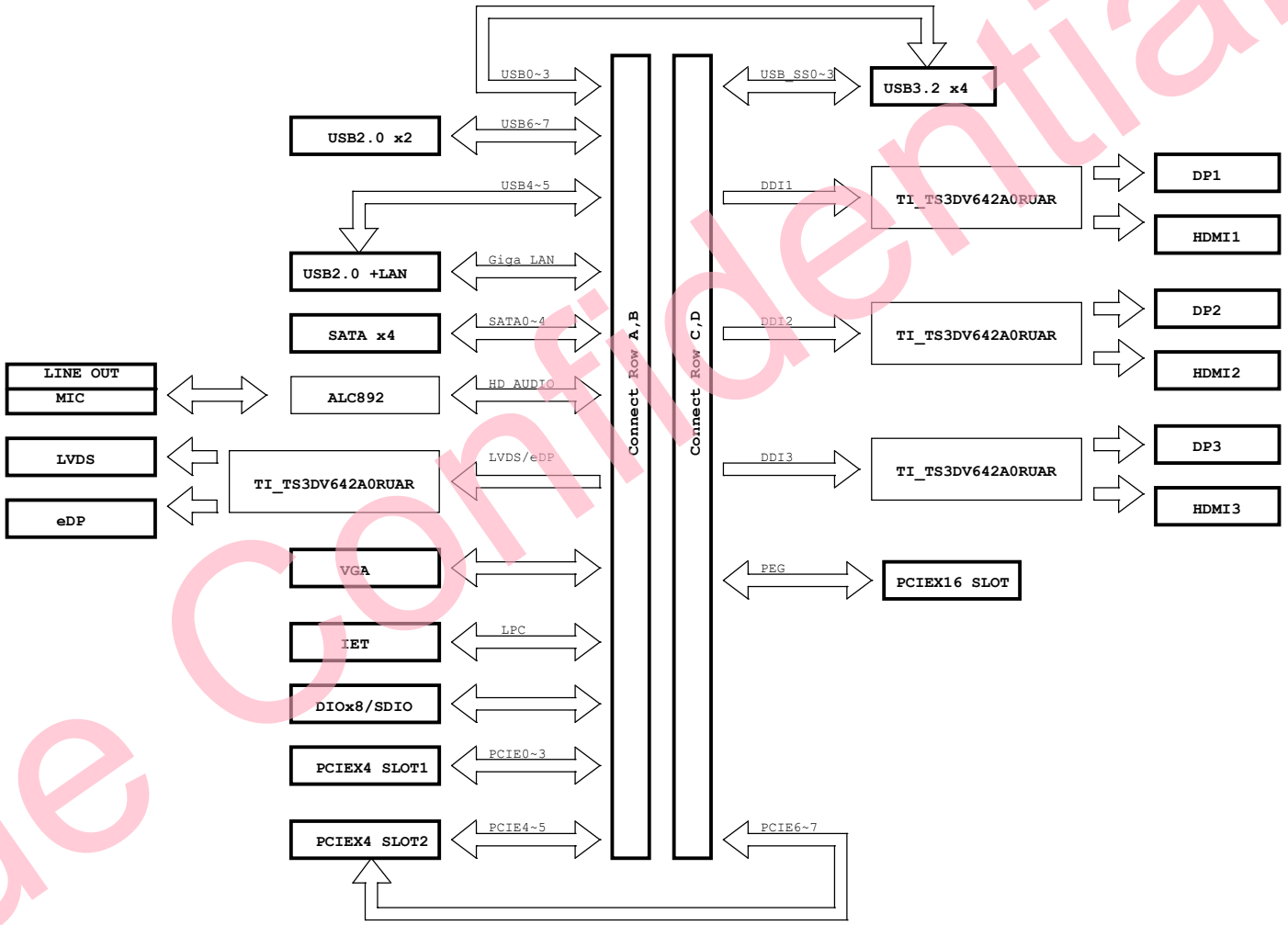
Page	Function
01	BLOCK DIAGRAM
02	Power Delivery Map
03	Clock Distribution
04	Power Sequence
05	Board information
06	COM EXPRESS CONNECTOR
07	DDI1 switch & DP1
08	HDMI1
09	DDI2 switch & DP2
10	HDMI2
11	DDI3 switch & DP3
12	HDMI3
13	LVDS & EDP
14	VGA
15	PCIEX16
16	PCIEX4
17	USB3.2、USB2.0
18	SATA、LAN、SD、DIO
19	SPI、RTC、FAN
20	AUDIO_2CH(ALC892)
21	IET & PORT 80(LPC/ESPI)
22	FPGA
23	CONTROL,SETTING,TEST
24	POWER IN & CONTROL
25	MODIFY HISTORY

BLOCK DIAGRAM



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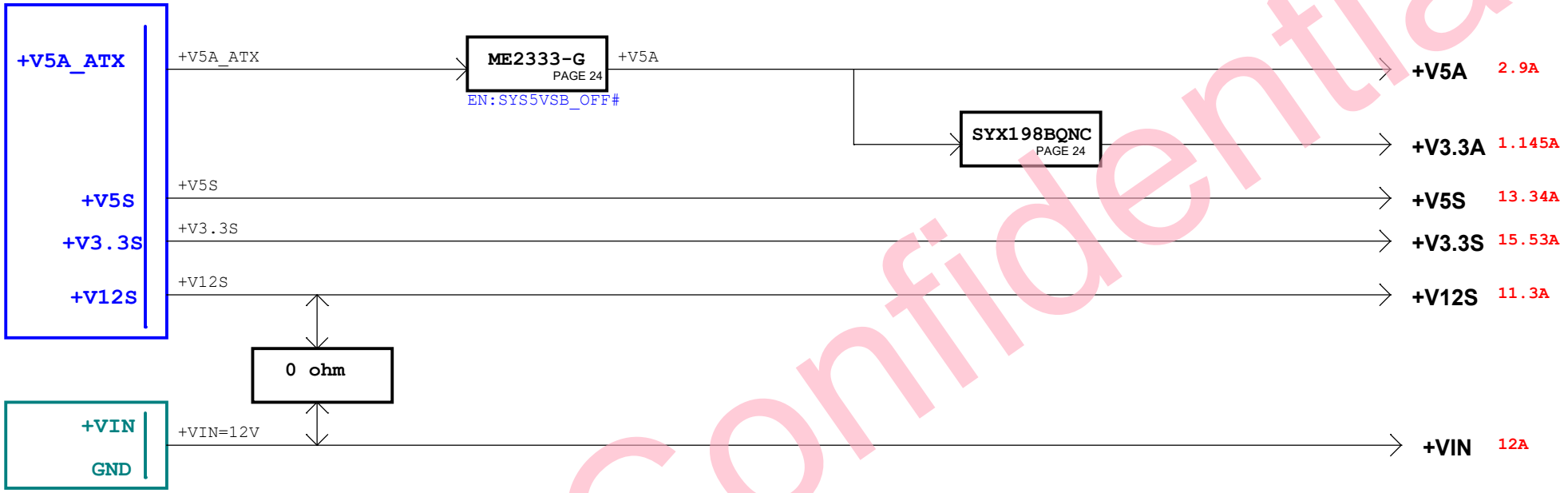
Project Name	Module Number	Rev
EEV-EX16	<Module no.>	?

Size	Title	Rev
A3	BLOCK DIAGRAM	A1

Date: Thursday, May 21, 2020 Sheet 1 of 27

Power Delivery Map



COMexpress	
+VIN	12A
+VCC_5VSB	2A

CPU FAN	
+V12S	1A

System FAN	
+V12S	1A

SDIO	
+V5S	1A

DIO	
+V5S	1A

DDI1 HDMI/DP SWITCH	
+V3.3S	0.05A

DDI2 HDMI/DP SWITCH	
+V3.3S	0.05A

DDI3 HDMI/DP SWITCH	
+V3.3S	0.05A

LVDS/eDP SWITCH	
+V3.3S	0.05A

HDMI1	
+V3.3S	0.1A
+V5S	0.05A

HDMI2	
+V3.3S	0.1A
+V5S	0.05A

HDMI3	
+V3.3S	0.1A
+V5S	0.05A

LVDS/eDP	
+V12S	3A
+V5S	2A
+V3.3S	2A

DP1	
+V3.3S	0.5A

DP2	
+V3.3S	0.5A

DP3	
+V3.3S	0.5A

VGA	
+V3.3S	0.25A

LPC/eSPI SWITCH	
+V3.3S	0.08A

PCIE x16	
+V12S	2.1A
+V3.3S	3A
+V3.3A	0.375A

PCIE x4_1	
+V12S	2.1A
+V3.3S	3A
+V3.3A	0.375A

PCIE x4_2	
+V12S	2.1A
+V3.3S	3A
+V3.3A	0.375A

FPGA	
+V3.3S	1.5A

USB 3.2 x4	
+V5S	3.6A

USB 2.0x4	
+V5S	2A

ALC892	
+V5S	0.046A
+V3.3S	0.012A

IET	
+V12S	2A
+V5S	3A

LAN	
+V3.3A	0.02A

BUZZER	
+V5S	0.044A

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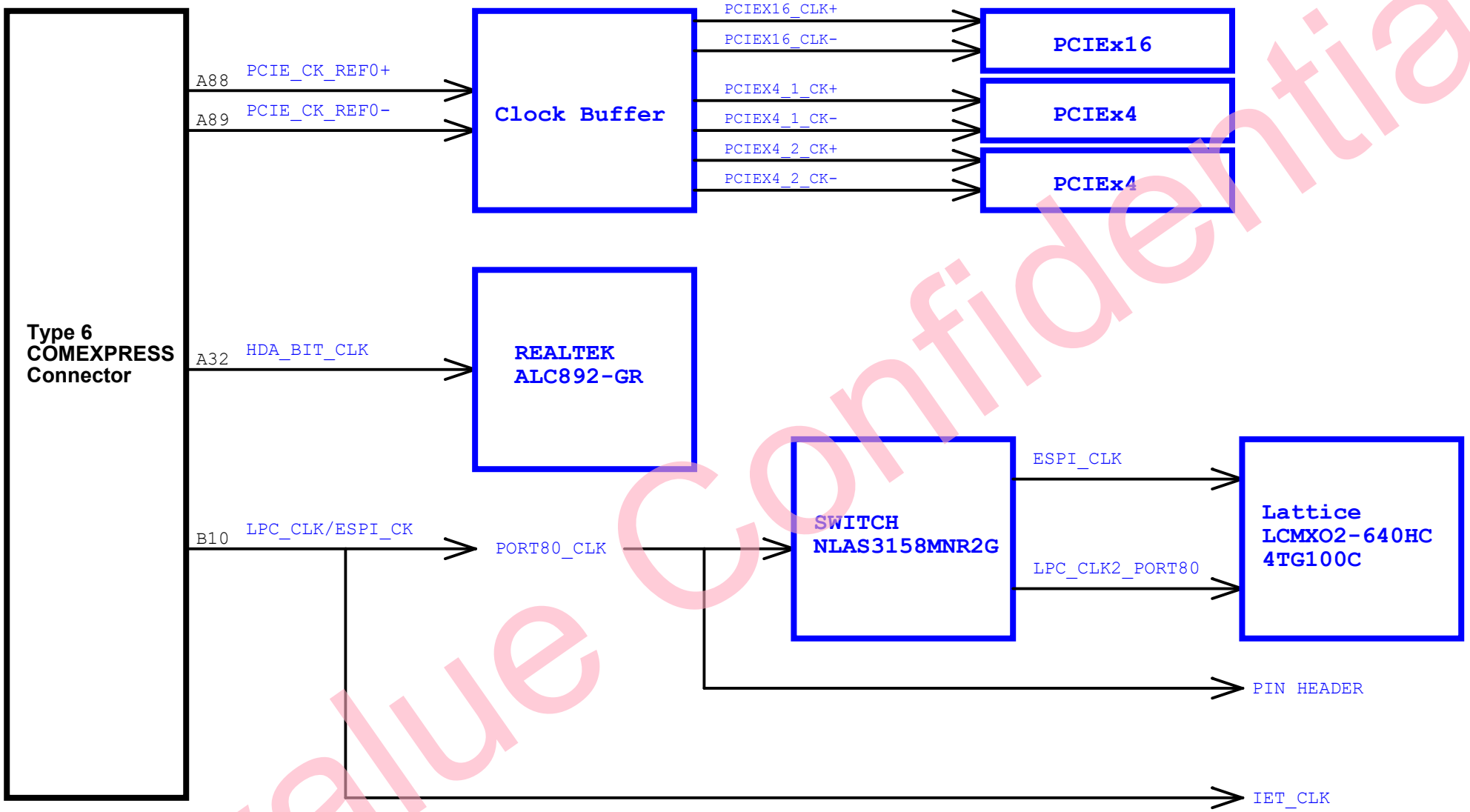
Project Name	Module Number	Rev
EEV-EX16	<Module no.>	?

Size	Title	Rev
A3	Power Delivery Map	A1

Date: Thursday, May 21, 2020 Sheet 2 of 27

Clock Distribution



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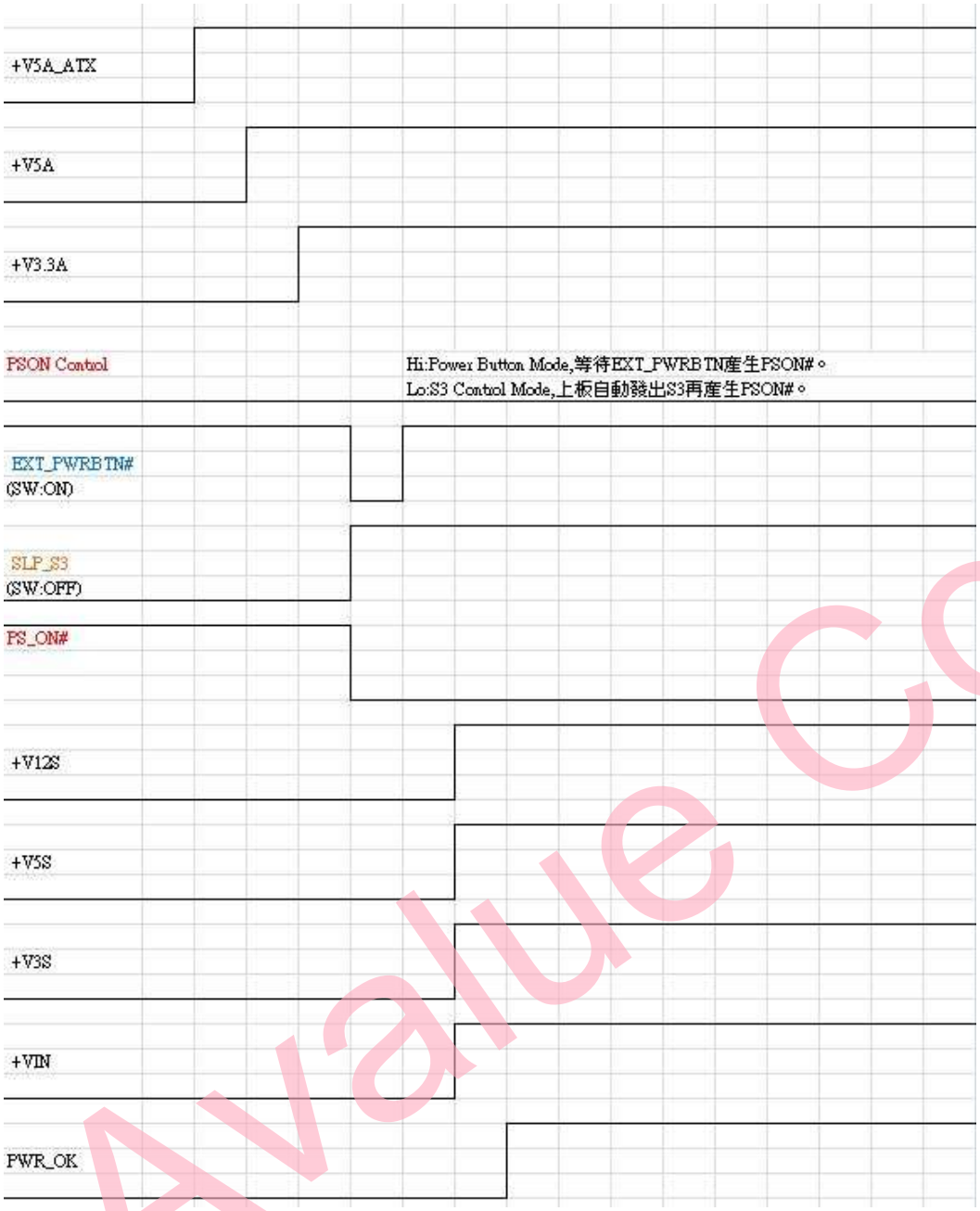
Project Name: EEV-EX16	Module Number: <Module no.>	Rev: ?	
Size: A3	Title: Clock Distribution	Rev: A1	
Date: Thursday, May 21, 2020	Sheet 3 of 27		

