



UltraTEV Monitor™

COMPLETE asset monitoring & alarm system

For 24/7 monitoring of Partial Discharge (PD) activity in all substation assets – including cables

benefits

Comprehensive PD monitoring enables:

- Early identification of asset deterioration
- Measurement and analysis of PD activity to identify faults BEFORE they lead to failures
- Valuable information provided on the actual condition of assets
- More effective asset management, reliability, efficiency and safety, at lower cost

features

The most comprehensive PD monitor ever developed for:

- Detection
- Measurement
- Monitoring
- Recording
- Analysis

FACT: 85% of disruptive substation failures are PD related

FACT: The UltraTEV Monitor™ is the most powerful PD monitoring solution available AND a complete substation management system



‘The UltraTEV Monitor™ is a step change in the management of substations, based on its ability to measure and analyse the actual condition of all their assets simultaneously’

third generation technology

The UltraTEV Monitor™ is the product of EA Technology’s unique experience as a pioneer of measuring and interpreting Partial Discharge (PD) activity, gained over more than 35 years.

first generation TEV instruments

EA Technology’s PD Monitor™ was one of the first transportable PD instruments to record activity by measuring Transient Earth Voltage effects using multiple probes: and the first to provide precedence measurement over all of its channels.



second generation Ultrasonic + TEV instruments

Combining ultrasonic and TEV measurement in single instruments like the UltraTEV Plus+ has transformed the ability to detect and measure PD activity.



third generation multiple sensor systems

The UltraTEV Monitor™ is the first of the new generation of asset management SYSTEMS, combining the functions of multiple PD instruments in a single package.



UltraTEV Monitor™

the total asset management system

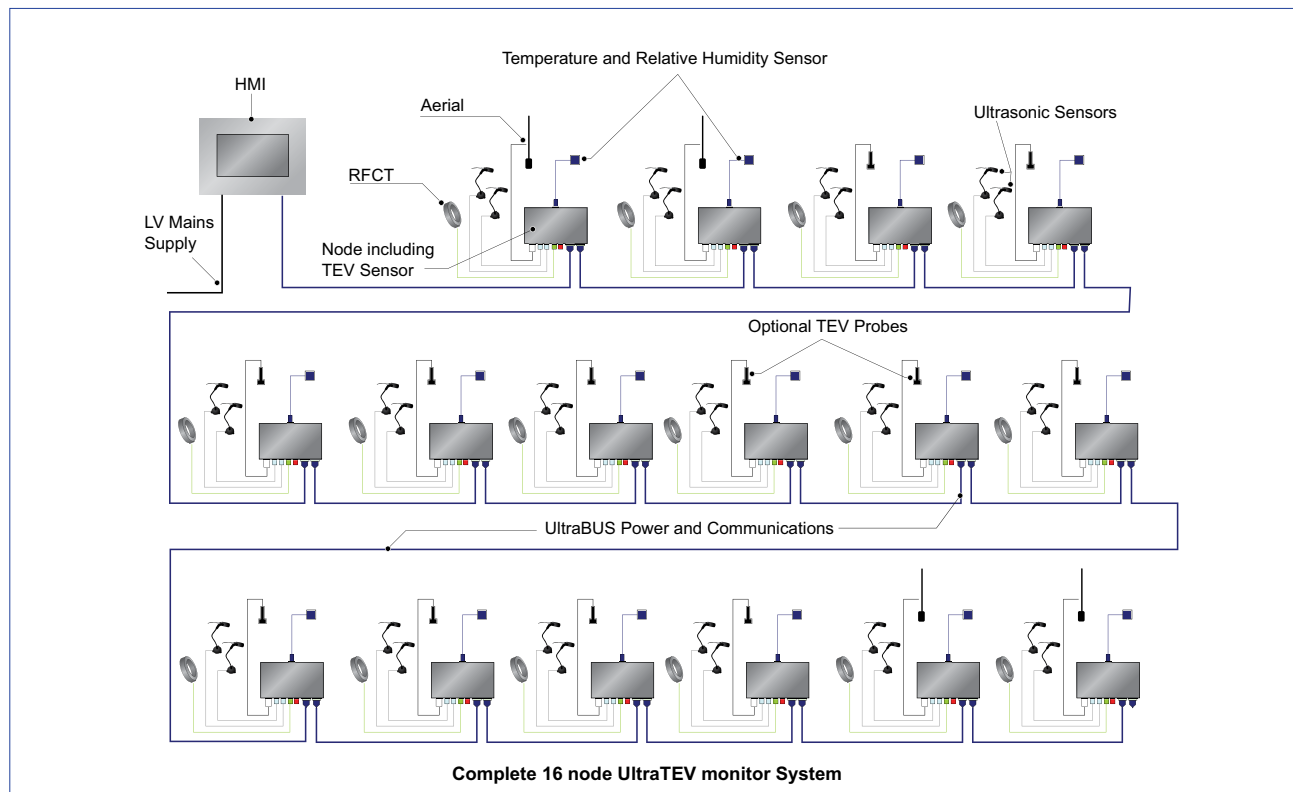
The UltraTEV Monitor™ is a fully integrated, modular asset management system. It comprises multiple sensor nodes, linked to a central processor which has communications capability over multiple networks.



