



# Displays

& Associated Technologies

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## Displays & Associated Technologies

The use of displays in electronic devices is increasing dramatically in both consumer and industrial electronics. There are many different models available and the technology is constantly advancing creating a big challenge to select the most suitable display for your product or application.

When selecting a display technology there are lots of points to consider, engineers need to not only be aware of all the options available but also what the latest technology trends are. This information is critical to ensure that the most suitable product is specified that meets or exceeds the performance criteria of the application and must also be easy to integrate into the end product. This book has been compiled to assist in the selection process.

### ● Using our website data reference

Find more information on any part in our 'Displays & Associated Technologies' book by using our dedicated website data reference.

Go to **www.anglia-live.com**

Enter the 'website data reference' into our search field at the top of the home page.

Browse the range for more pricing, information and specifications.

screen	Non-Touch screen	Website Data Reference
	●	DSP113
	●	DSP114
	●	DSP115
	●	DSP116
DSP113		Search
	●	DSP119
	●	DSP120

### Key Features

- Displays are c
- Choice of Po
- or white on
- Choice of LC
- Viewing Dire
- directions av
- Choice of LE
- Integrated d

### ● How to Order

Website

**www.anglia-live.com**

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## About Anglia

Anglia is the UK's leading independent authorised distributor of semiconductors, optoelectronics, interconnect, and passive and electromechanical components. A signatory of the ADS SC21 programme, the company holds AS9120, ISO9001 & ISO14001 accreditations and IECQ-CECC qualification.

Renowned for our great customer service and comprehensive technical support, Anglia has gained a wealth of experience and a thorough understanding of the market having served the electronics industry for over 40 years. Technically adept, we support OEM and EMS companies in every sector of electronics manufacturing. Our suppliers include some of the world's leading electronic component brands, complemented by many smaller companies with leadership in their chosen technologies.





This book has been compiled with the aim to help simplify the selection process for your display requirements, detailing the differences between the technologies, their features, benefits, performance criteria and recommendations for applications they are most suited to.

Furthermore, Anglia's engineering team are also able to provide additional technical assistance in the selection and design in of the correct display for your application.

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## Key Features

- Wide range of display sizes
- Excellent optical performance
- High contrast
- Standard, Wide & Letterbox screen formats available
- Models with wide viewing angles available
- Touch screen and Non-Touch versions
- LED Backlight options including High bright, Super High Bright for improved outdoor readability
- Rugged versions for harsh environments
- Low power consumption

## Introduction

Anglia offer an extensive range of TFT displays in a wide choice of sizes and screen resolutions to suit most applications.

Models are available with a selection of options including but not limited to anti-glare coatings and optical bonding for improved sunlight readability, wide viewing angles, long life LED backlighting and wider operating temperature ranges for industrial and rugged environments.

In addition, many models have the option of being specified with an integrated touch screen, this option is becoming increasingly popular as touch screen displays replace traditional mechanical buttons in many HMI applications.

## Environmental

Majority of display models are suitable for use over the -20 to +70°C industrial temperature range. Options are also available for wider temperature ranges covering -40 to +85°C.

## Typical Applications

The broad display portfolio available from Anglia suits a wide range of industrial and commercial applications including but not limited to:

- Industrial machines
- HMI equipment
- Instrumentation
- Kiosks and Consoles
- Medical
- Imaging machines
- Information systems
- Ticketing
- Vending
- Portable dataloggers
- Marine and Avionics



## Touch Screens & Additional Features

### Resistive Touch Screen

Resistive technology is the simplest and most widely used touch screen type in industrial applications. They work on pressure applied by user's finger making the contact between two conductive layers of material to complete the circuit. They are very well suited to Human Interface applications such as those found in factories, hospitals and outdoor environments. It is also possible and relatively simple to add additional protection such as a cover sheet to prevent foreign object and liquid contamination. Resistive touch screens can be operated using a stylus or similar pointing device and gloved fingers.

#### Key Features

- Simple to design in
- Good for industrial environments where contaminants may be present
- Work with gloved fingers
- Cost effective vs. Capacitive touch technologies

### Capacitive Touch

Capacitive touch screens have a transparent conductive material on the underside of the glass screen, touching the screen with a finger causes a change to the electrical field in this conductive material that is detected by the touch controller and then processed to perform the required action. Capacitive touch screens are already very common in consumer devices such as tablets and mobile phones, they are now being specified into industrial applications as manufacturers seek to increase functionality and ergonomics of their equipment.

#### Key Features

- Allow for thinner and lighter screens
- Accurate sensitivity
- Displays can be Clearer/sharper as touch screen is near invisible to the user
- Allow for multi-touch gestures such as pinch and zoom
- Low power consumption

### Projected Capacitive Touch

Projected capacitive touch technology is a variant of capacitive touch technology, these screens have a matrix of rows and columns of conductive material coated on the underside of the glass screen creating a uniform electrostatic field. Applying a finger to the screen distorts this field which is detected by the touch controller and then processed to perform the required action.

PCAP screens combine the functionality of Capacitive touch and Resistive touch screens allowing them to be used in a wider range of environments and operation using gloved fingers.

#### Key Features

- Allow for thinner and lighter screens
- Accurate sensitivity
- Displays can be Clearer/sharper as touch screen is near invisible to the user
- Allow for multi-touch gestures such as pinch and zoom
- Can be operated with gloved fingers
- Tolerant to contamination on the screen including water droplets without effecting performance
- Low power consumption


### Added Value Display Solutions

Anglia also offer a range of value added services and products including glass bonding, analogue to digital video cards and high brightness displays for outdoor/sunlight readable applications.

We are also able to offer custom and semi-customised displays designed to meet customers specific application requirements. Examples include addition of a touch panels through to fully integrated open frame monitors, majority of application requirements can be accommodated allowing the display product to offer the best possible end user experience.

