TOUGHBOOK TOUGHPAD

Panasonic

TOUCHSCREEN DISPLAY TECHNOLOGY

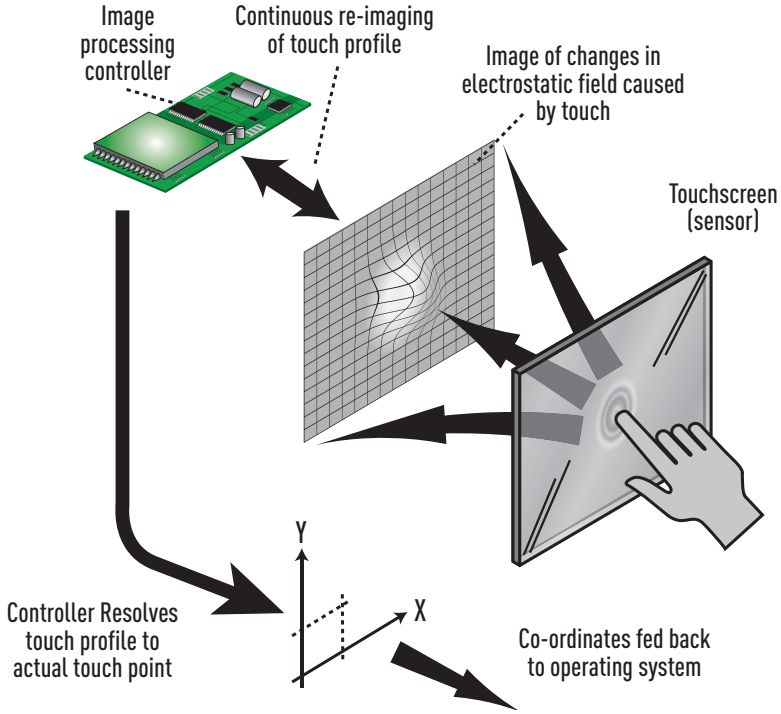
YOUR IN-DEPTH GUIDE

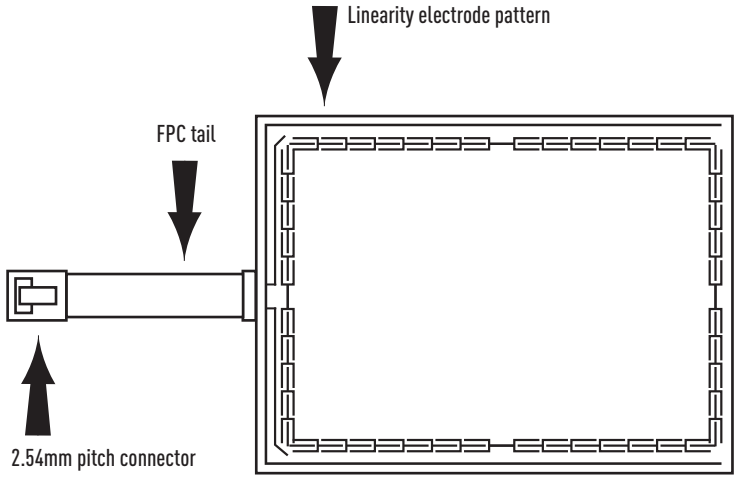
intel inside CORE i5 vPro

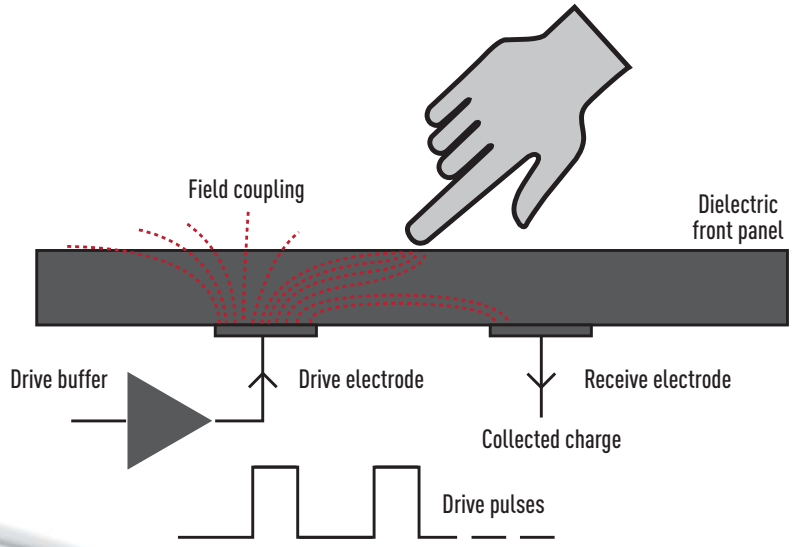
WHAT IS...
A CAPACITIVE TOUCHSCREEN?

A capacitive touchscreen panel is coated with a material that stores electrical charges. When the panel is touched, a small amount of charge is drawn to the point of contact. Circuits located at each corner of the panel measure the charge and send the information to the controller for processing.

Capacitive touchscreen panels must be touched with a finger, unlike resistive and surface wave panels that can be operated by either fingers or stylus. Capacitive touchscreens aren't affected by outside elements and have high clarity.



