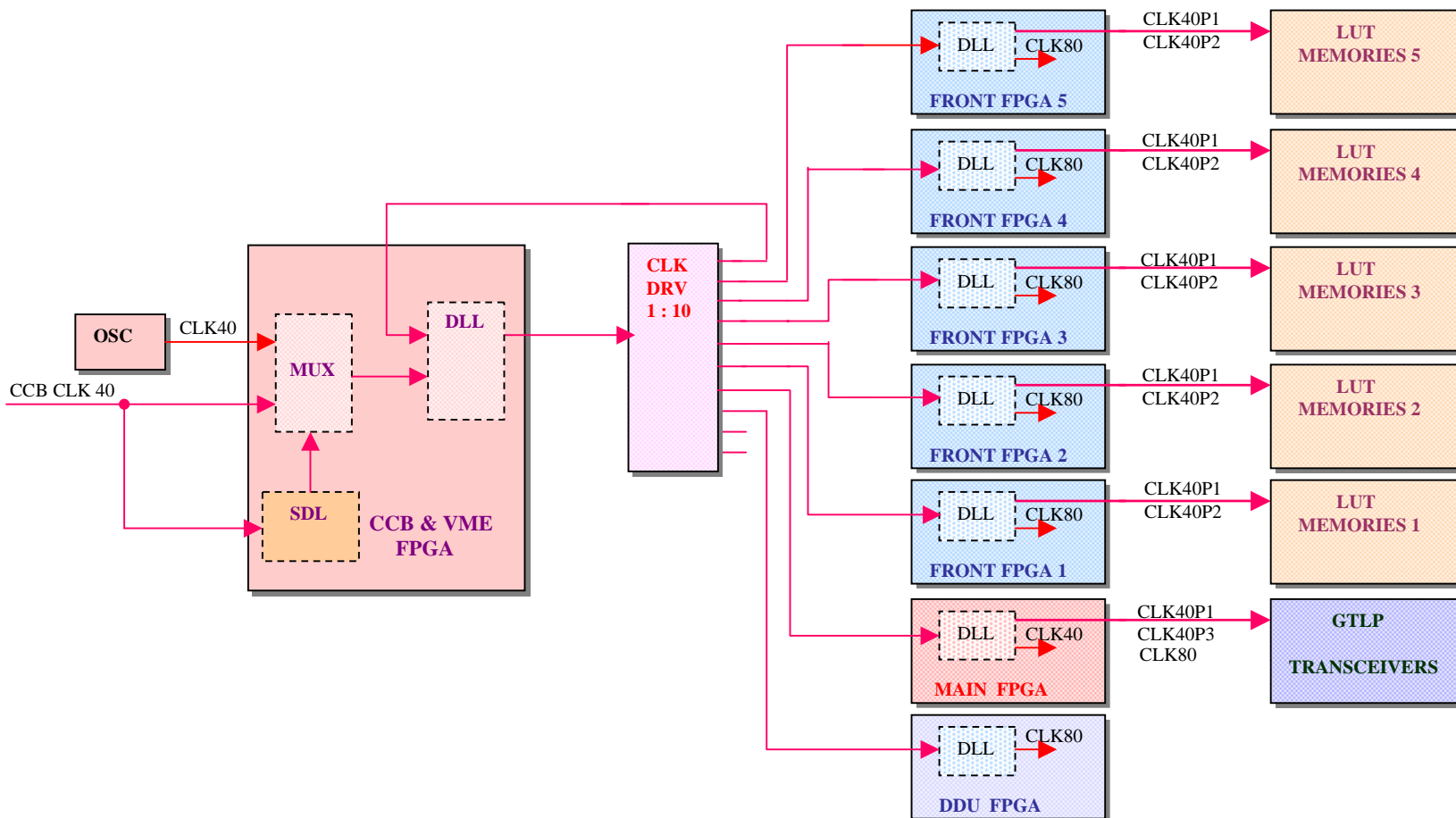
DDU FPGA

- Interfaces require at least 110 I/Os
 - Choice => XC2V250-?FG256C with 172 user I/Os

