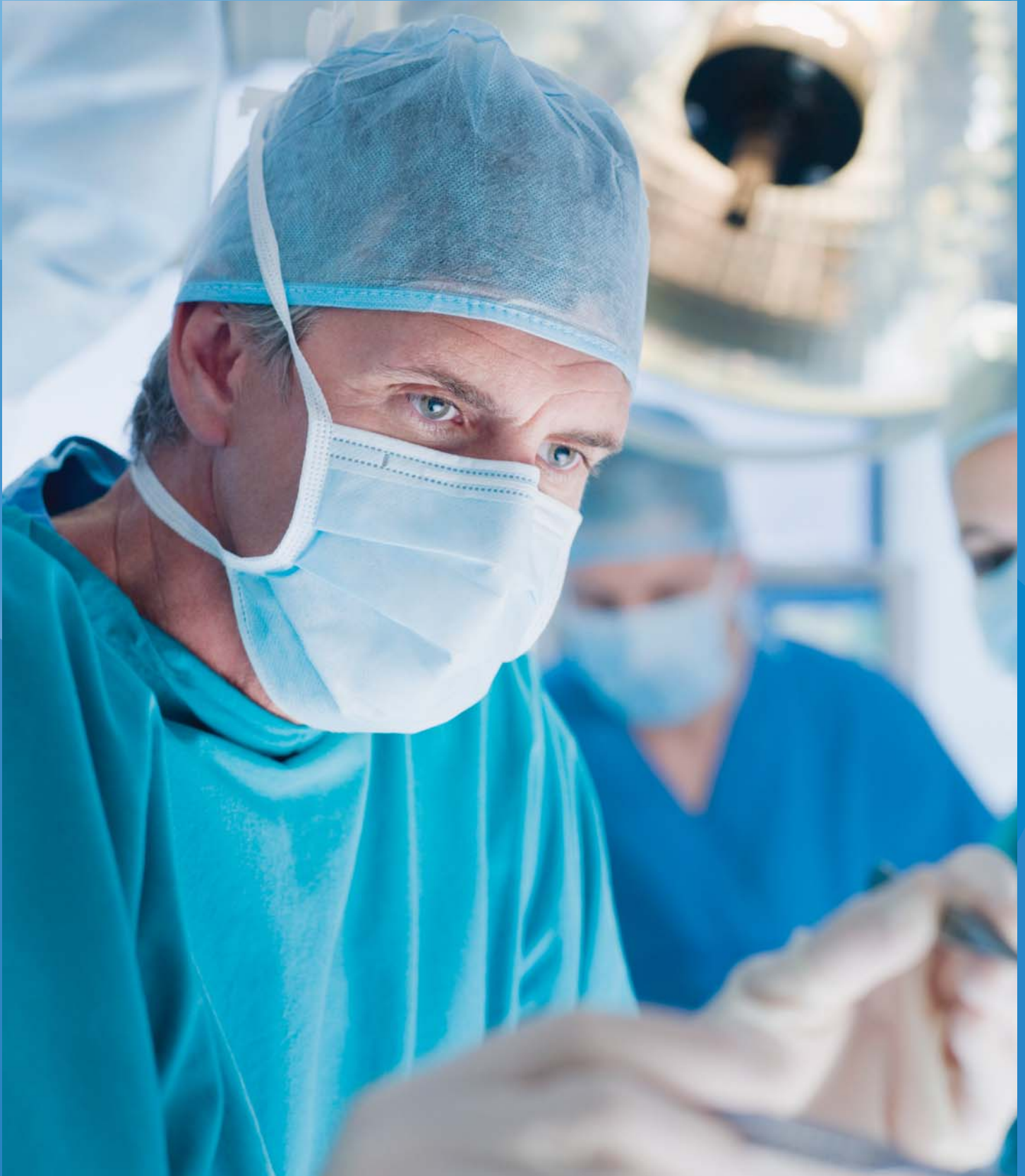




# Medical Products

Supporting the future of healthcare

Working together with our customers to improve the reliability and performance of medical devices and equipment to help save lives.



TT electronics is a focused, global electronics company supplying the world's leading medical electronic equipment manufacturers as well as independent design firms engaged in high-reliability medical and healthcare systems design.

TT electronics' products have long been specified for a number of applications in medical devices and equipment. In addition to electronic components, TT electronics also provides complete solutions through advanced manufacturing services for medical systems, including design support, application engineering assistance, and advanced testing for medical electronics. TT electronics' passive components, optoelectronics, and semiconductors are used extensively in diagnostic, imaging, laboratory equipment, patient monitoring systems, instrumentation, and pharmaceutical delivery and dispensing systems.

