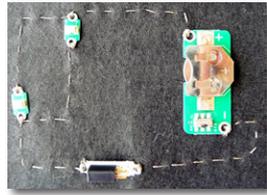


### E-Textiles

E-Textiles describes a contemporary and exciting new dimension for textile design. Using miniature components and conductive thread, simple LED circuits can be built into any type of textile product - including garments. For the ultimate in bling for dance or evening wear or to take high-visibility to another level, E-Textiles has a great deal to offer. The components we offer here have been developed to make the technique both accessible and reliable and all have a proven track record for success from KS2 to KS5.



#### How it works?

All the components are designed for easy but discrete stitching to the product and feature a pair of through-hole plated connection terminals. Simply over-sew around each terminal with conductive thread and a reliable circuit can be created. The different components are simply joined together using conductive thread and a small running stitch. No soldering is needed. The conductive thread forms an electrical circuit so the layout must be carefully designed to prevent stitches crossing or touching.

#### Designing with E-Textiles

Decide on what type, colour and how many LEDs you wish to use and work out their position on the product. They may sit on the surface or could be on a separate layer beneath - it is often easier to work in layers. Decide on what type of switch is required - this could be another component or simply metal press studs or a metal zip. Soft switches can be made from conductive fabric and foam and stitched anywhere in the circuit. Finally, decide where the batteries will best be hidden. A single coin cell will power up to 5 LEDs depending on the type and colours chosen. If necessary, an additional power supply board (or boards) can be added. Simply fix and connect them using a parallel connection and conductive thread.

*This Sochi Container was made using S80 non-woven fabric and was printed using the Sawgrass SG400 sublimation printer. This was then cut out on the CAMM 1 knife cutter. The design for the net and all the patterns were created in TechSoft's 2D Design V2. The embroidery on the surface and side stitching was done using a Brother Innov-is 35 sewing machine. Embroidered 3D sections were created using soluble fabric and organza, stitched on the Brother Innov-is V3 embroidery machine - the initial design was created in PE Design Next software. The electronics used were sewable LEDs, 3V power supply and a light sensor, stitched together with conductive thread.*



#### Don't Do Electronics?

You soon will with E-Textiles. All circuits are made using parallel connections for the LEDs with switches connected in series. Each component has positive (+) and negative (-) signs clearly marked and all you do is connect between these. Students will find it helpful to prepare a simple circuit diagram as part of their design work to guide them when building their E Textile product.



*This design was created using TechSoft's 2D Design V2 and sent to a CAMM 1 to be cut from textile vinyl. Sewable LEDs were added to the eyes and stitched to the power supply board in the front pocket using a conductive thread. Crystals were glued onto vinyl to reflect light from the LEDs. Flowers were stitched on the organza with soluble fabric stabiliser and were cut out after stitching.*

#### E-Textiles Starter Kit

Contains sewable coin cell holder, 2m thread and colour changing LED, 3 sewable coin cell holders, small conductive thread bobbin (6m), 10 blue sewable LEDs, 10 white sewable LEDs, sewable coin cell holder with built-in power switch, sewable push switch, sewable slide switch, sewable tilt, switch & strip of 5 CR2032 coin cells.



TXEF-PK1	E-Textiles Starter Pack.	
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#### E-Textiles Kit for BBC micro:bit

This kit is a great way to get started with creating BBC micro:bit controlled E-Textiles projects and designs. The kit includes 5 x Sewable Red LED boards, 5 x Sewable White LED boards, 5 x White 5mm Diffused LEDs, 10 x 28mm Crocodile Clips & 1 x Electro-Fashion, Conductive Thread, 6m.



EL-BM17	E-Textiles Kit for the BBC micro:bit	
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#### Flashing LED Kits



TXEF-LEDF1-COL



TXEF-LEDCC1

TXEF-LEDF1-COL*	Sewable Flashing LED Kit. (Includes coin cell holder, coin cell, 2m conductive thread, 2 flashing LEDs). Available in blue, green, red and yellow.	
TXEF-LEDCC1	Sewable Colour Changing LED Kit. (Includes coin cell holder, coin cell, 2m conductive thread, colour changing LED)	

#### Sewable Buzzer



TXEF-BUZZ1	Sewable Buzzer 18x8x6mm	
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#### Modules



TXEF-MOD1



TXEF-MOD2

TXEF-MOD1	E-Textiles Module - Flasher Controller & LEDs.	
TXEF-MOD2	E-Textiles Module - Light Sensor	

#### Power Boards

The power supply boards featuring CR2032 coin cells will keep more LEDs brighter for longer so are the most popular choice for most students.



	TXEF-CCH1	TXEF-CCH3	TXEF-CCH2	TXEF-CCH4	
TXEF-CCH1	Sewable Coin Cell Holder (34x20x4.5mm, accepts CR2032 batteries)				
TXEF-CCH3	Sewable Miniature Coin Cell Holder (22x12.5x4mm, accepts CR1220 batteries)				
TXEF-CCH2	Sewable Coin Cell Holder with Switch (44x20x4.5mm, accepts CR2032 batteries)				
TXEF-CCH4	Sewable Coin Cell Holder with Latching Switch (44x28x5mm, accepts CR2032 batteries)				

### Switches

Push switches only operate while you press them so might best be hidden in a pocket. A slide switch stays on so could be behind a cuff or lapel. A tilt switch operates when moved, if stitched into a sleeve then it could make the LEDs come on when you raise your arm. A latching switch is a push on, push off switch. Magnetic switches are in two parts, if they were stitched into either side of a pocket then the LEDs could be controlled by placing a hand in your pocket.



