



CURIOUS



CURIOUS Corporation

Introduction

Rev.2.70

1



CURIOUS

Contents of Company Introduction

1. Company History
2. Company Location
3. Business Model and Products
4. Feature of Products
5. Future Business Plan

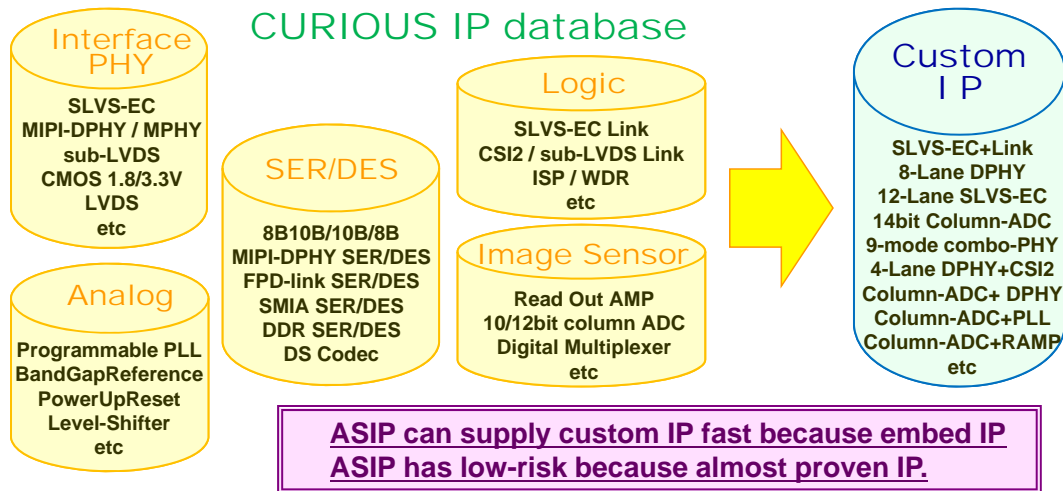
Rev.2.70

2

Technical Word explain

What is the A S I P ?

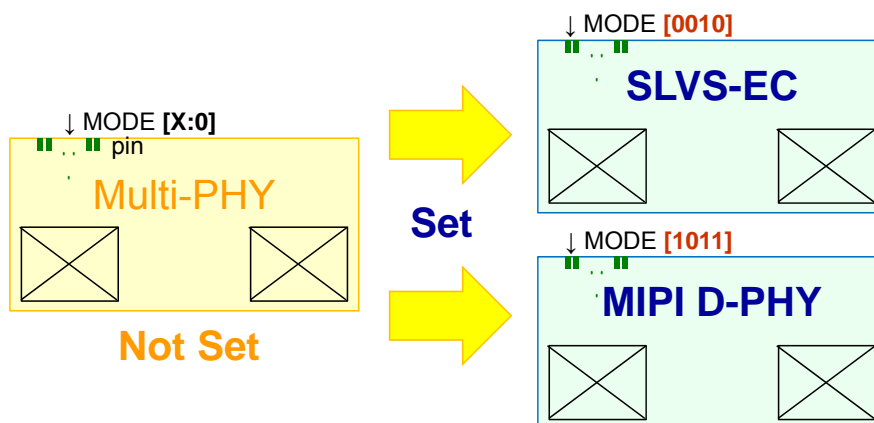
Application Specific IP (Custom IP)
Our coined word.



Technical Word explain

What is the multi-PHY ?

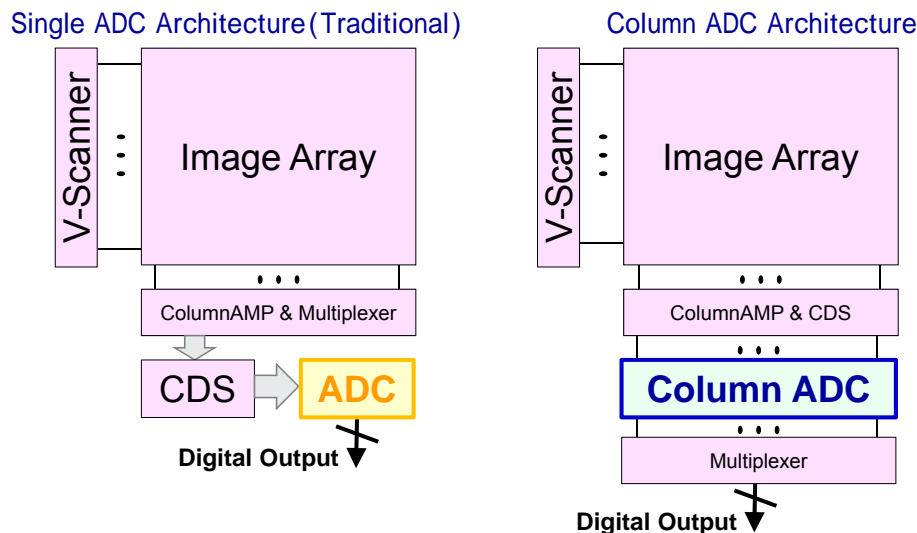
Multi-PHY means variable PHY cell for set mode pin. Our coined word.



Technical Word explain

What is the column-ADC ?

Column A/D converter convert from analog signal to digital signal for each column.



Rev.2.70

5

Technical Word explain

What is the CIS?

CMOS Image Sensor

What is the W-SA?

W-SA means column-ADC used double SA-ADC. Our coined word.

What is the Warp&Walk?

Warp&Walk means column-ADC used SA-ADC and SigleSlope-ADC. Our coined word.

