HYCON 紘康科技
HYCON TECHNOLOGY

Company Profile

Jan., 2023

TPEx Stock no.: 6457

2007/7/9
founded

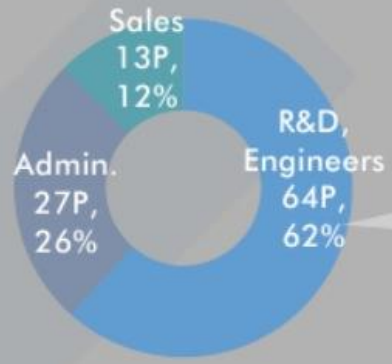
Taipei
Hsinchu
Shenzhen

Capital:
US$11.38 mil. approx.

MSP	built-in high resolution ADC platform
BMS	battery protection IC, fuel gauge IC
TP	projective capacitive touch panel IC
ASIC	digital smart sensor ASIC

Stock No.:
6457

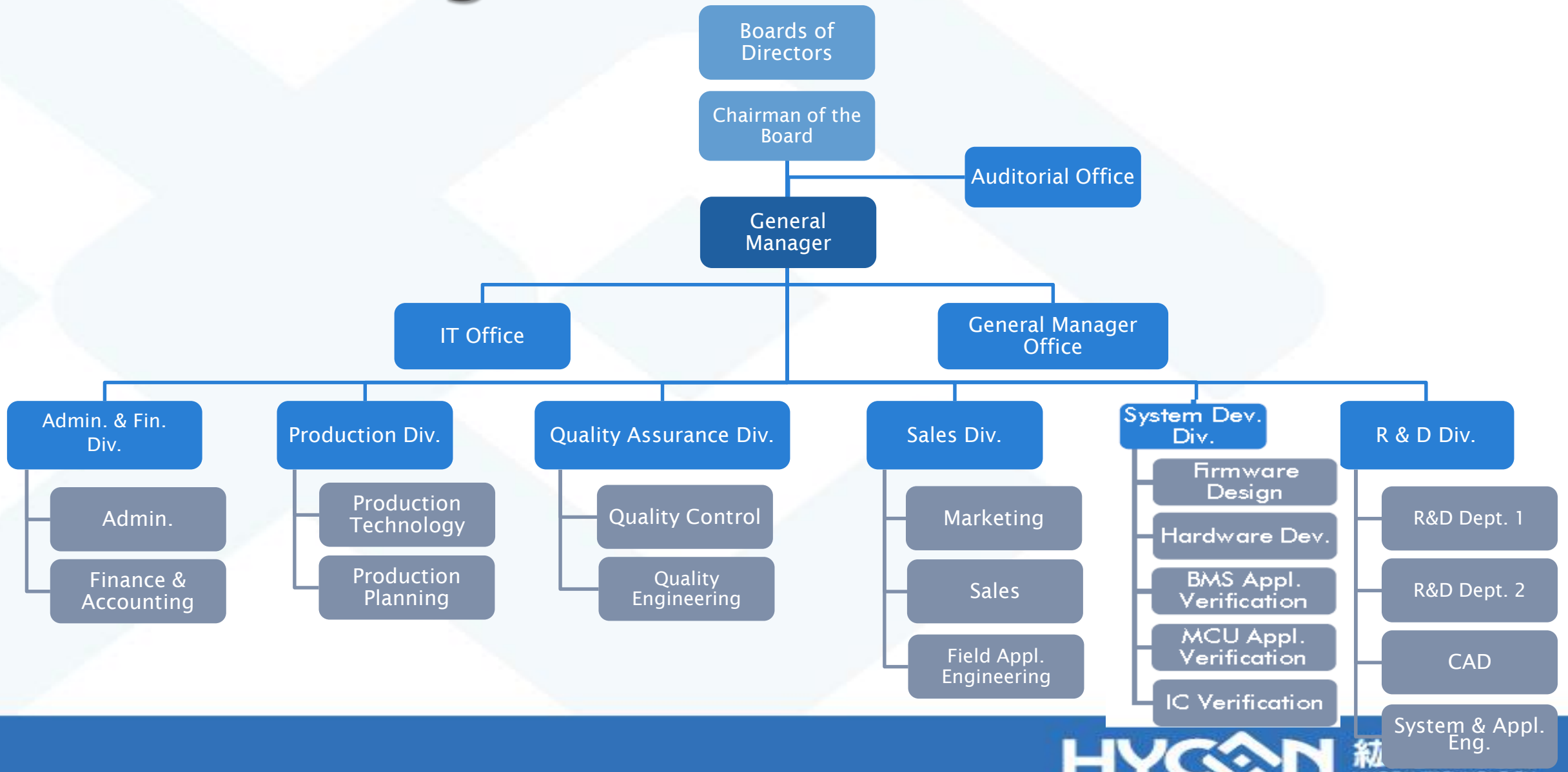
Staff:
104 Persons



Total Staff: 104P (**R&D/Engineers: 64P**)

Education Distribution	B.S. Degree	M.S. Degree		Ph.D. Degree
	39	23		2
Years of service in HYCON	< 3-Y	3~6 Ys	7~10 Ys	> 10-Y
	15	18	15	16

Organizational Chart



Mission and Value

Innovative Thinking

Sticking to Commitment

Persevering Quality Advancement

Encouraging Challenges

Corporate Social Responsibility

Environmental Protection

ISO9001 quality certification obtained, promised not to use hazardous substances and conflict minerals …