Note. As design progresses the number of required I/Os only **increases**, and never **decreases**



Board-Level Clock Deskewing



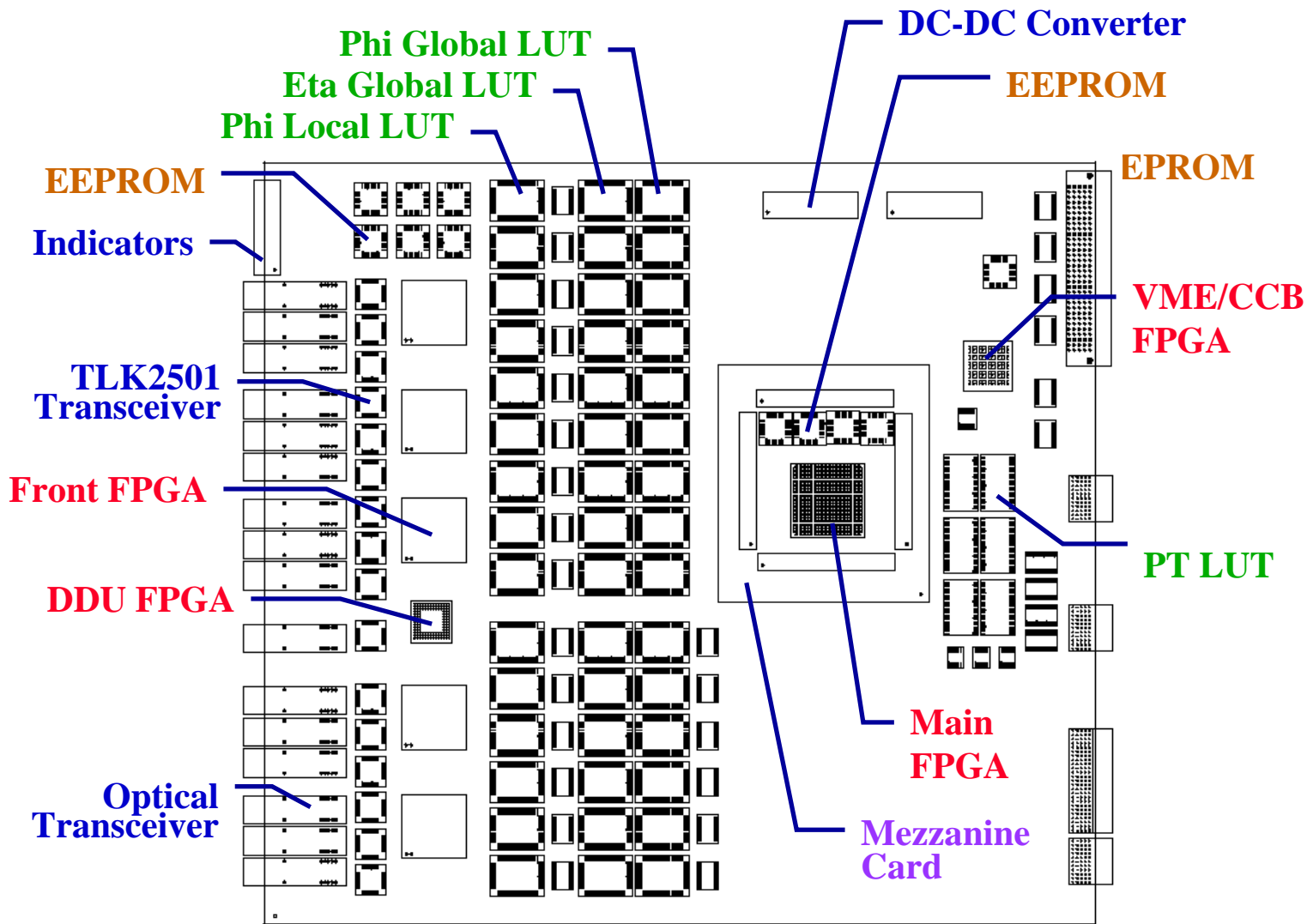


Active Components List

Function	Vendor	Part	Package	Pitch	Parts
Optical Transceivers	Finisar	FTRJ-8519-1-2.5	2x5-SSF	1,78	16
Deserializers	TI	TLK2501IRCP	64-PQFP	0,50	16
Front FPGA	Xilinx	XC2V1000-5FF896C	896-BGA	1,00	5
Front FPGA EEPROM	Xilinx	XC18V04VQ44C	44-VQFP	0,80	5
Local Phi LUT (256Kx18)	SGL	GS841Z18AT-200/180/166/150	100-TQFP	0,65	15
Global Eta LUT (512Kx18)	SGL	GS881Z18AT-250/225/200/166/150	100-TQFP	0,65	15
Global Phi LUT (512Kx36)	SGL	GS8161Z36T-250/225/200/166/150	100-TQFP	0,65	15
LUT Buffers	TI	SN74AVC16245DGGR	48-TSSOP	0,50	21
Main FPGA	Xilinx	XC2V4000-5FF1152C	1152-BGA	1,00	1
Main FPGA EEPROM	Xilinx	XC18V04VQ44C	44-VQFP	0,80	4
