RISE

ABOVE

THE

NOISE

SILENCE THE COMPETITION WITH THE
UNMATCHED NOISE IMMUNITY OF

CYPRESS TRUETOUCH®
TOUCHSCREEN SOLUTIONS

CYPRESS

PERFORM

WE TOOK NOISE OUT OF THE EQUATION

SO YOUR DESIGNS CAN BE HEARD CLEARLY IN THE MARKET.

REVOLUTIONARY TrueTouch TOUCHSCREEN CONTROLLERS DELIVER GAME-CHANGING NOISE IMMUNITY, PERFORMANCE, AND INNOVATION.

The world is a noisy place. Battery chargers, radio transmitters, LCDs, and other sources can generate enough noise to wreak havoc with capacitive touchscreen designs.

And the touchscreen world is demanding thinner, more elegant designs, making noise an ever bigger challenge moving forward.

Fortunately, Cypress TrueTouch® touchscreen solutions get noise out of your way so nothing interferes with your imagination. With the industry's highest signal-to-noise ratio (SNR), best touch performance, fast time-to-market, and largest portfolio of proprietary noise-immunity solutions, TrueTouch-powered devices enable a new era of touch interaction and creativity.

With Cypress, you can develop thinner products with more innovative interfaces that work under more challenging conditions than ever before. And with over half a billion touch solutions shipped, it's proven, market-leading technology that's changing the whole electronics industry.

TrueTouch powers the waterproof Sony Ericsson Xperia Active for real water rejection without sealant layers.

Driven by Cypress's TrueTouch solution, the dual touchscreens of the Acer Iconia won acclaim at the 2011 Consumer Electronics Show.

Powered by TrueTouch, the Barnes & Noble Color Nook e-reader captured a CNET Editors' Choice Award.

MORE THAN HALF A BILLION TOUCH SOLUTIONS SHIPPED.

TrueTouch powers some of the world's most innovative products, enabling design engineers to bring devices to market faster thanks to revolutionary noise immunity and performance. **What will you do with TrueTouch?**

TrueTouch® Gen4

EXPANDING DESIGN POSSIBILITIES WITH UNPRECEDENTED PERFORMANCE.

In addition to revolutionary noise immunity technologies (see next page), the newest member of the TrueTouch family adds:

- **The Industry's Highest SNR with Tx-Boost™** triples Cypress's already best-in class SNR without digital filters or expensive components

- **32-bit ARM Processing Power** for more demanding multitouch interfaces

- **Fastest Refresh Rates** for smooth input tracking

- **Lowest Power Consumption** to extend the battery life of mobile devices

- **Highest Accuracy**

- **Superior Multifinger Linearity**

CHARGER AND DISPLAY NOISE ISSUES ARE HISTORY. NEXT COMES YOUR COMPETITION.

FIND OUT HOW TrueTouch SILENCES NOISE TO TAKE SIGNAL-TO-NOISE RATIOS HIGHER THAN EVER.

Touchscreen designers and engineers have to overcome three main types of noise: common mode, display, and environmental. Left unchecked, noise can cause panels to register false touches, reduce input accuracy, and even cause touchscreens to stop functioning completely.
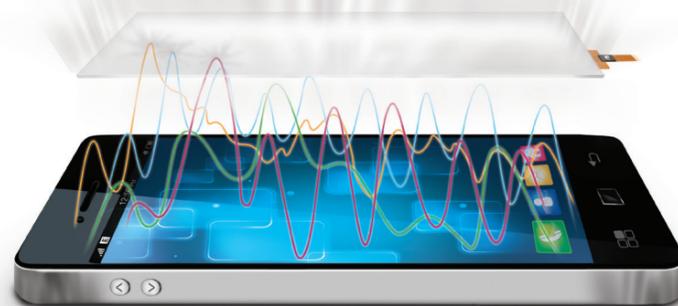
Cypress's TrueTouch solutions leverage three breakthrough technologies to address these noise challenges.

CHARGER ARMOR™ PULLS THE PLUG ON CHARGER NOISE.

Noise enters the touchscreen system through a power supply, such as a mobile handset's battery charger, in the presence of touch. The mobile device industry has established EN standards for maximum charger noise and TrueTouch easily exceeds them. However, for chargers that can emit noise at 20 times the spec and beyond, we have Charger Armor. It's an adaptive technology that listens for charger noise and activates when it surpasses a preset threshold to effectively deal with both periodic and broadband noise. The result is truly revolutionary charger noise immunity to the market.

DISPLAY ARMOR™ TAKES DISPLAY NOISE OUT OF THE PICTURE.