multiple assets

The web-enabled UltraTEV Monitor™ can support and process condition data from up to 250 measuring points simultaneously, all with precedence between them.

The modular nature of the system makes it equally suitable for large or small substations, continuously monitoring all types of MV and HV assets, including cables.



A typical UltraTEV Monitor™ installation, with 16 measurement nodes.

‘The ability to factor in environmental conditions greatly enhances the accuracy of the UltraTEV Monitor™’

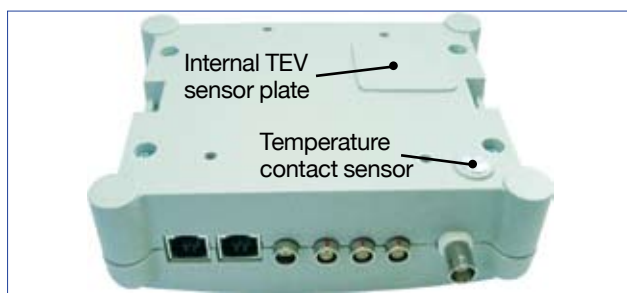
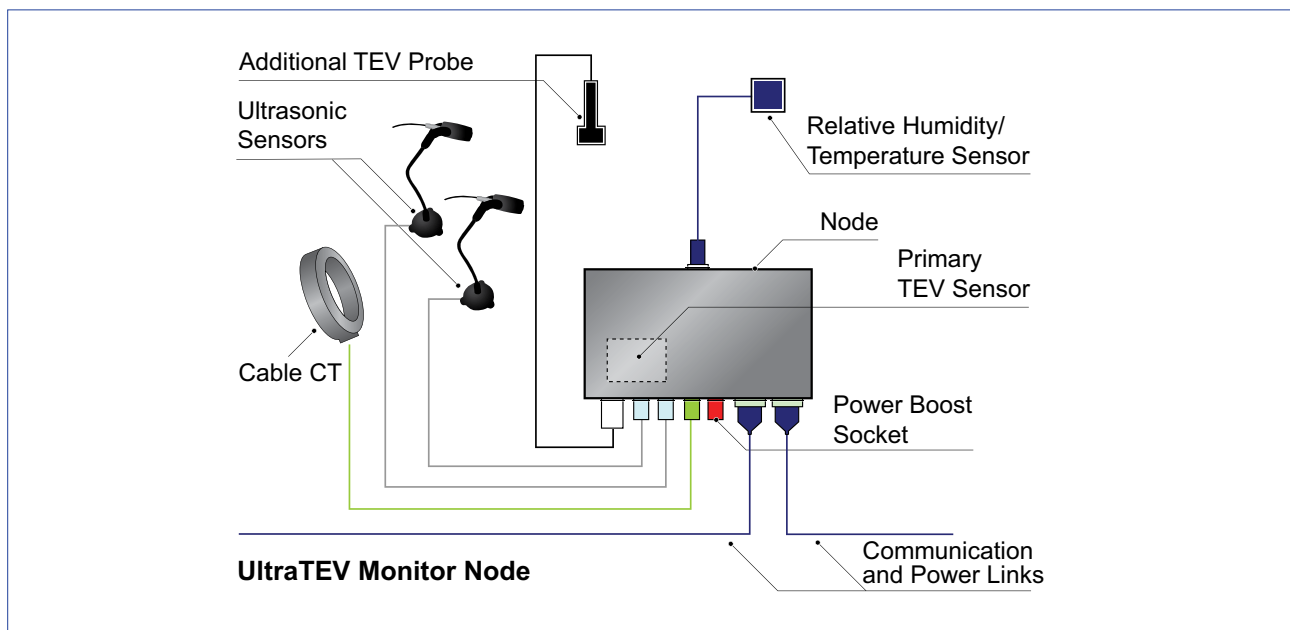
multiple sensors