PT LUT (4Mx4)	Toshiba	TC55V4400FT-10	54-TSOP	0,80	6
PT LUT Buffers	TI	SN74ALVCH245PWR	20-TSSOP	0,65	3
VME Buffers	TI	SN74LVT162245ADGGR	48-TSSOP	0,50	4
VME/CCB FPGA	Xilinx	XC2V250-4FG456CES	456-BGA	1,00	1
VME/CCB FPGA EEPROM	Xilinx	XC18V02VQ44C	44-VQFP	0,80	1
Clock Driver 1->10	TI	CDCVF2310PWR	24-TSSOP	0,65	1
DDU FPGA	Xilinx	XC2V250-5FG256CES	256-BGA	1,00	1
DDU FPGA EEPROM	Xilinx	XC18V02VQ44C	44-VQFP	0,80	1
MS Drivers	Fairchild	GTLP16617MTD	56-TSSOP	0,50	4
Clock40 Receiver	TI	SN65LVDT9637BDR	8-SOIC	1,27	1
CCB Transceivers	TI	SN74GTLPH16945GR	48-TSSOP	0,50	2
Transition Board Transmitters	TI	SN65LVDM1677DGGR	64-TSSOP	0,50	6,5
Transition Board Receivers	TI	SN65LVDM1677DGGR	64-TSSOP	1,50	3,5
5.0VDC-2.5VDC	ForeSight	AUSTIN5V/1.5		5,72	1
5.0VDC-1.5VDC	ForeSight	AUSTIN5V/2.5		5,72	1