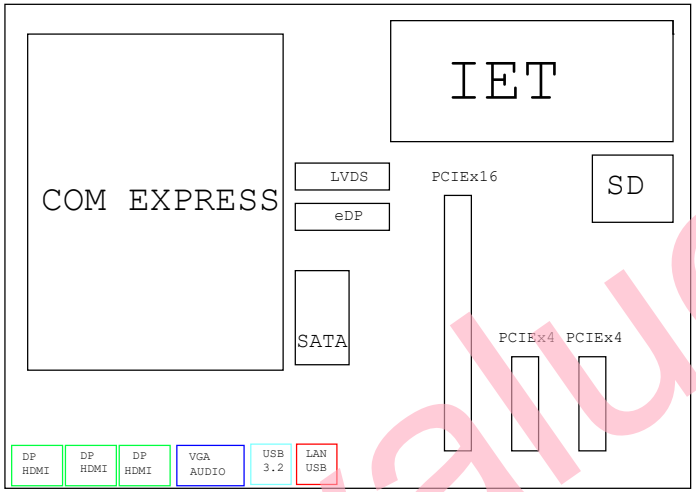
Power Sequence



avalue Technology Inc.	Confidential	
Project Name: EEV-EX16	Module Number: <Module no.>	Rev: ?
Size: A3	Title: Power Sequence	Rev: A1
Date: Thursday, May 21, 2020	Sheet 4 of 27	

Board information

Reference document	
SPEC.	Com ExpressR Module Base Specification PICMG COM.0 R3.0
Sch check list	COM Express Carrier Board Schematic Check List 20190620



COM EXPRESS CONNECTOR

PIN(D57)	PIN(C57)	PIN(C54)	
TYPE2#	TYPE1#	TYPE0#	
X	X	X	Pin-out Type 1
NC	NC	NC	Pin-out Type 2
NC	NC	GND	Pin-out Type 3 (no IDE)
NC	GND	NC	Pin-out Type 4 (no PCI)
NC	GND	GND	Pin-out Type 5 (no IDE, no PCI)
GND	NC	NC	Pin-out Type 6 (no IDE, no PCI)

Module板 對 TYPE2# 接GND ~~ 以示寫TYPE 6 PIN DEFINE
Carrier板 用此PIN來控制12V的輸出

COM EXPRESS CONNECTOR

PIN(A97)	
TYPE10#	
NC	Pin-out R2.0
PD	Pin-out Type 10 pull down to ground with 4.7K resistor
12V	Pin-out R1.0

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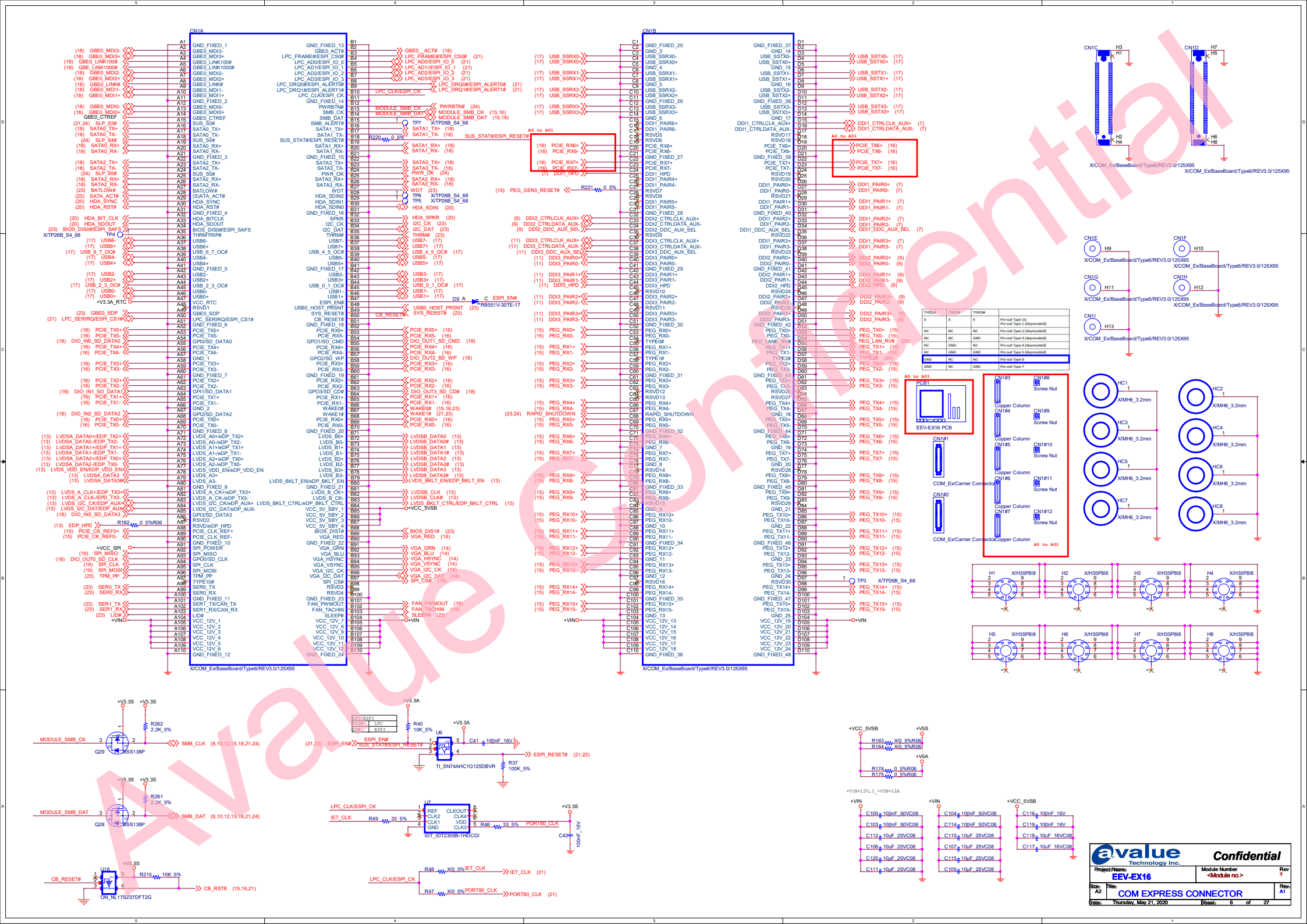
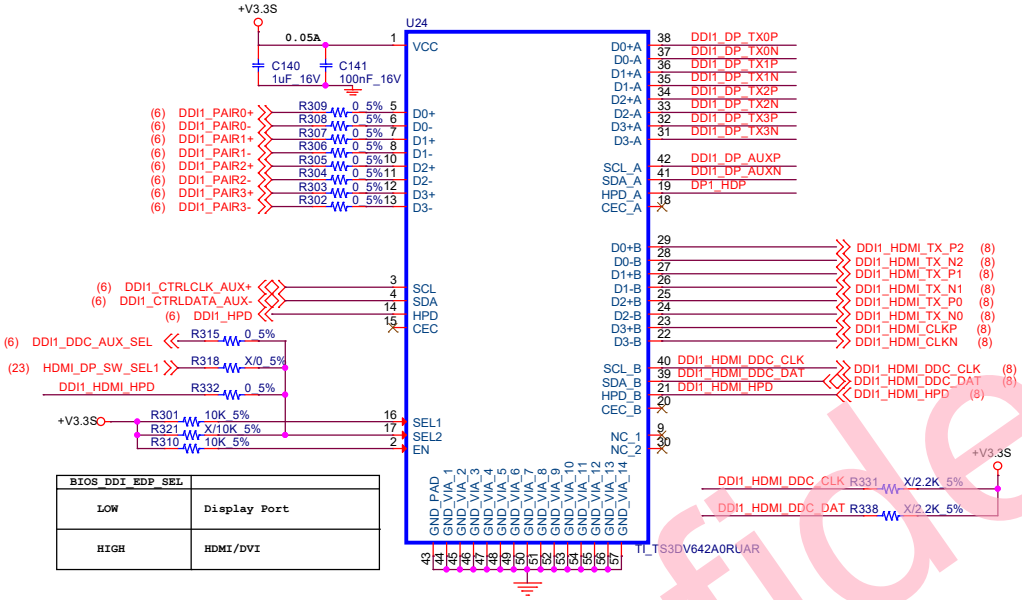
Project Name: EEV-EX16		Module Number: <Module no.>	Rev: ?
Size: A3	Title: Board information		Rev: A1
Date: Thursday, May 21, 2020	Sheet 5 of 27		



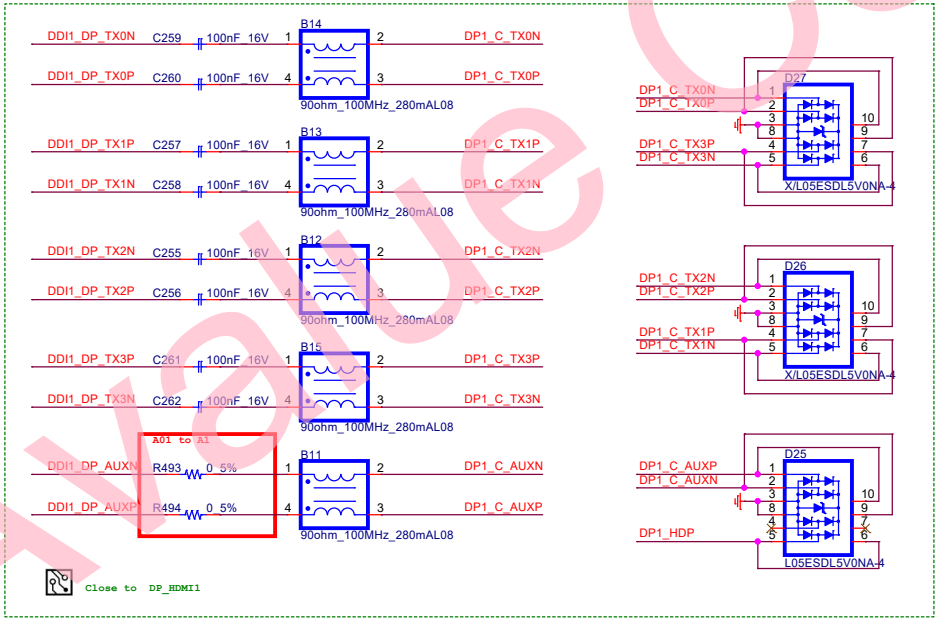
DDI1 switch

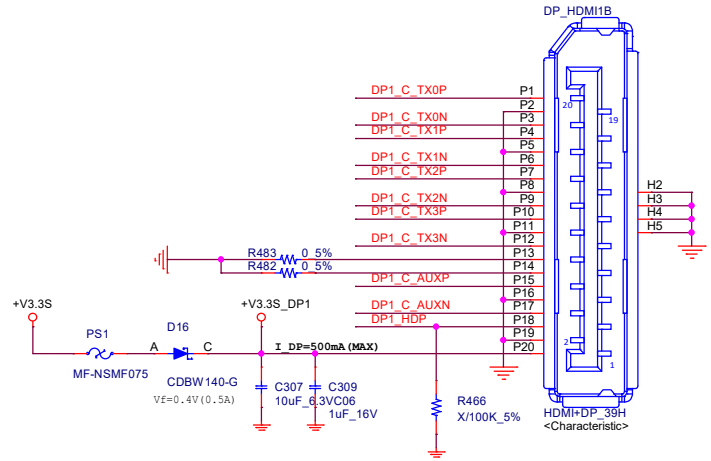


BIOS_DDI_EDP_SEL	
LOW	Display Port
HIGH	HDMI/DVI

EN	SEL1	SEL2	FUNCTION
L	X	X	Switch Disabled. All Channel Hi-Z.
H	L	L	D0+/D0– to D0+A/D0–A ON. All the other channels Hi-Z.
H	L	H	D0+/D0– to D0+B/D0–B ON. All the other channels Hi-Z.
H	H	L	Channel A Enabled. Channel B Hi-Z.
H	H	H	Channel B Enabled. Channel A Hi-Z.