Visit [www.anglia-live.com/products/displays/tft-colour](http://www.anglia-live.com/products/displays/tft-colour)  
to view Anglia's full range of TFT Displays


## Standard Format

Screen Size (inch)	Resolution (W x H)	Display Resolution	Backlight	Touch screen	Non-Touch screen	Website Data Ref. 
0.96	160 x 80	–	●		●	DSP001
1.26	144 x 168	–	●			DSP002
1.0	128 x 64	–	●	●	●	DSP003
1.3	128 x 128	–	●			DSP004
1.38	220 x 220	–	●			DSP005
1.44	128 x 128	–	●	●	●	DSP006
1.44	128 x 160	–	●	●	●	DSP007
1.77	128 x 160	–	●	●	●	DSP008
1.8	176 x 220	–	●			DSP009
2.0	176 x 220	–	●			DSP010
2.0	220 x 176	–	●	●	●	DSP011
2.0	320 x 240	QVGA	●			DSP012
2.0	240 x 320	QVGA	●	●	●	DSP013
2.2	240 x 320	QVGA	●	●		DSP014
2.2	320 x 240	QVGA	●	●		DSP015
2.4	240 x 320	–	●	●	●	DSP016
2.4	320 x 240	QVGA	●	●		DSP017
2.5	320 x 240	QVGA	●			DSP018
2.8	240 x 320	QVGA	●	●	●	DSP019
2.8	320 x 240	QVGA	●	●		DSP020
3.0	240 x 400	QVGA	●	●		DSP021
3.2	240 x 320	QVGA	●	●	●	DSP022
3.2	320 x 240	QVGA	●	●		DSP023
3.5	240 x 320	QVGA	●	●	●	DSP024
3.5	320 x 240	QVGA	●	●	●	DSP025
3.5	320 x 480	HVGA	●	●	●	DSP026
3.5	960 x 540	QHD	●	●	●	DSP027
3.8	320 x 240	QVGA	●		●	DSP028
4.2	480 x 272	HVGA	●			DSP029
4.3	480 x 272	QVGA	●	●	●	DSP030
4.3	800 x 480	VGA	●	●		DSP031
5.0	480 x 272	–	●	●	●	DSP032
5.0	640 x 480	VGA	●	●	●	DSP033
5.0	640 x 640	–	●	●	●	DSP034
5.0	800 x 480	VGA	●	●	●	DSP035

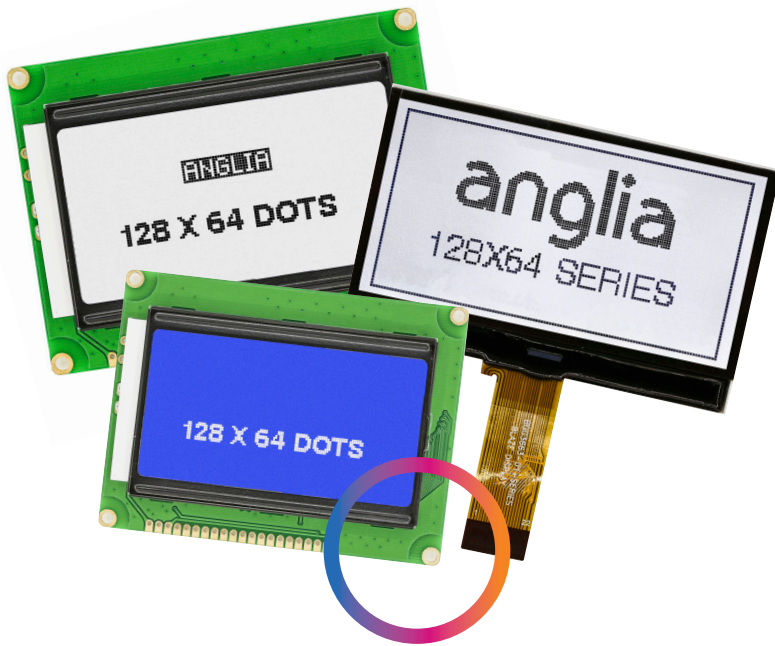
Screen Size (inch)	Resolution (W x H)	Display Resolution	Backlight	Touch screen	Non-Touch screen	Website Data Ref. 
5.7	320 x 240	QVGA	●	●	●	DSP036
5.7	640 x 240	QVGA	●	●	●	DSP037
5.7	640 x 480	VGA	●	●	●	DSP038
6.2	640 x 480	VGA	●	●	●	DSP039
6.5	640 x 480	VGA	●	●	●	DSP040
7.0	800 x 480	VGA	●	●	●	DSP041
7.8	800 x 300	HSVGA	●		●	DSP042
8.0	800 x 480	VGA	●	●	●	DSP043
8.0	1024 x 600	HD	●	●	●	DSP044
8.0	1600 x 480	–	●	●	●	DSP045
8.4	640 x 480	VGA	●	●	●	DSP046
8.4	800 x 600	SVGA	●	●	●	DSP047
8.4	1024 x 768	XGA	●	●	●	DSP048
9.0	800 x 480	VGA	●	●		DSP049
10.1	1024 x 600	SVGA	●	●	●	DSP050
10.1	1024 x 768	XGA	●		●	DSP051
10.2	800 x 256	–	●	●		DSP052
10.4	640 x 480	VGA	●	●	●	DSP053
10.4	1024 x 768	XGA	●	●	●	DSP054
12.1	800 x 600	SVGA	●		●	DSP055
12.1	1024 x 768	XGA	●	●	●	DSP056
15.0	1024 x 768	XGA	●	●	●	DSP057
15.0	1400 x 1050	SXGA+	●		●	DSP058
15.4	1024 x 768	XGA	●			DSP059
15.4	1280 x 800	SXGA	●			DSP060
17.0	1280 x 1024	SXGA	●		●	DSP061
19.0	1280 x 1024	SXGA	●	●	●	DSP062
20.1	1920 x 1080	FHD	●			DSP063
21.3	2048 x 1536	QXGA	●			DSP064
21.5	1920 x 1080	FHD	●			DSP065
23.1	1600 x 1200	UXGA	●			DSP066
24.0	1920 x 1080	FHD	●			DSP067
27.0	1920 x 1080	FHD	●			DSP068



