

Project: eBrick

NanoBrick

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Elevator Pitch



“e-ink필름과 Ink-in-motion 기술을 가지고 대형 블럭을 만듭시다. 이 블럭은 건축물 외장재로 새롭고 독특한 건물을 가능하게 합니다. 그리고 이 기술을 확장하여 고속도로 대형 광고판을 만들 수 있습니다. 기존에 비해 제조비용은 1/2, Operating cost를 1/10로 줄일 수 있게됩니다. 참고로 고속도로에 대형 광고판은 450,000개 정도가 1991년에 있었고 매년 5000~15000 개 정도 만들어집니다.”

Executive Summary

Who? Experts from Samsung and ETRI

What? Color Billboard display (14' x 48')(4 x 14m) (2DPI)

Why? 30B\$ outdoor industry in 2010 (62% Billboard)
1/2 build cost, 1/100 power consumption, 1/10 TCO

How? Using e-ink film with color filter

When? Working sample due '10.06

Where? NanoBRICK, Neolux

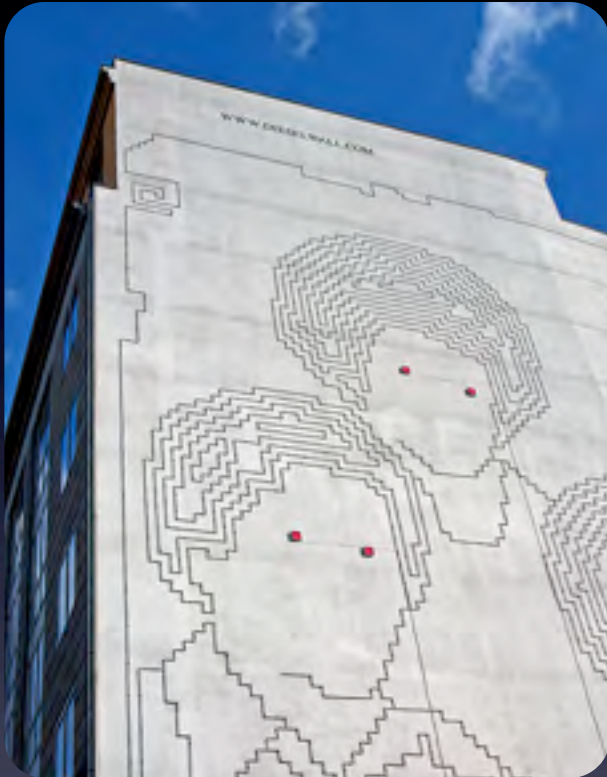


Wooden Mirror By Daneiel Rozin



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SIGGRAPH 2000 and Daniel Rozin





ART



Business

ART

- Creativity
- Uniqueness
- Difference



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TEMPORARY ART AWARD





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VOICELESS ALTARS OF FLESH
NAILED IN UNHOLY MISERY
CENTURIES IN DECOMPOSITION
SPAWN OF AZAGTHOTH
SCATOPHAGOUS GOATFATHER
EPOCH OF DISFIGURED UNLIGHT
FLUORESCENT BLEEDING CHAOS
PNEUMATIC SLAUGHTER
EXHAUSTED ORGANIC STENCH
FECULENT CRUCIFEAST
SODOMYTHICAL FROST GOATS
HERPETIFORM FETTERGRINDER
INVERTED PUTRID MASS
CANTHONOPHAGIC HUNGER

EXHUME TO CONSUME
BLASPHEMY MADE FLESH
ANCESTRAL NECROSODOMY
BIRTH BENEATH EARTH
SPIRITUAL AMPUTATION
VOMITORIUM CONVULSIONS
OCCULT BLOOD EXCREMENT
TRIUMPHANT SECRETIONS
ENDLESS BLEEDING JOURNEY
DIRTY INFAMOUS PAGAN FOG
SUCK MY UNHOLY VOMIT
MALIGNANT INCEPTION
AWAKENED BY IMPURITY
DESTROY SACRED WORDS

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ELEKTRO-ANLAGEN

Ing. Klaus Ludwig

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VOICELESS ALTARS OF FLESH
NAILED IN UNHOLY MISERY
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Parkplatz





What if...?