DP1





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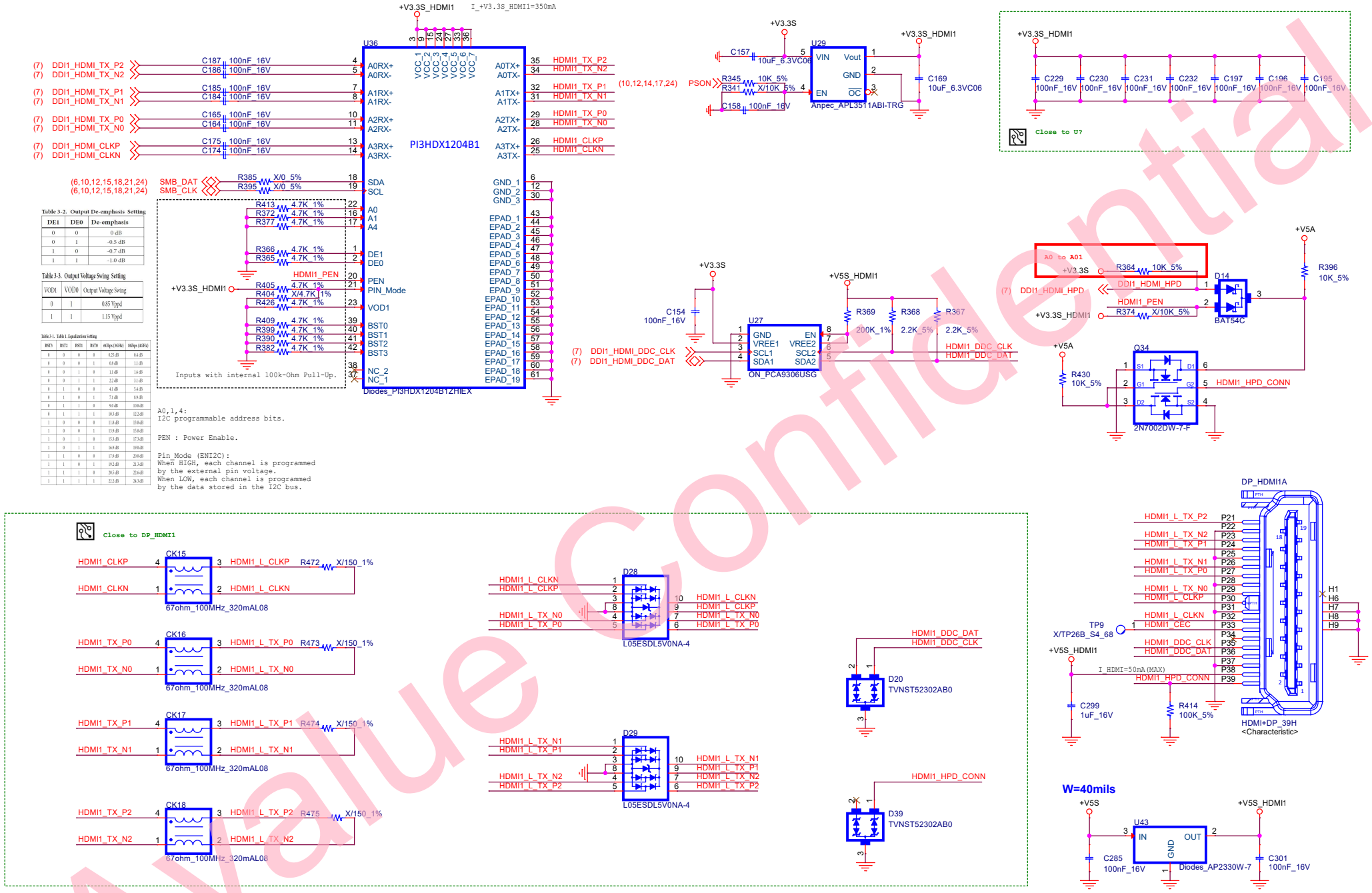
Project Name: EEV-EX16		Module Number: <Module no.>	Rev: ?
Size: A3	Title: DDI1 switch & DP1		Rev: A1
Date: Thursday, May 21, 2020	Sheet 7 of 27		



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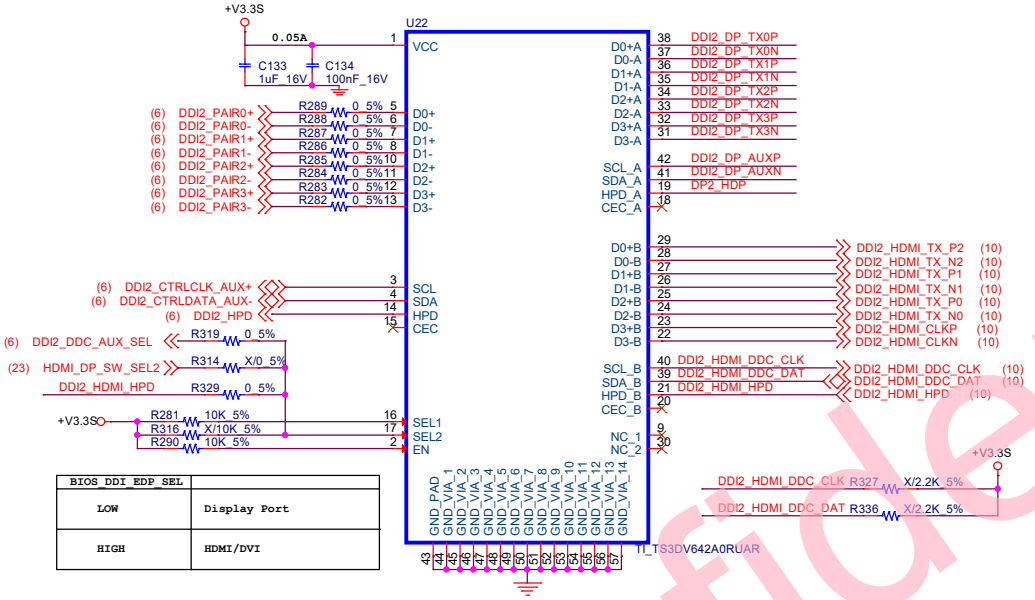
Project Name: EEV-EX16	Module Number: <Module no.>	Rev: ?
Size: A3	Title: HDMI1	Rev: A1
Date: Thursday, May 21, 2020	Sheet 8 of 27	

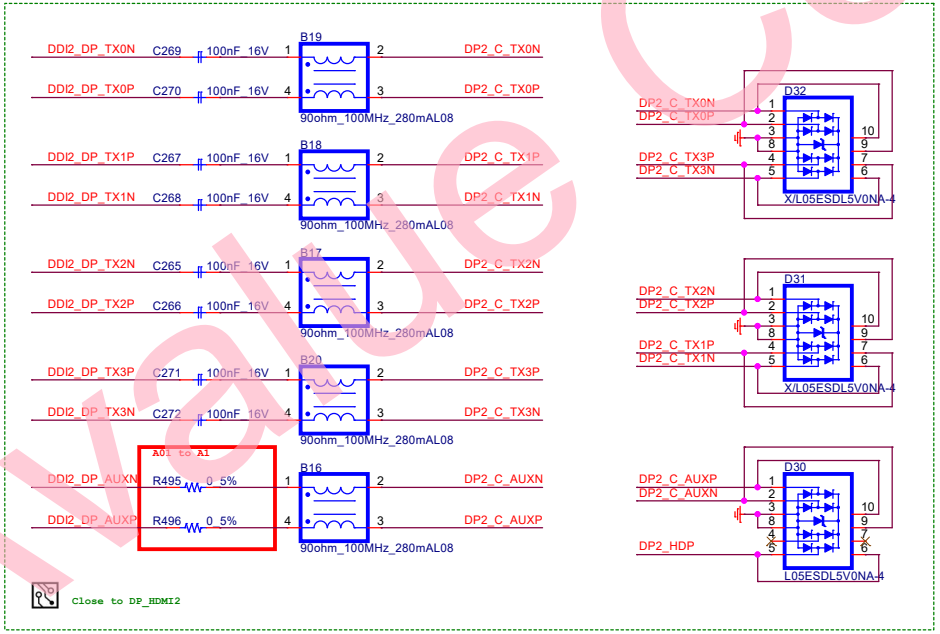
DDI2 switch

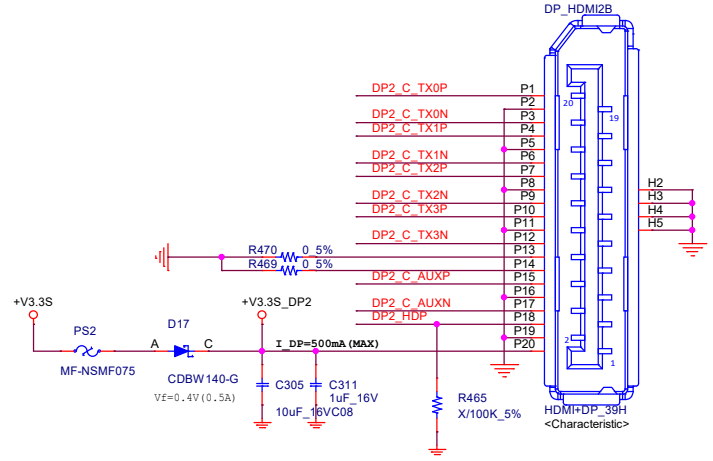


BIOS DDI EDP SEL	
LOW	Display Port
HIGH	HDMI/DVI

EN	SEL1	SEL2	FUNCTION
L	X	X	Switch Disabled. All Channel Hi-Z.
H	L	L	D0+/D0– to D0+A/D0–A ON. All the other channels Hi-Z.
H	L	H	D0+/D0– to D0+B/D0–B ON. All the other channels Hi-Z.
H	H	L	Channel A Enabled. Channel B Hi-Z.
H	H	H	Channel B Enabled. Channel A Hi-Z.

DP2





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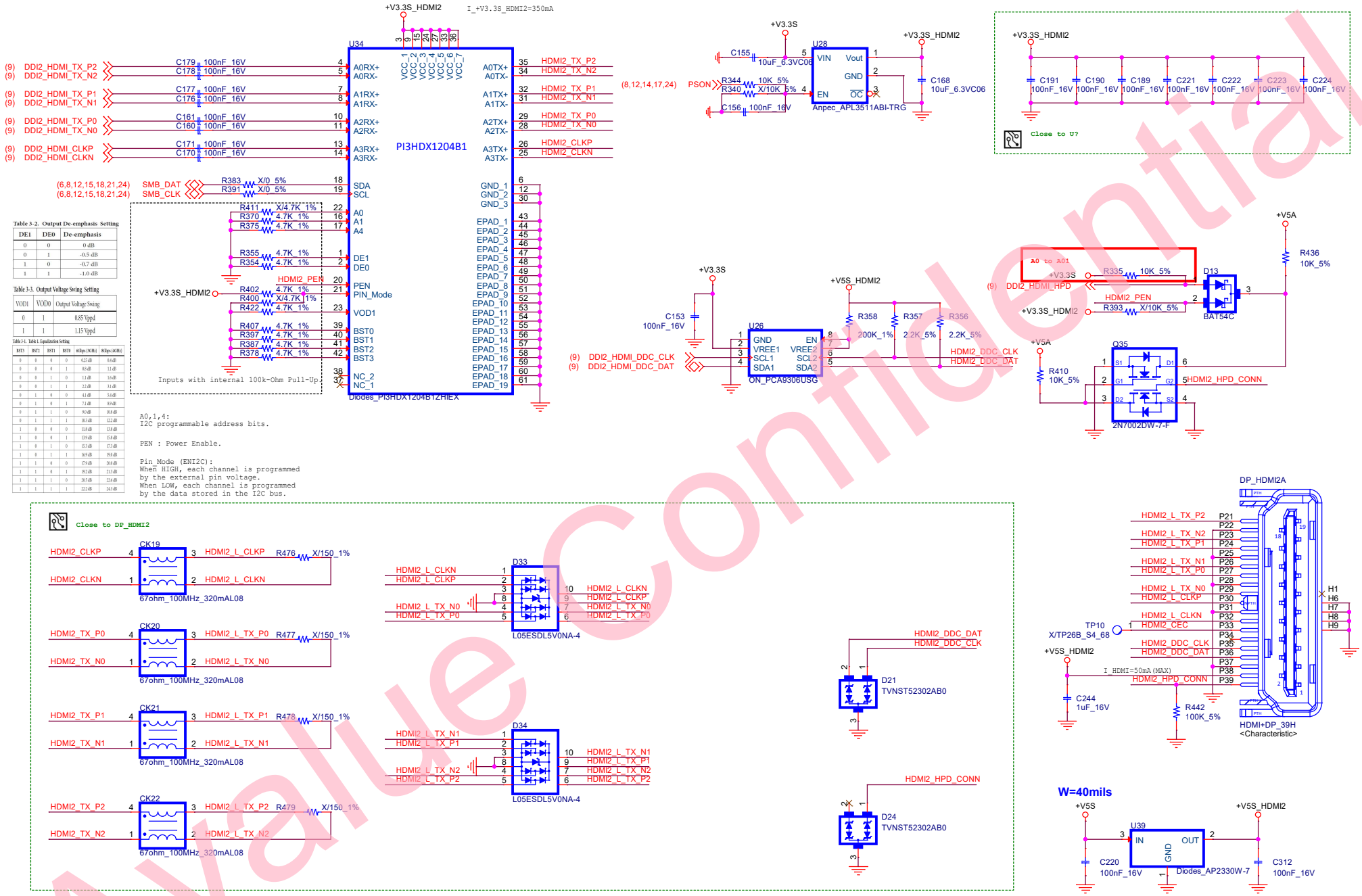
Project Name	Module Number	Rev
EEV-EX16	<Module no.>	?

Size	Title	Rev
A3	DDI2 switch & DP2	A1

Date: Thursday, May 21, 2020 Sheet 9 of 27

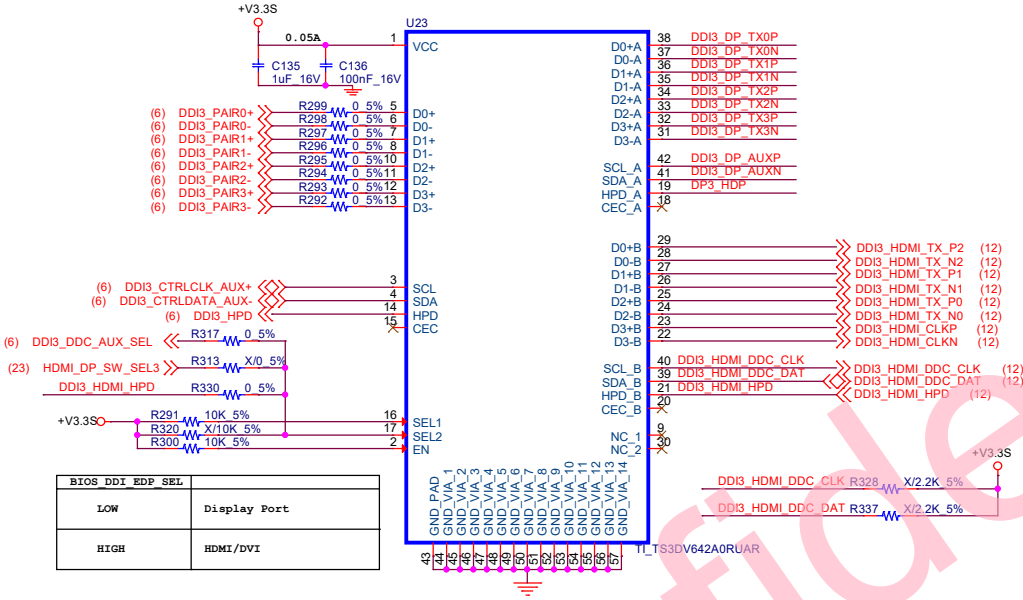


Project Name	Module Number	Rev
EEV-EX16	<Module no.>	?