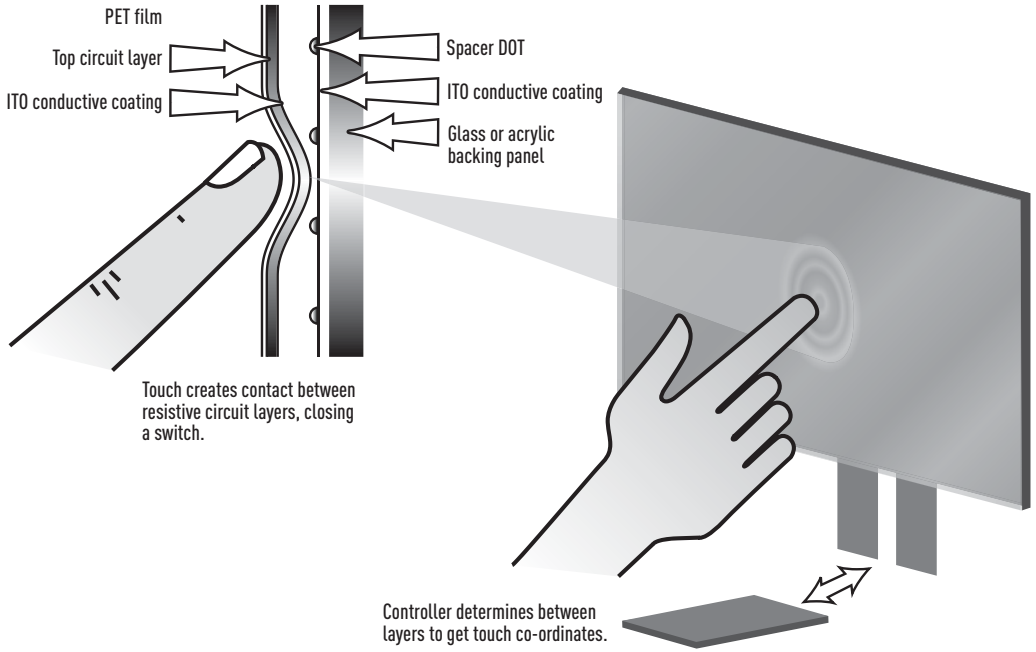


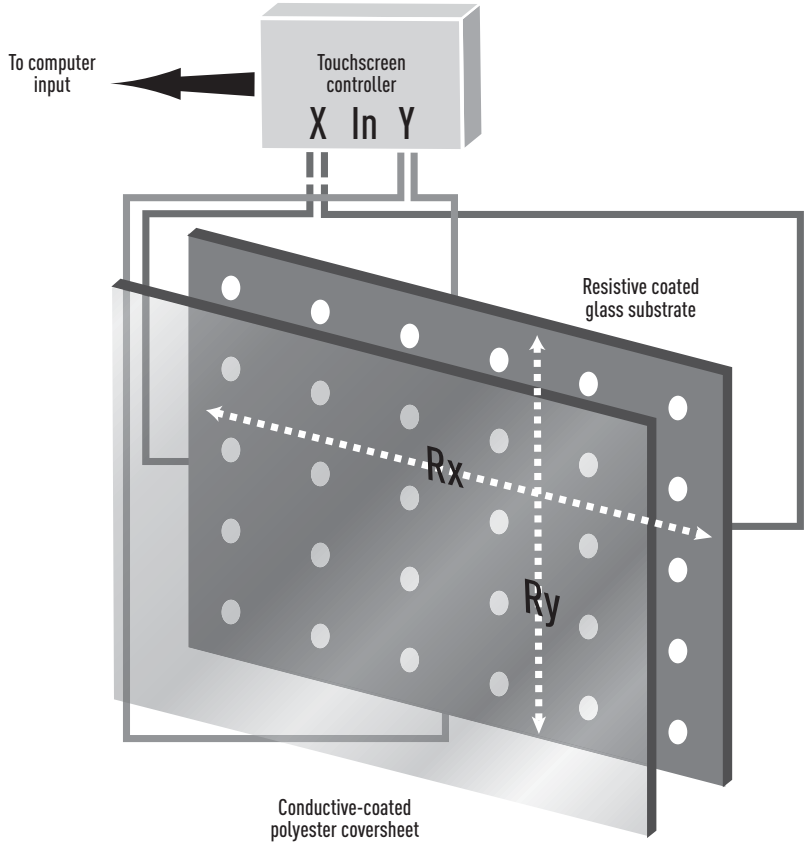


WHAT IS...
A RESISTIVE TOUCHSCREEN?

A resistive touchscreen panel is coated with a thin, metallic, electrically conductive and resistive layer. This causes a change in the electrical current which is registered as a touch event and sent to the controller for processing.

Resistive touchscreen panels are generally more affordable and work well with almost every stylus-like object. They aren't affected by outside elements such as dust or water, can even be controlled by gloved hands and are therefore the ideal companion for rugged PCs.