LCDs are inherently noisy devices. Display Armor—another industry first by Cypress—was developed specifically to overcome the unique challenges presented by LCDs. Typical touchscreen solutions use an air gap or a shield layer to deal with display noise, adding thickness and cost to the system. In comparison, Display Armor is built into the touchscreen controller, so it doesn't need shields or air gaps to protect against noise. Display Armor offers two distinct methods to detect and neutralize noise, ensuring a high-performance user interface no matter how loud the environment. That makes TrueTouch the ideal solution for all types of stackups, including direct lamination, on-cell, and in-cell.

10 V TX GENERATES MORE SIGNAL IN THE PRESENCE OF NOISE.

Signal-to-noise ratio is directly proportional to Tx voltage. Cypress's 10 V Tx already delivers four times the SNR of the competition. Additionally, our proprietary Tx-Boost solution triples this best-in-class SNR for unparalleled performance in the presence of noise.

Charger Armor™ and Display Armor™ are breakthrough proprietary technologies that ensure high performance from touchscreen devices in the presence of extreme noise.

SLIMMING DOWN YOUR BUDGET AND YOUR DESIGNS.

Cover Lens + Single Layer ITO

Direct Lamination to Display using Gen4

TrueTouch® SLIM™ Stackup

As touchscreen-enabled devices become more ubiquitous, it's important to make touchscreens more affordable to manufacture and to purchase. Cypress is here to help designers with an unmatched portfolio of single-layer touchscreen solutions to bring multitouch to the masses. From our new SLIM™ (Single-Layer Independent Multitouch) sensor for unbelievably thin designs with full multitouch functionality, to our Gen2 single-layer sensor for lower-cost touchscreen systems, there's a device for every application.

Eliminating the second sensor layer can save manufacturers 40 percent on sensor costs. It also allows the creation of a new wave of exceptionally thin devices.
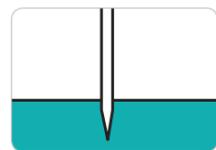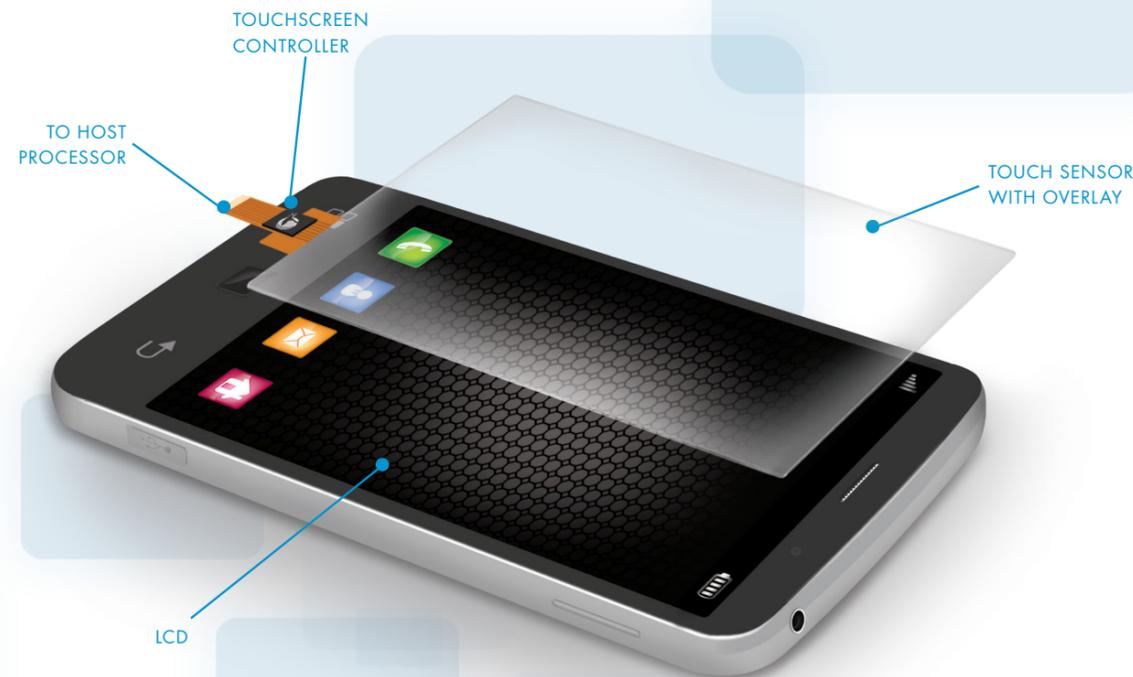
THE MOST INNOVATIVE TOUCHSCREEN DESIGNS
START WITH THE MOST INNOVATIVE TOUCHSCREEN SOLUTIONS.

FOUR WAYS TO UNLEASH YOUR DESIGN CREATIVITY.