Size	Title	Rev
A3	HDMI2	A1

Date: Thursday, May 21, 2020 Sheet 10 of 27

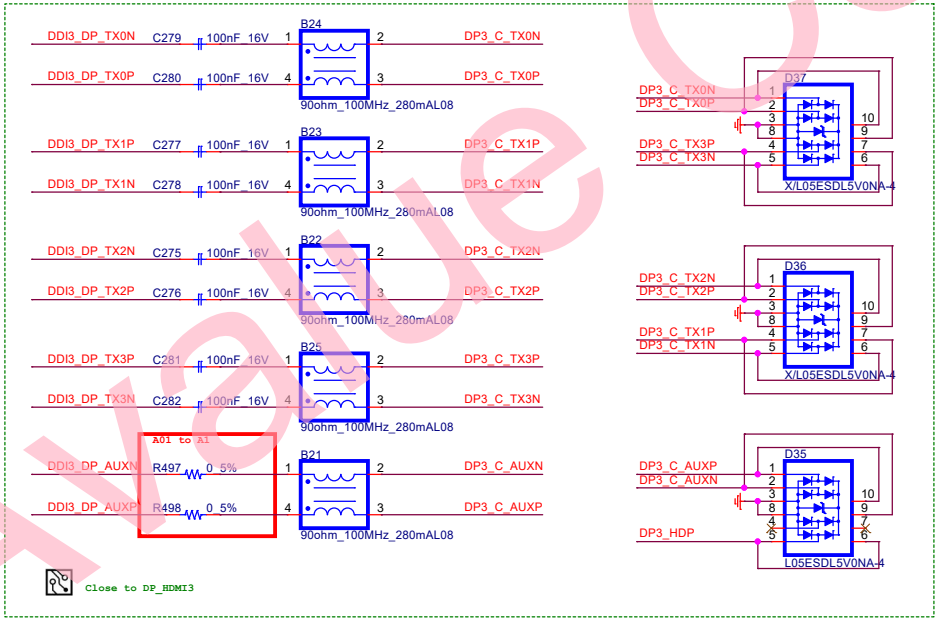
DDI3 switch

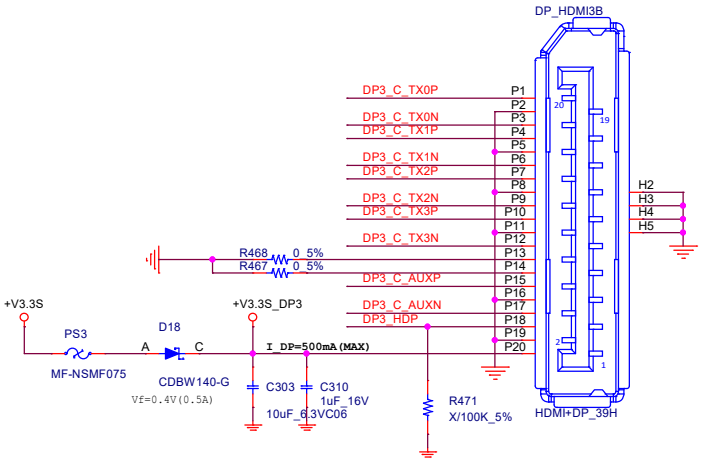


BIOS_DDI_EDP_SEL	
LOW	Display Port
HIGH	HDMI/DVI

EN	SEL1	SEL2	FUNCTION
L	X	X	Switch Disabled. All Channel Hi-Z.
H	L	L	D0+/D0– to D0+A/D0–A ON. All the other channels Hi-Z.
H	L	H	D0+/D0– to D0+B/D0–B ON. All the other channels Hi-Z.
H	H	L	Channel A Enabled. Channel B Hi-Z.
H	H	H	Channel B Enabled. Channel A Hi-Z.

DP3





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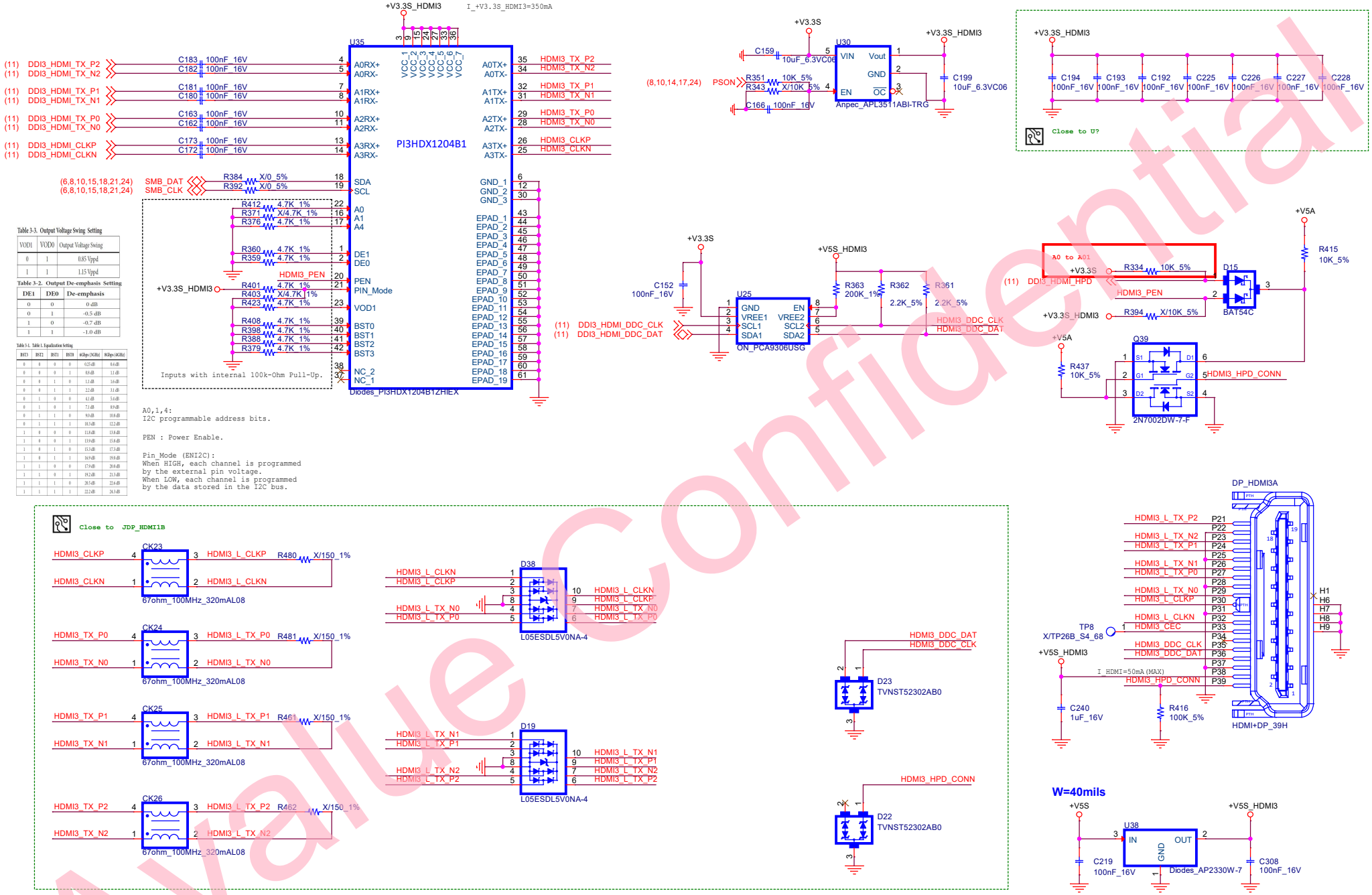
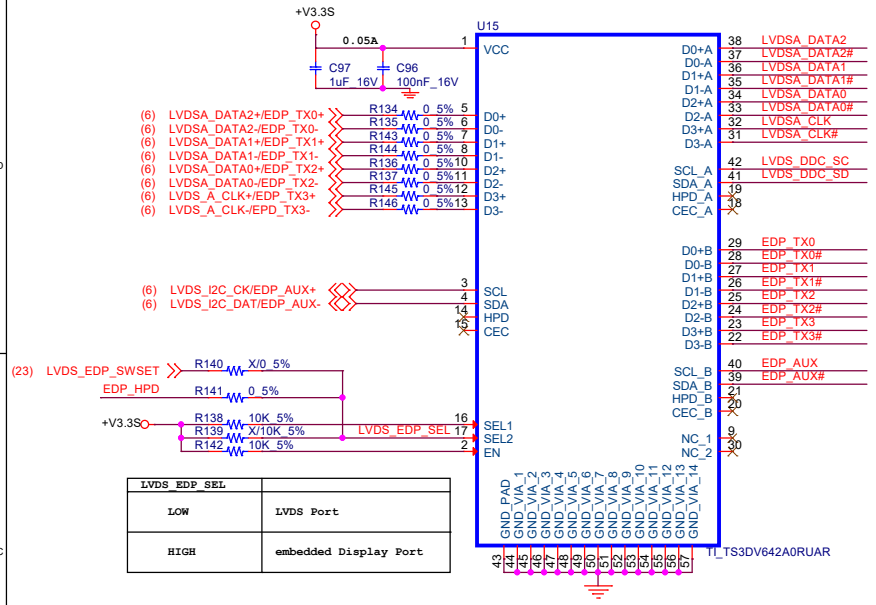
Project Name	Module Number	Rev
EEV-EX16	<Module no.>	?

Size	Title	Rev
A3	DDI3 switch & DP3	A1

Date: Thursday, May 21, 2020 Sheet 11 of 27

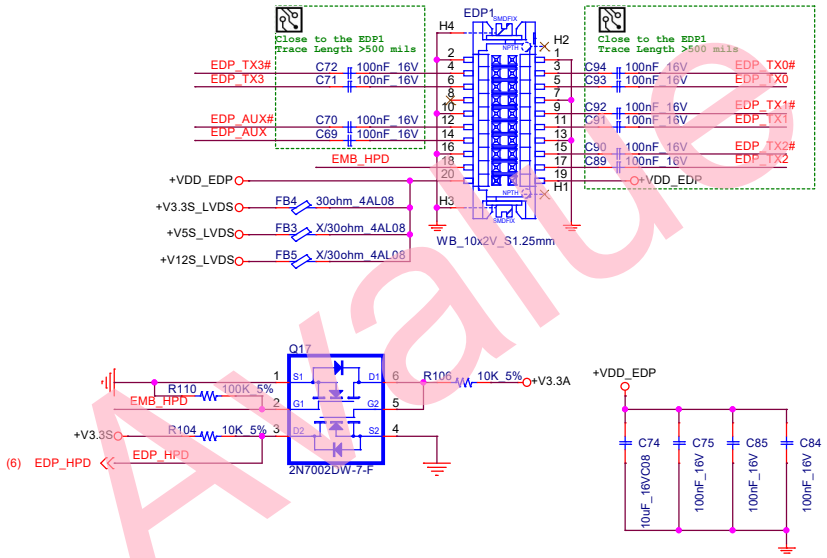

+V3.3S_HDMI3
I_+V3.3S_HDMI3=350mA
U35
PI3HDX1204B1
Diodes_PI3HDX1204B1ZHIEX
(11) DDI3_HDMI_TX_P2
(11) DDI3_HDMI_TX_N2
(11) DDI3_HDMI_TX_P1
(11) DDI3_HDMI_TX_N1
(11) DDI3_HDMI_TX_P0
(11) DDI3_HDMI_TX_N0
(11) DDI3_HDMI_CLKP
(11) DDI3_HDMI_CLKN
(6,8,10,15,18,21,24) SMB_DAT
(6,8,10,15,18,21,24) SMB_CLK
HDMI3_PEN
Inputs with internal 100k-Ohm Pull-Up.
A0,1,4:
I2C programmable address bits.
PEN : Power Enable.
Pin_Mode (ENI2C):
When HIGH, each channel is programmed
by the external pin voltage.
When LOW, each channel is programmed
by the data stored in the I2C bus.
Table 3-3. Output Voltage Swing Setting
Table 3-2. Output De-emphasis Setting
Table 3-1. Table 1. Equalization Setting
U30
Anpec_APL3511ABI-TRG
(8,10,14,17,24) PSON
U25
ON_PCA9306USG
(11) DDI3_HDMI_DDC_CLK
(11) DDI3_HDMI_DDC_DAT
HDMI3_DDC_CLK
HDMI3_DDC_DAT
(11) DDI3_HDMI_HPD
HDMI3_HPD_CONN
2N7002DW-7-F
BAT54C
Close to U?
Close to JDP_HDMI1B
CK23
CK24
CK25
CK26
67ohm_100MHz_320mAL08
D38
D19
L05ESDL5V0NA-4
D23
D22
TVNST52302AB0
DP_HDMI3A
HDMI+DP_39H
TP8
X/TP26B_S4_68
I_HDMI=50mA (MAX)
W=40mils
U38
Diodes_AP2330W-7
Avalue Confidential
Avalue Technology Inc.
Confidential
Project Name
EEV-EX16
Module Number
<Module no.>
Rev
?
Size
A3
Title
HDMI3
Rev
A1
Date:
Thursday, May 21, 2020
Sheet
12
of
27

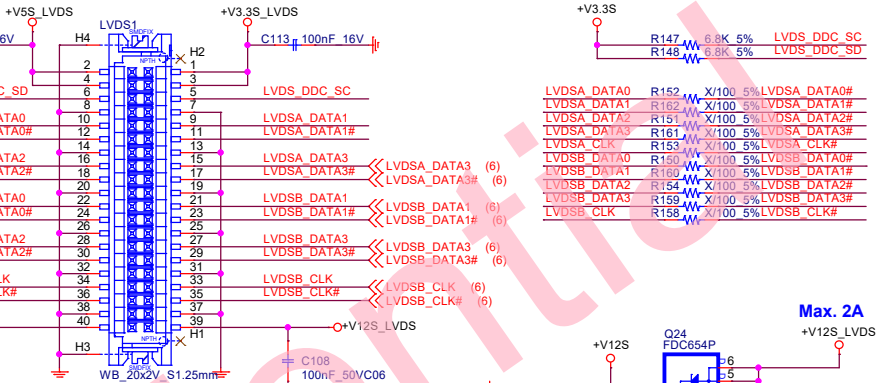
LVDS

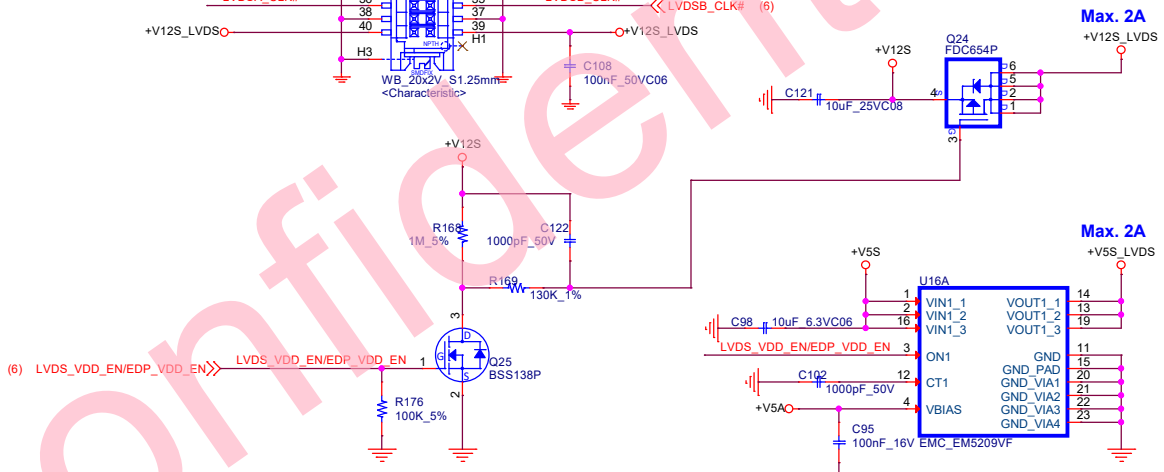


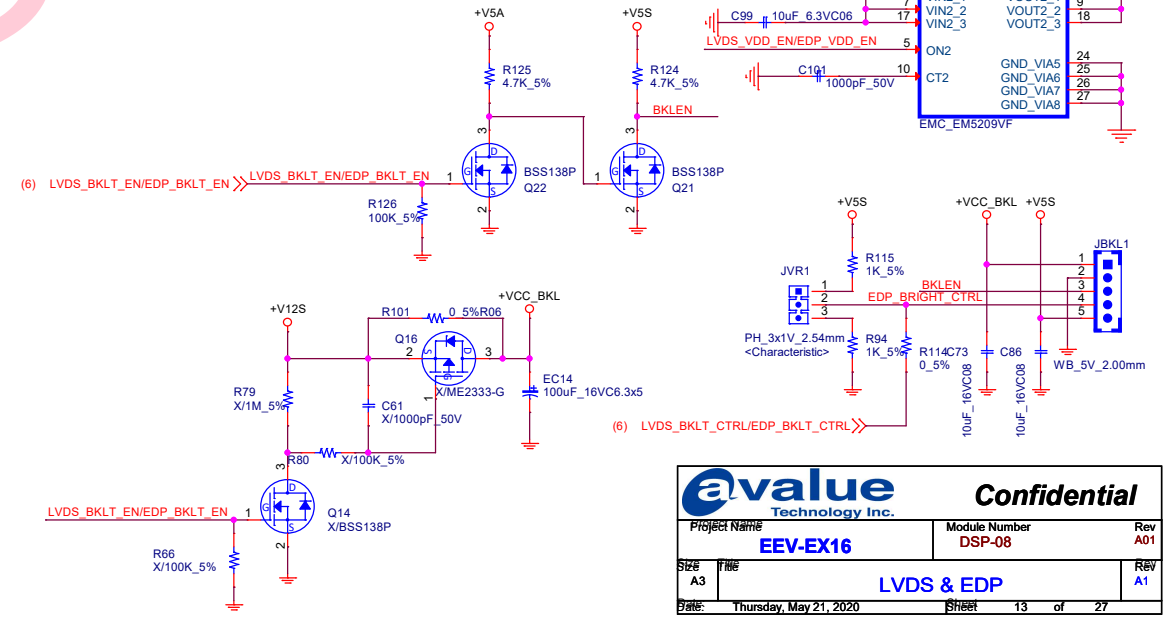
LVDS_EDP_SEL	
LOW	LVDS Port
HIGH	embedded Display Port