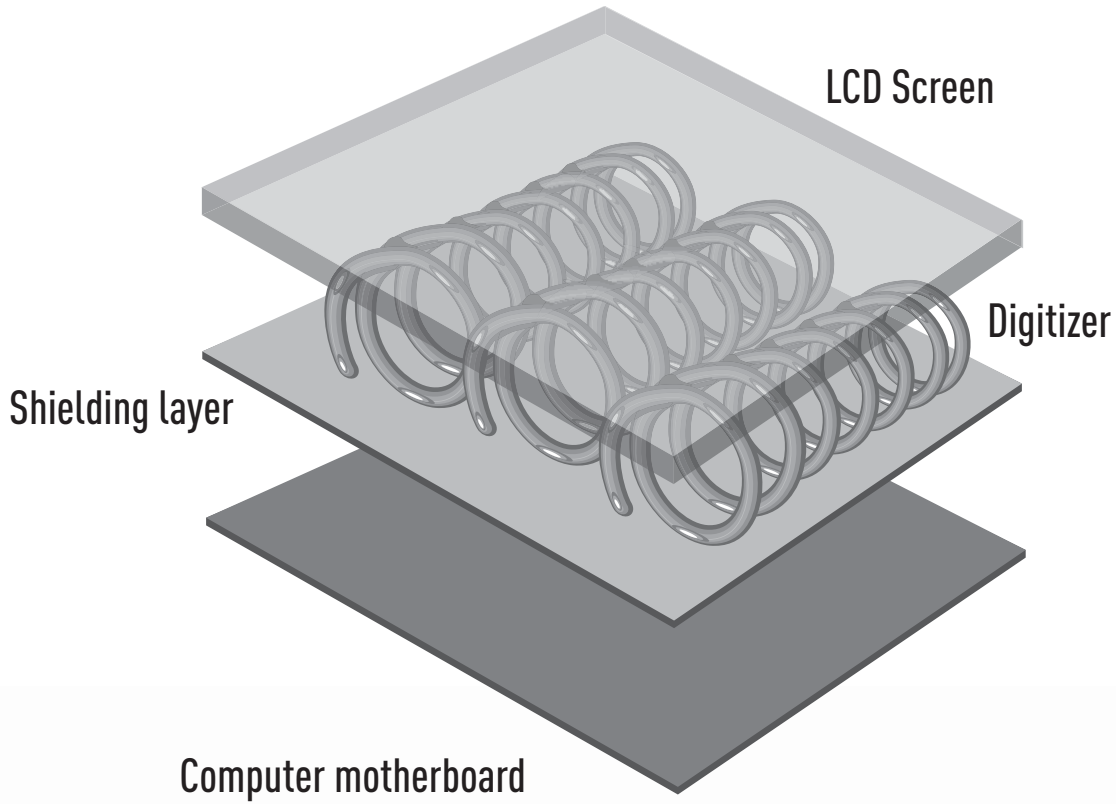
WHAT IS...
A DIGITIZER TOUCHSCREEN?

Digitizer touchscreens make use of electromagnetic induction technology, where the horizontal and vertical wires of the screen operate as both transmitting and receiving coils. The tablet generates an electromagnetic signal, which is received by the stylus. The wires in the tablet then change to a receiving mode and read the signal generated by the stylus.

Modern arrangements also provide pressure sensitivity and one or more switches (similar to the buttons on a mouse), with the electronics for this information present in the stylus itself, not the tablet.

By using electromagnetic signals, the tablet is able to sense the stylus position without the stylus having to even touch the surface, and powering the pen with this signal means that devices used with the tablet never need batteries.

The core benefit of this type of screen is the accuracy of the digitizer pen. So detailed drawings and signatures are possible. What's more, because a special digitizer pen is needed, the touchscreen can't be used with fingers or hands, eliminating accidental input errors.



WHAT IS...
A 'TRANSFLECTIVE PLUS'™ DISPLAY?