Each UltraTEV Monitor™ measurement node is capable of measuring PD activity and the environmental factors which affect it in FIVE ways:

- TEV Built-in TEV sensor, plus additional plug-in TEV probe
- Ultrasonic Via plug-in external sensors
- Temperature Built in contact sensor, plus plug-in external sensor
- Humidity Via plug-in external sensors
- RFCT Cables are monitored via plug-in Radio Frequency Current Transformer (RFCT)



Options include (from top left): ultrasonic microphone, contact ultrasonic sensor and plug-in TEV probe



Underside of UltraTEV Monitor Node



Additional temperature/humidity sensor

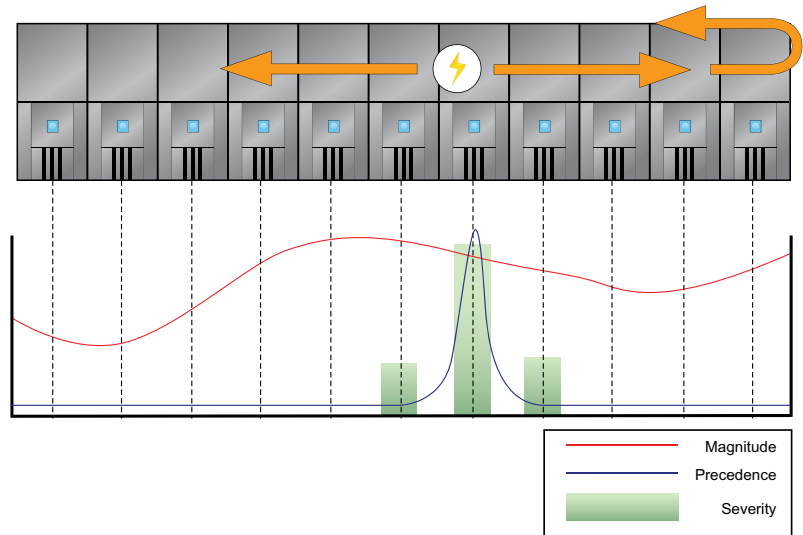


PD activity in cables is monitored using Radio Frequency Current Transformer (RFCT)

‘The system’s wide range of capabilities make it exceptionally good value: it is effectively several complete instruments in a single substation management package’

PD Monitoring

The UltraTEV Monitor™ employs precedence detection from several measurement points, together with sophisticated electronics, to measure the magnitude, location and severity of PD activity.



PD Detection	Continuously checks for the presence of PD activity on the surface of insulation internal to components and in cables.
PD Location	Uses time-of-flight measurement to a resolution of 1ns (nanosecond) to locate the source of PD activity to within 30cm. Earlier systems were only accurate to within 60 cms.
PD Measurement	Measures the magnitude and severity of PD activity at up to 250 measurement points simultaneously.
PD Monitoring	Monitors changes in PD activity over time, including environmental factors (noise, temperature and humidity) to eliminate false readings.
PD Recording	Records PD activity in all assets being monitored over time.
PD Analysis	Analyses and reports on PD activity over time.
PD Alarms	Automatically transmits alerts by email or optional SMS when PD activity reaches a critical level on any component being monitored. Also tracks trends in PD activity and warns when rates of change exceed specified parameters.

‘Single cable networking makes installation and expansion easy and flexible’

UltraBUS™ networking

The UltraTEV Monitor™ is the first system to deploy EA Technology’s new UltraBUS™ networking solution.

The UltraBUS™ carries data and power over a single cable, which makes the whole system easy and neat to install. It also enables measurement nodes and sensors to be added or moved whenever needed.



web-based interface

The UltraTEV Monitor™ software is built around Microsoft Windows® and all communications are web-based. This makes the system 100% compatible with standard PCs and laptops using industry standard web browsers.

In PD Alarm mode, the system automatically transmits alerts of critical activity by email and/or optional SMS to nominated users.

automatic analysis

The system's hub features a powerful processor running an all new suite of analytical software.