EN	SEL1	SEL2	FUNCTION
L	X	X	Switch Disabled. All Channel Hi-Z.
H	L	L	D0+/D0– to D0+A/D0–A ON. All the other channels Hi-Z.
H	L	H	D0+/D0– to D0+B/D0–B ON. All the other channels Hi-Z.
H	H	L	Channel A Enabled. Channel B Hi-Z.
H	H	H	Channel B Enabled. Channel A Hi-Z.









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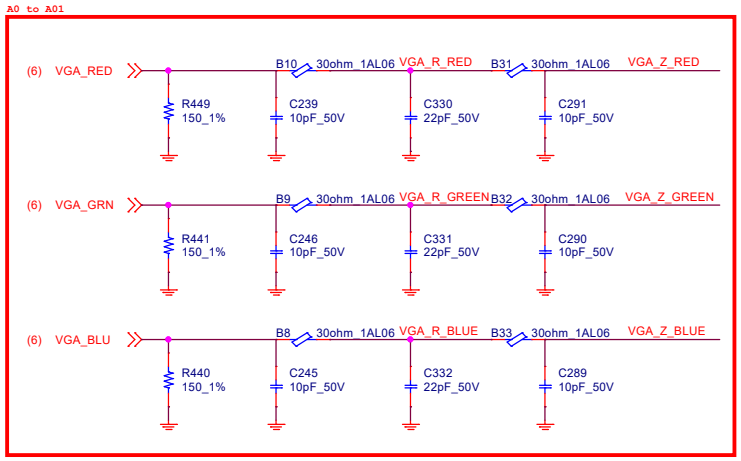
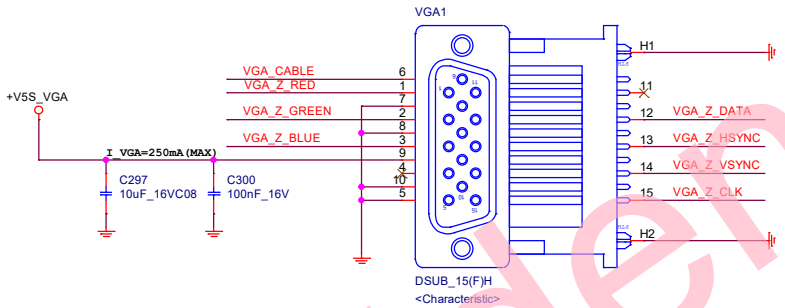
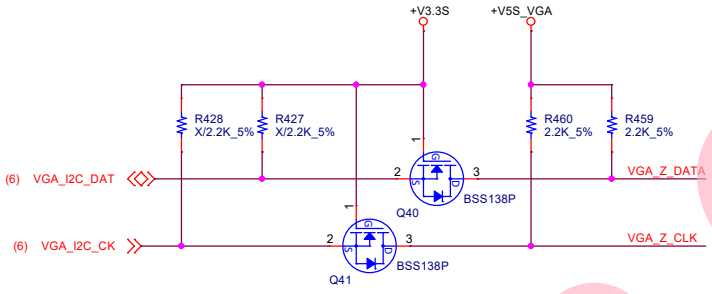
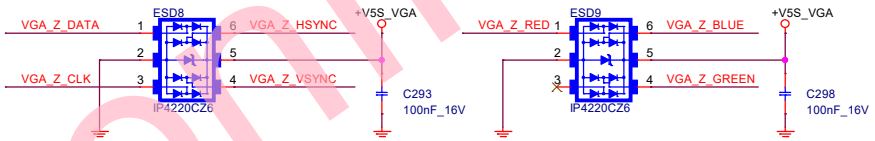
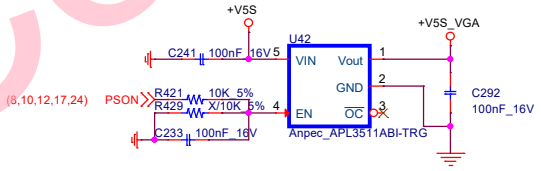
Project Name: EEV-EX16	Module Number: DSP-08	Rev: A01
Size: A3	Title: LVDS & EDP	Rev: A1
Date: Thursday, May 21, 2020	Sheet 13 of 27	

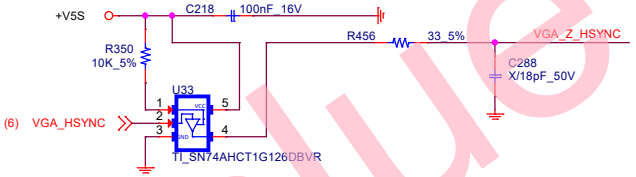


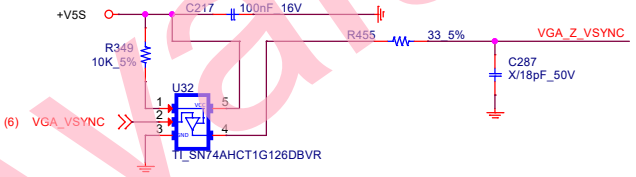


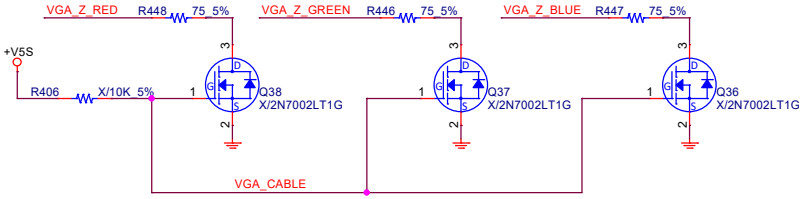




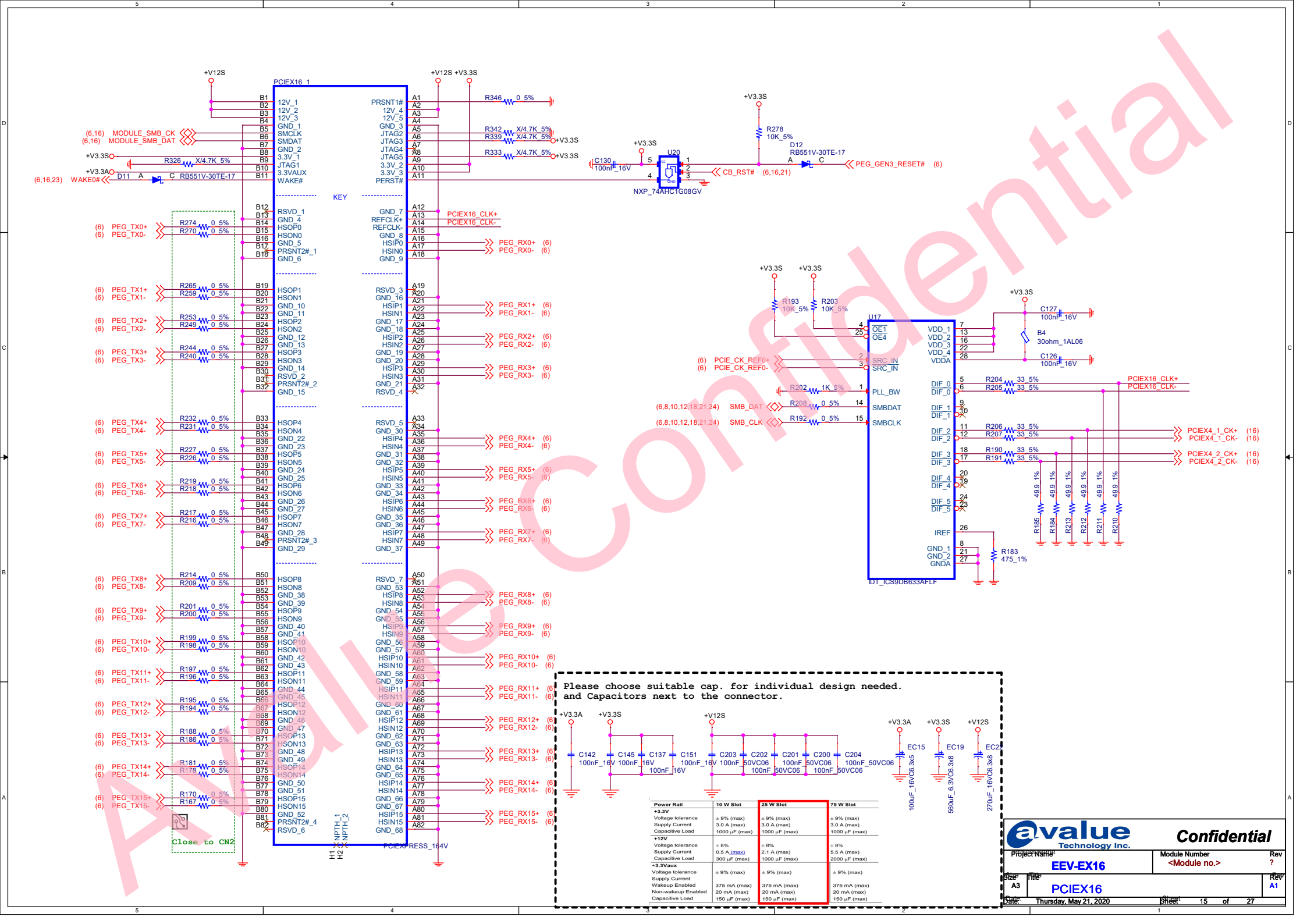


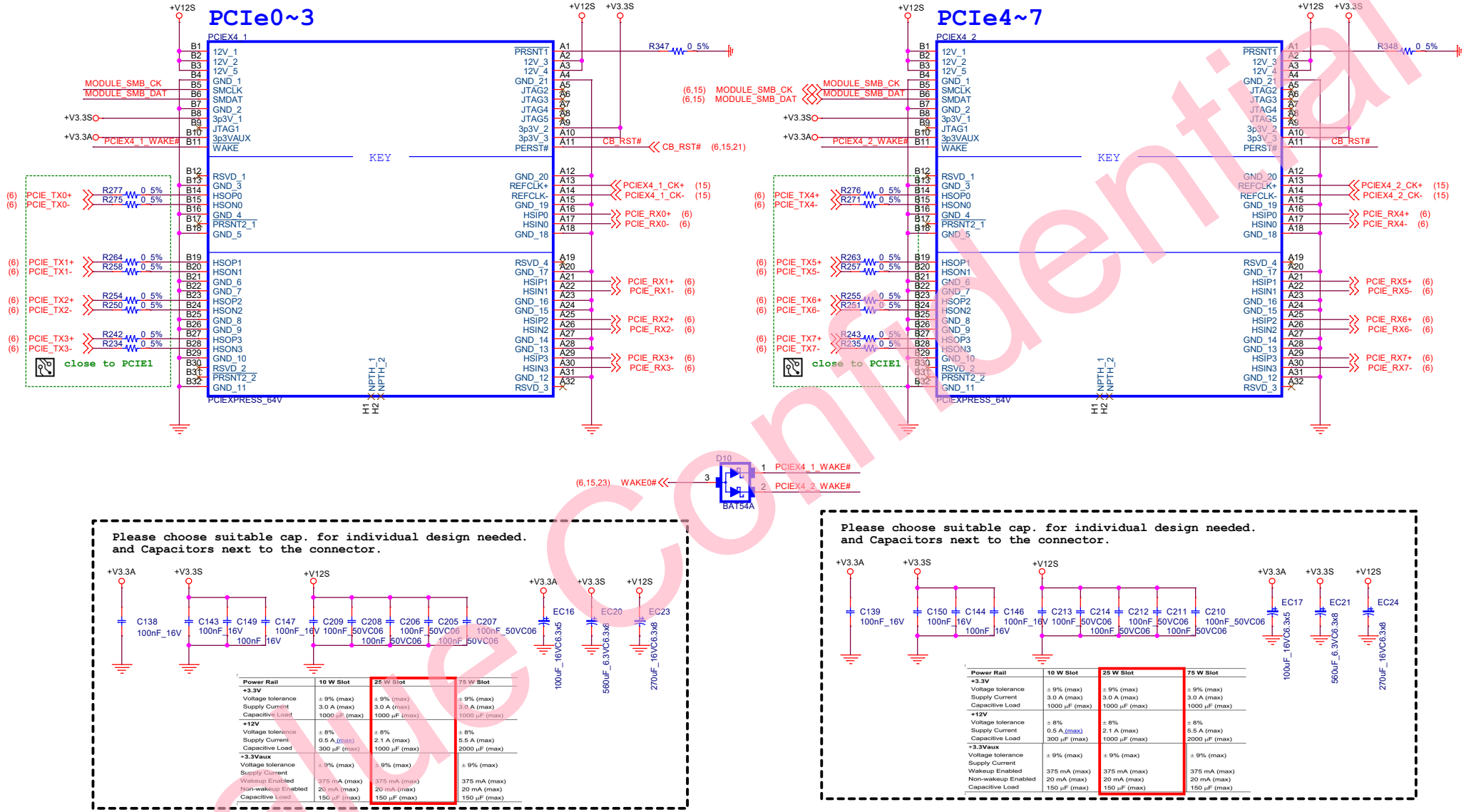






avalue Technology Inc.	Confidential		
Project Name: EEV-EX16		Module Number: DSP-08	Rev: A01
Size: A3	Title: VGA		Rev: A1
Date: Thursday, May 21, 2020		Sheet 14 of 27	