## Speciality &amp; Wide Format

Screen Size (inch)	Resolution (W x H)	Display Resolution	Backlight	Touch screen	Non-Touch screen	Website Data Ref. 
1.22 Round	240 x 204	–	●		●	DSP069
1.3 Round	240 x 240	–	●		●	DSP070
2.0	240 x 320	QVGA	●		●	DSP071
2.2	240 x 320	QVGA	●		●	DSP072
2.4	240 x 320	QVGA	●		●	DSP073
3.5	960 x 540	QVGA	●			DSP074
4.0	480 x 800	WVGA	●	●	●	DSP075
4.2	480 x 272		●		●	DSP076
4.3	480 x 272	–	●	●	●	DSP077
4.3	800 x 480	WVGA	●		●	DSP078
5.0	640 x 640	SHB	●			DSP079
5.0	800 x 480	WVGA	●	●	●	DSP080
6.2	640 x 240	–	●	●	●	DSP081
6.4	1024 x 768	–	●			DSP082
6.5	640 X 480	WVA	●	●	●	DSP083
6.5	800 x 480	WVGA	●		●	DSP084
7.0	800 x 480	WVGA	●	●	●	DSP085
7.0	1024 x 600	WSVGA	●	●	●	DSP086
7.0	1920 x 1080	HD	●	●	●	DSP087
7.8	800 x 300	SWVA	●			DSP088
8.0	800 x 480	WVGA	●	●	●	DSP089
8.0	1280 x 768	WXGA	●	●	●	DSP090
8.0	1600 x 480	–	●		●	DSP091
9.0	960 x 540	QHD	●			DSP092
9.0	800 x 480	WVGA	●	●	●	DSP093
9.0	1280 x 768	HSXGA	●	●	●	DSP094
9.0	1280 x 768	WXGA	●	●		DSP095
10.1	1920 x 1200	WUXGA	●		●	DSP096
10.2	800 x 256	–	●		●	DSP097
10.4	800 x 600	SVGA	●		●	DSP098
10.4	1024 x 768	XGA	●		●	DSP099
12.3	1280 x 480	HSXGA	●		●	DSP100
12.3	1920 x 720	HD	●		●	DSP101
10.3	1920 x 720	HD	●		●	DSP102
10.6	1280 x 768	WXGA	●	●	●	DSP103
10.6	1280 x 800	WXGA	●			DSP104
12.1	1280 x 768	WXGA	●			DSP105
12.1	1280 x 800	WXGA	●	●	●	DSP106
12.3	1920 x 720	HD	●		●	DSP107
14.1	1280 x 768	WXGA	●		●	DSP108
14.1	1280 x 800	WXGA	●			DSP109
14.9	1280 x 242	–	●		●	DSP110
15.4	1366 x 768	WXGA	●			DSP111
15.6	1366 x 768	WXGA	●		●	DSP112
17.5	1280 x 768	WXGA	●		●	DSP113
18.5	1366 x 768	WXGA	●			DSP114
19.2	1920 x 360	1/3HD	●			DSP115





## Introduction

Anglia have a wide range of TN (Twisted Nematic display), STN (Super-twisted nematic display) and FSTN (Film super-twisted nematic display) monochrome graphic display modules offering a choice of size, format, styles and backlight and LCD colours.

These displays are ideal for applications which require text or graphical information to be clearly displayed, they offer excellent readability in a wide range of lighting conditions and can be specified with and without touch screens.

The range is available in a choice of reflective, transmissive and transfective modes.

Reflective displays utilize the available ambient light making them very low power and suitable for portable powered equipment, however they are not suitable for use in low light environments because they have no backlight.

Transmissive displays have a backlight which can be adjusted to suit the ambient light conditions but it needs to be powered all the time in order to view content on the screen so therefore uses more power than a purely reflective display.

Transfective displays are designed to offer the best attributes of both reflective and transmissive type displays, they have a backlight which is used in the same way as a transmissive display but when ambient lighting conditions are suitable the backlight can be powered off so display is used in reflective mode which allows lowering of overall power consumption.


The range also includes many options such as wide operating temperatures, high contrast, high brightness, high ambient light legibility, built-in controllers and selectable interface.

Typical applications for Graphic displays include amongst others:

- Industrial machines
- HMI equipment
- Ticketing
- Vending
- Portable dataloggers



## Graphic Display

Resolution (W x H)	Non-Backlight	Backlight	Touch screen	Non-Touch screen	Website Data Ref 
96 x 16		●	●	●	DSP116
96 x 24	●	●	●	●	DSP117
96 x 36	●		●	●	DSP118
96 x 64	●		●	●	DSP119
96 x 96		●	●	●	DSP120
101 x 33		●	●	●	DSP121
120 x 16		●	●	●	DSP122
120 x 17		●	●	●	DSP123
120 x 32		●		●	DSP124
120 x 64		●		●	DSP125
122 x 32	●	●	●	●	DSP126
128 x 16		●	●	●	DSP127
128 x 17	●		●	●	DSP128
128 x 24	●		●	●	DSP129
128 x 32	●	●	●	●	DSP130
128 x 40		●		●	DSP131
128 x 48		●	●	●	DSP132
128 x 64	●	●	●	●	DSP133
128 x 80				●	DSP134
128 x 88		●	●	●	DSP135
128 x 96		●	●	●	DSP136
128 x 128	●	●	●	●	DSP137
131 x 64		●	●	●	DSP138
132 x 32	●	●	●	●	DSP139
132 x 40	●		●	●	DSP140
132 x 52		●	●	●	DSP141
132 x 58		●	●	●	DSP142
132 x 64	●	●	●	●	DSP143
160 x 32		●		●	DSP144
160 x 64		●		●	DSP145
160 x 48				●	DSP146
160 x 80		●		●	DSP147
160 x 100		●		●	DSP148
160 x 128				●	DSP149
160 x 160		●		●	DSP150
192 x 64				●	DSP151
240 x 64		●		●	DSP152
240 x 128		●	●	●	DSP153
240 x 160		●		●	DSP154
246 x 72				●	DSP155
256 x 24		●		●	DSP156
256 x 64		●		●	DSP157
320 x 240		●	●	●	DSP158
640 x 480		●		●	DSP159

## Key Features

- Displays are offered in TN, STN or FSTN technology
- Choice of Positive or Negative Mode, i.e. black on white or white on black display
- Choice of LCD and backlight colour combinations
- Viewing Direction 6 o'clock as standard with other viewing directions available upon request.
- Choice of LED, EL or CCFL backlights
- Integrated display controller

## Environmental

Standard operating temperature range is 0 to +50°C.

Displays capable of handling a wider temperature range of -20 to +70°C or an extended range of -30 to +80°C can also be supplied to special order.



## Introduction

In this section, we feature a wide range of STN alphanumeric display modules offering a choice of formats, backlighting colours and LCD colours in reflective, transfective or transmissive modes. These displays are ideal for applications where only alphanumeric information is required to be displayed such as status indication on an alarm panel or pricing information on vending machines.

## Key Features

- Available in TN, STN and FSTN technology
- Choice of Positive or Negative Mode, i.e. black on white or white on black display
- Viewing Direction 6 o'clock as standard with other viewing directions available upon request.
- Choice of LCD and backlight colour combinations
- Choice of LED or EL backlight technology
- LED backlights offered in white, yellow/green, amber, blue, green and red.
- Custom variations available upon request.