<b>TXEF-SW1</b>	Sewable Push Switch (18x8.5x6mm)	
<b>TXEF-SW2</b>	Sewable Slide Switch (18x8.5x4mm)	
<b>TXEF-SW3</b>	Sewable Tilt Switch (26x6.5x7mm)	
<b>TXEF-SW5</b>	Sewable Latching Switch (20x20x4mm)	
<b>TXEF-SW4</b>	Magnetic Switch Complete with Magnet	

### Batteries

A single CR1220 coin cell is about the size and weight of a 1p coin and will keep a single LED bright for about two hours. The CR2032 coin cell is about the size and weight of a 5p coin and will keep a single LED bright for about 10 hours.

<b>TXEF-BAT1-5</b>	Pack of 5 CR2032 Coin Cell Batteries	
<b>TXEF-BAT2-5</b>	Pack of 5 CR1220 Coin Cell Batteries	

### Conductive Thread

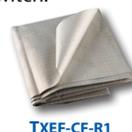
No soldering is needed! Connections are made using conductive thread. Several loops of this are firmly stitched around the connection terminal before being taken to the next terminal with a loose running stitch.



<b>TXEF-CT-2</b>	2m Conductive Thread (on Card)	
<b>TXEF-CT-6</b>	6m Conductive Thread (on Card)	
<b>TXEF-CT-45</b>	45m Conductive Thread (on Bobbin)	
<b>TXEF-CT-250</b>	250m Conductive Thread (on Bobbin)	

### Conductive Material

Conductive fabric gives even more opportunities for ingenuity. Small patches can be sewn where they can be deliberately (or randomly) touched together thus making a soft switch.



<b>TXEF-CF-R1</b>	Conductive Fabric (Ripstop, 305 x 330mm)	
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### LED Boards

There are two sorts of LEDs for use in textiles – the sew on ones that come on their own board and the regular LEDs for traditional electronic work.



<b>TXEF-LEDB10-6-COL*</b>	Pack of 10 Sewable LED Boards (15 x 6.5 x 2.7mm). Available in red, blue, white, green and lilac.	
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\* When ordering, where COL is included in the order code, please change this to specify the actual colour required.

### Traditional LEDs

To sew these traditional LEDs onto textiles, simply bend the legs so that they are at right angles to the bulb and curl them to form loops, through which conductive thread can be oversewn to make the circuit. Alternatively, the 5mm LEDs can be soldered onto a handy sewable LED holder.

#### Standard 3mm LEDs (25 degrees)



<b>TX-LED3C-10-BL</b>	Pk of 10 Blue 3mm Water Clear LED (1750mCd)	
<b>TX-LED3C-10-GR</b>	Pk of 10 Green 3mm Water Clear LED (75mCd)	
<b>TX-LED3C-10-OR</b>	Pk of 10 Orange 3mm Water Clear LED (1750mCd)	
<b>TX-LED3C-10-RD</b>	Pk of 10 Red 3mm Water Clear LED (1000mCd)	
<b>TX-LED3C-10-WH</b>	Pk of 10 White 3mm Water Clear LED (2750mCd)	
<b>TX-LED3C-10-YL</b>	Pk of 10 Yellow 3mm Water Clear LED (1000mCd)	

#### Standard 5mm LEDs (25 degrees)



<b>TX-LED5C-10-BL</b>	Pk of 10 Blue 5mm Water Clear LED (1150mCd)	
<b>TX-LED5C-10-GR</b>	Pk of 10 Green 5mm Water Clear LED (1000mCd)	
<b>TX-LED5C-10-OR</b>	Pk of 10 Orange 5mm Water Clear LED (900mCd)	
<b>TX-LED5C-10-RD</b>	Pk of 10 Red 5mm Water Clear LED (1150mCd)	
<b>TX-LED5C-10-WH</b>	Pk of 10 White 5mm Water Clear LED (2250mCd)	
<b>TX-LED5C-10-YL</b>	Pk of 10 Yellow 5mm Water Clear LED (800mCd)	
<b>TXEF-HOLD1</b>	Pk of 10 Sewable 5mm LED Holder (18x8x1mm)	

#### Pink 4.8mm LED (100 degrees)



<b>TX-LED48C-10-PK</b>	Pk of 10 Pink 4.8mm Water Clear LED (700mCd)	
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#### Flashing LEDs (15/30 degrees)



<b>TX-LED5FC-10-BL</b>	Pk of 10 Flashing Blue 5mm Water Clear LED	
<b>TX-LED5FC-10-GR</b>	Pk of 10 Flashing Green 5mm Water Clear LED	
<b>TX-LED5FC-10-RD</b>	Pk of 10 Flashing Red 5mm Water Clear LED	
<b>TX-LED5FC-10-WH</b>	Pk of 10 Flashing White 5mm Water Clear LED	
<b>TX-LED5FC-10-YL</b>	Pk of 10 Flashing Yellow 5mm Water Clear LED	
<b>TXEF-HOLD1</b>	Pk of 10 Sewable 5mm LED Holder (18x8x1mm)	

#### Colour Changing LEDs



<b>TX-LED5CC-10</b>	Pk of 10 Colour Changing 5mm LED (diffused, VF 2.7-5, 3000mcd@25mA)	
<b>TX-LED10CC-10</b>	Pk of 10 Colour Changing 10mm LED (diffused, VF 2.7-5, 3000mcd@25mA)	