Charger Armor, Display Armor, and the industry's highest SNR give designers and engineers greater freedom to experiment with configurations, but there's even more in TrueTouch to inspire your innovation.
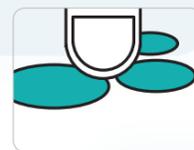
SWITCH BETWEEN SELF-AND MUTUAL CAPACITANCE MEASUREMENTS—DYNAMICALLY.

This unique capability gives TrueTouch the best of both technologies: robust signal acquisition and the ability to sense the position of simultaneous touches with the sophisticated accuracy required by high-performance touchscreens. By combining differential signal analysis with advanced algorithms, Cypress's patent-pending self-plus mutual capacitance sensing enables best-in-class waterproofing, 1 mm stylus support, and hover capability.

TOUCHSCREEN CONTROLLER

TO HOST PROCESSOR

TOUCH SENSOR WITH OVERLAY

LCD

CAPTURE FINER DETAILS WITH 1 MM STYLUS SUPPORT.

A stylus can give you the ability to accurately capture handwriting and other types of detailed input when a fingertip isn't precise enough. With TrueTouch, you can use a passive stylus with a tip as small as 1 mm for screens up to 5", and the patent-pending TruePen™ solution for tablet form factors up to 14". TruePen also has true hardware palm rejection and a one-year battery life. It can be used with existing ITO patterns and stackups, making it easy and affordable for OEMs to add active stylus support to devices. Both options have excellent handwriting capture, and TrueTouch's fast refresh rates mean your sketches, notes and diagrams all look just as they would on paper.

WATERPROOFING MAKES TOUCHSCREENS MORE FOOLPROOF.

Moisture on the surface of a touchscreen device can confuse an ordinary capacitive touchscreen controller, causing it to inaccurately track input or even become totally unresponsive. And it doesn't take much: a thin film of water, mist, or even perspiration is enough. But because TrueTouch uses both self-and mutual capacitance sensing to overcome these performance challenges, engineers can design truly waterproof products that meet IP-67 standards.

ELEVATE YOUR INTERFACE DESIGNS WITH HOVER.

Now you can develop touchscreen interfaces that respond before users even touch them. TrueTouch accurately tracks a user's finger up to 10 mm above the surface and senses it up to an inch above the surface. This unique feature allows UI designers to enable advanced features like mouse-over capability, true glove and long fingernail support, and create exciting new possibilities for gaming and 3D displays.

Unmatched Touch Leadership

TrueTouch Gen4 is the fourth version of Cypress's ground-breaking touchscreen technology. Our continued leadership in the evolving touchscreen space means that we respond to new challenges and market trends with cutting edge solutions.

Cypress has the world's broadest and most widely adopted portfolio of touchscreen solutions. We have been granted dozens of touchscreen patents, with hundreds more pending. Cypress engineers are constantly creating new technological advancements, and we continue to lead the market through innovation.

WE RAISED THE BAR ON TOUCHSCREEN PERFORMANCE.

NOW YOU CAN RAISE THE BAR ON APPLICATION INNOVATION.

TRUETOUCH UNLOCKS YOUR DESIGN'S POTENTIAL.

TrueTouch touchscreens are changing the way we interact with a wide range of products. They simplify and streamline application interfaces and provide a cleaner, more sophisticated look, which can give your products a significant competitive advantage in the marketplace.

KEY APPLICATIONS

Cypress touch technology enhances the features and functionality in these key applications:

- Mobile Phones
- Tablets & Notebooks
- Digital Cameras
- Portable Media Players
- GPS Navigation Devices
- E-readers
- Printers
- Automotive Infotainment Displays
- White Goods

Cypress's capacitive touch technologies provide a sleek user interface to many of the world's leading products.

"We are very excited that the ARM M0 is being used with Cypress's unique TrueTouch touchscreen controller IP to deliver the best-in-class touchscreen solution on the market."

—James Bruce, Mobile Strategy Director, ARM

"Cypress is one of the leaders in touchscreen technology, and we're excited to work with them to bring a great touch experience to upcoming tablets with Tegra. Customers can now build tablets that use less power, with an easy and simple design."

—Bill Henry, Director of Tegra Platform Management, NVIDIA

"The display is a critical part of the aesthetics and performance of the phone, and the Cypress TrueTouch solution delivered the accuracy and speed of touch sensing that users expect in a high performance product like Liquid MT."

—Hawk Wu, Director of Product Management, Smart Handheld BU, Acer Inc.

A COMPLETE RANGE OF SOLUTIONS.
SO YOU CAN COMPLETELY DOMINATE YOUR MARKET.

TRUETOUCH: EVOLVING TO MEET YOUR NEEDS AS QUICKLY AS THEY CHANGE.