Ideas

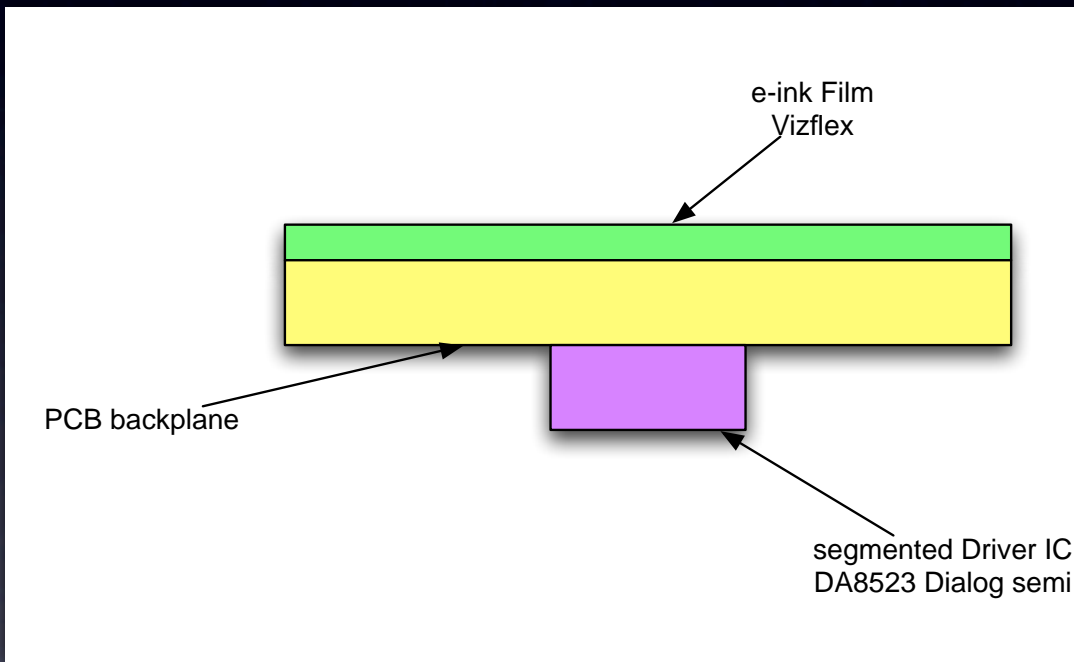
- A building surface which shows live Twitter Messaging
- A building surface which shows Today's newspaper cartoon

Value for Building owner

- Uniqueness
- Aesthetics
- Words of mouth
 - Interest economy

How?