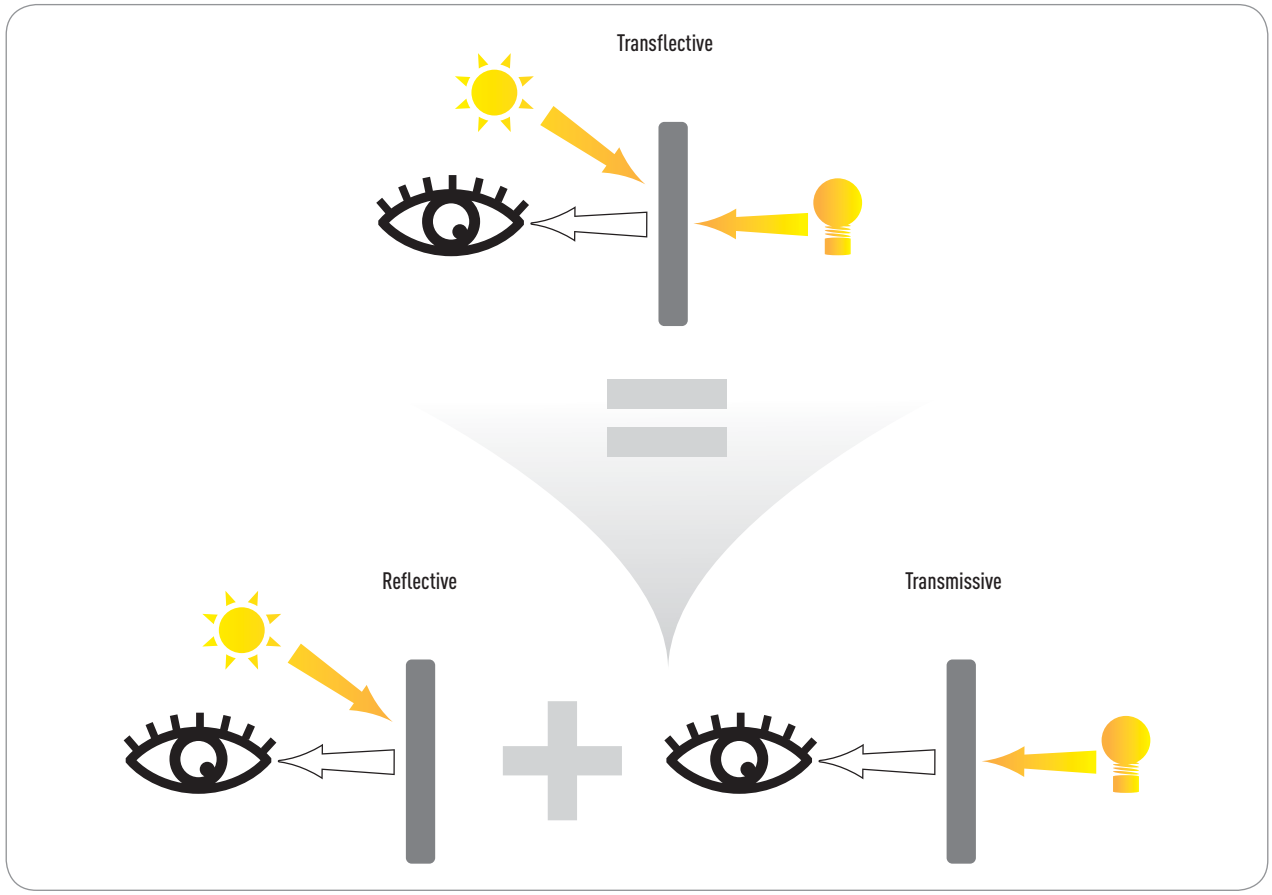
A transflective display reflects and transmits light (transflective = transmissive + reflective). Under bright illumination, the display acts mainly as a reflective display with the contrast being constant with illuminance. Only in dim and dark ambient situations will an auxiliary transmissive backlight be provided.

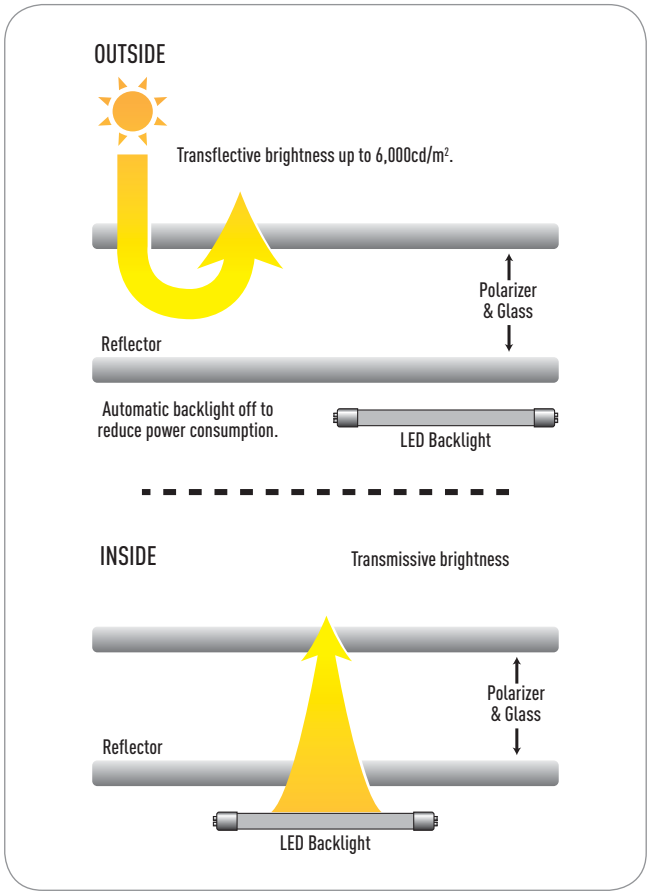
A transflective LCD can be read over a wide range of illuminance levels, when an illuminance sensor is added for control of the backlight. In portable electronic devices the transflective mode of operation helps to save battery life, since in bright environments no backlighting is required.

The essential component for a transflective LCD is the Reflector, a polymer sheet that reflects and transmits at the same time.

Some displays which reflects light and have minor reflection are best readable in bright sunlight, but are least readable under twilight without direct sunlight.