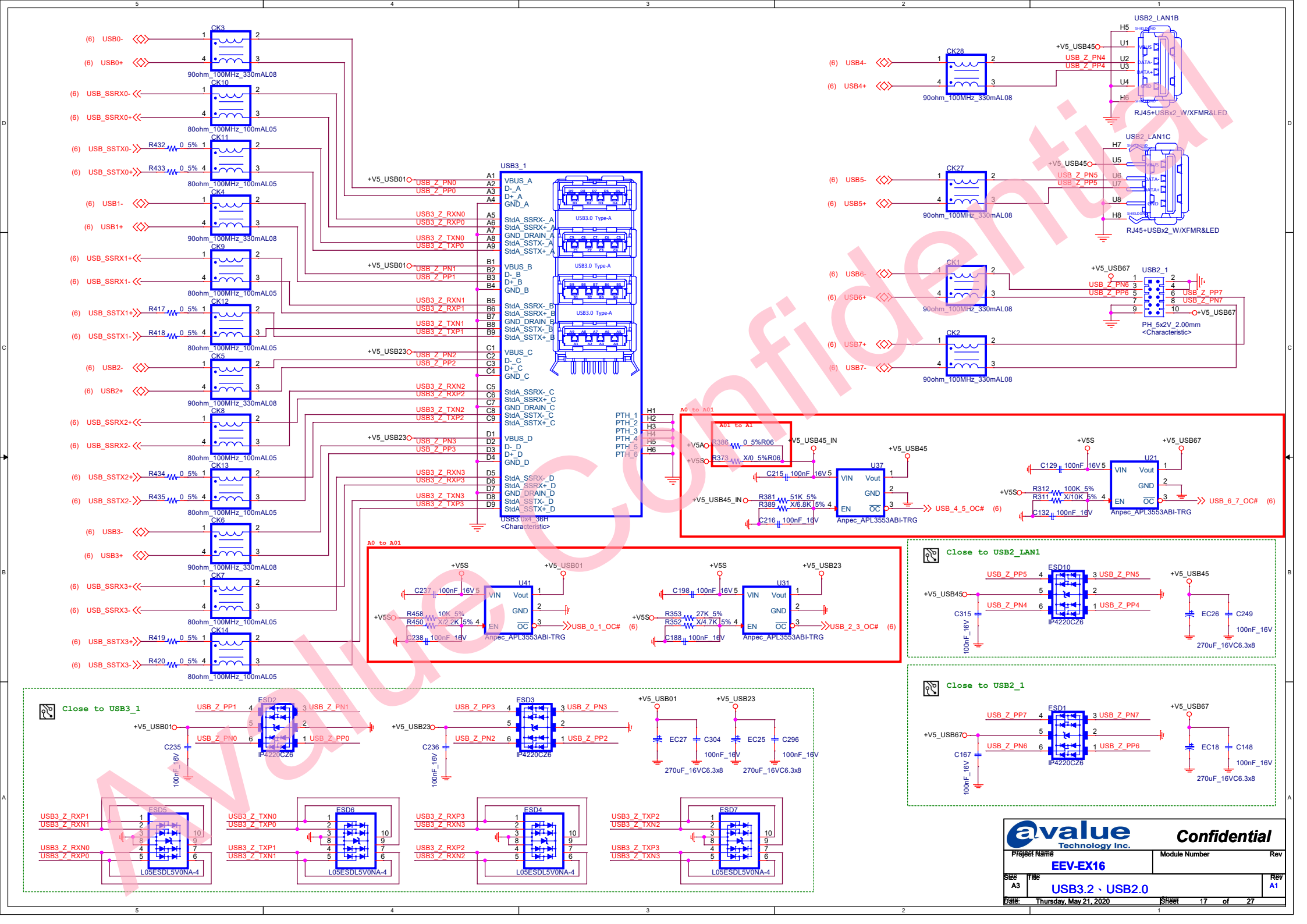




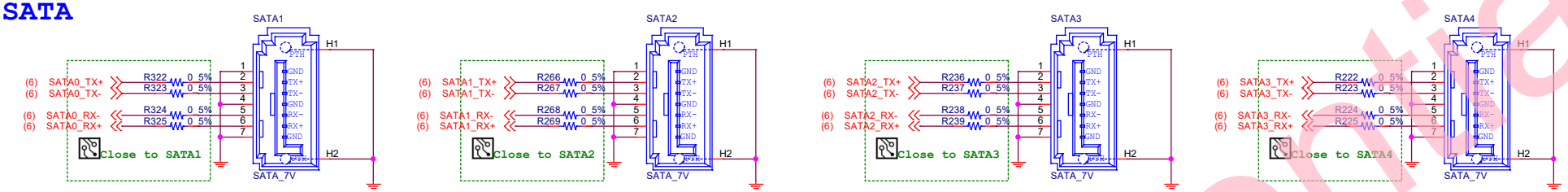
Project Name	Module Number	Rev
EEV-EX16	<Module no.>	?

Size	Title	Rev
A3	PCIEX4	A1

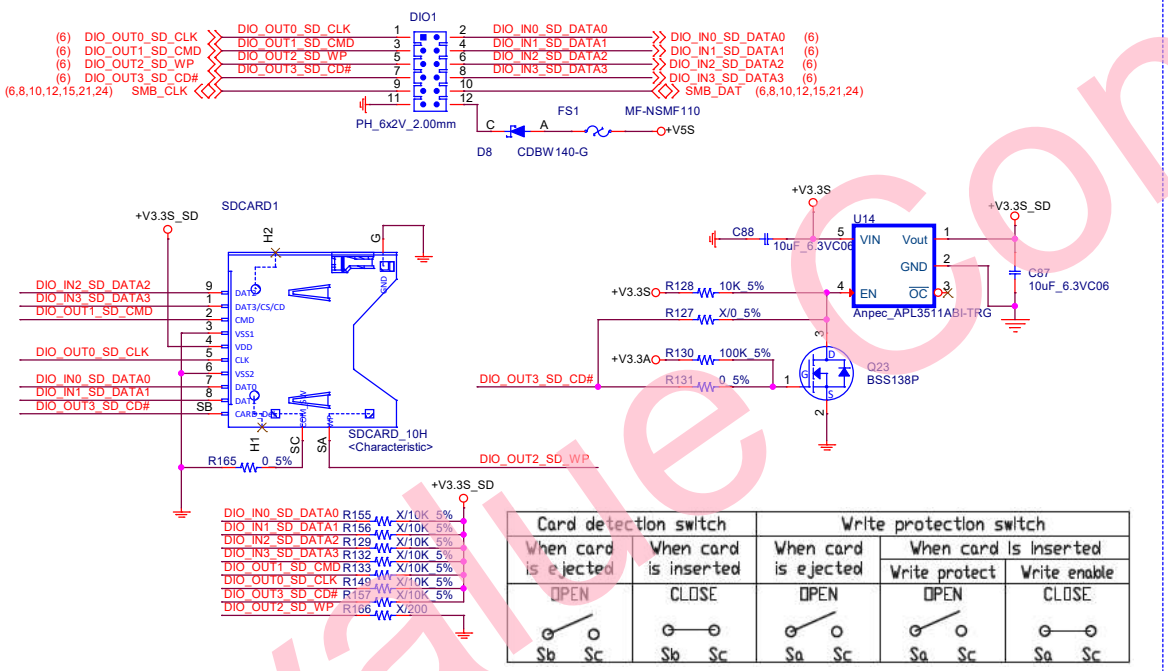
Date: Thursday, May 21, 2020 Sheet 16 of 27


USB3_1
USB2_LAN1B
USB2_LAN1C
USB2_1
RJ45+USBx2_W/XFMR&LED
90ohm_100MHz_330mAL08
80ohm_100MHz_100mAL05
USB3.0 Type-A
USB3.0x4_36H
<Characteristic>
PH_5x2V_2.00mm
Anpec_APL3553ABI-TRG
IP4220CZ6
L05ESDL5V0NA-4
Close to USB3_1
Close to USB2_LAN1
Close to USB2_1
A0 to A01
A01 to A1
Value Confidential
Confidential
Project Name
EEV-EX16
Module Number
Rev
Size
A3
Title
USB3.2、USB2.0
Rev
A1
Date:
Thursday, May 21, 2020
Sheet
17
of
27

SATA

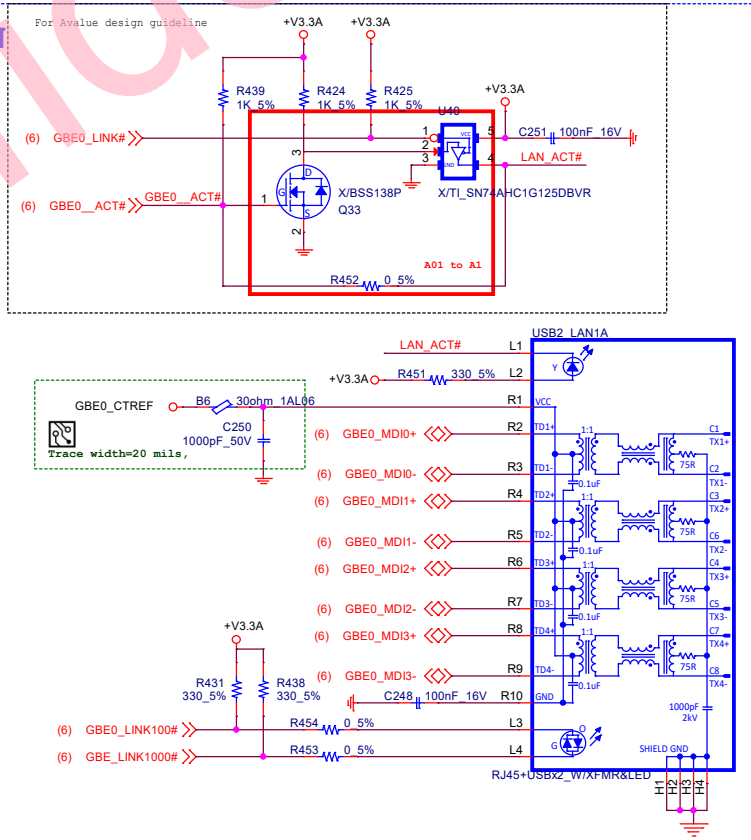


DIO/SDIO



Card detection switch		Write protection switch		
When card is ejected	When card is inserted	When card is ejected	When card is inserted	
			Write protect	Write enable
OPEN	CLOSE	OPEN	OPEN	CLOSE
Sb Sc	Sb Sc	Sa Sc	Sa Sc	Sa Sc

LAN



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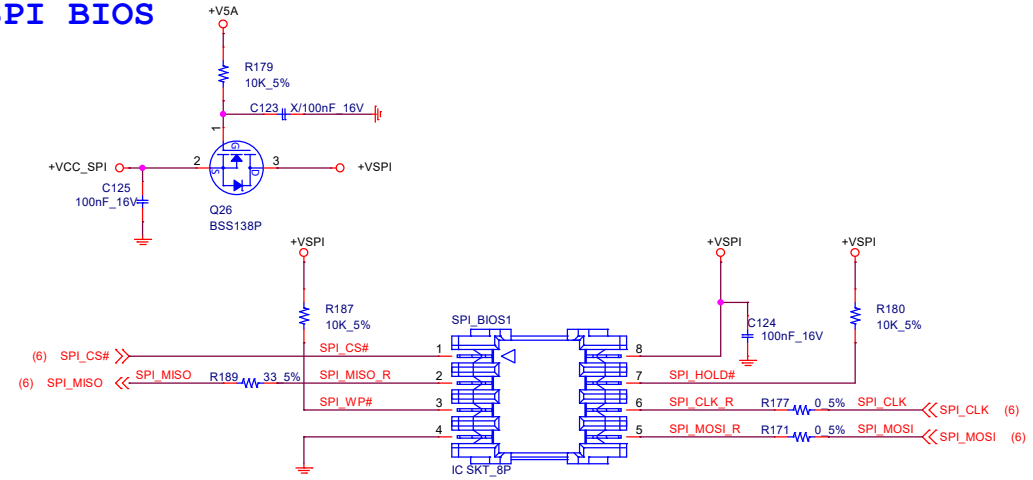
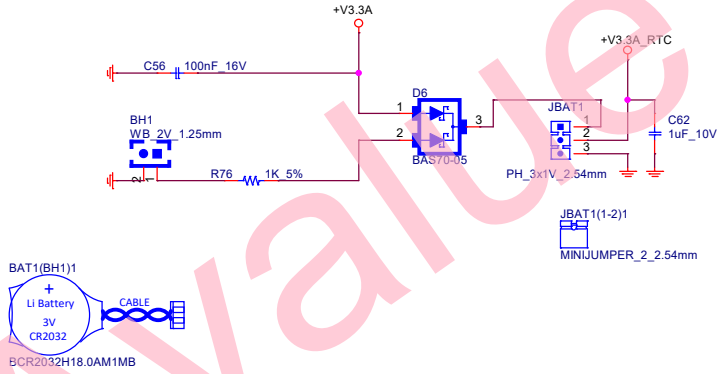
Project Name: EEV-EX16	Module Number: <Module no.>	Rev: ?
Size: A3	Title: SATA、LAN、SD、DIO	Rev: A1
Date: Thursday, May 21, 2020	Sheet 18 of 27	