## Environmental

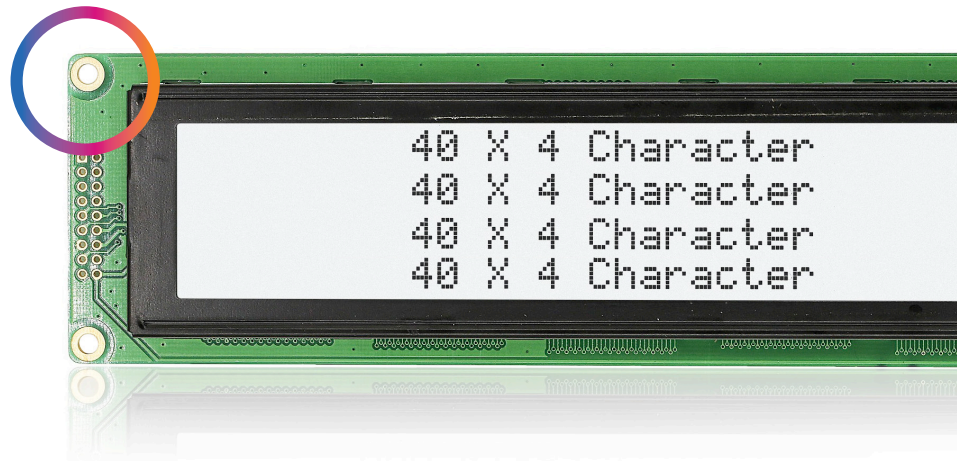
Standard operating temperature range is 0 to +50°C. Displays capable of handling a wider temperature range of -20 to +70°C or an extended range of -30 to +80°C can also be supplied to special order.

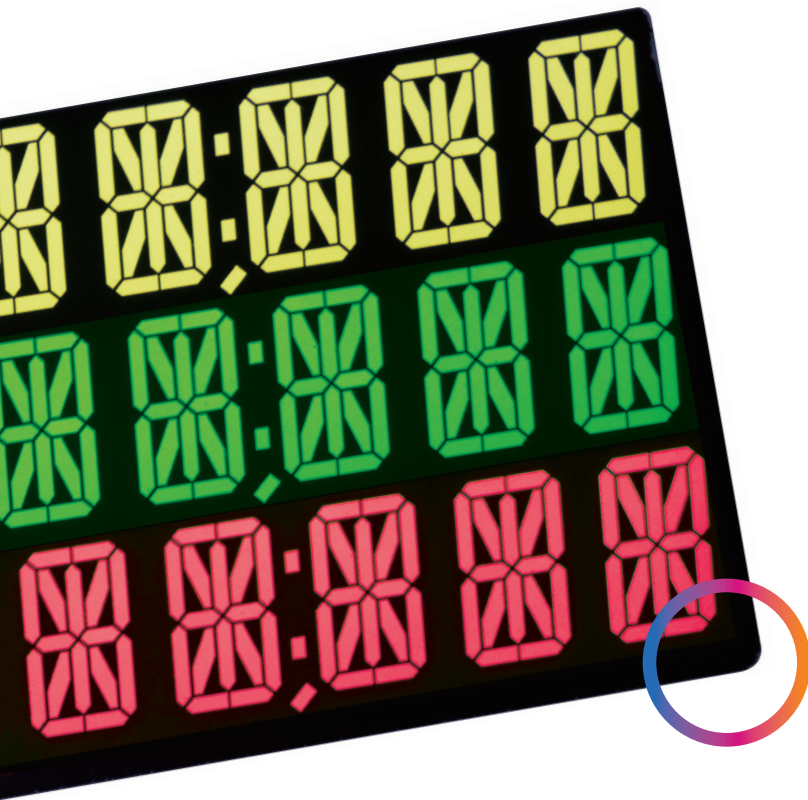




## Character Displays

No. of Characters and Rows (W & H)	Non - Backlight	Backlight	Website Data Reference 
8 x 1		●	DSP160
8 x 2	●	●	DSP161
10 x 2		●	DSP162
12 x 1		●	DSP163
16 x 1	●	●	DSP164
16 x 2	●	●	DSP165
16 x 4		●	DSP166
20 x 1		●	DSP167
20 x 2	●	●	DSP168
20 x 4	●	●	DSP169
21 x 4		●	DSP170
24 x 1		●	DSP171
24 x 2		●	DSP172
40 x 2	●	●	DSP173
40 x 4	●	●	DSP174





## Introduction

One of the newer LCD technologies - Vertical Alignment Twisted Nematic's or VATN display modules also known as EBTN (Enhanced Black TN). Are designed to offer a truly black display, giving one of the best negative high contrast images on the market. The truly black displays work by changing the crystal alignment and rotating to allow light to pass through once voltage is applied, the greater angle of tilt, the more light passes through. VATN display technology takes a completely different approach to the more traditional TN, STN and FSTN Technologies.

The high contrast performance of these displays makes them ideal for applications ranging from automotive use to wearable consumable and medical devices including activity trackers and health monitors.

## Key Features

- Super dark background
- Wide viewing angles
- High Backlight brightness
- Choice of backlight colour
- Choice of Interface options, Parallel, I<sup>2</sup>C or SPI
- A low cost alternative to OLED displays

## Typical Applications

- Wearables
- Medical devices
- Activity trackers
- Portable equipment
- Instrumentation
- Sunlight readable for outdoor applications
- Automotive
- Marine

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## Introduction

Anglia are able to offer a range of OLED (Organic Light Emitting Diode) displays. These displays due to their technology emit full light power immediately after being switched on, do not become hot under operation and are energy efficient making them suitable for many types of hand held battery powered devices. OLEDs can be dimmed and are suited for many types of ambient lighting applications.

There are two forms of OLED displays, PMOLED and AMOLED.

PMOLED stands for Passive-Matrix OLED, these displays use a simplified control method similar to traditional STN displays where each row (or line) of the display is controlled sequentially.

AMOLED stands for Active Matrix OLED, these displays are controlled in a similar way to TFT displays. AMOLED displays consume less power, have a faster refresh rate and enable larger screens with higher resolutions vs. PMOLED displays.

## Key Features

- True Blacks
- Lower Motion Blur
- Enhanced colours
- Sunlight Readable
- Extremely good viewing angles
- Very high contrast ratios
- Low power consumption

## Typical Applications

- Wearables
- Handheld devices
- Automotive applications
- Computer & electronics
- Communication equipment
- Medical devices

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tributor of semiconductors, optoelectronics,  
rconnect, and passive and electromechanical  
ponents.

ignatory of the ADS SC21 programme, the  
pany holds AS9120, ISO9001 & ISO14001  
editations and IECQ-CECC qualification.

owned for our great customer service and  
prehensive technical support, Anglia has gained  
wealth of experience and a thorough  
understanding of the market having served the  
tronics industry for over 40 years. Technically  
pt, we support OEM and EMS companies in every  
or of electronics manufacturing. Our suppliers  
ude some of the world's leading electronic  
ponent brands, complemented by many  
ller companies with leadership in their chosen  
nologies.