Caring for Employees

Value employee benefits, having reasonable and transparent evaluation system

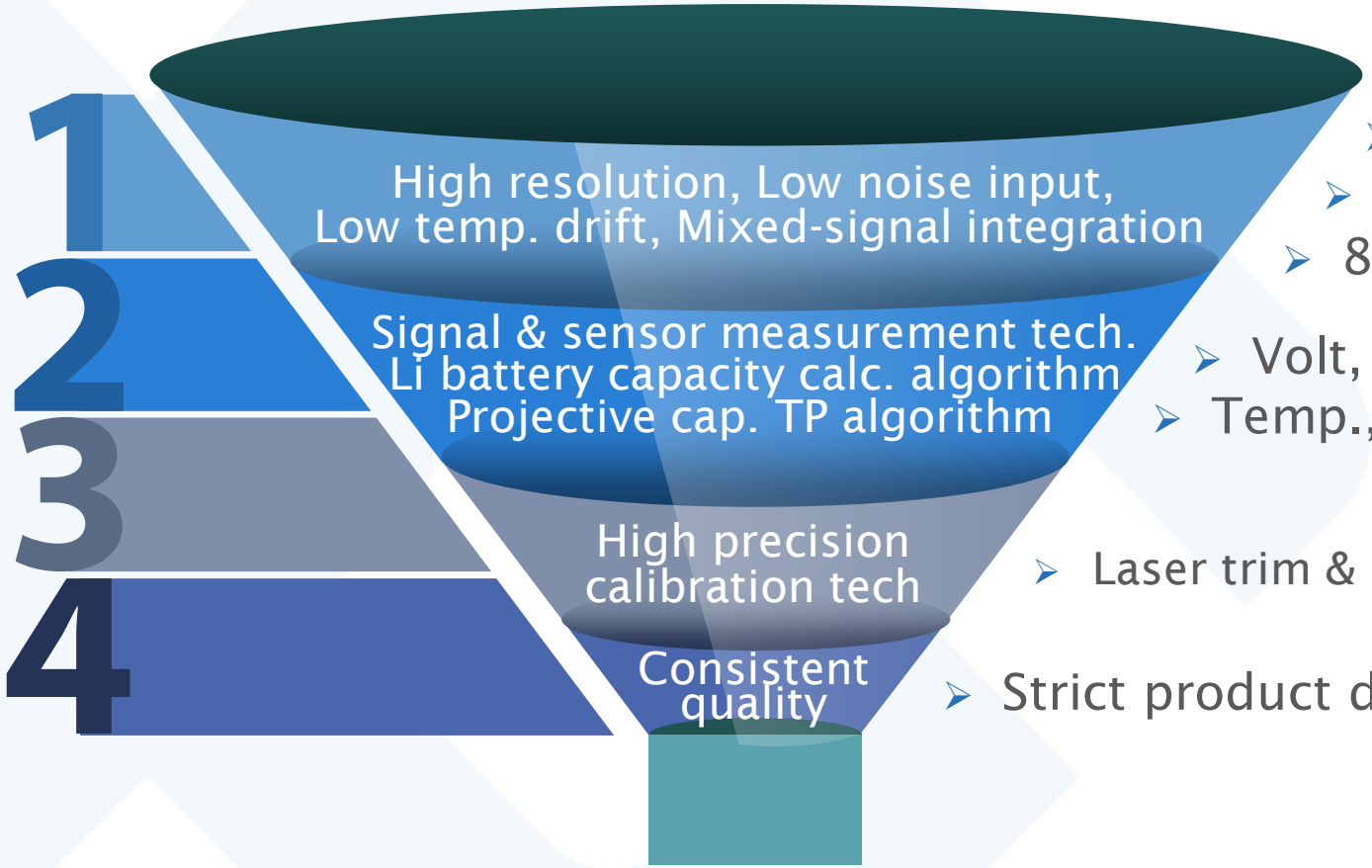
Value Shareholders

Long-term commitment to shareholders, creating win-win situation

Social Welfare

Actively participate in helping out underprivileged groups and charity donation..

Leader in High Precision Measurement IC



- 20-b ENOB ADC
- 50nV tiny signal resolution
- < 5ppm/℃ ADC gain drift
- 8/32-bit MCU integration
- Volt, current, resistor, capacitor, freq..
- Temp., pressure, weight, electrochemistry..
- Laser trim & offset compensation, deviation <0.5%
- Strict product design & production flow

Significant Milestone

2010 — **Profit-making year**

2012 — **MSP w/high resolution ADC** cumulative shipments **>100MM** pcs

2015 — **TPEx listed,** Stock no.: **6457**

2017 — **TP product spec** passed **SONY PS4 gaming controller certification**

2018 — **Digital sensor products** cumulative shipments **>10MM** pcs

2019 — Quality well-recognized by the supply chain of **leading brand customers**. **32-bit Andes CPU core products** cumulative shipments **>10KK** pcs

2020 — **Li battery protection IC** monthly shipments **>50KK** pcs; **MSP w/high resolution ADC** yearly shipments **>100KK** pcs; **Sales Revenue > 1 bn $NTD**

2021 — **Li battery protection IC** cumulative shipments **>4.3 bn** pcs; **32-bit Flash MCU** cumulative shipments **>20KK** pcs; **EPS >10 $NTD**

R&D Achievement

- High precision ADC
- 8-bit & 32-bit MCU
- Domestic healthcare electronic platform
- Digital sensor measurement platform
- Li battery protection & gauge solution
- High sensitivity and anti-interference touch panel solution
- Developing C complier platform to support 8-bit CPU Core