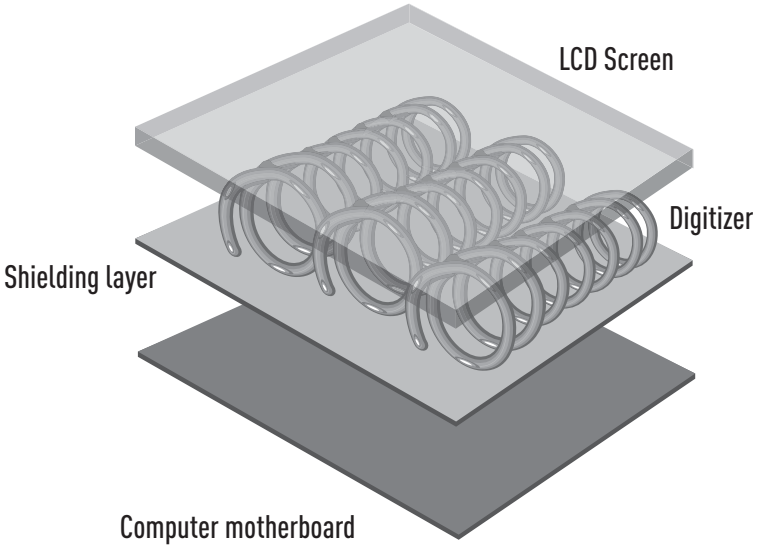
With this in mind, Panasonic introduces a special display technology – 'Transflective Plus'™ – to ensure best readably under all angles and outdoor conditions. 'Transflective Plus'™ displays can reach under direct sunlight display brightness scores up to 6.000 candela – premium display viewing quality in every outdoor situation.

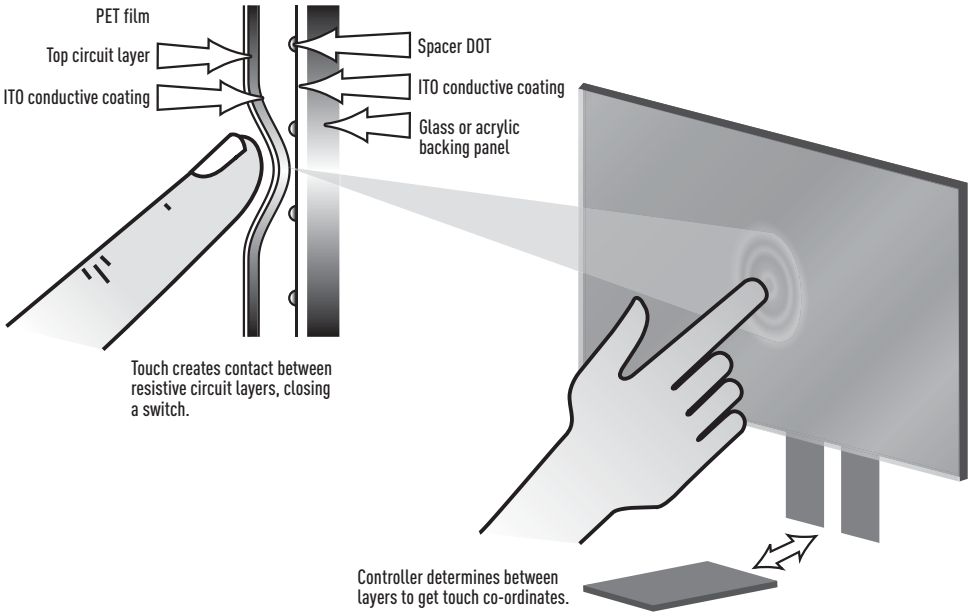




WHAT IS...
DUAL TOUCH?

Dual touch is the combination between resistive touchscreen and digitizer technology. It enables the operator to use the GUI with fingers, as well as with a digitizer pen. The key benefit of this combination is the intuitive handling via finger and the accuracy (signature capture, hand writing recognition) of the pen providing the flexibility to choose the right display input mode on demand.

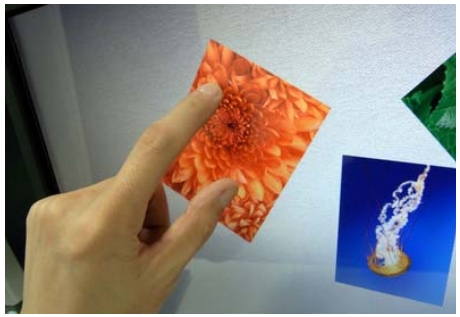




WHAT IS...
MULTI-TOUCH?

Multi-touch is a method of input on a touchscreen that allows two or more fingers to be used on the screen at one time. Multi-touch allow pinching and stretching gestures on the screen to control zooming.