Every channel of every measurement node is monitored individually and continuously, so data on the condition of each asset being monitored is accurate and complete.

The hub automatically records and analyses PD data and converts it into web-based management information, which is easy to read.

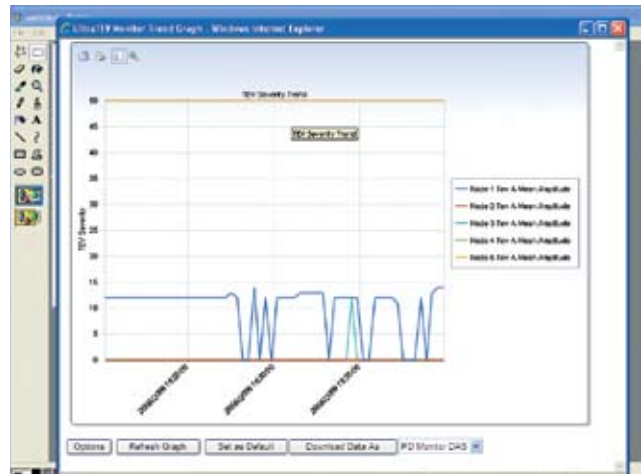
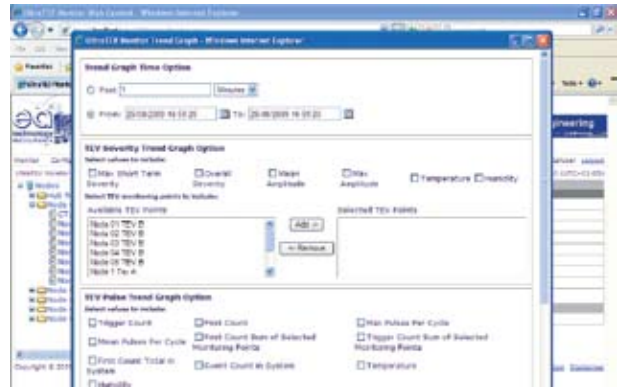
accessible information

Authorised users can interact with the system and view reports anywhere, any time, over the internet or company communications networks.

expert interpretation

Users have the option of interpreting their own data on PD activity, using the analysis and reporting features built into the software.

Alternatively, they can use EA Technology's own PD specialists to monitor the system online, anywhere in the world, and receive expert management reports and recommendations e.g. suggested maintenance interventions where PD activity indicates the likelihood of failure.