Honesty/ Quality/ Service/ Professional

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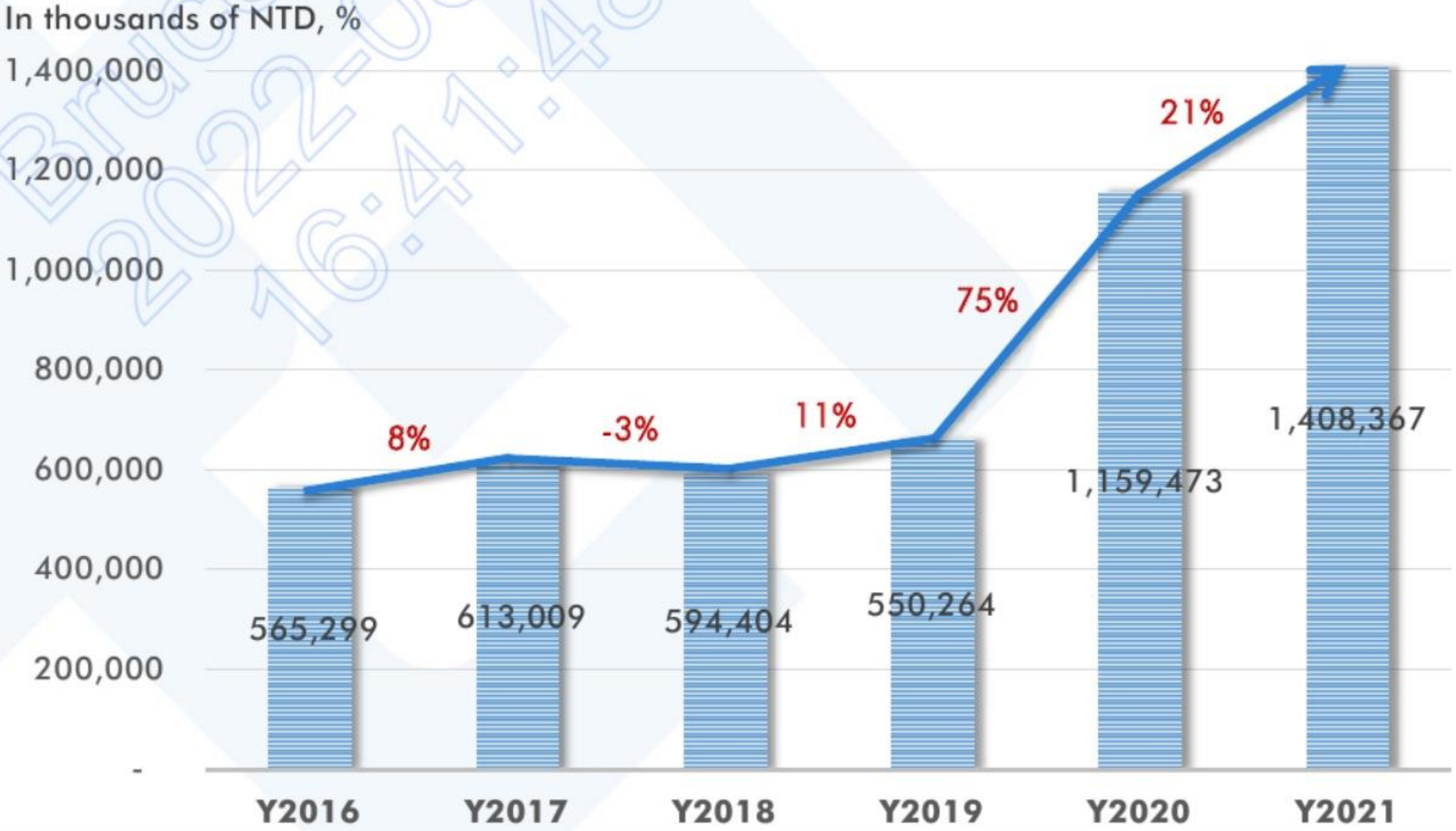
Sales Revenue



Product Applications

Healthcare Electronics

Electronic Scales

Instrumentation

Product Applications

Digital Sensor

Li Battery and Gauge

Touch Panel

Customer and Brand

Industrial Partnership

R&D

· Andes Technology Corporation
· eMemory Technology Inc.

Foundry

· United Microelectronics Corporation
· Wavetek Microelectronics Corporation

Test and Assembly

· Ardentec Corp.
· Greatek Electronics Inc.
· Hana Microelectronics Public Co., Ltd.
· Ningbo Liyuan Science And Technology Co., Ltd.
· Orient Semiconductor Electronics, Ltd.
· SiBASE Technology Co., Ltd.
· Vate Technology Co., Ltd.
· YoungTek Electronics Corp.

Business Cooperation

· Distributors
· Third Parties

IP Provider

Photomask & Wafer Fabrication

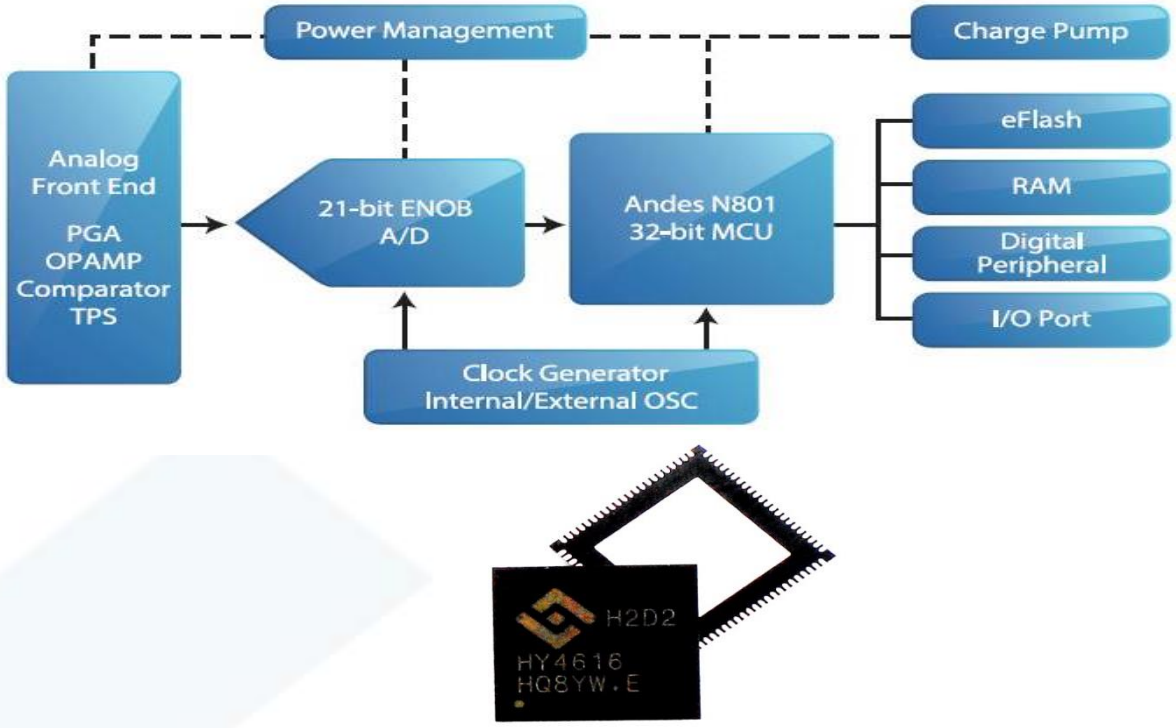
Wafer test, Assembly, Assembly test

Customer service and support

Projected Capacitive touch Controller IC Introduction

Why use Hycon’s touch controller ICs

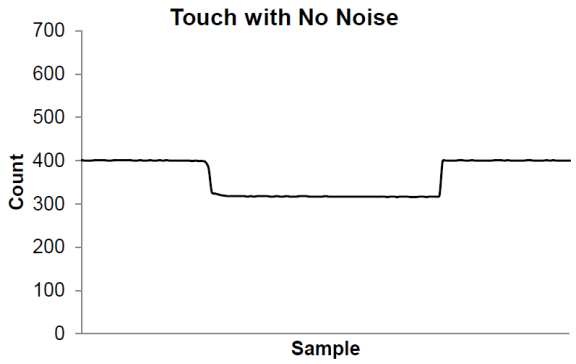
- HYCON has brought more devices to successful production.
- HYCON has a lot of application and experience in the little signal processing , so we can solve the noise problem more efficiently on touch solutions.
- HYCON has not only the most advanced touch solution,also the most mature.
- HYCON has the most complete analysis and development tools and mature manufacturing test tools.
- HYCON holds an open and flexible technical support attitude and a customer-centric service attitude.