Individual TT electronic divisions specialize in standard and application specific products including microelectronic assemblies, magnetics, optoelectronics, sensors, resistors, resistor networks, and precision potentiometers. As a combined company, TT electronics can serve as a single-vendor source for this wide range of medical-qualified products as well as specialized technologies needed to develop innovative custom solutions.

The TT electronics component divisions have manufacturing sites strategically positioned worldwide, three of which are ISO 13485:2003-certified, allowing them to manufacture medical electronic systems. All manufacturing facilities are ISO 9001 certified, and several of the sites are TS 16949:2002 certified as well.

About TT electronics	2
Medial Subsegments	
Diagnostic, Imaging, and Laboratory	4
Patient Care Equipment and Instruments	8
Pharmaceutical Delivery and Dispensing Systems	12
Patient Monitoring	14
Companies Core Technologies and Manufacturing Capabilities	
AB Mikroelektronik	16
BI Technologies - ECD	16
BI Technologies - MCD	16
IRC - AFD	16
IRC - WAFT	16
OPTEK Technology	17
Semelab	17
TT electronics integrated manufacturing services	17
Welwyn Components	17
Global Operating Locations	18
Global Sales Offices	20

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# Diagnostic, Imaging, and Laboratory

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Advances in medical diagnostics, laboratory, and imaging technology have redefined how physicians diagnose and treat a range of pathology from common illnesses to the most life threatening diseases. These advances have significantly reduced the need for invasive exploratory surgery, and have improved detection of diseases, which allows more accurate and timely diagnosis and treatment. Advancements in this technology have allowed the move from the hospital inpatient setting to outpatient facilities and physician offices resulting in lower cost and more timely access for the patient. TT electronics has extensive experience in partnering with our customers to develop and produce a wide range of high reliability electronic components and device systems to support innovative diagnostic, imaging, and laboratory equipment.



## Medical Applications

- 3D Imaging
- Analyzer
- Biomedical Workstation
- Biosciences
- Blood Diagnostic Equipment
- Blood Vessel Data Collection
- Clinical Analyzer
- CT Scan
- Dental Imagery
- Diagnostic Apnea
- Diagnostic Equipment
- EKG Equipment
- EMG Equipment
- Genetic Analysis
- Imaging
- Instrumentation
- Medical Measurement
- Microbiology Equipment
- Microbiology Light Analysis
- Microbiology Training
- Molecular Diagnostic Equipment
- MRI
- Optical Microbiology
- Pap Test
- Pharmaceutical Lab Equipment
- Radiation Dosimeter
- Research
- Scanner
- Test Equipment
- Test Strips
- Ultrasonic Equipment
- Urinalysis Equipment
- UV Detection
- Vascular Disease Analysis
- Vial Detection
- X-Ray
- X-Ray, Dental Equipment
- X-Ray, Portable



# Product Technology

## BI Technologies

### Transformers and Inductors



- Small compact SMD package
- Superior electrical performance

### Networks (BCN)

- Compact
- Numerous resistance values
- Various industrial form factors

### Potentiometers - 7286 / 8143 Series



- 5 million shaft revolutions
- Tight linearity (available +/- .1%)
- Can seal to IP 65
- Custom design cap

### Sensors - 6120 Series



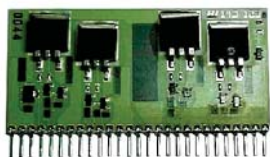
- 10 million shaft revolution
- Factory programmable angle
- 360° of electrical travel
- Custom output tapers

### Thin Film Resistor Networks (SS103VD, SFN06VD, S-Series, 66x, 69x)



- Precision resistors
- Excellent resistor ratio and TCR tracking tolerances
- Custom networks
- Industrial standard packages

### Hybrid Circuits



- Custom modules
- Integrated resistors
- Flexible form factor

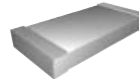
## TT electronics integrated manufacturing services

### Capabilities

- Product design improvement
- PCB layout services
- Obsolescence management
- Electrical design
- Mechanical packaging design
- In-circuit test
- Automated test equipment
- Manual test equipment
- Functional test development & software
- Environmental and investigative test services
- Automated backplane test
- Cable harness testing
- AOI / X-ray
- Flying probe test capabilities

## IRC

### Current Sense (LRC / OARS / OARS-XP)



- Low TCR resistive allow
- High power dissipation in a small size
- High current capability
- LRC - very low inductance <0.2nh

### High Voltage (CGH / GS-3)



- Inorganic construction
- Proven reliability
- Rated up to 1000 volts

### Precision (PFC / PFC-D1206 / SOT)



- Precision
- Stability
- Moisture resistance

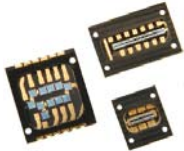
### Surge (SMC / WDBR / HSF / CHP)