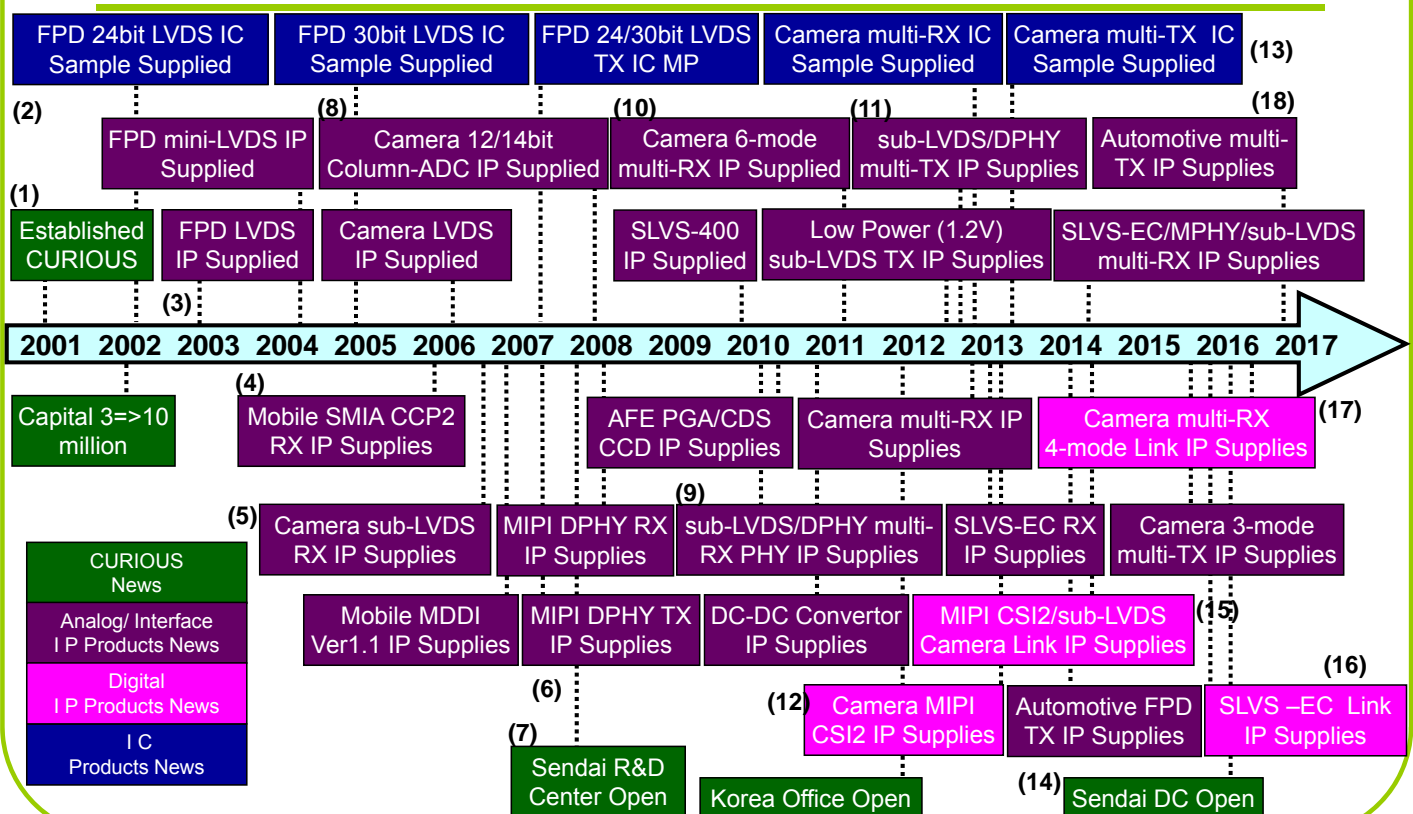
Rev.2.70

6

Contents of Company Introduction

1. Company History
2. Company Location
3. Business Model and Products
4. Feature of Products
5. Future Business Plan

Company History



Contents of Company Introduction

1. Company History
2. Company Location
3. Business Model and Products
4. Feature of Products
5. Future Business Plan

Company Location

IWATE Ichinoseki Head Office

Tohoku-Shinkansen & Airplane

Tokyo ~ Ichinoseki Hayate Hayabusa	About 2-hours 10-minuts 2-line/day
Tokyo ~ Ichinoseki Yamabiko	About 2-hours 40-minuts 1-line/hour
Itami-Airport ~ Ichinoseki Station	About 2-hours 40-minuts
Sendai ~ Ichinoseki Shinkansen	About 37-minuts

Tohoku-Highway

Morioka-IC ~ Ichinoseki-IC 92km	About 1-hour
Sendai-IC ~ Ichinoseki-IC 88km	About 1-hour

MIYAGI Sendai DC (Design Center)