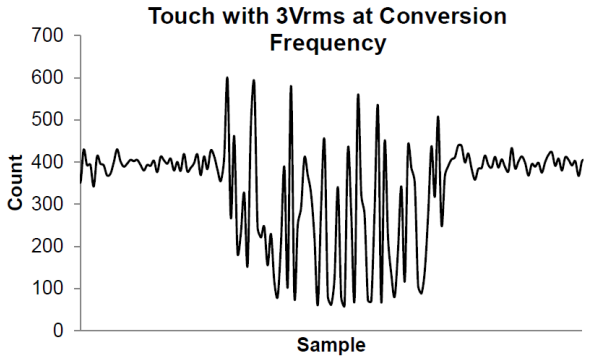


Major Clients

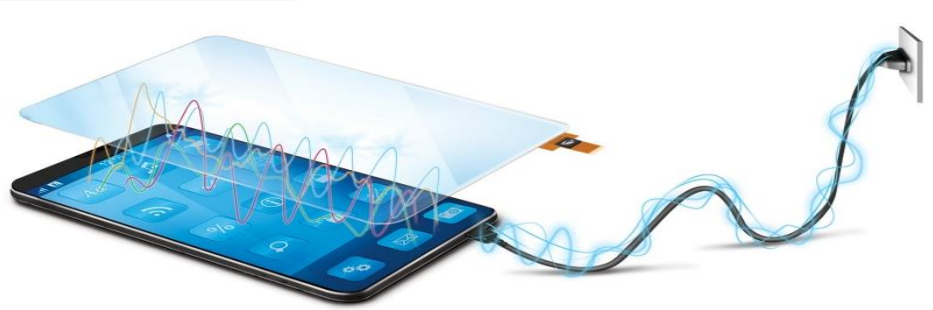
Hycon touch controller IC application category

Hycon touch unique noise immunity technology





A touchscreen device can be subject to many different noise sources, both internal and external, in a given day. **Charger** and **display** noise are two of the most common and problematic noise sources today. As devices get thinner and noisier chargers enter the market, these challenges will only become tougher to manage. Additionally, many other everyday items can generate noise that causes interference, including radio signals, AC mains, and even fluorescent light ballasts. In the presence of noise, the positions reported by low-performance capacitive touch systems will be distorted impacting accuracy and reliability.



Hycon Touch BREAKTHROUGH NOISE-IMMUNITY SOLUTIONS

- Touchscreens have historically been plagued by two major noise sources: charger noise and display noise. Hycon touch eliminates these noise challenges in most efficient way.
- Figure 1 is showed Hycon touch controller performance analysis. The noises are measured on **different driver frequency**, even we calculate touch performance for RMS Noise and SNR on driver frequency band **each 1KHz**.
- We use **high precision ADC measurement technology**. It can get the characteristic of the narrow band frequency noise.
- Hycon has unique debug tool that can easy analyze the noise disturbance problem and be solved easily.