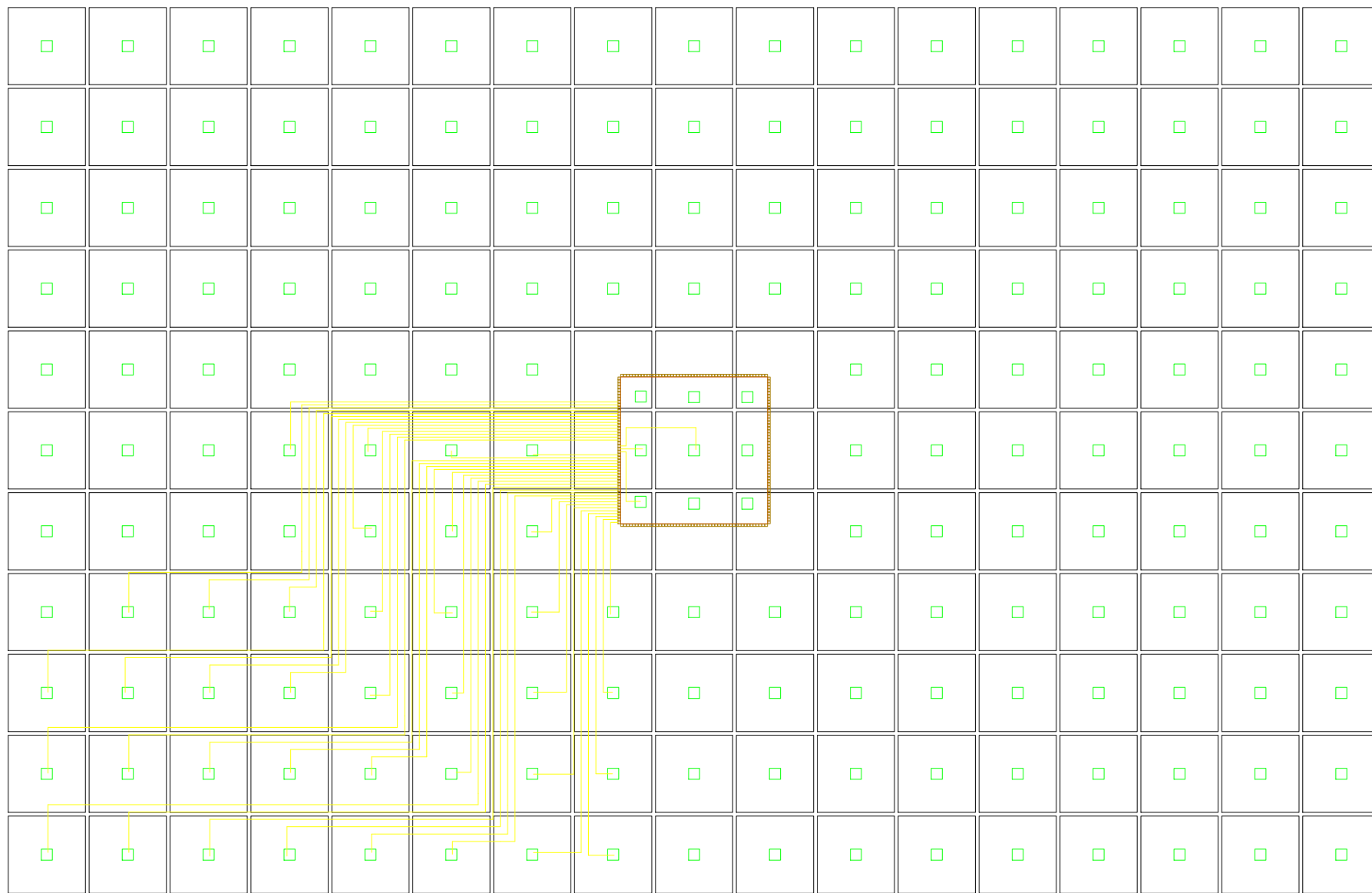
eBrick

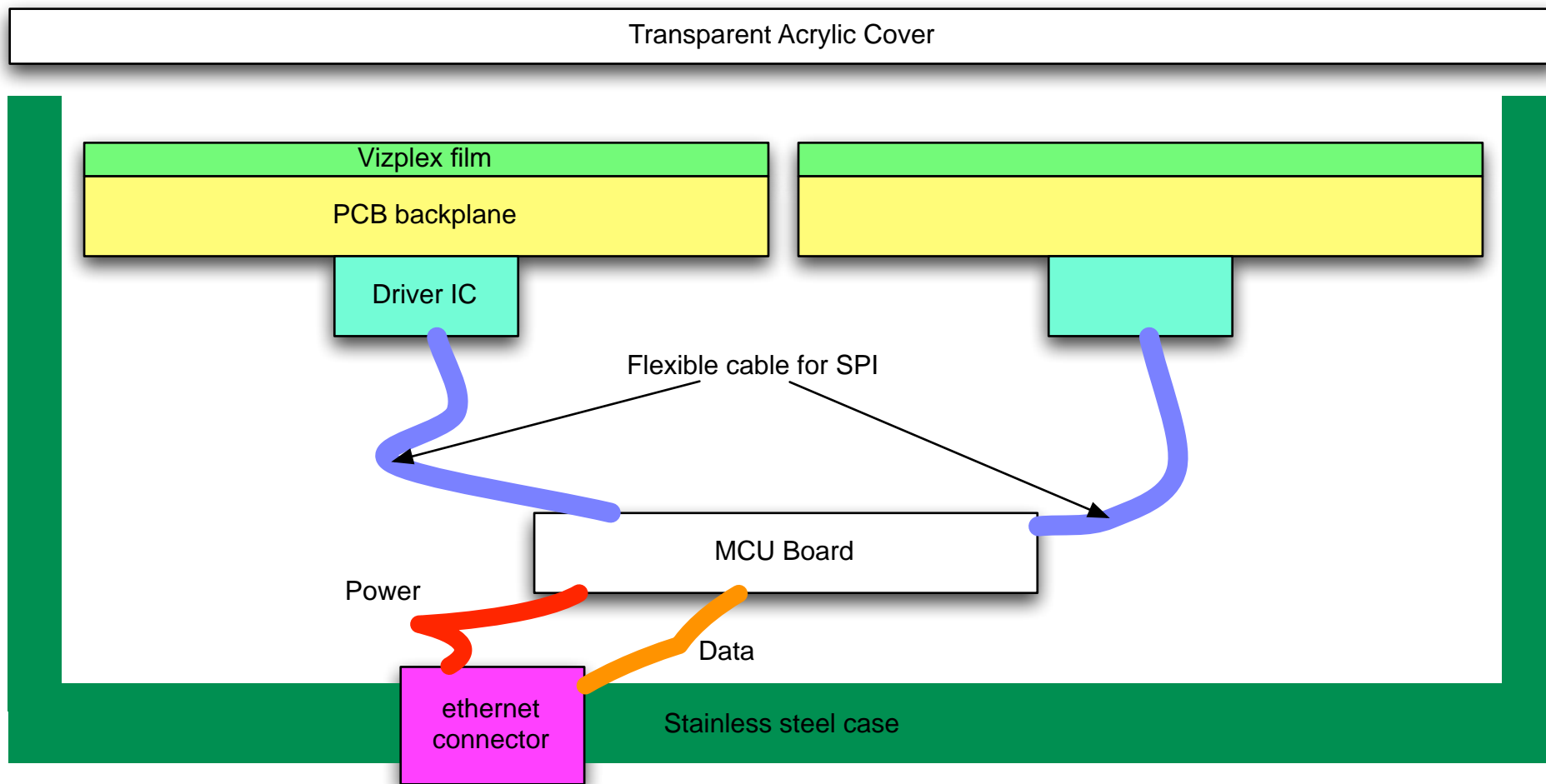


Film Size	530 by 378 mm
Pixel Size	22 by 22mm
Resolution	24 by 16
Color	B/W
Driver IC	2 DA8523

378

250



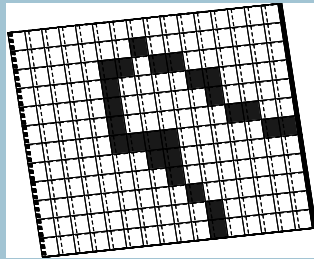


756 by 530 mm

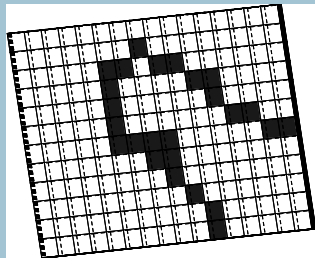
Specification

- Stainless steel case with strong Acrylic front
- Water-proof
- Only one connector output
 - Data - ethernet
 - Power - Power Over Ethernet (POE)

eBrick



ethernet

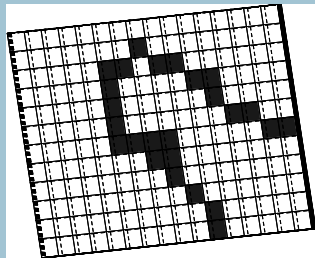


POE Router Rack

ethernet



Control PC
From Picture data to packet data



Optional Power Module

Outdoor cable



There is a need for eBrick.
But the market size is not big.