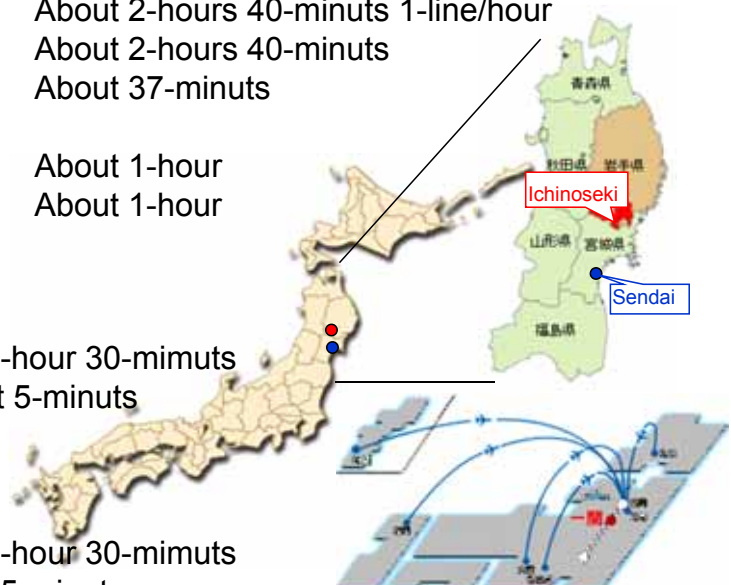
Tohoku-Shinkansen & Subway

Tokyo ~ Sendai Hayate	About 1-hour 30-mimuts
Sendai ~ Kitayobancho subway	About 5-minuts

MIYAGI Sendai R&D Center

Tohoku-Shinkansen

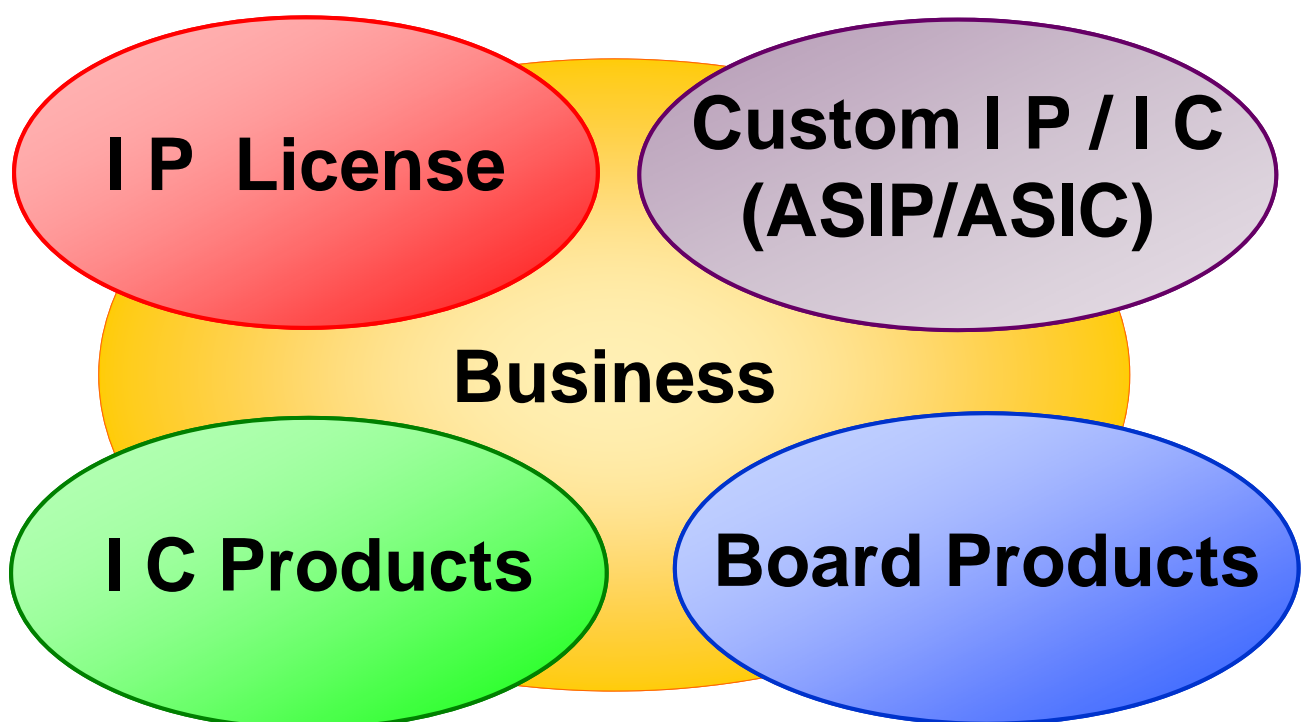
Tokyo ~ Sendai Hayate	About 1-hour 30-mimuts
Sendai ~ Izumicyuo subway	About 15-minuts
Izumicyuo ~ Sendai DC Taxi	About 15minuts



Contents of Company Introduction

1. Company History
2. Company Location
3. Business Model and Products
4. Feature of Products
5. Future Business Plan

Business Model



IP License

multi-Interface IP

Camera PHY: MIPI(DPHY,MPHY,CPHY), sub-LVDS(Serial/Parallel),SLVS(EC,400,200),HiSPi
 Display PHY: LVDS, mini-LVDS, MIPI(D-PHY,M-PHY), etc
 Camera LINK: MIPI(CSI2,CSI3), sub-LVDS(8/10/12/14/16bit,Serial/Parallel), SLVS-EC, HiSPi

Camera Interface IP

PHY: MIPI(DPHY,MPHY,CPHY), sub-LVDS(Serial/Parallel),SLVS(EC,400,200),HiSPi
 LINK: MIPI(CSI2,CSI3), sub-LVDS(8/10/12/14/16bit, Serial/Parallel), SLVS-EC, HiSPi

Display(LCD/Plasma) Interface IP

PHY: MIPI(D-PHY,M-PHY), mini-LVDS, LVDS, RSDS, etc
 LINK: MIPI(DSI), FPD-link, DDR Format, etc