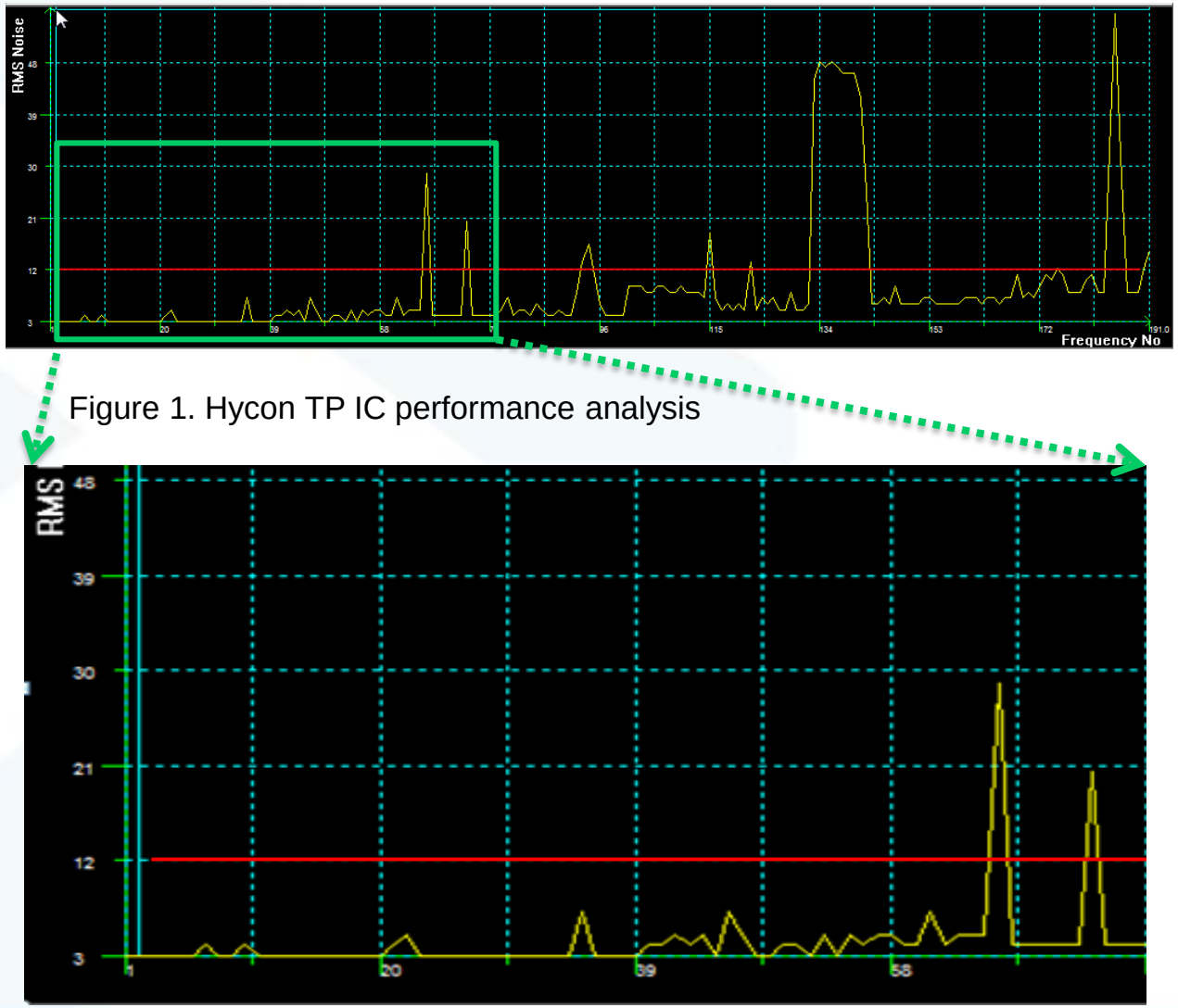
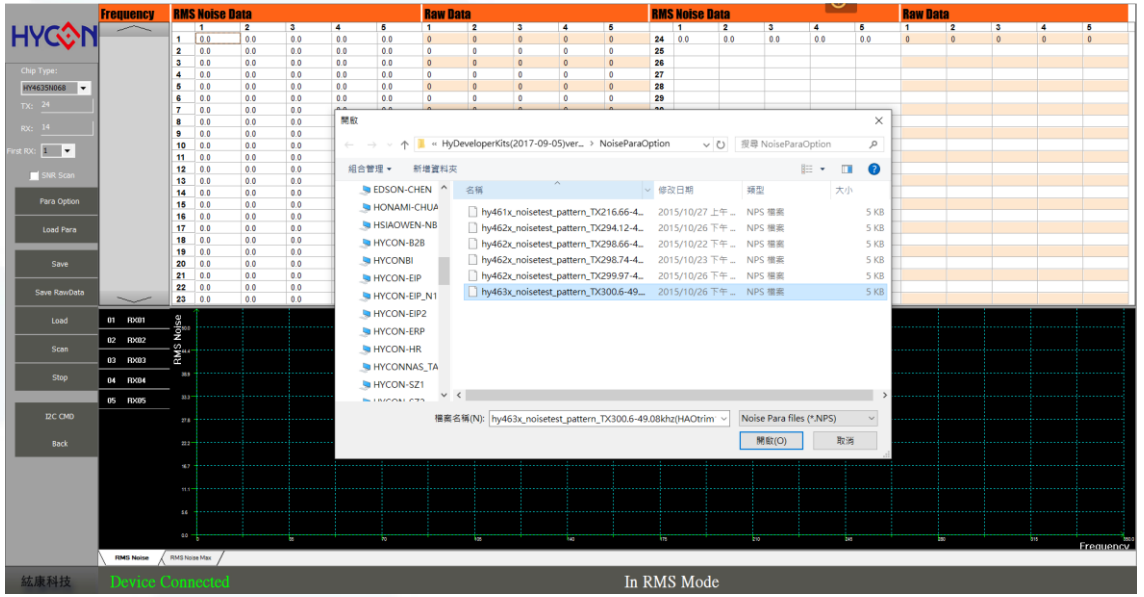
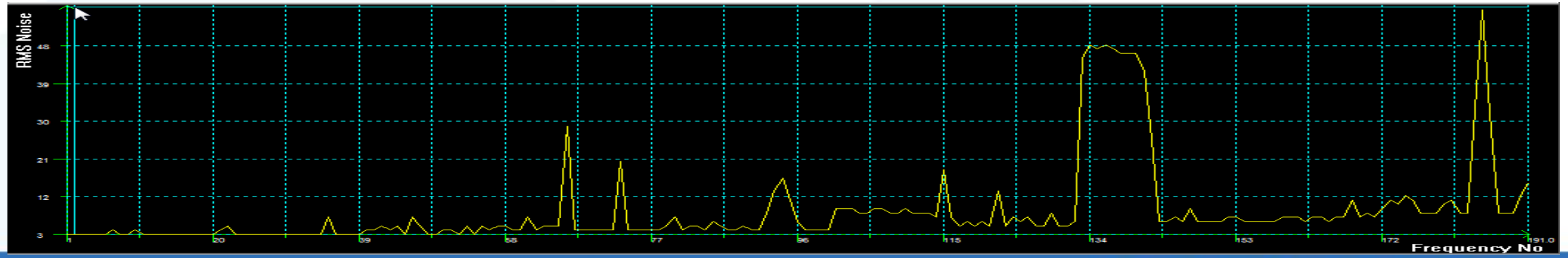


Figure 1. Hycon TP IC performance analysis

Hycon touch analyzing tool





Hycon Touch Overview 1

- The HY461xB and HY462x Series ICs are single-chip capacitive touch panel controller ICs with a built-in 32-bit Micro-controller unit (MCU).
- They adopt the mutual capacitance approach, which supports true multi-touch capability. In conjunction with a mutual capacitive touch panel, these touch controller ICs has user-friendly input functions, and embedded flash memory.
- The touch solution supports IIC interface for most of the devices as cellular phone, e-book, tablet, portable devices.

Model Name	Panel		Package			Touch Panel Size	Status
	TX	RX	Type	Pin	Size		
HY4613B-N048	21	12	QFN	48	6mm*6mm	≤ 5.3"	M/P
HY4614B-N068	28	16	QFN	68	8mm*8mm	≤ 10.1"	M/P

Model Name	Panel		Package			Touch Panel Size	Status
	TX	RX	Type	Pin	Size		
HY4621-NS32	13	9	QFN	32	4mm*4mm	≤ 5.0"	M/P
HY4623-NS48	24	12	QFN	48	5mm*5mm	≤ 7.0"	M/P

HY461xB & HY462x series Touch IC Key Features

Features and Specifications

- Multi-touch with up to 11 touches supported
- High touch report rate (>100Hz)
- Finger pinch separation <12mm ,base on sensor pitch
- High Accuracy and Linearity
- Unintended touch rejection
- Operation under the water smoke
- Supports stylus operation
- Supports thick cove lens <4mm
- Not only COF, also chip on board supported
- The automatic environment compensation function.