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"Care to expand on your new idea?"

Business

Business

- Market Size
- Numbers
- Competition

Background



Market Size



- 450,000 highway billboard(1991)
- 5,000~15,000 built annually

Target

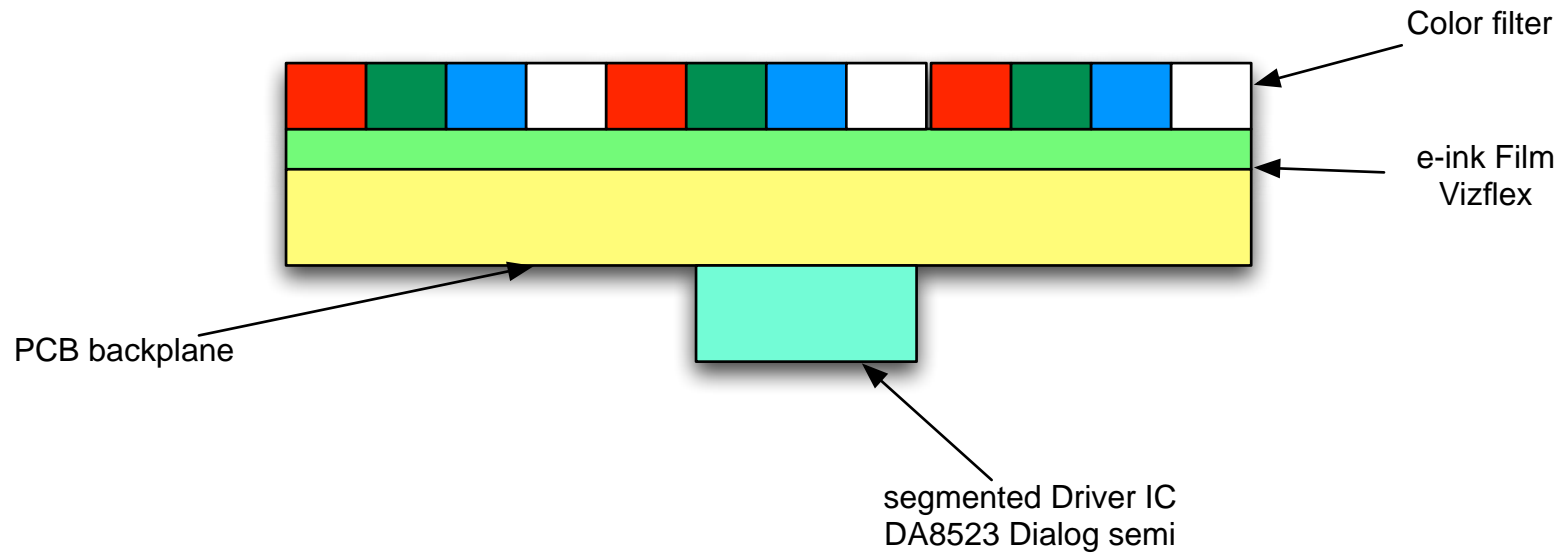


Wireless Update

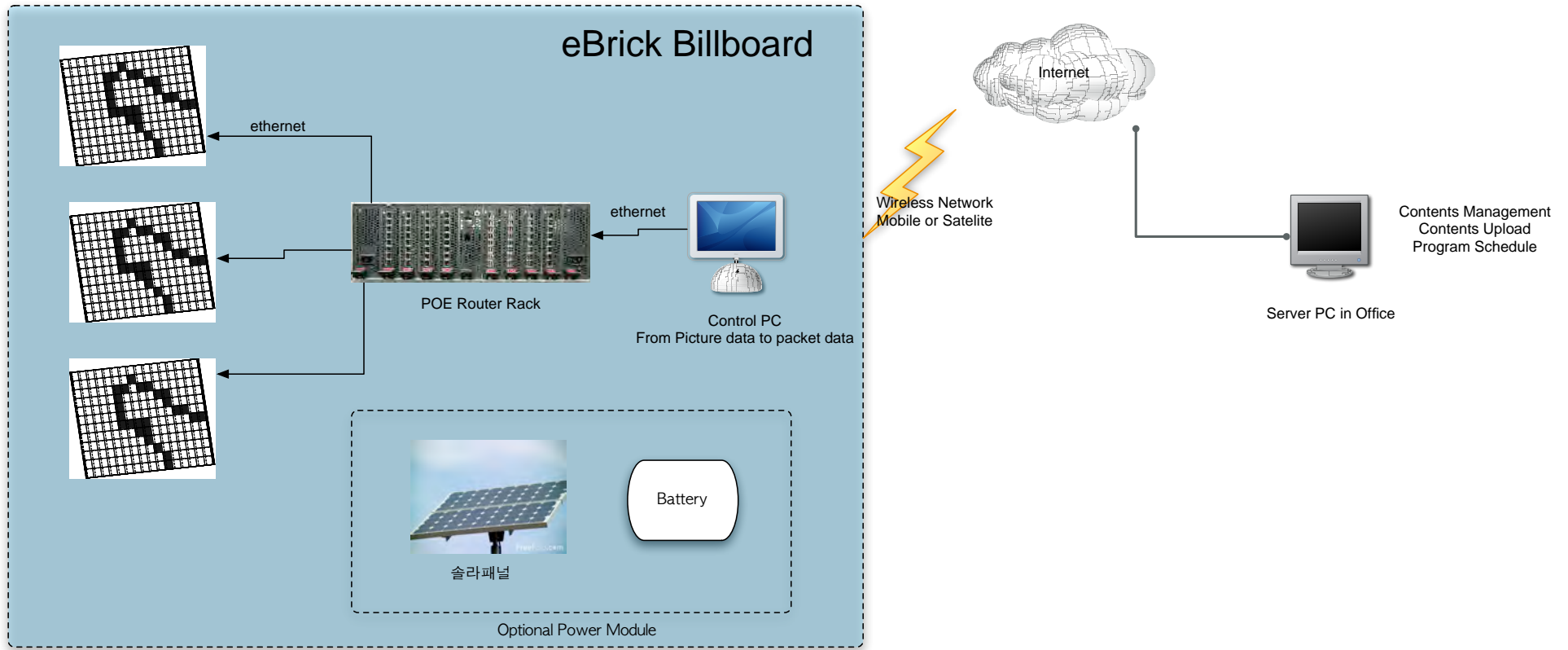


Solar Powered
e-ink
Color Billboard





Film Size	530 by 378 mm
Color filter	RGBW
Pixel Size	22 by 22mm
Resolution	24 by 16
Grayscale	8
Color	4096
Driver IC	8 DA8523



- 1 screen = 14 by 48 feet (4.26 by 14.63 m)
- Module = 310
- Resolution = 1152 by 336

Competition



Advantages over static billboard

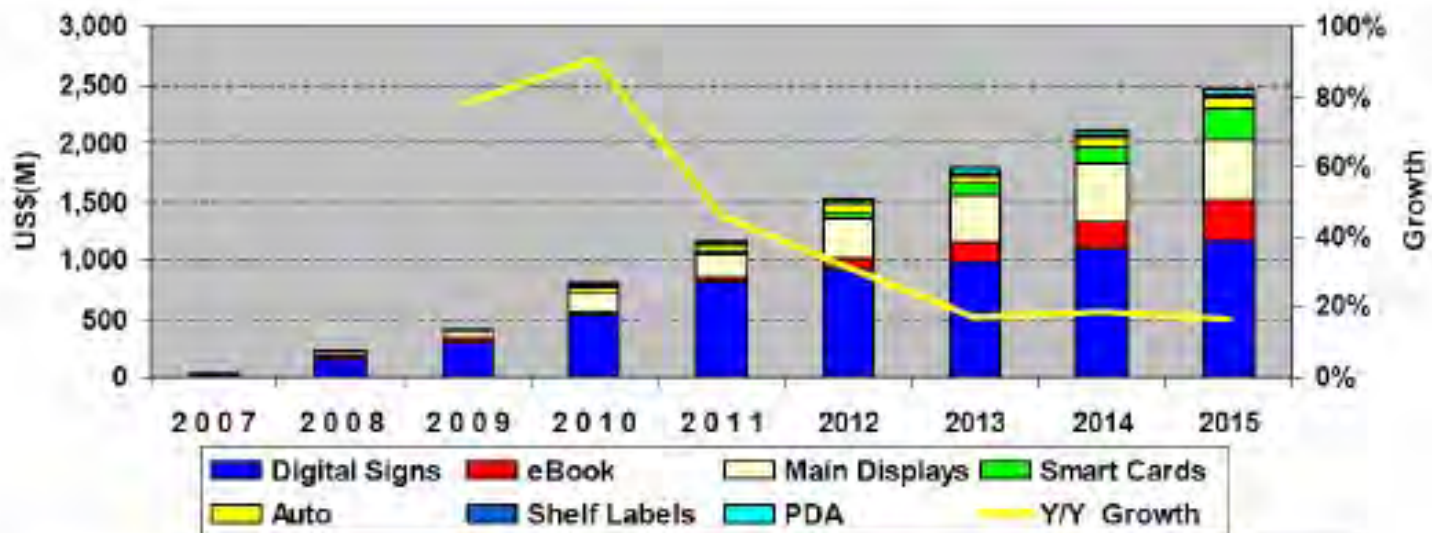
- More Revenue
 - Target Ad for Time Slot
- Less Contents upgrade cost
- More permission
 - Realtime government notification - disaster, lost child



Advantages over LED billboard

- Permission
 - Light Pollution
 - Driving distraction
- Less operating cost
 - 1/10 mostly from electricity and depreciation
- Less build cost
 - 1/2





	US\$(M)								
	2007	2008	2009	2010	2011	2012	2013	2014	2015
Digital Signs	0	155	300	529	800	915	985	1,092	1,165
eBook	15	21	20	33	58	97	157	240	346
Main Displays	10	43	65	152	194	341	421	486	523
Smart Cards	0	1	5	14	29	53	90	152	257
Auto	0	8	14	48	58	66	71	81	103
Shelf Labels	0	2	7	11	13	21	21	22	22
PDA	0	5	6	9	12	32	37	39	39
Y/Y Growth			78%	91%	46%	31%	17%	18%	16%

Sounds too good to be true.
Is it technically possible?

a) E Ink's prototype



b) Implemented with RGBW color filters



c) Bridgestone's prototype



Fig 4 E Ink Goes Color A number of particle-based type color ePaper designs are expected to go commercial in 2009 and 2010. (a) The color ePaper from E Ink, with an enlarged view (b). The RGBW color filters are visible. Bridgestone is also implementing color display using RGBW color filters (c).