Image Sensor & Analog IP

Image Sensor: column ADC, Sense Amp, Ramp-Generator, OB-Clamp, CDS, PGA, etc
 Analog: DC-DC convertor, LDO, PLL/DLL, ADC, DAC, Bias, etc

Digital IP

ISP, LINK-Layer(Controller), SyncCodeDetector, Video-Codec, HDR/WDR, Fisheye Camera, etc

URL: http://www.curious-jp.com/en/ip_if_camera.html
http://www.curious-jp.com/en/ip_if_fpd.html

IP License

Camera Multi(Combo)-Interface IP

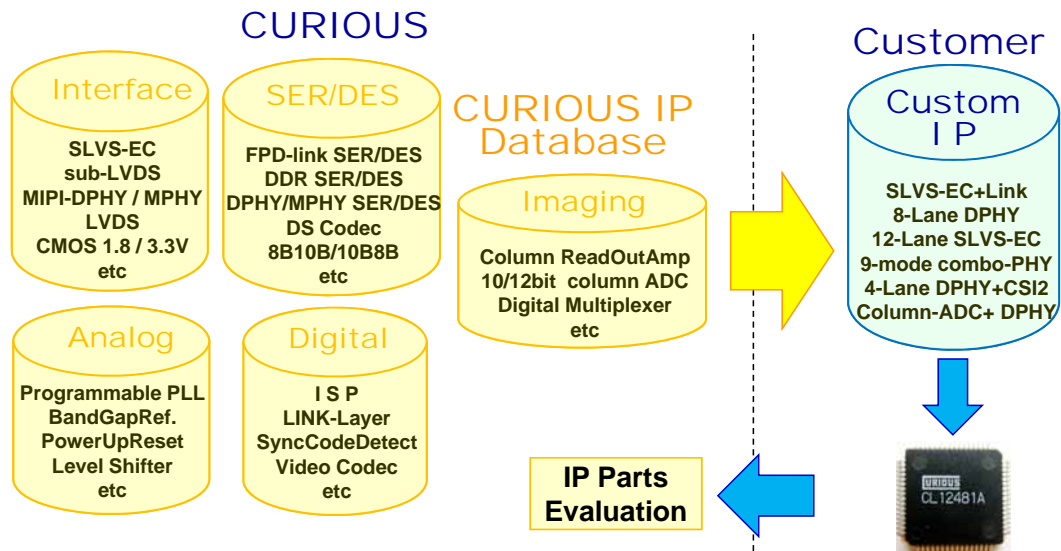
Product Name	Input Interface	Output Interface	Maximum Frequency	TX/RX Lane	Process Name	Process Node	Status
CL12842 Series	SLVS-EC MIPI D-PHY HiSPi SLVS sub-LVDS CMOS1.8V	CMOS	2.304Gbps 2.5/1.5/1.0Gbps 1Gbps/700Mbps 1Gbps/700Mbps 1Gbps/650Mbps 200/170/150MHz	RX 4-Lane 8-Lane 12-Lane 16-Lane	TSMC UMC GF	14/16 22/28 40	Available or 2018
CL12684 Series	MIPI D-PHY HiSPi SLVS sub-LVDS LVDS miniLVDS CMOS1.8V	CMOS	2.5/1.5/1.0Gbps 1Gbps/700Mbps 1Gbps/700Mbps 1Gbps/650Mbps 1Gbps 1Gbps 200/170/150MHz	RX 4-Lane 8-Lane 12-Lane 16-Lane	TSMC UMC SMIC TPSCo	28 40 55 65 110 180	Available or 2018

Other IPs:

URL: http://www.curious-jp.com/en/ip_if_camera.html

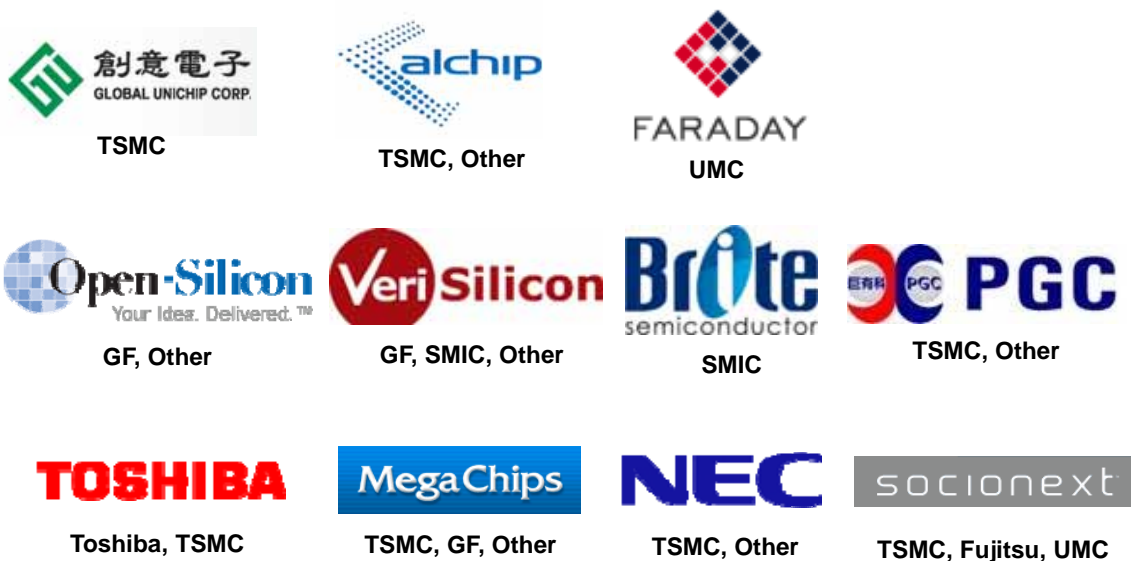
A S I P (Custom IP)