TrueTouch® Gen4

Whether you need simple single-touch gestures to navigate your applications or want sophisticated multitouch gesture and all-points interfaces, TrueTouch supports a wide range of applications. This family of single chip solutions works with screen sizes from 1.5 inches to 14 inches with the industry's highest SNR, fastest refresh rates, and lowest power consumption. TrueTouch also supports single-layer sensors and multiple stackup options for the most flexible and cost-reduced designs, including PET, glass, sensor-on-lens, and direct lamination on-cell and in-cell.

GEN4—THE HIGHEST LEVEL OF MULTITOUCH PERFORMANCE. PERIOD.

TrueTouch Gen4 solutions deliver unparalleled multitouch capacitive touchscreen performance. Gen4 provides breakthrough noise cancellation with proprietary solutions to deal with noise from chargers and displays, and 10 V Tx and Tx-Boost™ for the industry's best signal-to-noise ratio in application. This chip family also delivers the fastest scan and refresh rates; very low power consumption; superior multifinger linearity; exceptional accuracy; and the same advanced features from Gen3 like waterproofing, 1 mm passive and active stylus support, and hover.

GEN3—MULTITOUCH FOR THE MASSES.

TrueTouch Gen3 was the first to deliver self plus mutual capacitance on the same chip for true multitouch, plus the advanced functionality of 1 mm stylus, waterproofing, and hover. Gen3 solutions can also help enable lower-cost multitouch system designs. The TMA140 mutual capacitance-only chip supports four-finger touch and gestures, with adaptive frequency hopping for the industry's best charger noise immunity.

GEN2—SINGLE AND TWO-TOUCH FUNCTIONALITY THAT REPLACES RESISTIVE TOUCHSCREENS.

TrueTouch Gen2 solutions make it easy to enable capacitive touch at the cost of resistive touchscreens. With the enhanced functionality of two-finger gestures like pinch and zoom, Gen2 delivers high-end performance at lower costs. Gen2 (TST242) also supports Cypress's Single-Layer Sensor. This proprietary design cuts costs and stackup height in half by eliminating the need for a second ITO layer while providing capacitive two-finger and single touch.

CYPRESS TRUETOUCH SOLUTIONS

Part Number	IO	SCREEN SIZE	MAXIMUM FINGERS SUPPORTED	STYLUS	PACKAGES
TMA140	32	5.1	4	N	QFN
TST241	32	3.8	1	N	QFN, CSP
TST242	32	3.8	2	N	QFN, CSP
TMG240	32	3.8	2	N	QFN, CSP
TMA340	32	5.1	4	1 mm	QFN, CSP
TMA375/395	84-112	13.0 - 17.5	10	N	QFN
TMA4XX	40	6.0	10	1 mm	QFN, CSP
TMA616	50	7.5	10	N	QFN
TMA768	56	8.5	10	ACTIVE	BGA
TMA884	60	9.4	10	N	QFN
TMA1036	65	10.1	10	ACTIVE	BGA

DESIGN ASSISTANCE GETS YOU TO MARKET FASTER.

Cypress provides an easy design platform to accelerate your time to market. We also have in-house sensor and touch experts to help in the design and tuning of your system, making implementation a snap.

OTHER TRUETOUCH FEATURES THAT ACCELERATE TIME-TO-MARKET INCLUDE:

- Assisted tuning for simpler, faster design implementations

- An entire platform of single-chip solutions that support a wide variety of screen sizes, from mobile phones to tablets

- Controllers that are operating system and manufacturing ready

- Multiple stackup and topology options – traditional on-stack, sensor on lens and display integration – for the most flexible designs with the lowest cost

CONTACT US

CYPRESS HEADQUARTERS

Cypress Semiconductor Corporation
198 Champion Court
San Jose, CA 95134 USA
Tel: +1 (408) 943-2600
Fax: +1 (408) 943-6848
Toll-free: +1 (800) 858-1810 (U.S. only)

www.cypress.com

FOR MORE INFORMATION ON TOUCH SENSORS: www.touch.cypress.com
REGISTER FOR HANDS-ON WORKSHOPS AT: www.cypress.com/training

CYPRESS EDUCATION—
UNIVERSITY ALLIANCE
www.cypress.com/go/university

ONLINE TECHNICAL SUPPORT
www.cypress.com/go/support

CYPROS® CERTIFIED CONSULTANTS
www.cypress.com/go/cypros

CYPRESS ONLINE STORE
www.cypress.com/go/buyonline

THIRD-PARTY USER FORUM
www.cypress.com/go/PSoCDeveloper

CYPRESS DEVELOPER COMMUNITY
www.cypress.com/go/community

CYPRESS

P E R F O R M