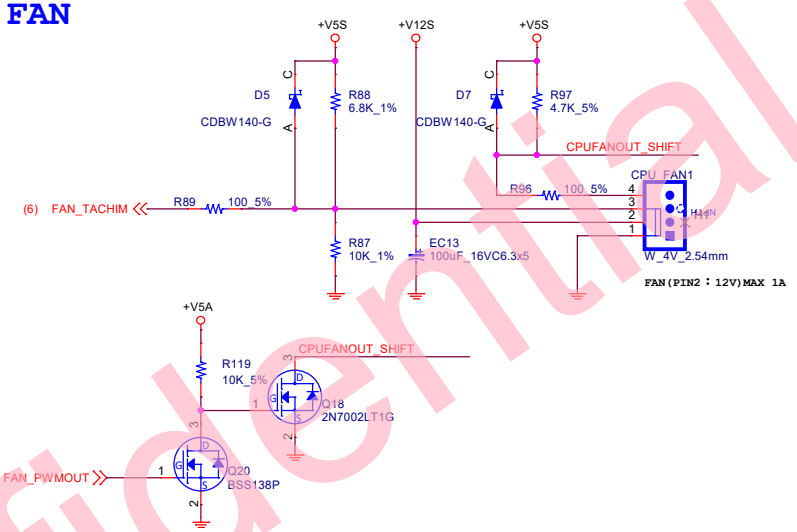
SPI BIOS



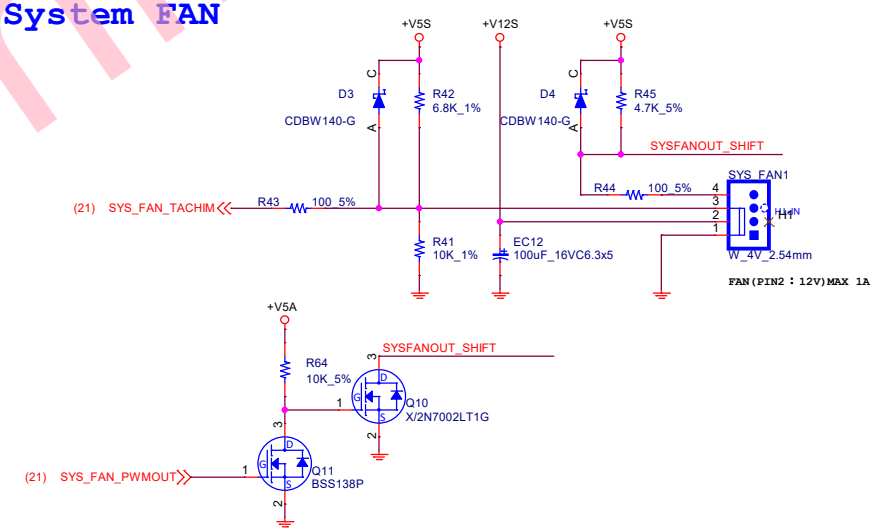
RTC BATTERY



CPU FAN



System FAN



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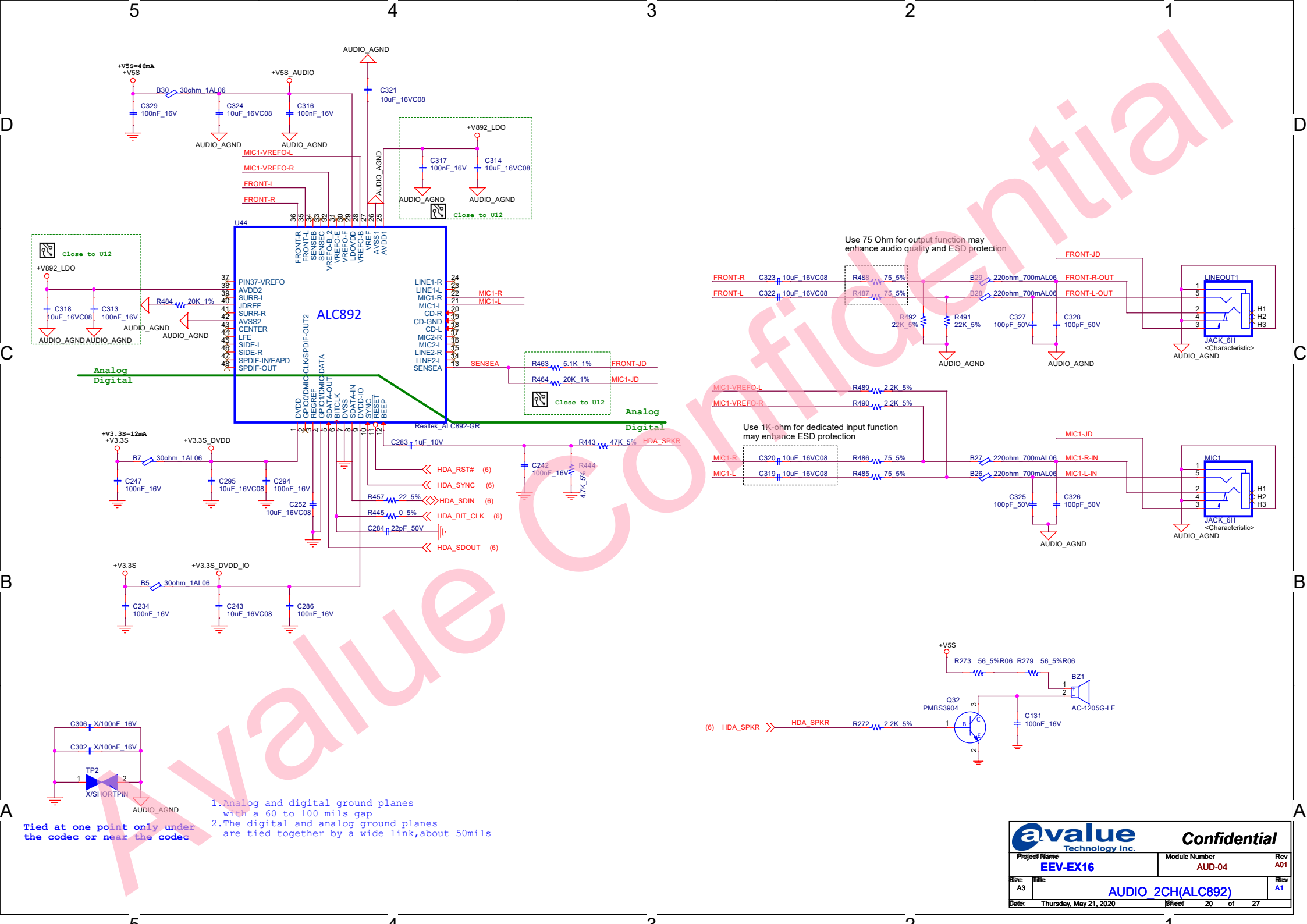
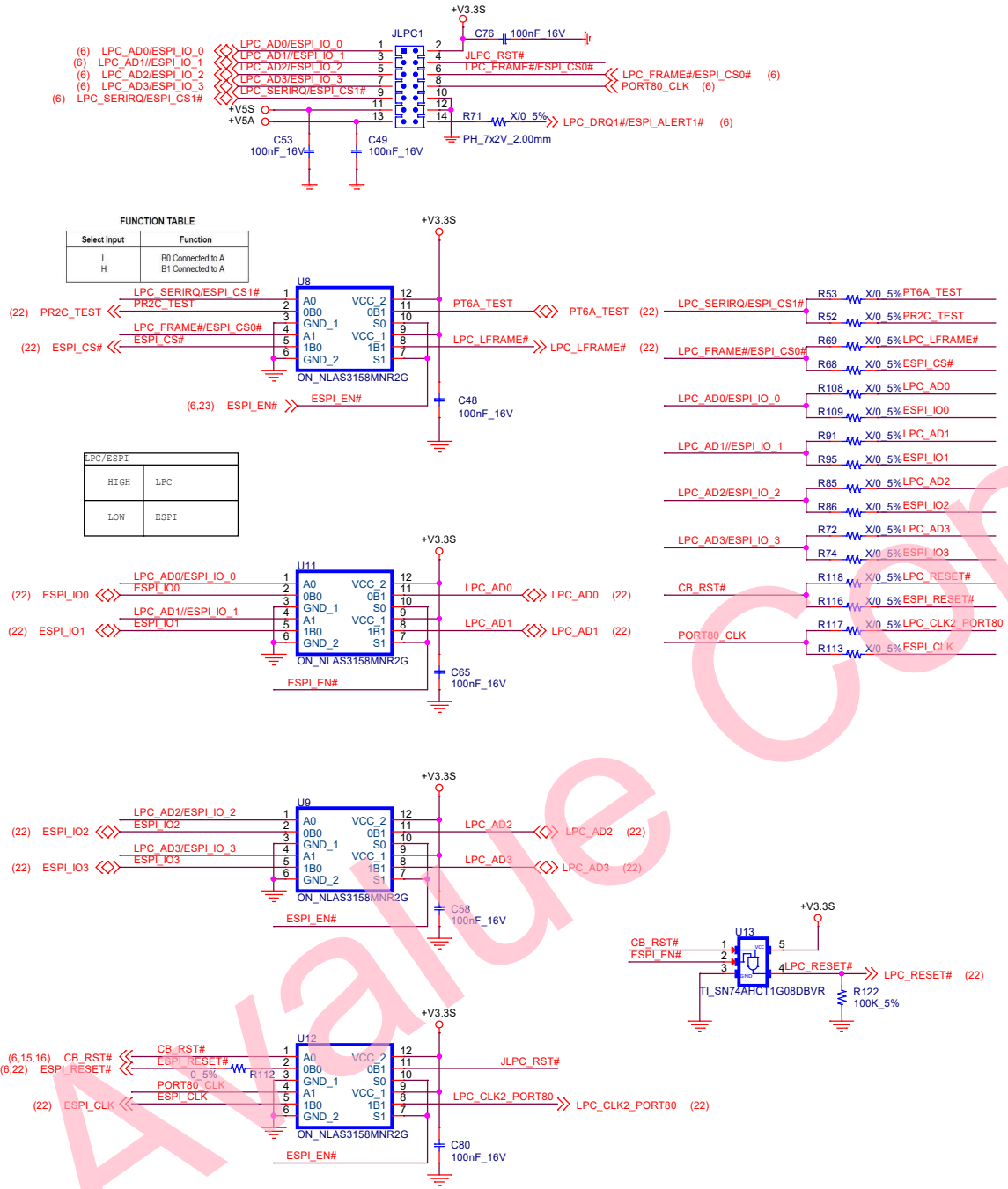
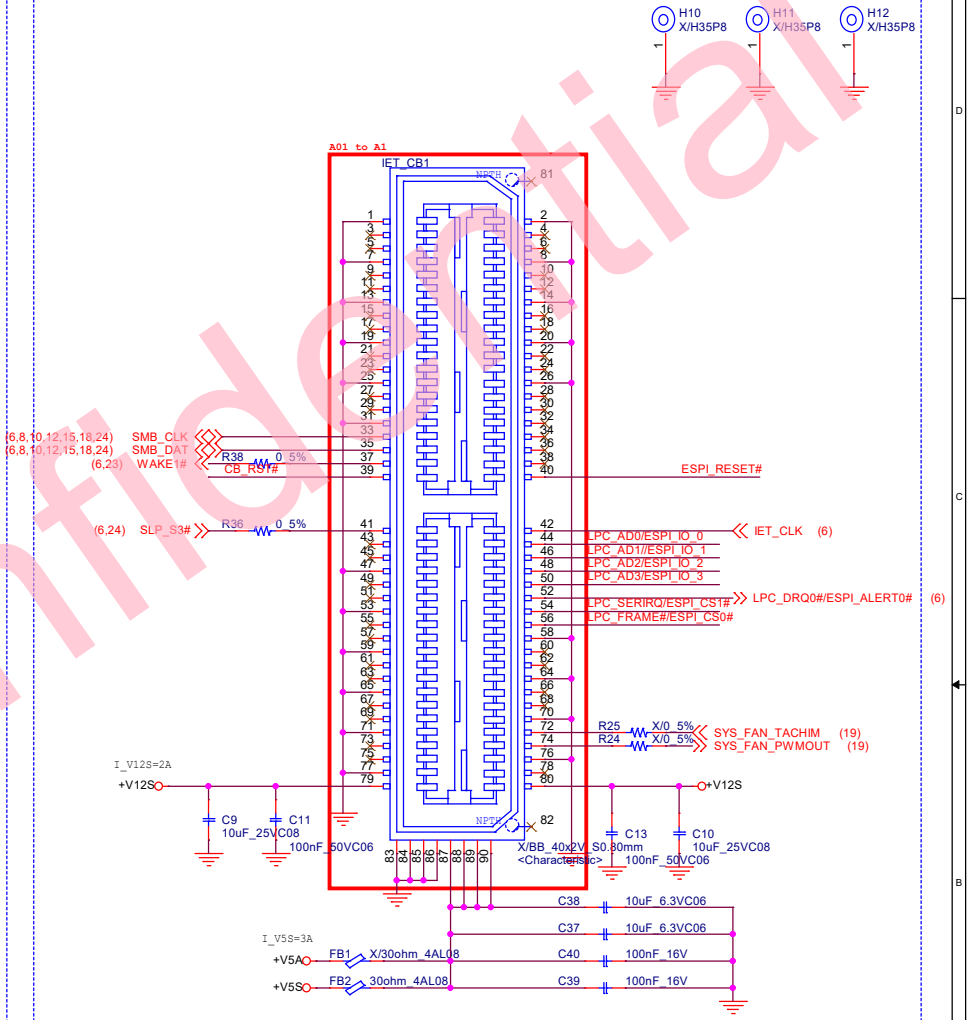
Project Name: EEV-EX16	Module Number: <Module no.>	Rev: ?
Size: A3	Title: SPI、RTC、FAN	Rev: A1
Date: Thursday, May 21, 2020	Sheet 19 of 27	


AUDIO_AGND
+V5S=46mA
+V5S
+V5S_AUDIO
B30 30ohm_1AL06
C329 100nF_16V
C324 10uF_16VC08
C316 100nF_16V
C321 10uF_16VC08
+V892_LDO
C317 100nF_16V
C314 10uF_16VC08
Close to U12
MIC1-VREFO-L
MIC1-VREFO-R
FRONT-L
FRONT-R
U44
ALC892
PIN37-VREFO
AVDD2
SURR-L
JDREF
SURR-R
AVSS2
CENTER
LFE
SIDE-L
SIDE-R
SPDIF-IN/EAPD
SPDIF-OUT
LINE1-R
LINE1-L
MIC1-R
MIC1-L
CD-R
CD-GND
CD-L
MIC2-R
MIC2-L
LINE2-R
LINE2-L
SENSEA
R484 20K_1%
C318 10uF_16VC08
C313 100nF_16V
R463 5.1K_1%
R464 20K_1%
FRONT-JD
MIC1-JD
Analog
Digital
Realtek_ALC892-GR
+V3.3S=12mA
+V3.3S
+V3.3S_DVDD
B7 30ohm_1AL06
C247 100nF_16V
C295 10uF_16VC08
C294 100nF_16V
C252 10uF_16VC08
C283 1uF_10V
R443 47K_5%
HDA_SPKR
C242 100nF_16V
R444 4.7K_5%
HDA_RST# (6)
HDA_SYNC (6)
HDA_SDIN (6)
HDA_BIT_CLK (6)
HDA_SDOUT (6)
R457 22_5%
R445 0_5%
C284 22pF_50V
+V3.3S
+V3.3S_DVDD_IO
B5 30ohm_1AL06
C234 100nF_16V
C243 10uF_16VC08
C286 100nF_16V
C306 X/100nF_16V
C302 X/100nF_16V
TP2
X/SHORTPIN
Tied at one point only under the codec or near the codec
1.Analog and digital ground planes with a 60 to 100 mils gap
2.The digital and analog ground planes are tied together by a wide link,about 50mils
Use 75 Ohm for output function may enhance audio quality and ESD protection
FRONT-R
FRONT-L
C323 10uF_16VC08
C322 10uF_16VC08
R488 75_5%
R487 75_5%
B29 220ohm_700mAL06
B28 220ohm_700mAL06
FRONT-R-OUT
FRONT-L-OUT
R492 22K_5%
R491 22K_5%
C327 100pF_50V
C328 100pF_50V
LINEOUT1
JACK_6H
<Characteristic>
Use 1K-ohm for dedicated input function may enhance ESD protection
MIC1-VREFO-L
MIC1-VREFO-R
R489 2.2K_5%
R490 2.2K_5%
MIC1-R
MIC1-L
C320 10uF_16VC08
C319 10uF_16VC08
R486 75_5%
R485 75_5%
B27 220ohm_700mAL06
B26 220ohm_700mAL06
MIC1-R-IN
MIC1-L-IN
C325 100pF_50V
C326 100pF_50V
MIC1
+V5S
R273 56_5%R06
R279 56_5%R06
BZ1
AC-1205G-LF
Q32
PMBS3904
C131 100nF_16V
(6) HDA_SPKR
R272 2.2K_5%
H1
H2
H3
Avalue Confidential
avalue Technology Inc.
Confidential
Project Name
EEV-EX16
Module Number
AUD-04
Rev
A01
Size
A3
Title
AUDIO_2CH(ALC892)
Rev
A1
Date:
Thursday, May 21, 2020
Sheet
20
of
27