ASIP : Application Specific IP (Custom IP)






ASIC & Other IP

ASIC Partner Company








IC Products

Camera Interface IC

Product Name	Input Interface	Output Interface	Maximum Frequency	TX/RX Lane	Package	Status
CL12842 Series	SLVS-EC D-PHY v.1-1 HiSPi sub-LVDS CMOS1.8V,etc	CMOS1.8V LVDS	2.304Gbps 1.5Gbps 700Mbps 650Mbps 150MHz	RX 4-Lane	LFBGA 400-pin 	Sample Out
CL12684 Series	D-PHY/HiSPi sub-LVDS LVDS, miniLVDS CMOS1.8V,etc	CMOS1.8V LVDS	1.0Gbps 650Mbps 1.0Gbps 150MHz	RX 4-Lane	LQFP 144-pin 	Sample Out
CL12683 Series	CMOS1.8V	D-PHY/HiSPi sub-LVDS LVDS, miniLVDS CMOS1.8V,etc	1.0Gbps 650Mbps 1.0Gbps 150MHz	TX 4-Lane	LQFP 144-pin 	Sample Out

Board Products

FPGA&Chip Board for Camera

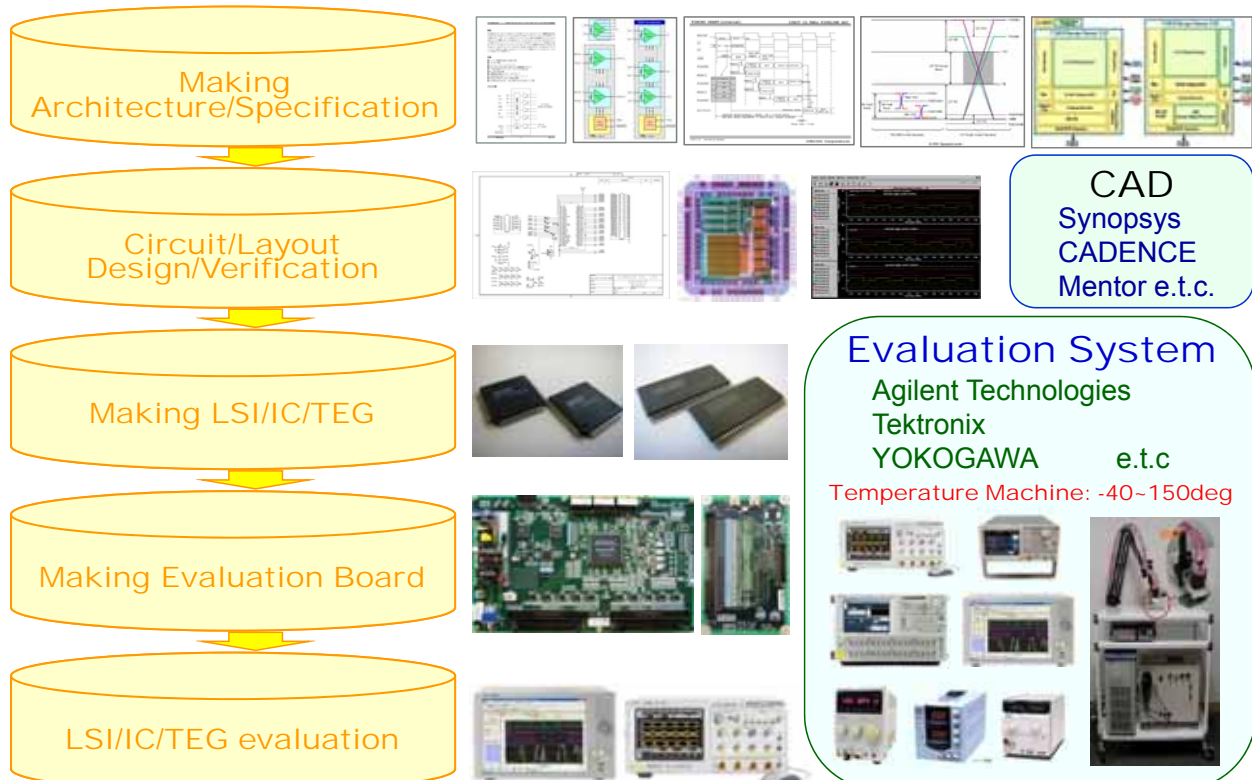
Product Name	Input Interface	Output Interface	Maximum Frequency	TX/RX Lane	Picture	Status
EB12842 (Stratix-IV)	SLVS-EC D-PHY/HiSPi sub-LVDS CMOS1.8V,etc	CMOS1.8V LVDS	2.304Gbps 1.5Gbps 650Mbps 150MHz	RX 4-Lane x3 + FPGA (Stratix-IV)		Available
EB-SMA-SAMTEC	SMA Connector	SAMTEC Connector QTH-060-02-*D-A	3Gbps	TX 12-Lane		Available
EB-SMA-WR	JAE Connector WR-80P-HF-HD-A1E	SMA Connector	2Gbps	RX 8-Lane		Available
EB12684	D-PHY v.1-0 HiSPi sub-LVDS LVDS, miniLVDS CMOS1.8V,etc	CMOS1.8V LVDS	1.0Gbps 700Mbps 650Mbps 1.0Gbps 150MHz	RX 4-Lane		Available
EB12683	CMOS1.8V	D-PHY/HiSPi sub-LVDS LVDS, miniLVDS CMOS1.8V,etc	1.0Gbps 650Mbps 1.0Gbps 150MHz	TX 4-Lane		Available