A screenshot of the UltraTEV Monitor software interface showing a table of monitoring points. The table has columns for 'Node ID', 'Node Name', 'Node Type', 'Node Status', and 'Node Last Update'. The table contains several rows of data, including nodes like 'Node 01 - 100 A, Mean Amplitude', 'Node 02 - 100 A, Mean Amplitude', 'Node 03 - 100 A, Mean Amplitude', 'Node 04 - 100 A, Mean Amplitude', 'Node 05 - 100 A, Mean Amplitude', 'Node 06 - 100 A, Mean Amplitude', 'Node 07 - 100 A, Mean Amplitude', 'Node 08 - 100 A, Mean Amplitude', 'Node 09 - 100 A, Mean Amplitude', 'Node 10 - 100 A, Mean Amplitude', 'Node 11 - 100 A, Mean Amplitude', 'Node 12 - 100 A, Mean Amplitude', 'Node 13 - 100 A, Mean Amplitude', 'Node 14 - 100 A, Mean Amplitude', 'Node 15 - 100 A, Mean Amplitude', 'Node 16 - 100 A, Mean Amplitude', 'Node 17 - 100 A, Mean Amplitude', 'Node 18 - 100 A, Mean Amplitude', 'Node 19 - 100 A, Mean Amplitude', 'Node 20 - 100 A, Mean Amplitude', 'Node 21 - 100 A, Mean Amplitude', 'Node 22 - 100 A, Mean Amplitude', 'Node 23 - 100 A, Mean Amplitude', 'Node 24 - 100 A, Mean Amplitude', 'Node 25 - 100 A, Mean Amplitude', 'Node 26 - 100 A, Mean Amplitude', 'Node 27 - 100 A, Mean Amplitude', 'Node 28 - 100 A, Mean Amplitude', 'Node 29 - 100 A, Mean Amplitude', 'Node 30 - 100 A, Mean Amplitude', 'Node 31 - 100 A, Mean Amplitude', 'Node 32 - 100 A, Mean Amplitude', 'Node 33 - 100 A, Mean Amplitude', 'Node 34 - 100 A, Mean Amplitude', 'Node 35 - 100 A, Mean Amplitude', 'Node 36 - 100 A, Mean Amplitude', 'Node 37 - 100 A, Mean Amplitude', 'Node 38 - 100 A, Mean Amplitude', 'Node 39 - 100 A, Mean Amplitude', 'Node 40 - 100 A, Mean Amplitude', 'Node 41 - 100 A, Mean Amplitude', 'Node 42 - 100 A, Mean Amplitude', 'Node 43 - 100 A, Mean Amplitude', 'Node 44 - 100 A, Mean Amplitude', 'Node 45 - 100 A, Mean Amplitude', 'Node 46 - 100 A, Mean Amplitude', 'Node 47 - 100 A, Mean Amplitude', 'Node 48 - 100 A, Mean Amplitude', 'Node 49 - 100 A, Mean Amplitude', 'Node 50 - 100 A, Mean Amplitude', 'Node 51 - 100 A, Mean Amplitude', 'Node 52 - 100 A, Mean Amplitude', 'Node 53 - 100 A, Mean Amplitude', 'Node 54 - 100 A, Mean Amplitude', 'Node 55 - 100 A, Mean Amplitude', 'Node 56 - 100 A, Mean Amplitude', 'Node 57 - 100 A, Mean Amplitude', 'Node 58 - 100 A, Mean Amplitude', 'Node 59 - 100 A, Mean Amplitude', 'Node 60 - 100 A, Mean Amplitude', 'Node 61 - 100 A, Mean Amplitude', 'Node 62 - 100 A, Mean Amplitude', 'Node 63 - 100 A, Mean Amplitude', 'Node 64 - 100 A, Mean Amplitude', 'Node 65 - 100 A, Mean Amplitude', 'Node 66 - 100 A, Mean Amplitude', 'Node 67 - 100 A, Mean Amplitude', 'Node 68 - 100 A, Mean Amplitude', 'Node 69 - 100 A, Mean Amplitude', 'Node 70 - 100 A, Mean Amplitude', 'Node 71 - 100 A, Mean Amplitude', 'Node 72 - 100 A, Mean Amplitude', 'Node 73 - 100 A, Mean Amplitude', 'Node 74 - 100 A, Mean Amplitude', 'Node 75 - 100 A, Mean Amplitude', 'Node 76 - 100 A, Mean Amplitude', 'Node 77 - 100 A, Mean Amplitude', 'Node 78 - 100 A, Mean Amplitude', 'Node 79 - 100 A, Mean Amplitude', 'Node 80 - 100 A, Mean Amplitude', 'Node 81 - 100 A, Mean Amplitude', 'Node 82 - 100 A, Mean Amplitude', 'Node 83 - 100 A, Mean Amplitude', 'Node 84 - 100 A, Mean Amplitude', 'Node 85 - 100 A, Mean Amplitude', 'Node 86 - 100 A, Mean Amplitude', 'Node 87 - 100 A, Mean Amplitude', 'Node 88 - 100 A, Mean Amplitude', 'Node 89 - 100 A, Mean Amplitude', 'Node 90 - 100 A, Mean Amplitude', 'Node 91 - 100 A, Mean Amplitude', 'Node 92 - 100 A, Mean Amplitude', 'Node 93 - 100 A, Mean Amplitude', 'Node 94 - 100 A, Mean Amplitude', 'Node 95 - 100 A, Mean Amplitude', 'Node 96 - 100 A, Mean Amplitude', 'Node 97 - 100 A, Mean Amplitude', 'Node 98 - 100 A, Mean Amplitude', 'Node 99 - 100 A, Mean Amplitude', 'Node 100 - 100 A, Mean Amplitude'. The table is part of a larger web page with a header 'Innovators in Power Engineering' and a navigation menu.