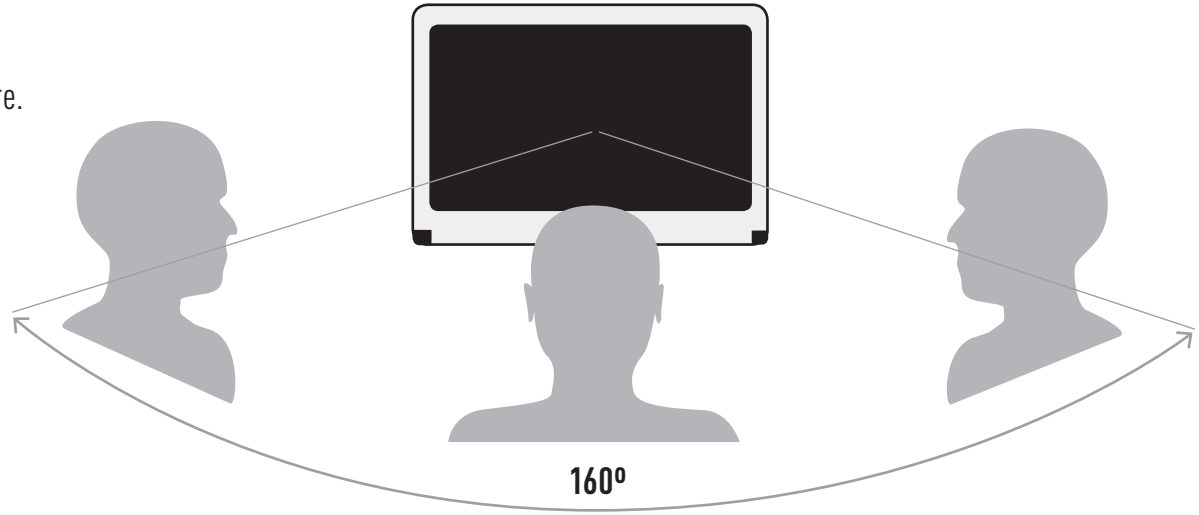
A multi-touch display is pressure sensitive, as well as gesture sensitive, which are predefined motions that are commands to perform an action, such as rotate the object on the z-axis.



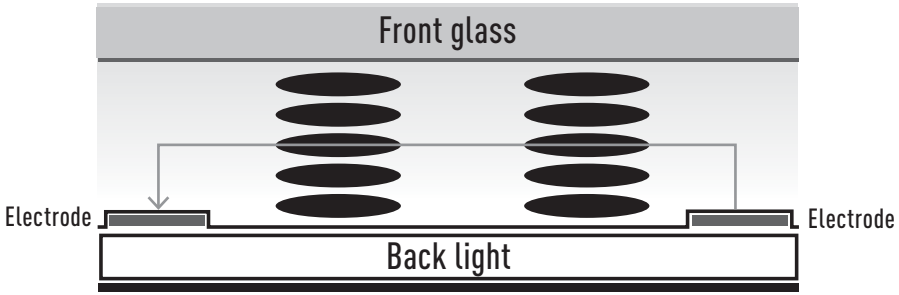
WHAT IS...
IPS?

In IPS (In-Plane Switching) technology the liquid crystal runs horizontally, giving it a wide viewing angle, fast response speed and a simple pixel structure.

IPS panels employ pairs of electrodes at the sides of each cell, running the electric field horizontally through the material. This approach keeps the liquid crystals parallel to the front of the panel, increasing the viewing angle.



IPS PANEL DESIGN

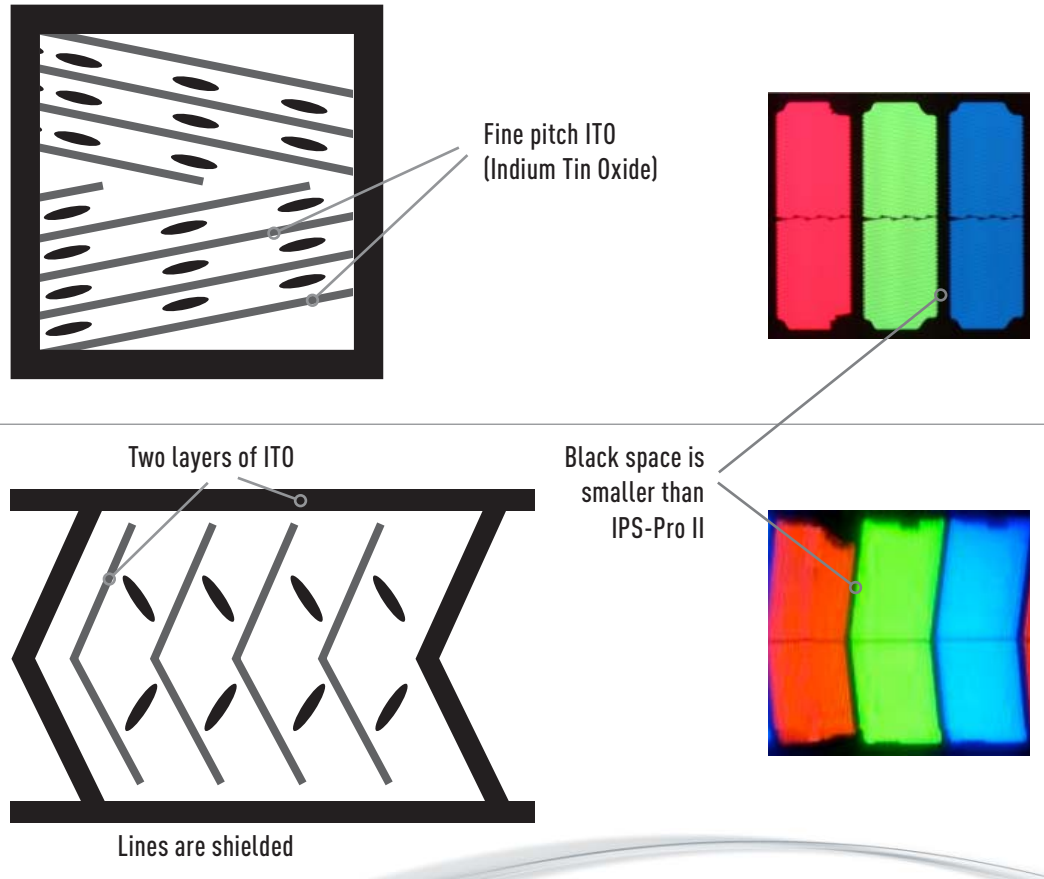


CONVENTIONAL
Loss of contrast and colours appear washed out.