Board Products

Camera Sensor Board

Product Name	Input Interface	Output Interface	Maximum Frequency	TX/RX Lane	Picture	Status
CEIMX271HB	Sony IMX271	SLVS-EC SLVS 8-Lane	2.304Gbps 864Mbps	TX CIS		Available
CEIMX272HB	Sony IMX272	SLVS-EC 12-Lane (6-Lane and 6-Lane)	2.304Gbps			Available
CEIMX269HB	Sony IMX269	subLVDS 12-Lane	576Mbps			Available
CEIMX277HB	Sony IMX277	SLVS-EC 8-Lane	2.304Gbps			Available
CEIMX377HB	Sony IMX377	MIPI v.1-1 4-Lane	1.44Gbps			Available

Evaluation Services / Consulting



Business Model

Product Class

Display Interface Application

LVDS / mini-LVDS
MIPI(D-PHY, M-PHY)
FPD-link / MIPI(DSI)

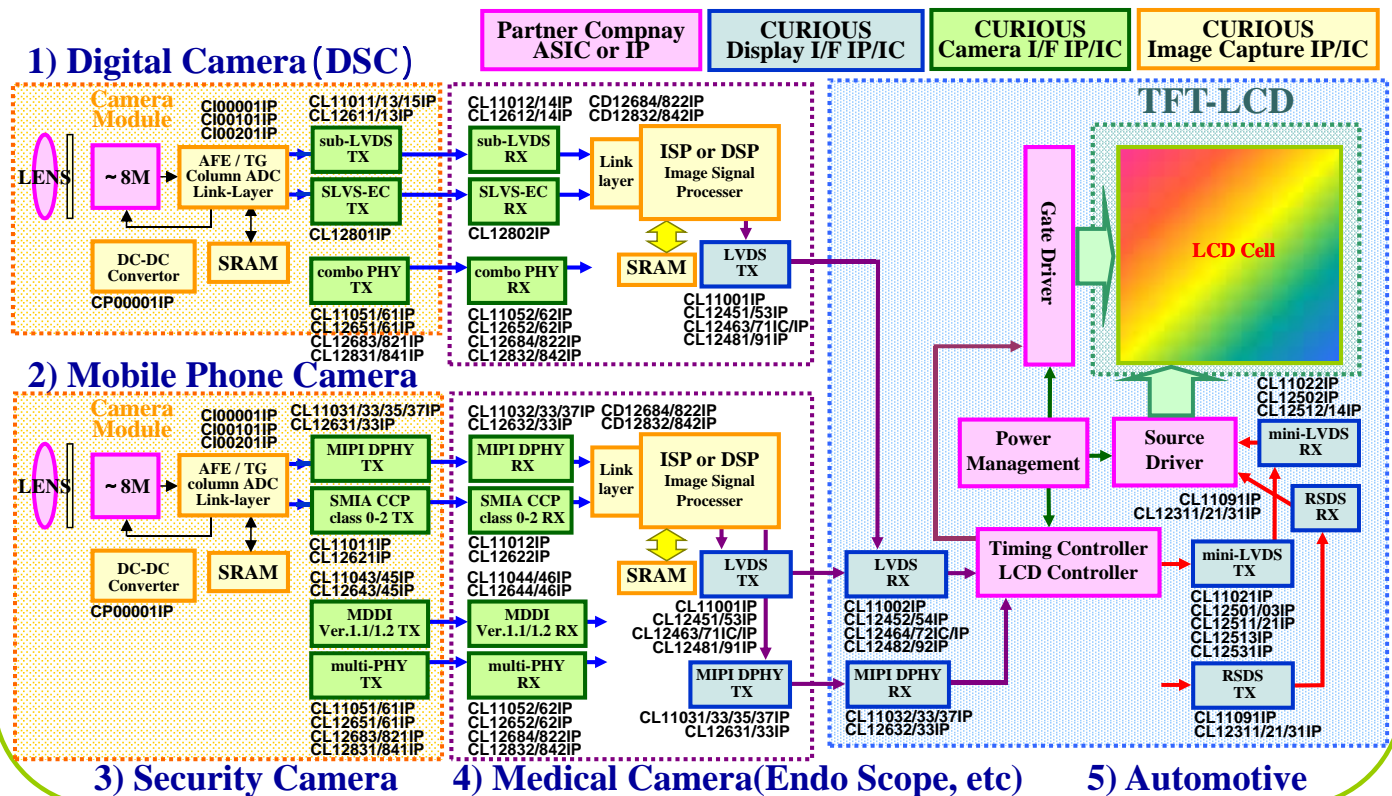
Camera Interface Application

MIPI(D-PHY, M-PHY)
SLVS-EC / sub-LVDS
MIPI(CSI2, CSI3)

Image Capture Application

column A/D converter
AFE / V-Driver
ISP, Video Decoder

IC/IP Products (Target Application)