Hycon Touch Overview 2

HY463x(B) series accommodate a wide range of applications with a set of buttons up to a 2D touch sensing device, their typical applications as listed below.

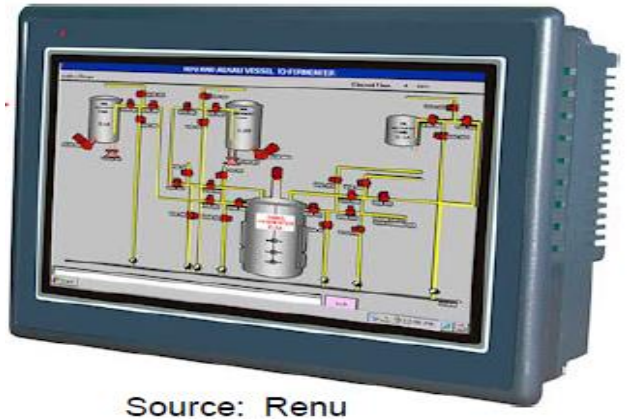
- Industrial Touch PPC & HID
- Household appliances
- Navigation systems, GPS
- Fitness equipment
- Car applications

Model Name	Panel		Package			Touch Panel Size	Status
	TX	RX	Type	Pin	Size		
HY4633-N048	21	12	QFN	48	6mm*6mm	< 5.3"	M/P
HY4635-N068	28	16	QFN	68	8mm*8mm	7”~10.1"	M/P

HY463x(B) series Touch IC Key Features

Features and Specifications.

- Multi-touch with up to 11 touches supported
- Supports thick cover lens<**10mm**
- Operation with gloved finger
- Waterproof function including salt water
- Immune to power and LCD noise Interferences
- Supports auto-calibration function to prevent environmental variations
- Classifying and rejecting unintended touch, e.g., a resting hand on the screen
- Realize touch screen, buttons and proximity
- Operating temperature range: -40˚C to +85˚C



Source: Renu

Hycon Touch Overview 3

HY4658 accommodate a wide range of applications with a set of buttons up to a 2D touch sensing device, their typical applications as listed below.

- Industrial Touch PPC & HID
- Household appliances
- Entertainment devices
- Car applications
- POS (Point of Sales) devices

Model Name	Panel		Package			Touch Panel Size	Status
	TX	RX	Type	Pin	Size		
HY4658-L128	50	30	LQFP	128	14mm*14mm	10.1” < 15.6"	M/P

Comparison List

IC type	Max. Points	Report Rate	Thickness Cover Lens	Glove	Stylus tip	Waterproof	Palm rejection	Unexpected rejection	Auto Calibration	Operation temperature	ESD immunity	Interference immunity
HY461x series	11	60HZ-120Hz	0.3mm-4.0mm	<2.0mm	<4mm	Light spray	Yes	Yes	Yes	-20˚C to +70˚C	Yes	Yes
HY462x series	11	60HZ-200Hz	0.3mm-4.0mm	<2.0mm	<4mm	Light spray	Yes	Yes	Yes	-40˚C to +85˚C	Yes	Yes
HY463x series	11	60HZ-120Hz	0.3mm-8.0mm	<5.0mm	<2mm	Glob *salt water	Yes	Yes	Yes	-40˚C to +85˚C	Yes	Yes

Chip Solution		HY4633-N048	HY4635-N068	HY4633B-N048	HY4635B-N068	HY4658-L128
TX Driving Voltage		5V	5V	5V	5V	5V/9V
Channels of Chip		TX:21 channel RX: 12 channel	TX:28channel RX: 16 channel	TX:21 channel RX: 12 channel	TX:28channel RX: 16 channel	TX:50 channel RX: 30 channel
Touch Panel Size		up to 6"	up to 10"	up to 6"	up to 10"	up to 15"
Package size		QFN(6X6X0.75mm)	QFN(8X8X0.76mm)	QFN(6X6X0.75mm)	QFN(8X8X0.75mm)	LQFP(14X14X0.75mm)
Interface	Single Chip	IIC	IIC	IIC	IIC	IIC
	With HY9601-N020	USB	USB	USB	USB	USB
ESD:IEC 61000-4-2		Level 4(Max Level) Air : +-15KV; Contact : +-8KV	Level 4(Max Level) Air : +-15KV; Contact : +-8KV	Level 4(Max Level) Air : +-15KV; Contact : +-8KV	Level 4(Max Level) Air : +-15KV; Contact : +-8KV	Level 4(Max Level) Air : +-15KV; Contact : +-8KV
CS(Conductive Susceptibility): IEC 61000-4-6		Level 3(Max Level) 150KHz-80MHz:10Vrms	Level 3(Max Level) 150KHz-80MHz:10Vrms	Level 3(Max Level) 150KHz-80MHz:10Vrms	Level 3(Max Level) 150KHz-80MHz:10Vrms	Level 3(Max Level) 150KHz-80MHz:10Vrms
RS(Radiated Suscepetibility): IEC 61000-4-3		Level 4(Max Level) 80MHz-1GHz:30V/m	Level 4(Max Level) 80MHz-1GHz:30V/m	Level 4(Max Level) 80MHz-1GHz:30V/m	Level 4(Max Level) 80MHz-1GHz:30V/m	Level 4(Max Level) 80MHz-1GHz:30V/m
EFT:IEC 61000-4-4		Level 4(Max Level) AC Power line:4KV I/O Port:2KV	Level 4(Max Level) AC Power line:4KV I/O Port:2KV	Level 4(Max Level) AC Power line:4KV I/O Port:2KV	Level 4(Max Level) AC Power line:4KV I/O Port:2KV	Level 4(Max Level) AC Power line:4KV I/O Port:2KV
CG Thickness		up to 8mm	up to 8mm	up to 10mm	up to 10mm	up to 8mm
Glove Thickness		up to 4mm	up to 4mm	up to 5mm	up to 5mm	up to 4mm
Palm Rejection		Yes	Yes	Yes	Yes	Yes
Automatic environmental compensation		Yes	Yes	Yes	Yes	Yes
Water proof	Spraying fresh water/Saline	Single-touch based	Single-touch based	2 fingers are allowed	2 fingers are allowed	2 fingers are allowed
	Spraying Salt water 3.5%/Salt water 5%	Single-touch based	Single-touch based	Single-touch based	Single-touch based	Single-touch based
	Pooling fresh water/Saline	No false touches	No false touches	No false touches 1 finger is allowed	No false touches 1 finger is allowed	No false touches 1 finger is allowed
	Pooling Salt water 3.5%/Salt water 5%	No false touches	No false touches	No false touches	No false touches	No false touches
	Writing with Sprayling condition (1 finger touch)	No interruptions; no jagged lines(false touches)	No interruptions; no jagged lines(false touches)	No interruptions; no jagged lines(false touches)	No interruptions; no jagged lines(false touches)	No interruptions; no jagged lines(false touches)
	Writing with pooling condition (1 finger touch)	Interruptions and jagged lines,but no false touches	Interruptions and jagged lines,but no false touches	Interruptions and jagged lines,but no false touches	Interruptions and jagged lines,but no false touches	Interruptions and jagged lines,but no false touches
Report Rate	Normal environment	80Hz	70Hz	80Hz	70Hz	80Hz
	Special environment	up to 50Hz	up to 40Hz	up to 70Hz	up to 60Hz	60Hz
OS Supported		Win, Andriod, Linux	Win, Andriod, Linux	Win, Andriod, Linux	Win, Andriod, Linux	Win, Andriod, Linux
Active pen supported		Can be matched with EM pen solution	Can be matched with EM pen solution	Can be matched with EM pen solution	Can be matched with EM pen solution	Can be matched with EM pen solution