All reports are viewable as interactive web pages in any browser.



specification

UltraTEV Monitor Node

TEV

Measurement Range:	0 to 60dBmV
Pass band:	3 to 80 MHz
Maximum Sensitivity:	1mV
Pulse Polarity:	Positive or negative
Resolution:	1dB
Accuracy:	±1dB
Precedence Resolution:	1ns
Number of Channels:	Up to 50 measuring points per string (maximum of 5 strings)

Ultrasonic

Measurement Range:	-7dB μ V to 68dB μ V
Resolution:	1dB
Accuracy:	±1dB
Transducer Sensitivity:	-65dB (0dB = 1 volt/ μ bar rms SPL)
Transducer Centre Frequency:	40 kHz
Transducer Diameter:	16mm
Number of channels:	2

Indicators

Power LED:	Bi-colour Red/Green LED
Status LED:	Bi-colour Red/Green LED
TEV State:	Bi-colour Red/Green LED
Ultrasonic State:	Bi-colour Red/Green LED
Cable PD State:	Bi-colour Red/Green LED

Connectors

Power and Comms Signals:	2 off RJ45
External TEV Sensor:	1 off BNC socket
Ultrasonic Sensor:	2 off 5-pin Lemo socket
Cable PD Sensor:	1 off 3-pin Lemo socket
Relative Humidity Sensor:	1 off micro USB
Aux Power Connector:	1 off 2-pin Lemo socket

Power Supply

Low Voltage DC:	48V, 80 mA
-----------------	------------

Dimensions

Size:	155 x 135 x 55 mm
Weight:	0.45 Kg

Environmental

Operating Temperature:	0 to 50 degrees C
Humidity:	0 – 90% RH non-condensing
IP Rating:	53

EMC

Safety class:	SELV
EMC Immunity:	Industrial Levels
EMC Emissions:	Industrial Levels

UltraTEV Monitor Hub

Description

The Hub is available as standard either as a wall mounted unit or within a portable enclosure. Rack mounted or other custom styles can be provided at extra cost.

- Provides power and communications to the Nodes
- Communicates via the Web, SMS, and email
- Receives, collates, and analyses data from the Nodes
- Can support up to 50 TEV measuring points per 'string'
- Can support up to 5 'strings'
- Produces customisable data display screens
- Indicates location and severity of all PD activity
- Performs trend analysis on selectable data inputs
- Multiple configurable alarms
- Multiple I/O ports for additional monitoring applications

Models

Portable
Wall mounted Cabinet

Power Supply

Voltage:	100-240V AC 47-63Hz
Power:	200 Watts
Fusing arrangements:	Node Supply internally fused Mains Supply fused 2A Antisurge (T) fuse for 230V 3A Antisurge (T) fuse for 115V

Node Power Supply

48V, maximum 3A

Connectors

Nodes:	RJ45 Connector
Ethernet:	RJ45 Connector, 10/100/1000Mb
USB:	2 off USB Type-A Sockets
Power Inlet:	3-pin IEC Connector

Environmental

Operating Temperature:	0 - 50 degrees C
Humidity:	0 – 90% RH non-condensing
IP Rating:	30

EMC

Safety Class:	I
EMC Immunity:	Industrial Levels
EMC Emissions:	Industrial Levels

'The UltraTEV Monitor™ is more than a fault detection and alarm system. It's a complete management system that gathers detailed information on the condition of assets.'

valuable condition data

The UltraTEV Monitor™ is much more than a fault detection and alarm system. It is the most powerful tool ever developed for collecting and recording information on the condition of large numbers of assets.

The system provides operators with the information they need to implement full condition-based asset management techniques.

The ability to gather data on the condition of assets is a key part of the process of upgrading to Condition Based Risk Management™ (CBRM). This is EA Technology's market-leading methodology, based on applying a Health Index to each asset and factoring in both the probability and consequences of their failure: an approach which is proven to improve asset reliability, availability and safety, whilst reducing the overall costs of asset maintenance and replacement.

driven by customer need

The addition of the UltraTEV Monitor™ to our portfolio is the direct result of listening carefully to what customers require from a new asset management system.

global support

The UltraTEV Monitor™ can be supplied and supported anywhere in the world, through our network of international sales offices and distribution partners, including

- Installation & commissioning
- Training
- Whole life technical support
- Online data analysis & reports

PRODUCT CODE: UTM



EA Technology ISI Limited
Capenhurst Technology Park
Capenhurst
Chester, UK
CH1 6ES

t. +44 (0) 151 339 4181
f. +44 (0) 151 347 2139
janice.mckay@eatechnology.com
www.eatechnology.com

A member of the EA Technology Group