IPS
Virtually no change in contrast and colour.

WHAT IS...
IPSα?

	Transmittance	Point of image quality	Front view of a pixel, (red, green, blue)
IPS-PRO	x1.0	• High transmittance • High contrast ratio • Wide viewing angle	
IPSα	**x1.5**	• **High resolution** • High transmittance • High contrast ratio • Wide viewing angle	

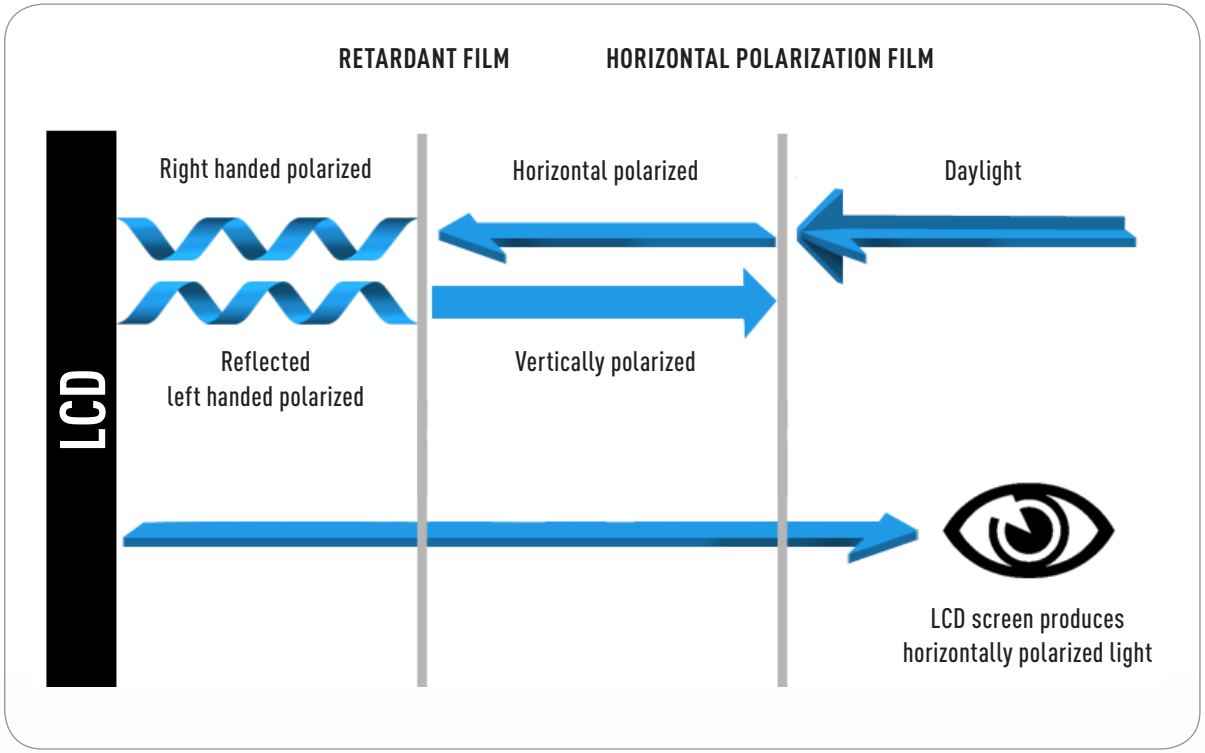


WHAT IS...
‘CIRCULUMIN’™ TECHNOLOGY?

Circular polarizer film passes only horizontally polarized light

- Retardant film converts horizontal polarization to right-handed circular polarization
- Upon reflection, right-handed polarization changes into left-handed polarization
- Retardant film converts left-handed polarized light to vertically polarized light
- Polarizer film rejects vertically polarized light
- Outbound light from the LCD is horizontally polarized, so it can pass all the way through (in fact, direction polarizer film is chosen to match LCD polarization)

The main effect is that sunlight is adsorbed and the reflection rate is minimized, which provides perfect sunlight readability. Panasonic CircuLumin™ technology provides full circle viewability in all lighting conditions. Optimising a display for sunlight viewability can have a side effect of reducing visibility in other lighting conditions. Panasonic CircuLumin™ technology solves this and allows for full circle viewability, from bright sunlight to pitch darkness.