PORT 80



IET



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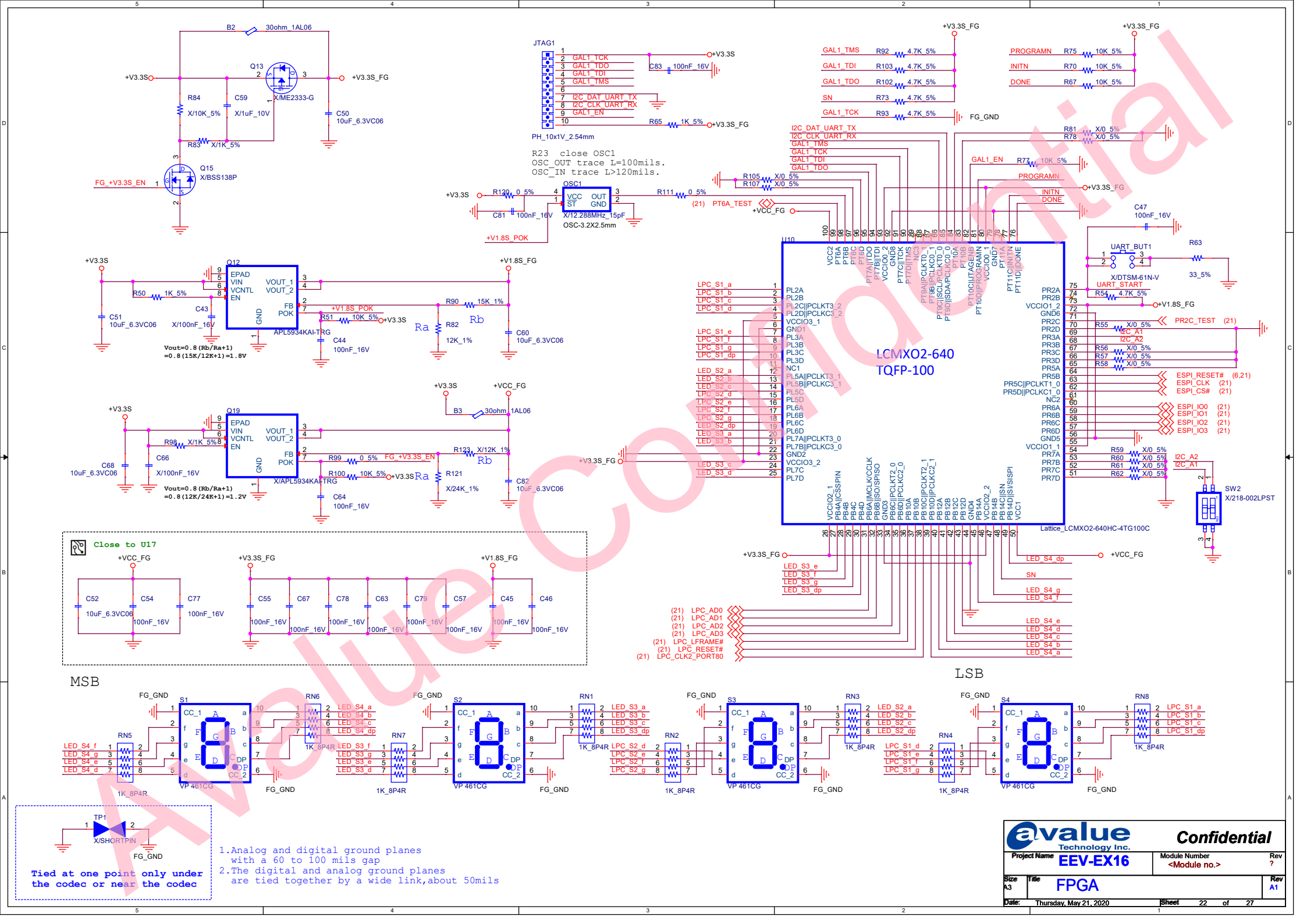
Project Name: EEV-EX16		Module Number: <Module no.>	Rev: ?
Size: A3	Title: IET & PORT 80(LPC/ESPI)		Rev: A1
Date: Thursday, May 21, 2020		Sheet 21 of 27	



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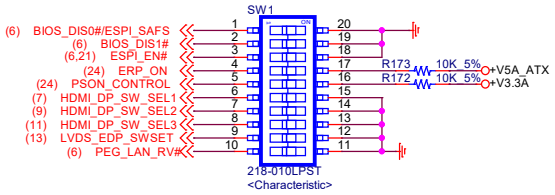
Project Name: EEV-EX16	Module Number: <Module no.>	Rev: ?
Size: A3	Title: FPGA	Rev: A1
Date: Thursday, May 21, 2020	Sheet 22 of 27	

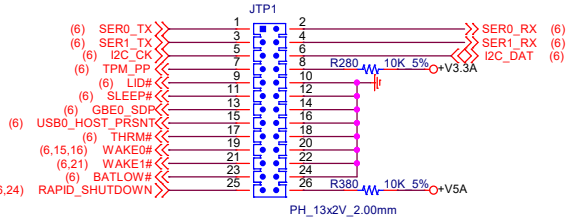
SW1 Setting

	Function	OFF	ON
1	BIOS ROM select	Default	
2	BIOS ROM select	Default	
3	LPC/eSPI select	LPC	eSPI
4	ERP setting	ERP OFF	ERP ON
5	PSON control	S3	Power button
6	DP/HDMI select1 (optional)	HDMI1	DP1
7	DP/HDMI select2 (optional)	HDMI2	DP2
8	DP/HDMI select3 (optional)	HDMI3	DP3
9	LVDB/eDP select (optional)	eDP	LVDB
10	PCIeX16 reverse select	Normal	Reverse



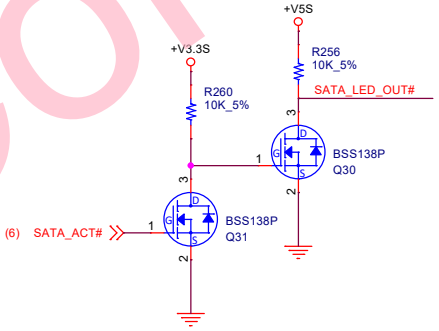
ESPI_EN#	BIOS_DIS1#	BIOS_DIS0#	Boot Bus	BBS	Chipset ESPI_CS0# Destination	Chipset ESPI_CS0# Pin	Chipset SPI_CS1# Destination	Chipset SPI_CS0# Destination	Carrier SPI_CS# Pin	SPI Descriptor	Ref to Images Above	Notes
1	0	0	SPI	0	-	-	Carrier	Module	SPI1	Module	A	MAFS on Module LPC bus enabled
1	0	1	SPI	0	-	-	Module	Carrier	SPI0	Carrier	B	MAFS on Carrier LPC bus enabled
1	1	0	-	0	-	-	-	-	High	-	-	Not used - was FWH
1	1	1	SPI	0	-	-	Module	Module	High	Module	A	MAFS on Module LPC bus enabled
0	0	0	SPI	0	-	-	Carrier	Module	SPI1	Module	C	MAFS on Module ESPI bus enabled
0	0	1	SPI	0	-	-	Module	Carrier	SPI0	Carrier	D	MAFS on Carrier ESPI bus enabled
0	1	0	eSPI	1	Module	-	-	-	SPI0	Module	E	SAFS and BMC on Module ESPI bus enabled
0	1	1	eSPI	1	Carrier	Chipset ESPI_CS0#	-	-	SPI0	Carrier	F	SAFS and BMC on Carrier ESPI bus enabled

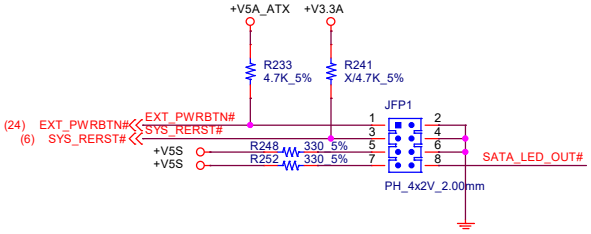
Test position



Function	Pin define			
Serial port0	1	SER0_TX	2	SER0_RX
Serial port1	3	SER1_TX	4	SER1_RX
I2C	5	I2C_CK	6	I2C_DAT
TPM_PP	7	TPM_PP	8	+V3.3A
LID switch	9	LID#	10	GND
Sleep button	11	SLEEP#	12	GND
IEEE 1588 SDP	13	GBE0_SDP	14	GND
USB0_HOST_PRSNT	15	USB0_HOST_PRSNT	16	GND
Over-temp	17	THRM#	18	GND
PCI Express wake up	19	WAKE0#	20	GND
General wake up	21	WAKE1#	22	GND
Battery low	23	BATLOW#	24	GND
Rapid Shutdown	25	RAPID_SHUTDOWN	26	+V5A

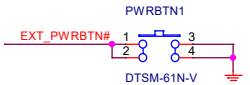
Front panel



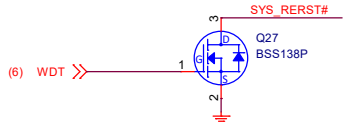


Function	Pin define			
Power button	1	PWRBTN#	2	GND
Reset button	3	RERST#	4	GND
Power LED	5	+V5S	6	GND
SATA LED	7	+V5S	8	SATA_LED#

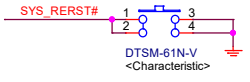
Power button



WDT



Reset button



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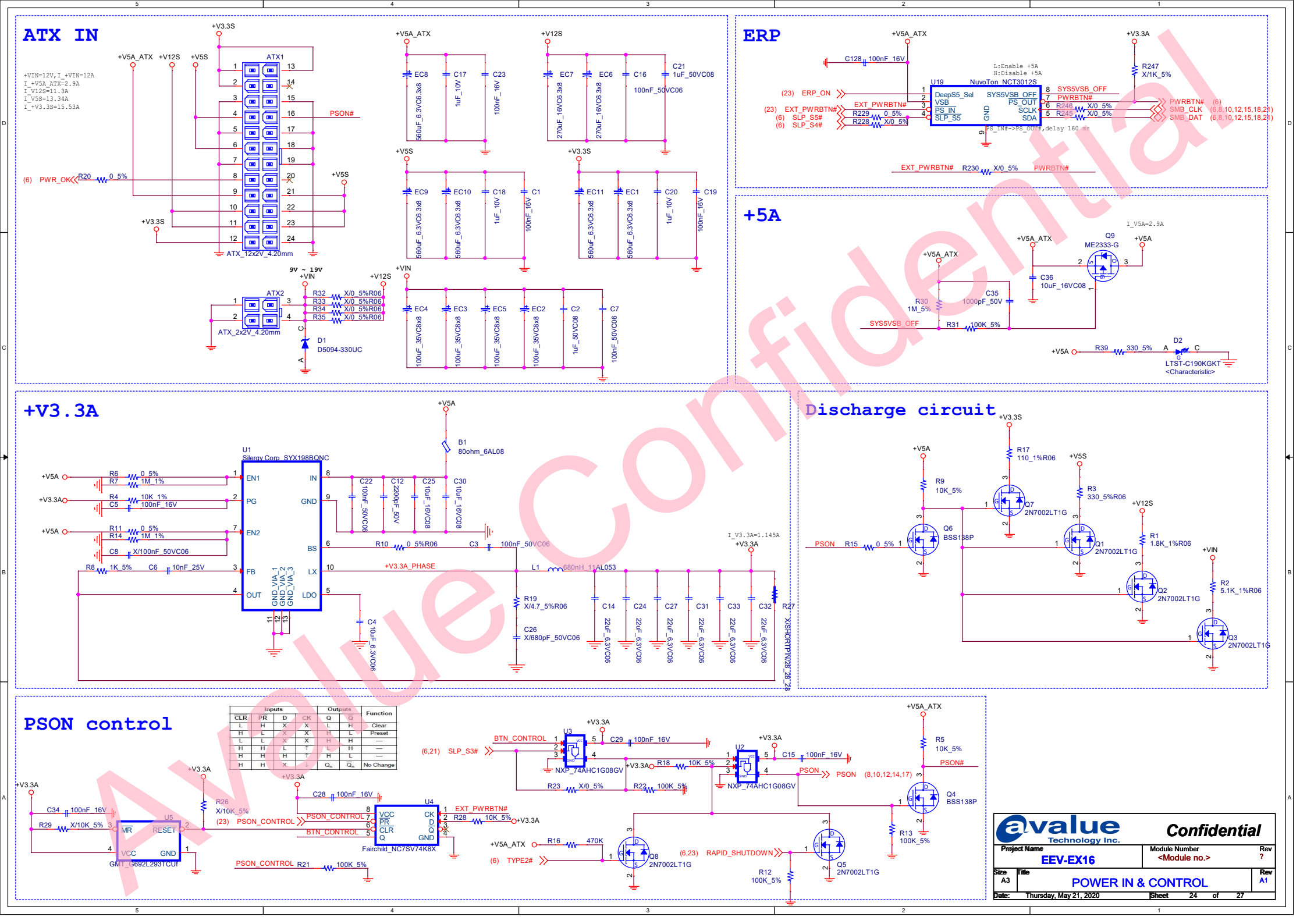
Project Name	EEV-EX16	Module Number	<Module no.>
			Rev ?
Size A3	Title CONTROL,SETTING,TEST		Rev A1
Date: Thursday, May 21, 2020		Sheet 23 of 27	



Modify History

EEV-EX16 Rev:A0 EE:Gas

Item	Description	Track or reason	Page	Date
1.	First Release			

EEV-EX16 Rev:A01 EE:Elmo

Item	Description	Track or reason	Page	Date
1.	E1907EX1601RO Release	PCB Part Number Update.	06	2019/10/23
2.	CN1#3~12	Nut and Column BOM Level Change to DIP.	06	2019/10/23
3.	CN1B PIN:(C19、C20、C22、C23、D19、D20、D22、D23)	PCIE HW Issue.	06	2019/10/23
4.	ADD R364、R335、334	HDMI Level Shift HDP Pull UP.	08、10、12	2019/10/23
5.	ADD B31、B32、B33、C330、C331、C332	VGA EMI Issus.	14	2019/10/23
6.	Change U21、U31、U37、U41	USB Protect IC Change to APL3553.	17	2019/10/23
7.	Change R312、R353、R381、R458	USB Delay Resistor Change.	17	2019/10/23
8.	Enable : +V5_USB45_IN 、+V5S	USB Protect IC Change Enable POWER.	17	2019/10/23
9.				2019/10/23

EEV-EX16 Rev:A1 EE:Elmo

Item	Description	Track or reason	Page	Date
1.	Remove R373 , Add R386	USB45 use Standby Power.	17	2020/05/21
2.	Remove Q33 U40 , Add R452	LAN ACT Control.	18	2020/05/21
3.	Remove IET_CB1	Final Bom Cost Down.	21	2020/05/21
4.	Remove C253 C254 C263 C264 C273 C274 , Add R493 R494 R495 R496 R497 R498	DP Issue.	07、09、11	2020/05/21