E-Paper displays can also be specified with Red pigment as well as the standard white and black pigments in each pixel. Future versions of these displays will also have options to specify additional colours.

## Introduction

The latest range of black on white paper displays available from Anglia, are commonly referred to as Electronic Paper Displays (EPD) due to the fact they mimic the appearance of ordinary ink on paper.

With high contrast ratios and anti-glare surfaces, these displays suit applications such as e-readers, wearable devices, electronic shelf labelling and all kinds of outdoor information displays.

An advantage of this bistable technology is low power consumption, as the image being displayed will remain the same even once the driving voltage is removed.

Further power is only required once a user requires to make a change/update to the displays contents.

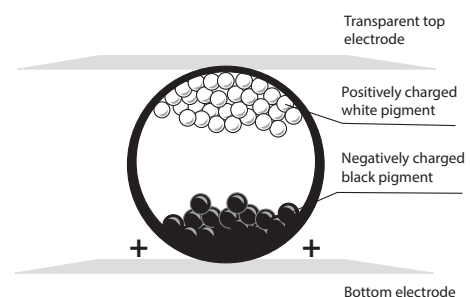
## Key Features

- Very low power consumption
- High contrast
- Daylight readability
- Wide viewing angle
- Flexible and durable
- Thin and lightweight

## Typical Applications

- Portable electronic devices
- Electronic Shelf Labelling (ESL)
- Indoor & Outdoor digital signage
- Luggage / Logistic Tags
- White goods

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Creating a negative charge to the bottom of the capsule forces the black pigment to the top, creating darker areas.

## Introduction

Human Machine Interface (HMI) interaction with a display via an integrated keypad or joystick, can be a preferred option to that of a touch screen due to the requirements of the application or the environment in which the end product is going to be used.

Anglia are able to offer an extensive range of joysticks and membrane keypads with customization options allowing you to specify a product to meet your applications exact needs.

## Typical Keypad Features

- Graphic overlay only or full switching membrane
- Metal or poly-dome contacts
- Tactile or non-tactile feel
- Integral SMD LEDs in a choice of colour
- LCD windows
- ESD/RFI shielding
- Legend options available
- Plastic key tops available

## Typical Joystick Features

- Excellent smooth operation
- Long service life
- Additional integrated switches for extra functionality
- Illumination
- Long life sensors for increased durability
- Single, Dual and Multi axis operation
- Specified x & y axis Lever force
- IP rated sealing
- Analogue or Digital outputs
- Choice of handle size and shapes

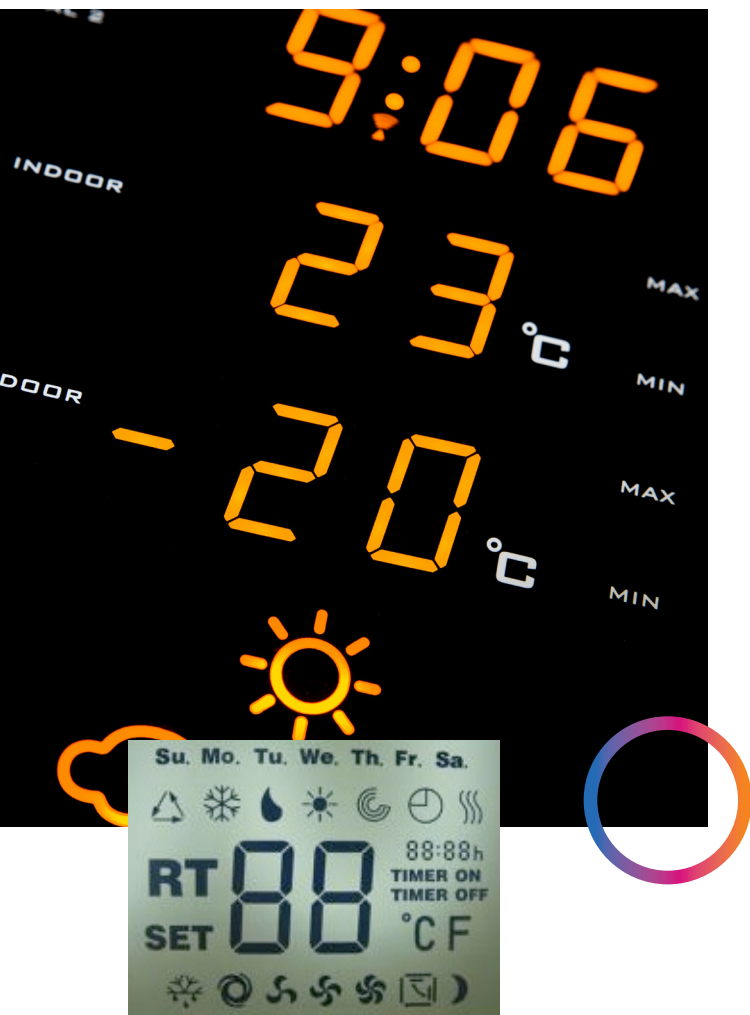
## Typical Applications

- Medical Applications
- Factory Floor Environments
- Material handling equipment
- Public terminal/kiosks
- Harsh Environments
- Access/Security Control Panels
- Specialist Vehicles
- Automotive Entertainment
- Marine and Avionics



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## Introduction

Anglia are able to offer an extensive range of standard LCD Displays but for those applications which require a non-standard display, Anglia can offer a wide variety of custom made displays and options.

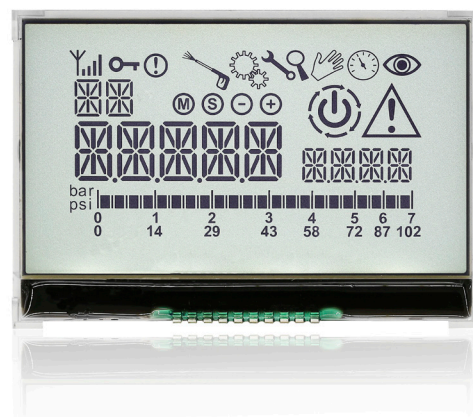
Customising the display enables designers the flexibility to differentiate or distinguish their end products Anglia are able to offer many options from custom symbols to special text fonts and many other features.

Custom displays can also be tailored to individual domains or applications allowing them to meet the demands of specific industries such as high-performance control panels that can be embedded into equipment and machines.