THE TOUGHBOOK RANGE AND TOUCHSCREEN CONFIGURATION

Model	CF-19mk7		CF-31mk4	
	Touchscreen	Dual-touch	Performance	Standard
Input device	Resistive touch	Resistive touch & digitizer	Resistive touch	Resistive touch
Display brightness	500cd/m²	500cd/m²	1,200cd/m²	1,200cd/m²
IPS				
IPSα				
Dual Touch		✔		
Anti-glare	✔	✔	✔	✔
Anti-reflection	✔	✔	✔	✔
CircuLumin™	✔	✔	✔	✔
Protection film	✔	✔	✔	✔
Transflective plus™	✔	✔		
Direct bonding				
Multi-touch				
Standard signatures	✔	✔	✔	✔
High-res drawings and signatures		✔		
Digitizer pen		✔		
Stylus pen	✔	✔	✔	✔
Gloves	✔	✔	✔	✔

CF-19

CF-31

THE TOUGHBOOK RANGE AND TOUCHSCREEN CONFIGURATION

Model	CF-53mk3	CF-D1mk2	
	Touchscreen	Standard	Outdoor
Input device	Resistive touch	Resistive touch	Resistive touch
Display brightness	1,000cd/m²	400cd/m²	1,000cd/m²
IPS			
IPSα			
Dual Touch			
Anti-glare	✔	✔	✔
Anti-reflection	✔	✔	✔
CircuLumin™	✔		✔
Protection film	✔	✔	✔
Transflective plus™			
Direct bonding			
Multi-touch			
Standard signatures	✔	✔	✔
High-res drawings and signatures			
Digitizer pen			
Stylus pen	✔	✔	✔
Gloves	✔	✔	✔

CF-53

CF-D1

THE TOUGHBOOK RANGE AND TOUCHSCREEN CONFIGURATION

Model	CF-U1mk2.6	CF-H2mk3	
	Touchscreen	Healthcare	Field
Input device	Resistive touch	Resistive touch & digitizer	Resistive touch & digitizer
Display brightness	380cd/m²	500cd/m²	500cd/m²
IPS			
IPSα			
Dual Touch		✔	✔
Anti-glare	✔	✔	✔
Anti-reflection	✔	✔	✔
CircuLumin™	✔		✔
Protection film	✔	✔	✔
Transflective plus™	✔	✔	✔
Direct bonding			
Multi-touch			
Standard signatures	✔	✔	✔
High-res drawings and signatures		✔	✔
Digitizer pen		✔	✔
Stylus pen	✔	✔	✔
Gloves	✔	✔	✔

CF-U1

CF-H2
Healthcare

CF-H2
Field

THE TOUGHBOOK RANGE AND TOUCHSCREEN CONFIGURATION

Model	CF-C2mk2	CF-AX3mk1
	Touchscreen	Touchscreen
Input device	Capacitive multi-touch & digitizer	Capacitive multi-touch
Display brightness	500cd/m²	200cd/m²
IPS	✔	
IPSα		
Dual Touch		
Anti-glare	✔	✔
Anti-reflection	✔	✔
CircuLumin™		
Protection film	✔	✔
Transflective plus™		
Direct bonding	✔	
Multi-touch	Ten-finger Multi-Touch	Ten-finger Multi-Touch
Standard signatures	✔	✔
High-res drawings and signatures	✔	
Digitizer pen	✔	
Stylus pen		
Gloves		

CF-C2

CF-AX3

THE TOUGHPAD RANGE AND TOUCHSCREEN CONFIGURATION

Model	FZ-A1mk2	FZ-G1mk1	JT-B1mk1
	Touchscreen	Touchscreen	Touchscreen
Input device	Capacitive multi-touch & digitizer	Capacitive multi-touch & digitizer	Capacitive multi-touch & digitizer
Display brightness	500cd/m²	800cd/m²	500cd/m²
IPS			
IPSα		✔	
Dual Touch			
Anti-glare	✔	✔	✔
Anti-reflection	✔	✔	✔
CircuLumin™		✔	
Protection film	✔	✔	✔
Transflective plus™			
Direct bonding	✔	✔	✔
Multi-touch	Two-finger Multi-Touch	Ten-finger Multi-Touch	Four-finger Multi-Touch
Standard signatures	✔	✔	✔
High-res drawings and signatures	✔	✔	
Digitizer pen	✔	✔	
Stylus pen			
Gloves			

FZ-A1

FZ-G1

JT-B1

THE TOUGHPAD RANGE AND TOUCHSCREEN CONFIGURATION

Model	TOUGHPAD 4K	FZ-M1mk1
	Touchscreen	Touchscreen
Input device	Capacitive Touchscreen	Capacitive Touchscreen
Display brightness	300cd/m²	500cd/m²
IPS		✔
IPSα	✔	
Dual Touch		
Anti-glare		✔
Anti-reflection		✔
CircuLumin™		✔
Protection film		✔
Transflective plus™		
Direct bonding	✔	✔
Multi-touch	Ten-finger Multi-Touch	Ten-finger Multi-Touch
Standard signatures	✔	✔
High-res drawings and signatures	✔	
Digitizer pen		
Stylus pen	✔	✔
Gloves		✔

TOUGHPAD 4K

FZ-M1

Computer Product Solutions (CPS) BU, Panasonic System Communications Company Europe (PSCEU), Panasonic Marketing Europe GmbH, Hagenauer Straße 43, 65203 Wiesbaden (Germany).

21862-FEB2014-EN-V4