EMC test report

QuieTek
DEKRA company

Conductive Susceptibility Measurement Results

Applicant:	紘康科技	Data Sheet:	
EUT:	Touch Controller IC	Date of Measurement:	2016/11/15
Input Voltage	230V, 50Hz	Temperature:	23 ℃
Test Mode:	Touch Controller IC:HY4614B-N068 LCM:EP0700M12	Humidity:	51 %

Standard : Test Site : ■ SR6 , □ SR12

Modulation : ■ AM 80 % 1 KHz , □ PM 1Hz (0.5s ON , 0.5s OFF) , Other □

Frequency Range (MHz)	Test Voltage (V)	Inject Method	Complied to Criteria
0.15-80	10	CDN - AC IN	■ A, □ B, □ C, □ D
		CDN -	□ A, □ B, □ C, □ D
		CDN -	□ A, □ B, □ C, □ D
		CDN -	□ A, □ B, □ C, □ D
		CDN -	□ A, □ B, □ C, □ D
		CDN -	□ A, □ B, □ C, □ D
		CDN -	□ A, □ B, □ C, □ D
		CDN -	□ A, □ B, □ C, □ D

Frequency Range (MHz)	Test Voltage (V)	Inject Method	Complied to Criteria
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D
		Clamp -	□ A, □ B, □ C, □ D

Remark : Criteria A

*測試手法爲每段頻率手指進行單指畫線動作。
*測試判定標準:測試過程中劃線正常並無任何誤報點情況。

Measurement Equipment:

Operator Signed: Fran

QuieTek
DEKRA company

RF Field Strength Susceptibility Measurement Results

Applicant:	紘康科技	Data Sheet:	
EUT:	Touch Controller IC	Date of Measurement:	2016/11/15
Input Voltage:	AC230V , 50Hz	Temperature:	24 ℃
Test Mode:	Touch Controller IC:HY4614B-N068 LCM:EP0700M12	Humidity:	48 %

Standard : Test Site : ■ CB5 , □

Modulation : ■ AM 80 % 1 KHz , □ PM 1Hz (0.5s ON , 0.5s OFF) , Other □

Frequency Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/M)	Complied to Criteria
80-3000	0°	H	10	■ A, □ B, □ C, □ D
80-3000	90°	H	10	■ A, □ B, □ C, □ D
80-3000	180°	H	10	■ A, □ B, □ C, □ D
80-3000	270°	H	10	■ A, □ B, □ C, □ D
80-3000	0°	V	10	■ A, □ B, □ C, □ D
80-3000	90°	V	10	■ A, □ B, □ C, □ D
80-3000	180°	V	10	■ A, □ B, □ C, □ D
80-3000	270°	V	10	■ A, □ B, □ C, □ D
	0°	H		□ A, □ B, □ C, □ D
	90°	H		□ A, □ B, □ C, □ D
	180°	H		□ A, □ B, □ C, □ D
	270°	H		□ A, □ B, □ C, □ D
	0°	V		□ A, □ B, □ C, □ D
	90°	V		□ A, □ B, □ C, □ D
	180°	V		□ A, □ B, □ C, □ D
	270°	V		□ A, □ B, □ C, □ D
	0°	H		□ A, □ B, □ C, □ D
	90°	H		□ A, □ B, □ C, □ D
	180°	H		□ A, □ B, □ C, □ D
	270°	H		□ A, □ B, □ C, □ D
	0°	V		□ A, □ B, □ C, □ D
	90°	V		□ A, □ B, □ C, □ D
	180°	V		□ A, □ B, □ C, □ D
	270°	V		□ A, □ B, □ C, □ D

Remake : Criteria A Pass

Measurement Equipment:

Operator Signed: Chi Fan

QuieTek
DEKRA company

Electrical Fast Transient/Burst Measurement Ressults

Applicant:	紘康科技	Data Sheet:	
EUT:	Touch Controller IC	Date of Measurement:	2016/11/8
Input Voltage:	230V , 50Hz	Temperature:	22 ℃
Test Mode:	Touch Controller IC:HY4614B-N068 LCM:EP0700M12	Humidity:	50 %

Standard : Test Site : □ SR3 , ■ SR6

Repetition frequency : □ 5KHz , ■ 100KHz , Other □

Inject Line	Voltage (KV)	Inject Time(s)	Inject Method	Complied to Criteria
L	±1	60	Direct	■ A, □ B, □ C, □ D
N	±1	60	Direct	■ A, □ B, □ C, □ D
L-N	±1	60	Direct	■ A, □ B, □ C, □ D
L	±4	60	Direct	■ A, □ B, □ C, □ D
N	±4	60	Direct	■ A, □ B, □ C, □ D
L-N	±4	60	Direct	■ A, □ B, □ C, □ D
			Direct	□ A, □ B, □ C, □ D
			Direct	□ A, □ B, □ C, □ D