SP02 Board Layout



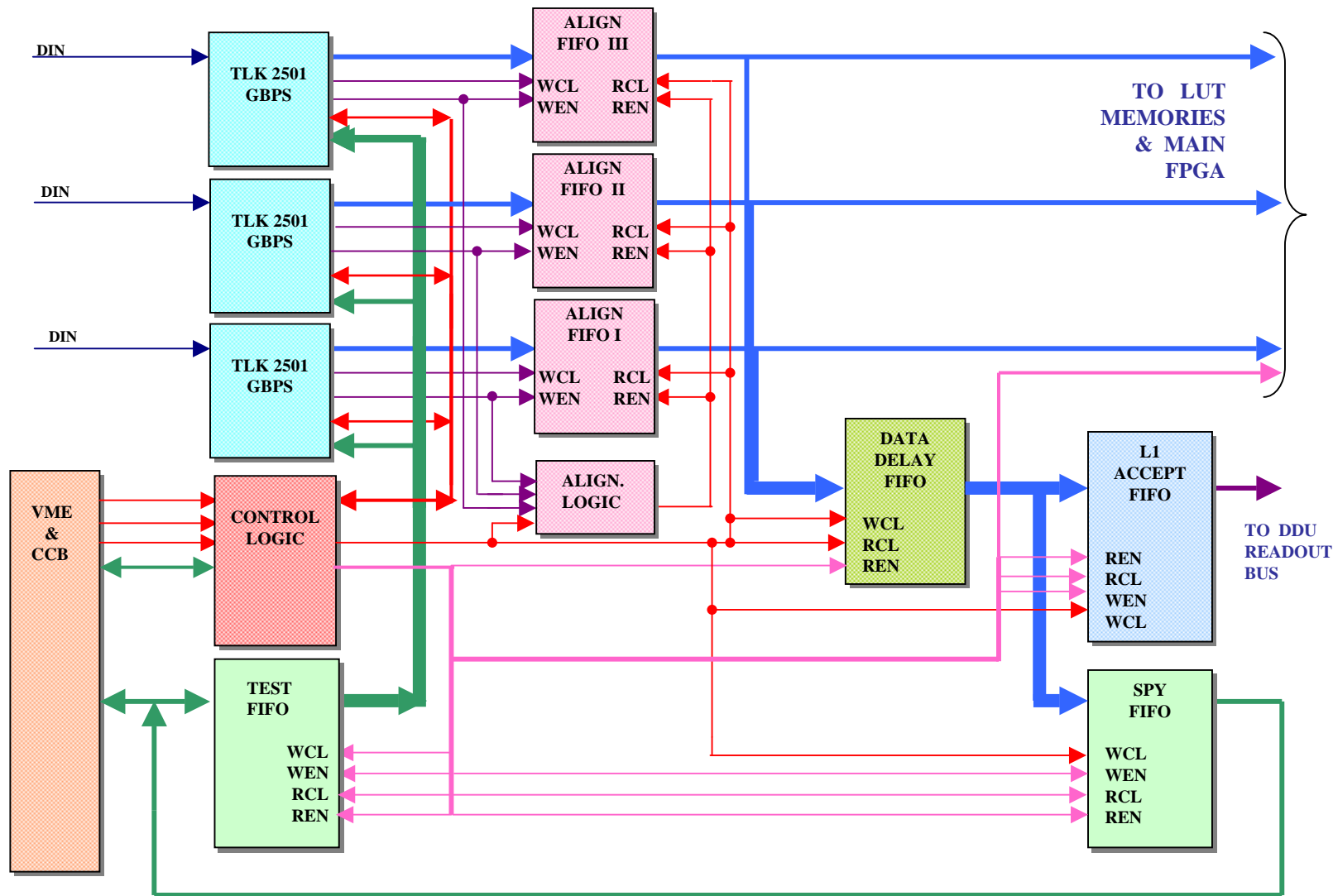


Active Component Price List

Vendor	Part	Distributor	Parts	Price	
				Unit	Total
Finisar	FTRJ-8519-1-2.5		16		
TI	TLK2501IRCP	Digi-Key	16	\$28,73	\$459,68
Xilinx	XC2V1000-5FF896C	Nu Horizons	5	\$556,00	\$2 780,00
Xilinx	XC18V04VQ44C	Nu Horizons	5	\$36,40	\$182,00
SGI	GS841Z18AT-200/180/166/150	????	15	\$11,00	\$165,00
SGI	GS881Z18AT-250/225/200/166/150	Nu Horizons	15	\$25,00	\$375,00
SGI	GS8161Z36T-250/225/200/166/150	???	15	\$49,00	\$735,00
TI	SN74AVC16245DGGR	Digi-Key	21	\$2,88	\$60,48
Xilinx	XC2V4000-5FF1152C	Nu Horizons	1	\$3 007,00	\$3 007,00
Xilinx	XC18V04VQ44C	Nu Horizons	4	\$36,40	\$145,60
Toshiba	TC55V4400FT-10	Arrow -?	6	\$63,24	\$379,44
TI	SN74ALVCH245PWR	Digi-Key	3	\$0,63	\$1,88
TI	SN74LVT162245ADGGR	Digi-Key	4	\$2,34	\$9,36
Xilinx	XC2V250-4FG456CES	Nu Horizons	1	\$106,00	\$106,00
Xilinx	XC18V02VQ44C	Nu Horizons	1	\$23,10	\$23,10
TI	CDCVF2310PWR	Digi-Key	1	\$4,05	\$4,05
Xilinx	XC2V250-5FG256CES	Nu Horizons	1	\$136,00	\$136,00
Xilinx	XC18V02VQ44C	Nu Horizons	1	\$23,10	\$23,10
Fairchild	GTL16617MTD	Newark	4	\$13,29	\$53,16
TI	SN65LVDT9637BDR	Digi-Key	1	\$4,41	\$4,41
TI	SN74GTLPH16945GR	Avnet -??	2	\$4,20	\$8,40
TI	SN65LVDM1677DGGR	Digi-Key	6,5	\$11,46	\$74,49
TI	SN65LVDM1677DGGR	Digi-Key	3,5	\$11,46	\$40,11
ForeSight	AUSTIN5V/1.5	FastPower	1	\$24,00	\$24,00
ForeSight	AUSTIN5V/2.5	FastPower	1	\$24,00	\$24,00
					\$8 821,26