Color e-ink

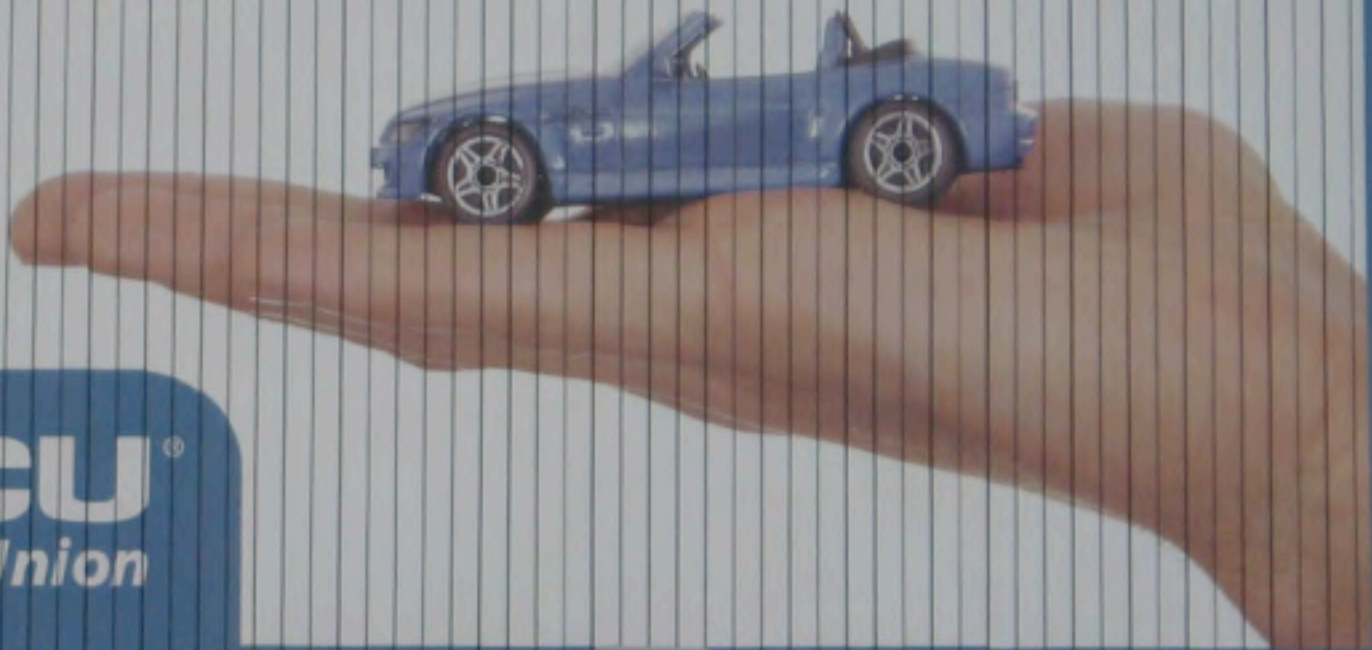
- Low brightness
- Low Contrast (20:1)
- Low Resolution
- Low switching speed
- High Price

Low Brightness, contrast

- Billboards are under the bright SUN.
- Color e-book readers will be used much darker condition.

Get a great deal on
new wheels!