## Typical Custom Options

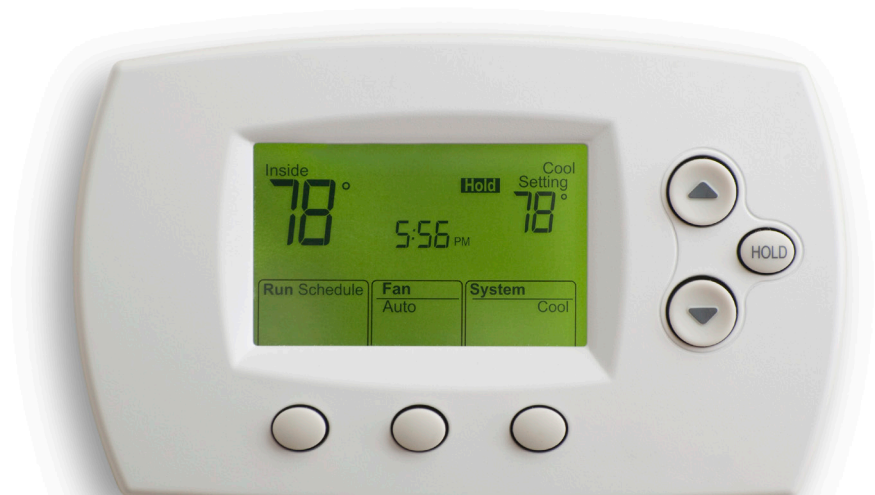
- Fully customised display
- Addition of custom icons, characters or fonts
- Wide temperature range options
- Addition of Capacitive or Resistive touch panels
- EL backlight options
- LED backlights in white or other colour options
- Mono or Colour Graphics LCD/TFT
- Negative mode operation
- Special viewing angles
- Reflective, transfective and transmissive
- Built in Driver IC selection
- Connector options for data, touch screen and backlight

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## Typical Applications

- Medical
- Telecom
- Control panels
- HVAC
- Security
- Process control
- Recreational
- Portable devices



## Creating your Custom Display

Whether you are designing **wearables, medical, industrial, instrumentation or consumer devices**, we can offer a solution for your application along with the highest quality technical assistance which you would expect to receive from an Independent Distributor such as Anglia.

In order for us to assist you further, please answer a few questions to enable us to understand your requirements. By providing us with this information, we will be able to guide you to the best product to meet your goals and support you through all of the design stages.

Fill out our simple online form at [www.anglia-live.com/customparts](http://www.anglia-live.com/customparts)

To further enhance your design Anglia are able to offer **bespoke keypads**  
More information on custom keypads can be seen on page 13 of this book.

## Introduction

Single board computers are an ideal solution for applications that require a display. These powerful but compact computers can be programmed to run the customers application software, they can also be easily connected and control other hardware devices in the system.

The selection available from Anglia consists of Embedded single board computers (SBC), Industrial motherboards, Embedded systems and Panel PC products. The extensive range of products includes a wide choice of options such as processor cores enabling designers to select the best performance/cost balance for the application's requirement.

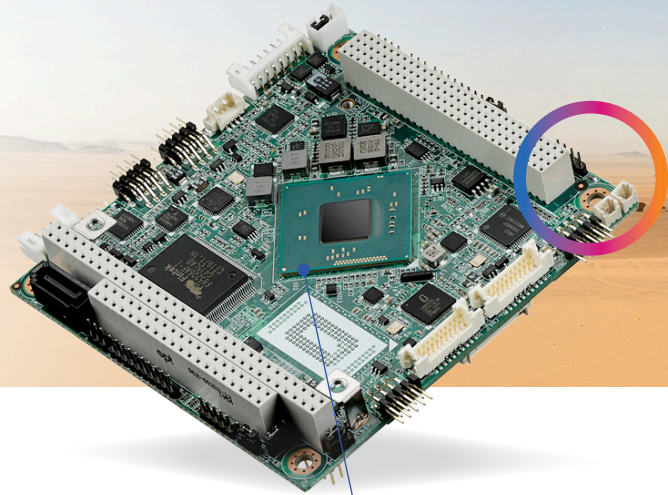
The entry level Embedded SBC products come with a choice of high performance CPU's including ARM based cores. The Embedded systems take the Embedded SBC and Industrial motherboards and house them conveniently in a ruggedised case with multiple I/O connections & fanless cooling for extended reliability.

The theme is taken a step further with the Panel PC products which incorporate the display with touch screen control.

Finally, a wide range of complementary interface Accessory cards are offered with LVDS, VGA, TV-out, USB/Serial and Panel-Link functionality.

For fully customised solution to suit your application's individual requirements please contact us.

Website Data Reference  
**DSP180**



- Rugged PCB Material
- Wide Temperature
- ESD Protection
- Remote Device Management
- Built-in Intelligence