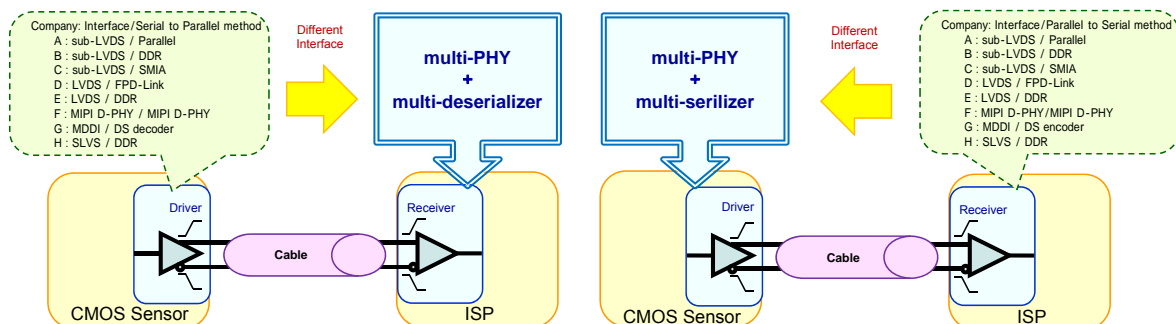
Contents of Company Introduction

1. Company History
2. Company Location
3. Business Model and Products
4. Feature of Products
5. Future Business Plan

Feature of Products

Uniquely technology : multi-PHY

1. multi-PHY(only technology)
2. multi-SER/DES (DDR,8B10B,DS-codec etc)
3. multi-Link (MIPI, SLVS-EC, sub-LVDS etc)
2. Covered almost CIS (Hot: SLVS-EC,MPHY)

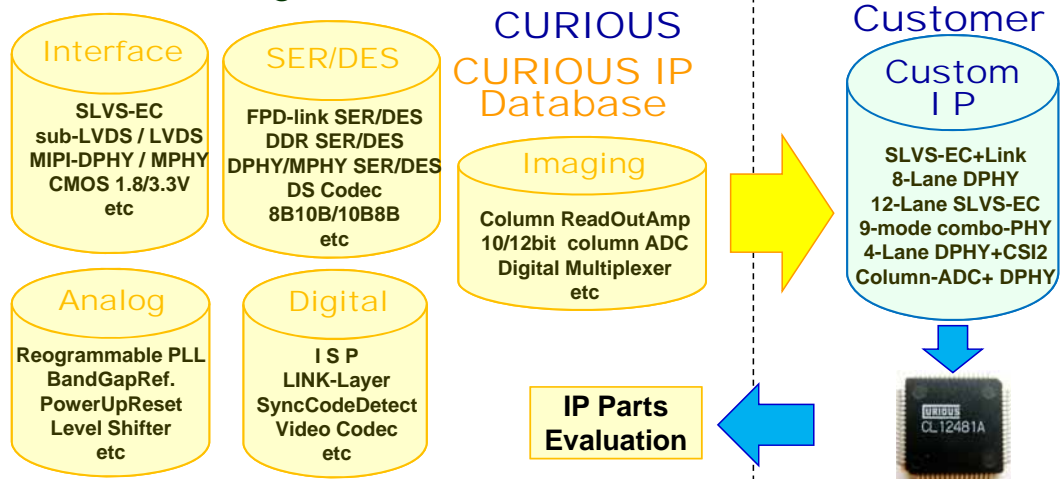


Different Interface can solve for use our multi-PHY

Feature of Products

Uniquely system: ASIP(Custom-IP)

1. Custom IP can be quick-delivery for use assemble IP method.
2. Our ASIP has low-risk because many our IP are confirmed movement.



Rev.2.70

25

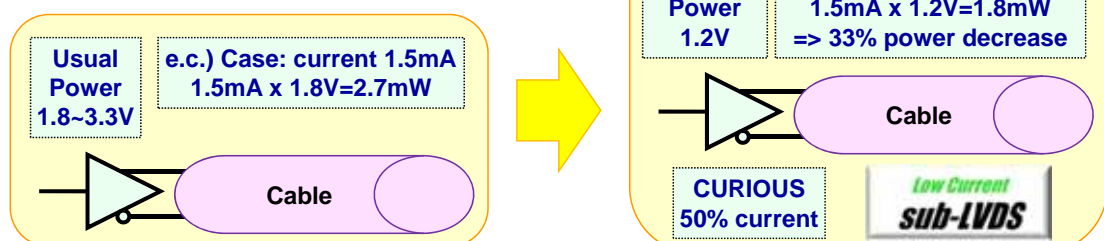
Feature of Products

Uniquely technology: sub-LVDS

1. Power Supply 1.2V (Only One Technology)
2. Low Power
3. Provided multi-PHY with DPHY(1.2V PWR)

Almost CIS of S,P company is covered in Japan

Our IP is accepted both.



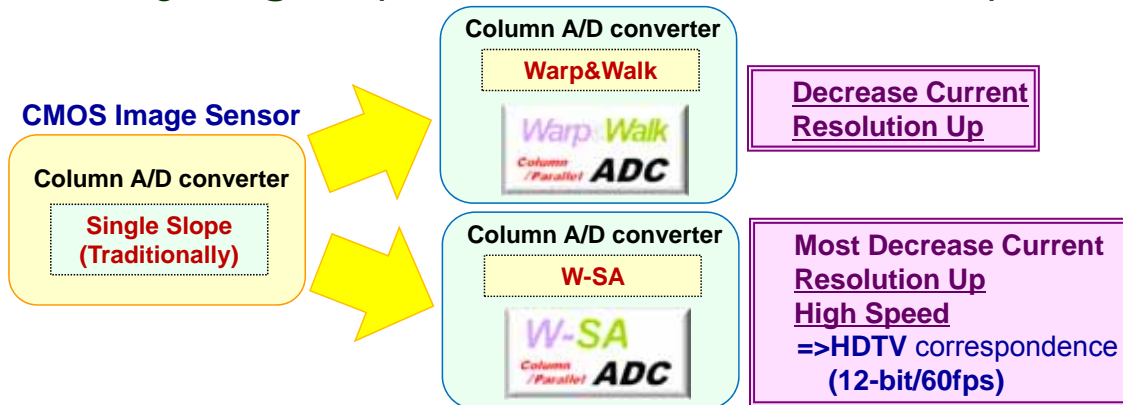
Rev.2.70

26

Feature of Products

Uniquely technology: column-ADC

1. W-SA algorithm (Uniquely Technology)
2. Warp&Walk algorithm (Uniquely Technology)
3. 1,2 both resolution Up & Current Down ,
2 only High Speed=Frame Number Up