Inject Line	Voltage (kV)	Inject Time(s)	Inject Method	Complied to Criteria
			Clamp	□ A, □ B, □ C, □ D
			Clamp	□ A, □ B, □ C, □ D
			Clamp	□ A, □ B, □ C, □ D
			Clamp	□ A, □ B, □ C, □ D
			Clamp	□ A, □ B, □ C, □ D
			Clamp	□ A, □ B, □ C, □ D
			Clamp	□ A, □ B, □ C, □ D
			Clamp	□ A, □ B, □ C, □ D

Remark : Criteria A Pass

測試完後，在測試Touch Panel功能正常。

Measurement Equipment:

Operator Signed: Nordy

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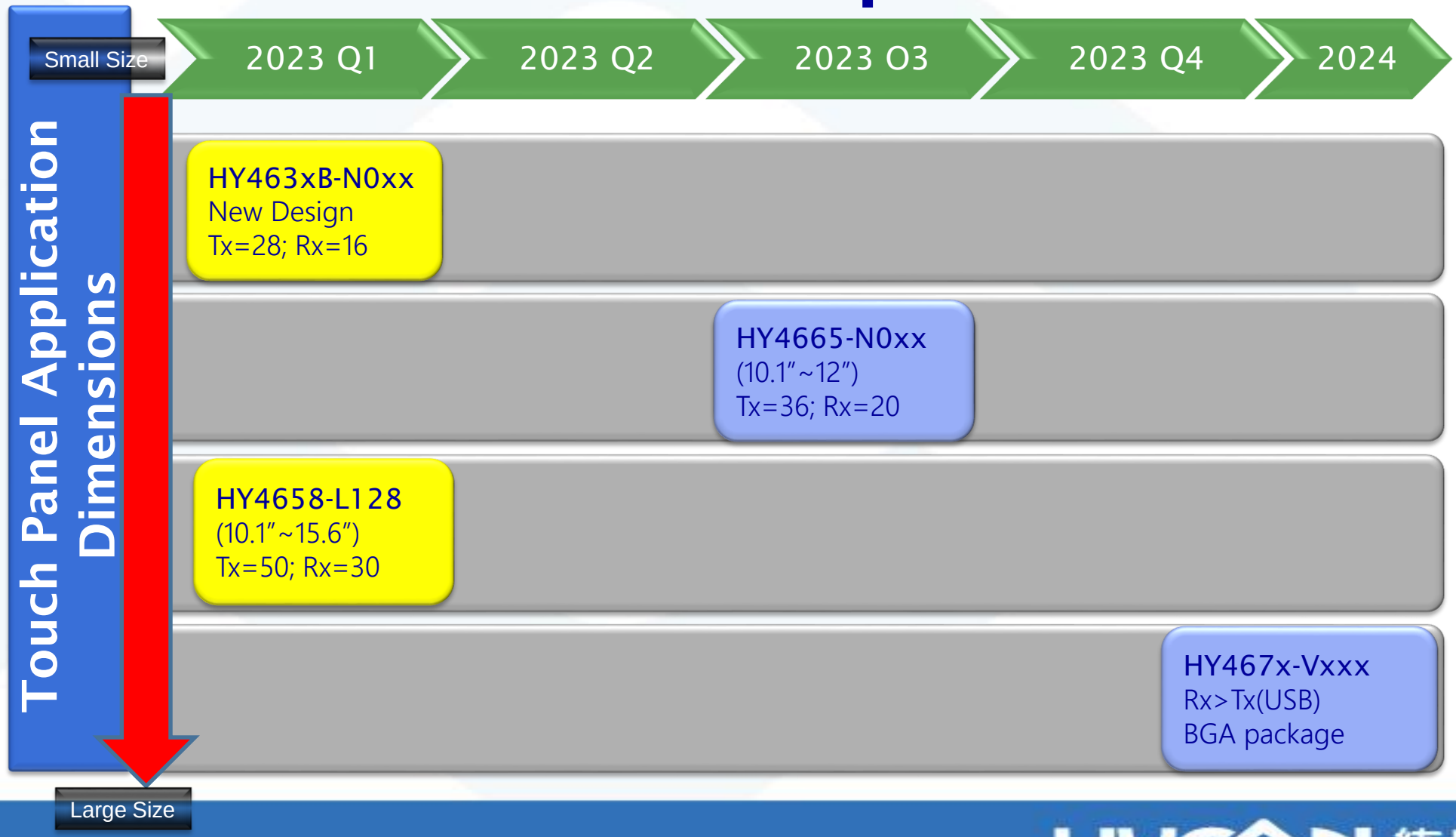
2023 Touch IC product roadmap

2023.03

Bruce Wang

2023 Touch Controller IC Roadmap



HY463xB series Touch IC
Key Features

Features and Specifications:

- Multi-touch with up to 10 touches supported
- Support thick cover lens touch screen application <10mm
- Operate with gloves of various materials
- Waterproof function including salt water
- Increase the ability of hardware to deal with interference: solve power and LCD noise interference
- Solve the problem of low reporting rate due to interference problems
- Support automatic calibration function to prevent misoperation caused by environmental changes
- Strengthen the adaptability of IIC communications
- Strengthen the tolerance to sensor production

HY466x series Touch IC
Key Features

Features and Specifications:

- TX:36 / RX:20 Multi-touch with up to 10 touches supported
- The touch control IC that fills in the application of 10.1"-11" touch screen
- Support touch screen impedance compensation to solve the problem of uneven impedance of touch modules on the production line
- Effectively solve the interference problem caused by the power supply
- Expand the memory size and add customized algorithms flexibly
- Enhance computing efficiency and ensure that the reporting rate can reach more than 100HZ
- Wider working frequency(ex: up to 400K hz)
- More stable communication adaptability
- Self-Mutual Capacitance Improves (Salt) Water proof effect
- QFN68 package; If necessary, the QFN52 package will be evaluated
- Operating temperature range: -40°C to +85°C

HY467x **series** Touch IC
Key Features

Features and Specifications:

- Support multi-touch screen applications
- Multi-chip or Single chip support to 21"~32"
- Preliminary evaluation of the number of channels 96 RX and 58 TX.
- TX is a high-voltage process, which can support up to 18V
- BGA type package:BGA200(9mm*9mm*1mm)
- IIC/USB(2.0 full speed)/UR communication interface
- Expected TX operating frequency can be 200K-500K Hz
- Operating temperature range: -40°C to +85°C

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Thank you!
Q & A