## Introduction

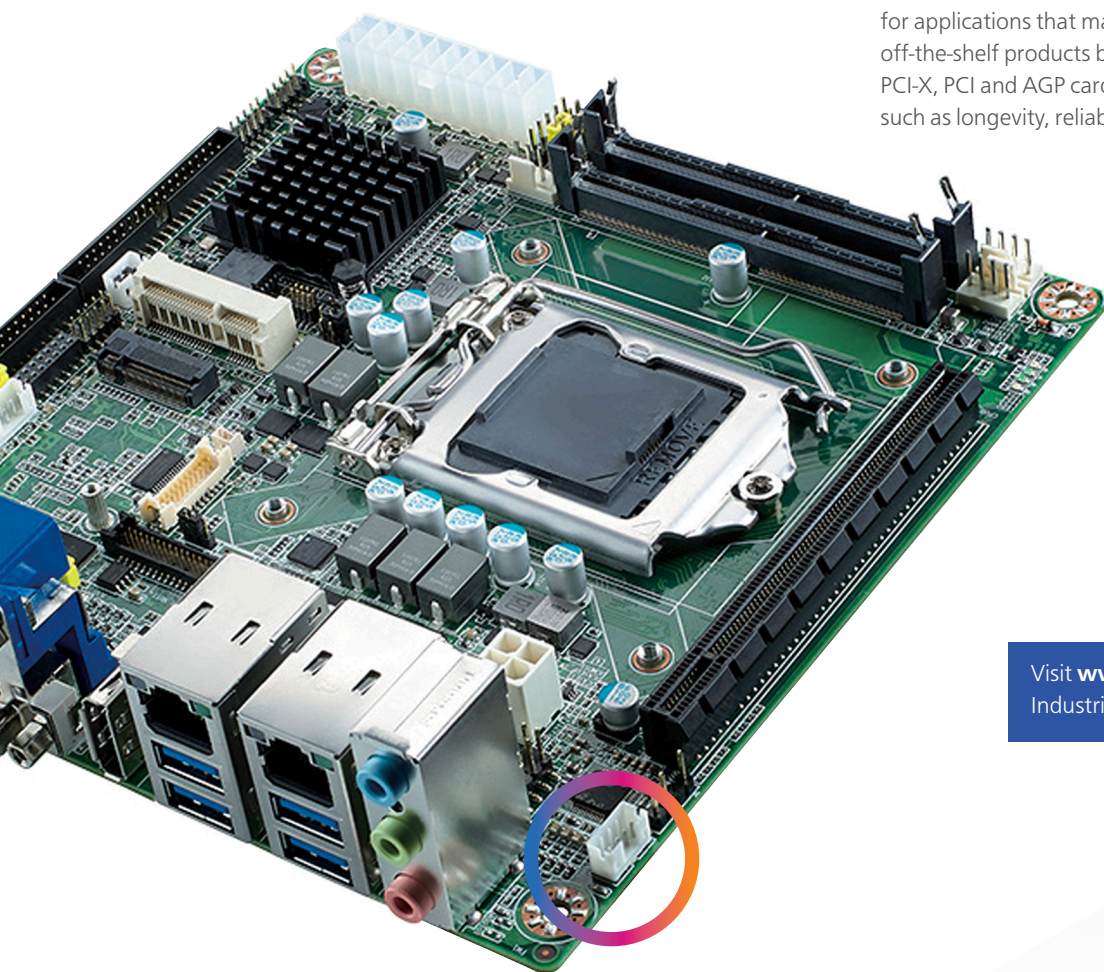
Anglia are able to offer a range of Industrial motherboard series ranging from Mini-ITX, Micro ATX to ATX form factor boards. These industrial motherboard series are built with standard form factors which allow customers to seamlessly upgrade without compatibility concerns.

The Mini-ITX, Micro ATX and ATX motherboards have all been designed with industrial applications in mind and feature strict revision control, this means engineering changes are kept to a minimum and long product life cycle is assured. Specifying these industrial motherboards helps reduce high cost design changes and costly maintenance and upgrade efforts throughout the lifetime of the end product.

The industrial motherboard series are also ideal solutions for applications that may currently be using commercial off-the-shelf products but require the flexibility of PCIe, PCI-X, PCI and AGP card expansion with industrial features such as longevity, reliability and manageability.

Website Data Reference  
**DSP181**

Visit [www.anglia-live.com](http://www.anglia-live.com) for the latest Industrial Motherboards





## Introduction

Touch controllers enable the link between human interaction and the display screen, this is often referred to as the Human Machine Interface (HMI).

The touch controller detects the change in electrical charge created when touching the surface of a touch panel display using a stylus or finger/fingers (multi-touch action).

It then translates this detected change into a digital signal and sends to the host computer which in turn makes the appropriate change to the image on the display, all within fractions of a second.

The latest touch controllers offer improved accuracy and lower power consumption. Touch controllers are also available which can sense temperature, supply voltage and touch pressure offering improved ergonomics for modern display applications.

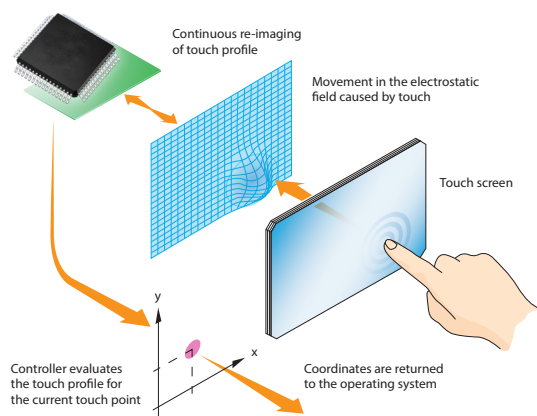
Anglia have a comprehensive selection of Touch Controller options to suit a wide range of application requirements.

## Key Features

- Low power consumption
- LCD noise reduction feature
- Touch pressure measurement
- Wake up on touch function
- Advanced movement tracking

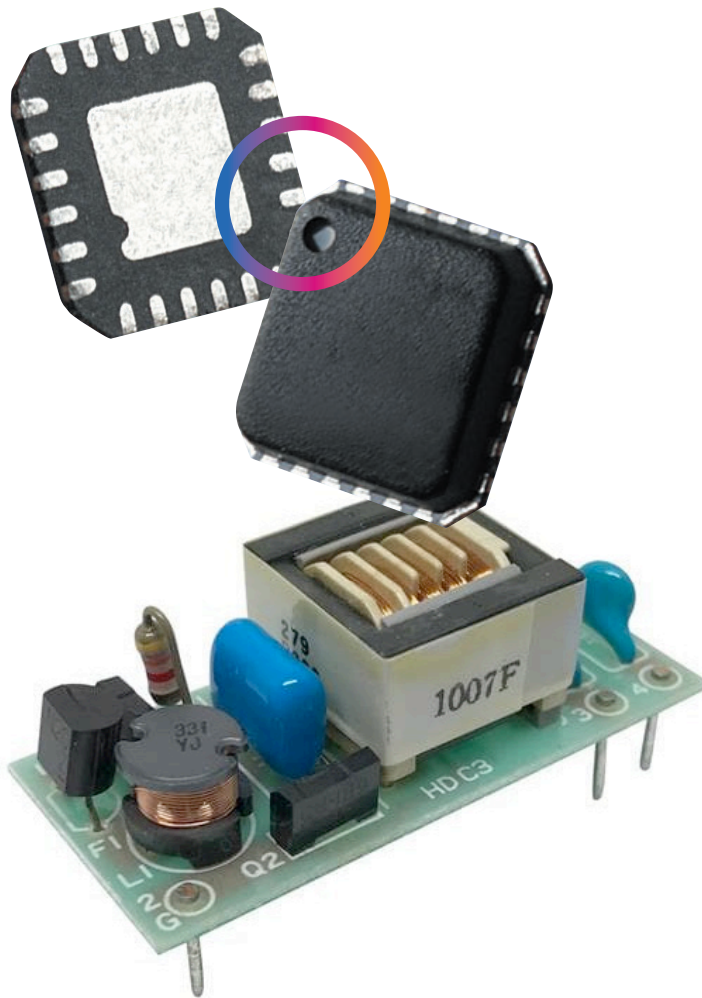
## Typical Applications

- Industrial control displays
- Portable devices
- Navigation equipment
- Touch screen monitors
- Point of Sale terminals
- Interactive digital signage displays
- Vending machines
- AV streaming devices
- Medical Imaging



Website Data Reference  
**DSP182**





## Introduction

Display panels are now an integral part of modern technology being found in applications ranging from TV/ Monitors, mobile phones, notebooks, industrial machines through to high end automotive cabin interiors. Most displays have an integrated backlight source to illuminate the panel, traditionally CCFL (cold cathode fluorescent lamp) was used but now LED backlighting is much more common.