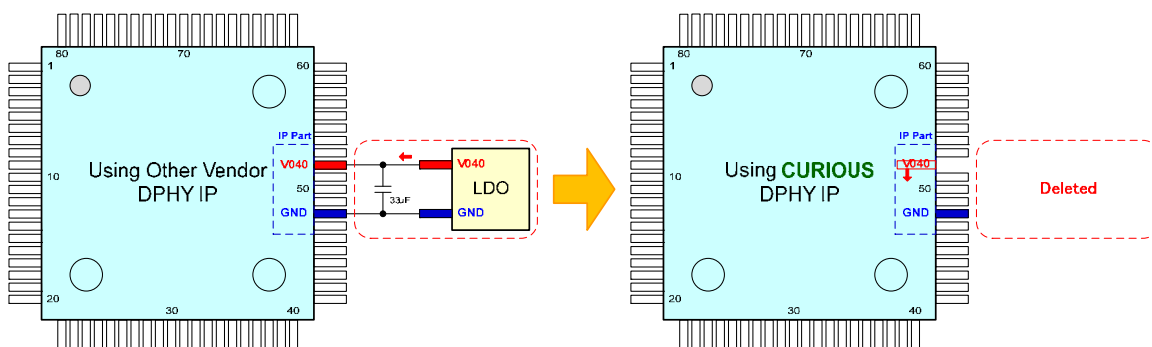
Rev.2.70

27

Feature of Products

Uniquely technology: MIPI D-PHY

Internal of Reference Voltage 0.4V
Decreased External Parts



Rev.2.70

28

Feature of Products

Verilog Verification: CIS Verilog Models

Verifying total Function for verilog

CIS Verilog Model	Input Interface	Output Interface	CIS Vendor	bit	Lane	Status
CV00001 Series	CMOS	sub-LVDS Serial	P Company	10/12/16	2-CK,2~6-DA	Available
CV00002 Series	CMOS	MIPI D-PHY	MIPI	8	1-CK,1~4-DA	Available
CV00003 Series	CMOS	sub-LVDS Parallel	S Company	10/12/14	1-CK,10~14-DA	Available
CV00004 Series	CMOS	SLVS-EC	S Company	10/12/14	8-DA	Available
					8/12(16)-DA	Available
CV00005 Series	CMOS	sub-LVDS Serial	S Company	10/12/14	1-CK,4-DA	Available
					1-CK,4/12-DA	Available
CV00006 Series	CMOS	HiSPi	O (A) Company	10/12/14	1-CK,4-DA	Available

Feature of Products

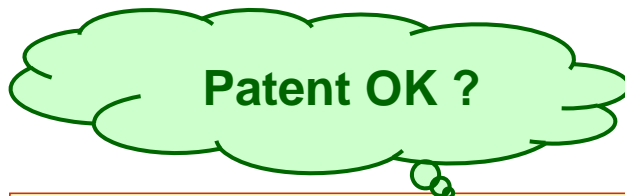
WDR/HDR CIS Verilog Models

CIS Verilog Model	Input Interface	Output Interface	CIS Vendor	bit	Status
CV00001DR Series	CMOS	sub-LVDS Serial	P Company	10/12/16	Available
CV00002DR Series	CMOS	MIPI D-PHY	MIPI	8	Available
CV00003DR Series	CMOS	sub-LVDS Parallel	S Company	10/12/14	Not Support
CV00004DR Series	CMOS	SLVS-EC	S Company	10/12/14	Available
CV00005DR2 Series	CMOS	sub-LVDS Serial	S Company	10/12/14	Available
CV00005DR3 Series	CMOS	sub-LVDS Serial	S Company	10/12/14	Available
CV00006 Series	CMOS	HiSPi	O (A) Company	10/12/14	Available

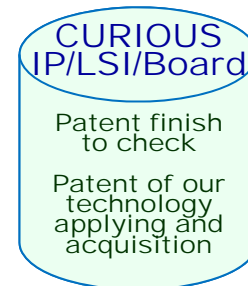
Feature of Products

Checking and applying , acquiring of patent

1. Our all products finished to check patent.
(But our checking of patent can not assure all patent.)
2. Our technology apply and acquire patent.



1. Usually the IP from IP Vendor must check patent for making IC/LSI vendor.
2. The products of specification for standard group is OK about patent and royalty ?



Contents of Company Introduction

1. Company History
2. Company Location
3. Business Model and Products
4. Feature of Products
5. **Future Business Plan**

Future Business Plan

Increasing Camera Board Development

- 1) (Our RX IC+FPGA) Board
- 2) CIS Board

Increasing IC/IP Products

- 1) Camera multi-PHY IP of SLVS-EC
- 2) Camera HDR/WDR, ISP, Link-layer

Increasing IP Support Materials

- 1) CIS Verilog Models Lineup



CURIOUS Corporation

Thank You Very Much