NCUA



CEFCU[®]
Your Credit Union

PRENZLER

Low Resolution

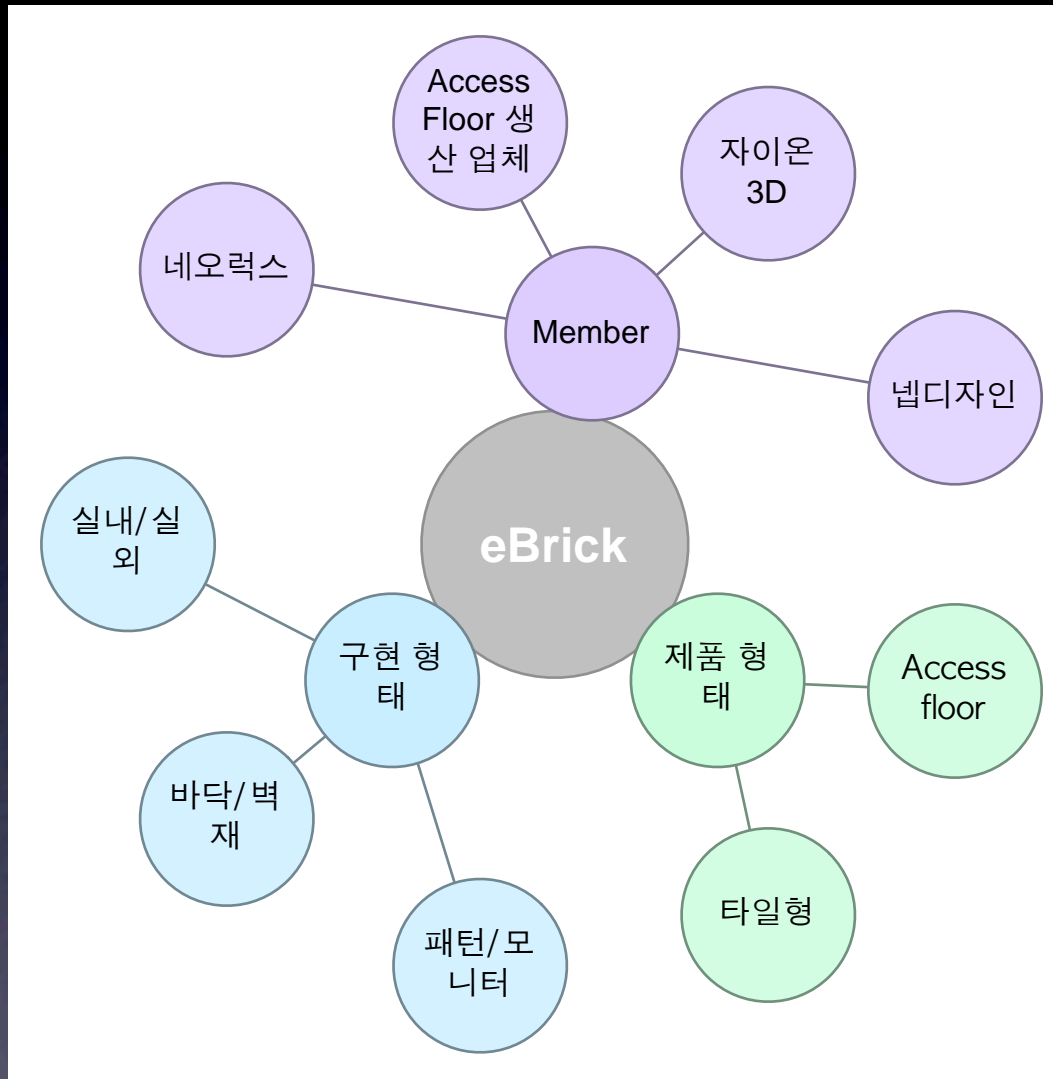
- Traditional Billboards are 2 to 20 DPI