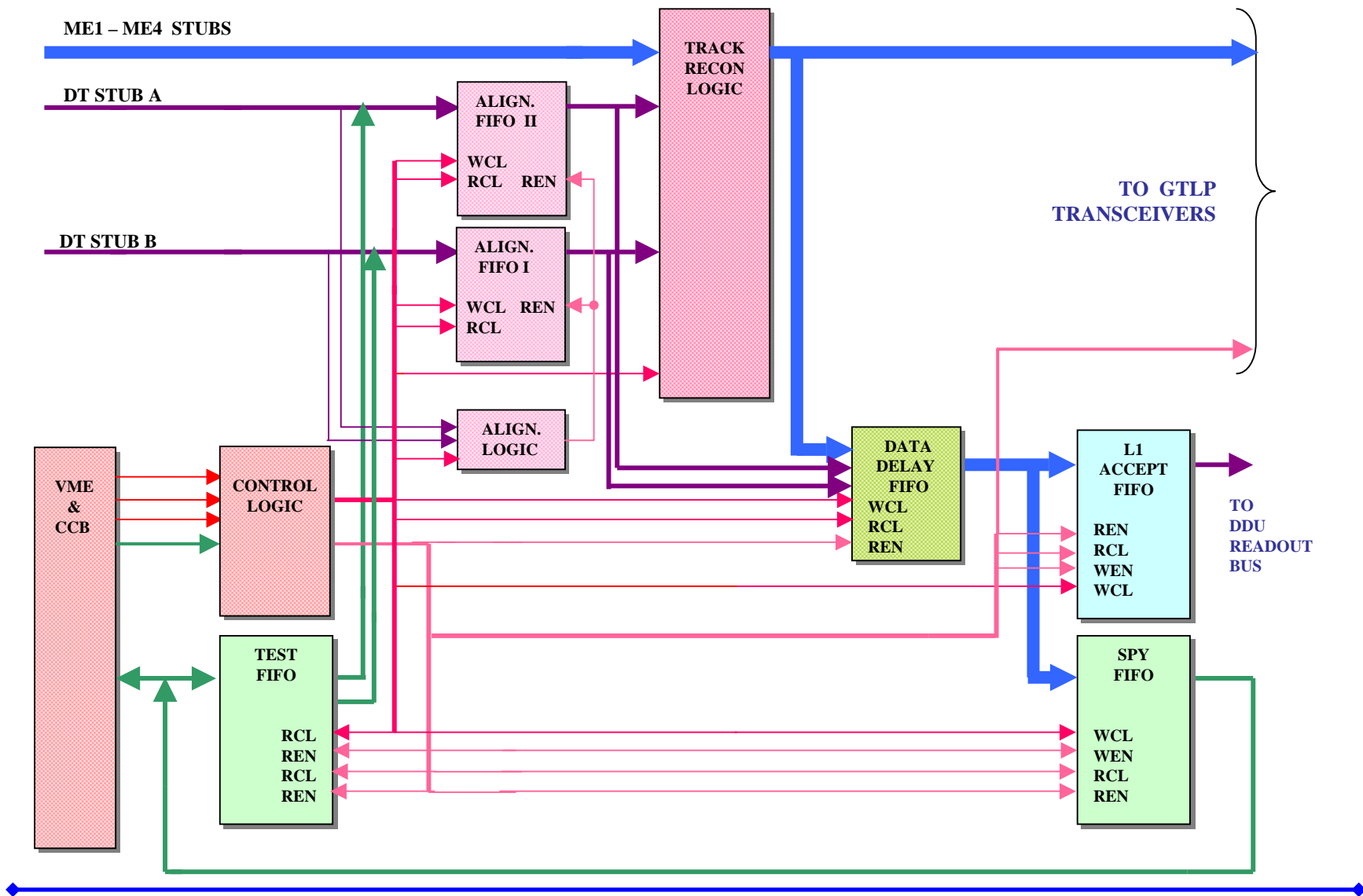


Front FPGA Logic



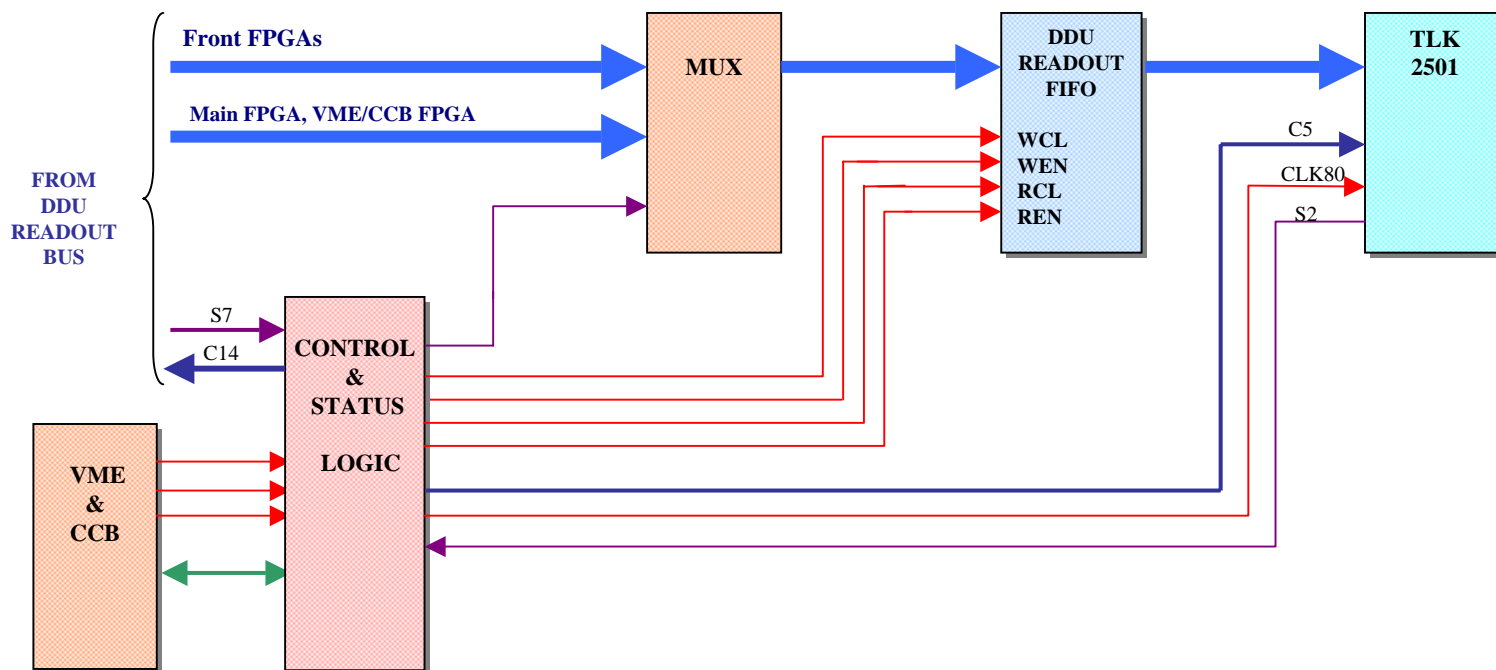


Main FPGA Logic





DDU FPGA Logic



Two D32 @ 40 MHz readout busses to minimize trace length