LED backlighting is now more popular due to its low power consumption, lower cost, higher reliability, greater control and smaller/slimmer footprint. Modern high performance LED backlight drivers incorporate features such as brightness adjustment and protection circuits, they are available as modules or discrete components in the latest compact packages helping to reduce the board space required.

Anglia are able to offer a range of CCFL and LED backlight controllers to address the varying demands of modern display applications.

## Key Features

- Module or discrete component options
- Low power consumption
- Long lifetime
- Instant brightness control
- Built in protection
- High reliability

Website Data Reference

**DSP183**

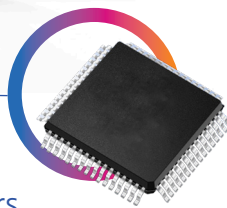






## Graphic Display Controllers

Anglia are able offer the best display driving solution for your application. Whether your requirement is for a simple display driver or a fully integrated graphic controller we can help.



## Introduction

Demand continues to increase for larger and higher resolution displays in modern applications, this puts increased demand on the microprocessor or microcontroller in the host system. The solution to this problem is to use a separate dedicated display driver, whether you are looking for a single chip or a higher level of integration Anglia are able to offer a display driver to meet the requirement of your application.

The range of display driver ICs available can interface with almost any kind of microcontroller, including low-cost 8-bit MCUs. The single chip display driver/graphics controller handles the entire image rendering and display interface functions thus freeing up host system resources.

To reduce software manipulation for animation, display drivers with on-chip graphic engines are also available which provide additional graphic manipulation functions such as display rotation, window mode, graphic cursor mode, and so on.

Website Data Reference  
**DSP184**



## Introduction

Display drivers and Graphics controllers bring added value to your device without sacrificing the display quality of the end product.

The drivers and controllers contain embedded RAM which acts as a frame buffer between the host processor and the display panel, controlling processes such as mirroring and windowing, display enhancement such as brightness, contrast and saturation control.

## Key Features

- Full HD through 4K x 2K resolution support
- DisplayPort 1.2 compliancy with multi-stream and daisy-chaining capabilities
- Superior image quality with Faroudja video processing technologies
- Extensive connectivity: DP1.2, HDMI1.4, DVI-Dual Link, VGA, component video
- Flexible panel interface: eDP, LVDS (dual, quad channel)
- Analogue and digital audio support

## Typical Applications

- Industrial controls
- Medical equipment
- Office automation
- Portable and handheld Equipment
- Mobile devices

Website Data Reference  
**DSP185** 





## Introduction

Animated graphics, OSD menus with customised fonts/ icons, full motion video and high resolution images are now a standard requirement in many applications that use a display. To meet these increased application demands requires a dedicated image processor, these powerful IC's allow more complex features to become reality.

As the resolution and quality of display demands increase, ensuring the application is performing as efficiently as possible becomes even more important. By utilising a dedicated image processor in the design tasks such as multi-layer composition and image post-processing can be handled more efficiently giving improved visual quality and reduced overall system power consumption.

Anglia are able to supply a range of image processors to meet the requirements of different markets, including high-end portable display devices, security and surveillance, gaming, industrial and medical applications.

## Key Features

- Image sharpening/Clarity
- Noise reduction
- Re-construction of incomplete digital imagery

Website Data Reference  
**DSP186**





## Introduction

The cable assembly is often overlooked however this component is a critical part of the system as it ensures the correct interconnect between the various elements of the system such as the display and embedded computer or touch controller. Anglia are able to offer interface cables including LVDS, USB, LED backlight, UART for touch screens and other high-quality cables for all display applications.

Working closely with the designer and our partner suppliers, we can produce simple cable assemblies through to more complex complete cable assemblies. We can also offer expert technical advice to help link your chosen display to any driver card or single board computer, whatever the combination.

Anglia has access to a wide portfolio of high quality and cost-effective industry standard connectors which can be configured into cable assemblies to meet your requirements.

To discussed in more detail with one of Anglia's Technical engineers. Visit our website and complete our basic custom cable assembly requirement questionnaire.

Fill out our simple online form at  
[www.anglia-live.com/customparts](http://www.anglia-live.com/customparts)



# GLOSSARY OF TERMS

AMOLED	Active Matrix Organic Light Emitting Diode
Active	Each pixel is driven by a thin film transistor in the LCD glass
Backlight	A light source that is positioned behind the display
Brightness	The light intensity of the display - this is expressed in candela per square metre (cd/m2)
CCFL	Cold Cathode Fluorescent Lamp
COB	Chip on Board
COG	Chip on Glass
Contrast Ratio	The ratio between the lightest and darkest pixels in the display
EBTN	Enhanced Black Twisted Nematic
EPD	Electronic Paper Display
FFC	Flat Flex Cable
FPC	Flexible Printed Circuit
FSTN	Film compensated STN
I <sup>2</sup> C	Communication protocol used to control device
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LVDS	Low-voltage differential signalling
Mono	Also referred to as Monochrome, meaning single colour
Negative Mode	Light characters on a dark background
OLED	Organic Light Emitting Diode
Passive	Passive technology - each row and column of the display are multiplexed or addressed in turn
Pixel	An individual dot on the display
PMOLED	Passive Matrix Organic Light Emitting Diode
Positive Mode	Dark characters on a light background
Reflective	Viewing mode which uses ambient light only and no backlight
Resolution	Pixel count, for example 800 x 480 (800 pixels across and 480 pixels down)
SBC	Single Board Computer
SPI	Communication protocol used to control device
STN	Super Twisted Nematic
TAB	Chip on Tab
TFT	Thin Film Transistor
TN	Twisted Nematic
Transflective	Viewing mode which can use backlighting or natural light for display illumination
Transmissive	Viewing mode which relies on backlighting for display illumination
VATN	Vertically Aligned Twisted Nematic
Viewing Angle	The angle or angles from which the display can be viewed clearly
Zebra Strip	Conductive rubber strip - used to connect LCD's to printed circuit boards
ZIF	Zero Insertion Force

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