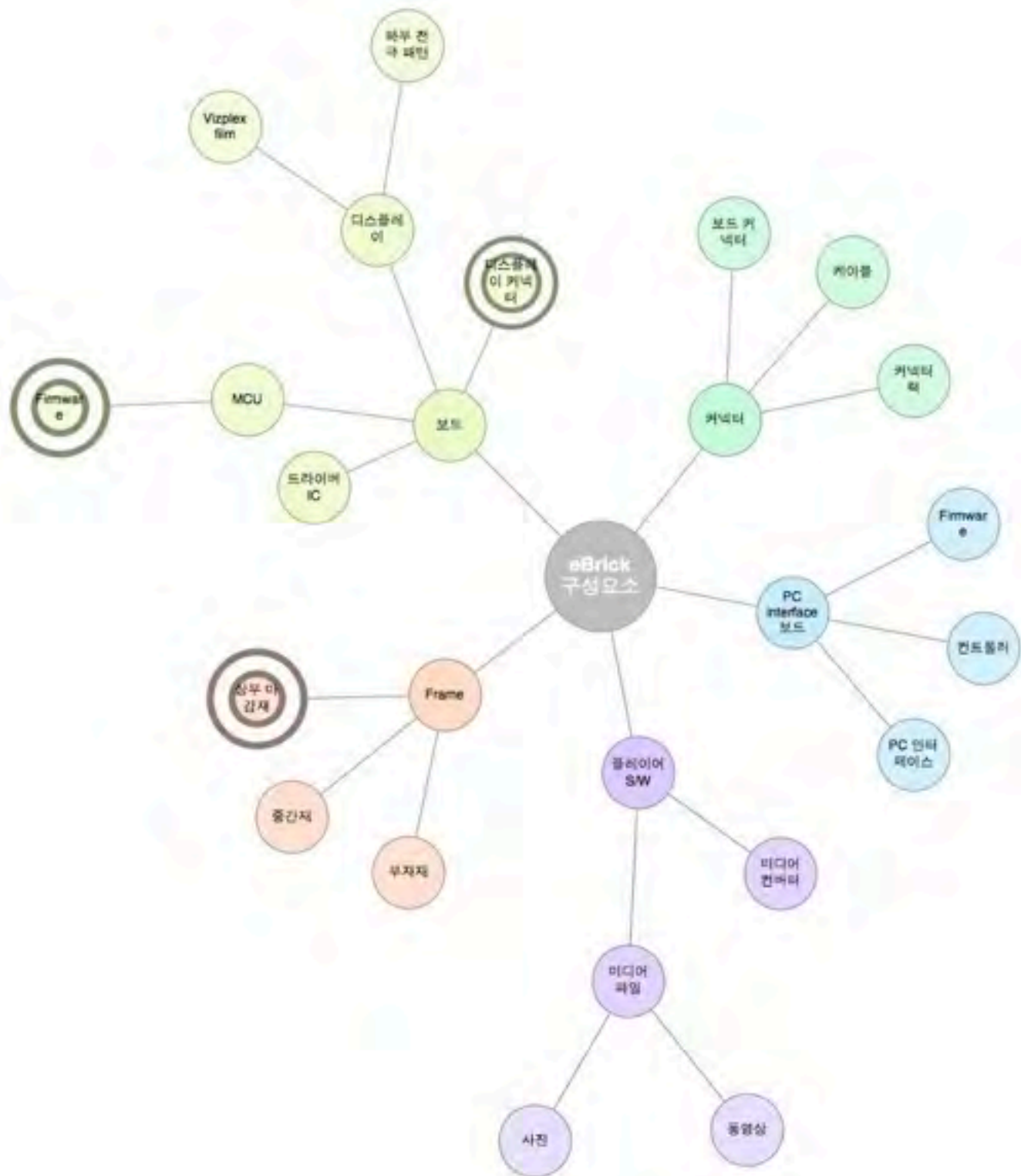
Low switching speed

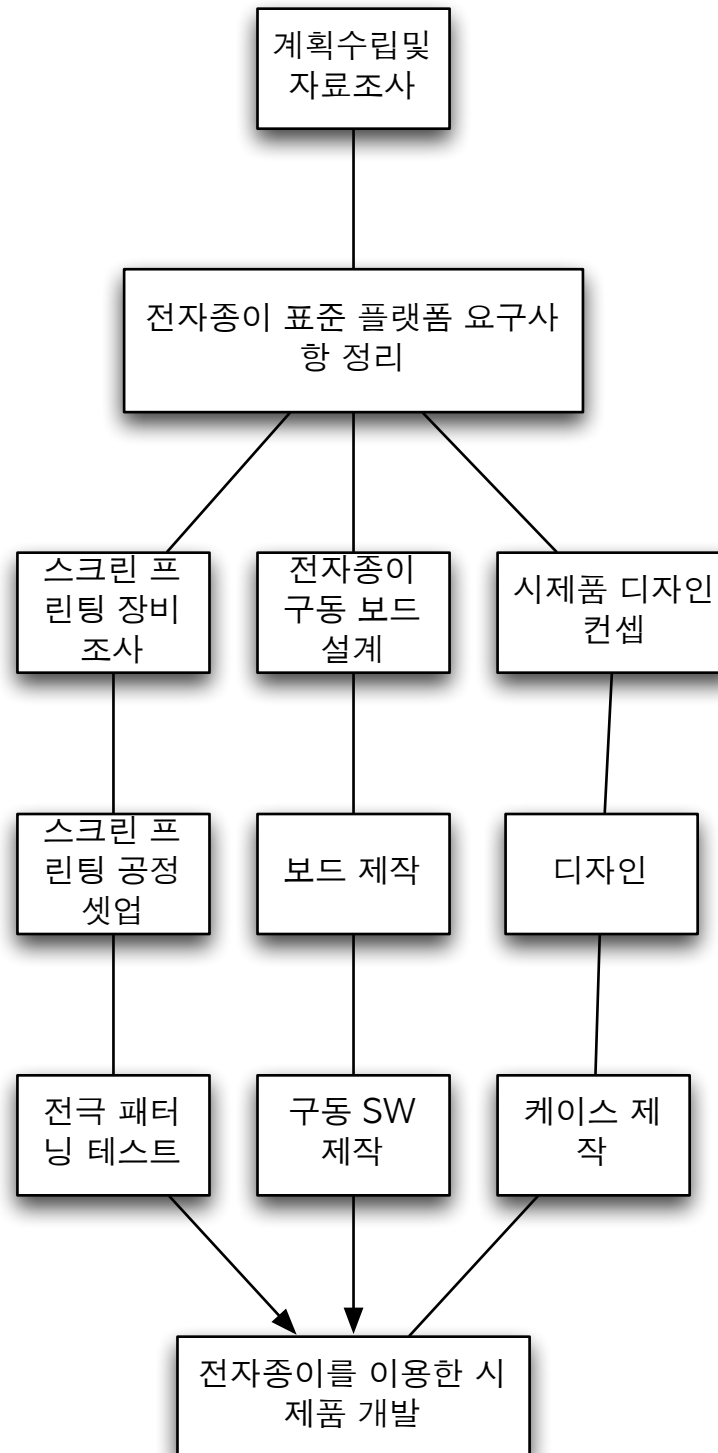
- In highway, movies are prohibited by law.
- People will see it only for a few seconds.

High Price

- Lessons from History
 - LCD price
 - LED price
 - Solar panel price







Technical Issue

- Driver IC routing
 - FPC 로 연결
 - COF (Chip on Flexible Printed Circuit, chip on film), FCOF(Flip chip on flexible printed circuit)
- Backplane material
 - PET film
 - PCB
 - FPCB
- Segmented vs Passive matrix
- Adjustment of Grayscale using time control
- Custom silicone

Risk

- e-ink로부터 판넬을 공급받을 수 있는가?
- 구동 보드 및 Backplane을 만들 수 있는가?
- 과연 사람들이 사겠는가?
 - Price
 - Aesthetics (흑백 디스플레이?)

Summary



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The End