- Low profile
- High power dissipation
- 2500 VDC rated dielectric strength

## OPTEK Technology

### Optoelectronic Hybrids, Microcircuits & Assemblies



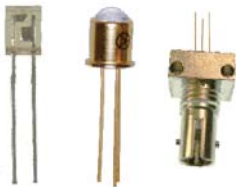
- Low profile
- Surface mountable
- High-resolution sensing
- Custom versions available

### Infrared Sensing Components & Assemblies



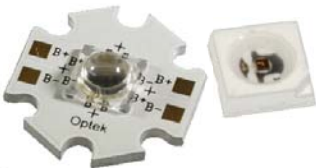
- Wide variety of output types
- Wide variety of mounting configurations
- Wired or PCB mount
- Circuit isolation

### Discrete IR & Fiber Optic Components



- Wide variety of output types
- Easily customizable
- SMT or through hole
- Wide variety of IRLED types

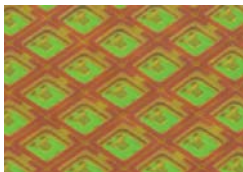
### Precision Visible LEDs & Lighting Products



- High efficiency
- Long life
- Large variety of colors
- Plug & Play assemblies available

## Semlab

### Radiation Dosimeter



- Custom detectors
  - Designed to suit customer-specific applications
  - Excellent response to Gamma, Beta and X-ray radiation
  - Design, test, and manufacture of complimentary ASICS for use with radiation detection system
- Standard packages
  - TO can package
  - Surface mount LCC packages
- Custom packages
  - Scintillators
  - Filtering
  - Signal conditioning electronics
  - Multi element arrays

## Welwyn Components

### RC and CAR Series



- Precision to 0.01%, 5ppm/°C
- High lifetime stability
- High integrity protection
- Metal foil replacement

### T Series



- Ultra high voltage to 100k V
- Ideal for x-ray systems
- Oil compatible
- Customizable ratings

### VRW Series



- High voltage
- Compact size
- Pulse withstanding
- EN60065 certified

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# Patient Care Equipment and Instruments

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Patient care medical equipment and instruments range from highly sophisticated electronic implants to simple surgical staples. Their use can be found in hospitals, outpatient facilities, physician offices, as well as patient homes. TT electronics has a wide array of standard and application specific passive components, optoelectronics, and semiconductors that are currently designed in numerous medical devices for patient care. TT electronics' development engineers work closely with our medical device and equipment customers to design world class solutions that deliver world class healthcare.



## Medical Applications

- Air Systems
- Apnea
- Asthma Relief Equipment
- Blood Pump
- Breathing Systems
- Call Systems
- Cardio Resuscitation
- Catheter
- Chest Draining
- Cough Insufflator
- CT Scanning
- Customer Eye Rinsing
- Defibrillators
- Dental Camera
- Dental Equipment
- Dental Ultrasonic
- Dialysis
- Electrical Stimulation
- Electrotherapy
- Endoscopic Sewing
- Exam Tables
- Food Pump
- Hearing Aid
- Heart Treatment
- Heart Valve
- Home Dialysis
- Hospital Beds
- Hospital Equipment
- Hospital Intercom
- Incontinence Treatment
- Infant Defibrillator
- Infection Protection
- Infusion Pumps
- Instrumentation
- Laparoscopy Equipment
- Laser
- Lipo
- Massage Equipment
- Medical Billing
- Medical Cables
- Medical Equipment
- Medical Laser
- Medical Optics
- Medical Visual Systems
- Motion Therapy
- Nasal Irrigating
- Opto Medical Systems
- Orthopedic Products
- Pacemakers
- Pain Management Equipment
- Radiation Therapy
- Radio Pain Management
- Respiratory Equipment
- Syringe
- Sleep Apparatus
- Sleep Respiratory Equipment
- Smoke Evacuating Equipment
- Stethoscope
- Surgical Instrumentation
- Suture Welding
- Therapeutic Bed
- Thermometer
- Urology Treatment
- UV Cure Lamp
- Vision Correction Equipment
- Wheel Chair Modifications



# Product Technology

## AB Mikroelektronik

### High Voltage Power Modules



- Bare die application
- High voltage pulse generation
- Individual high voltage packaging

### Hybrids



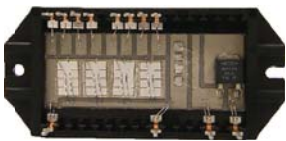
- Miniaturization
- High temperature stable circuits

### Motor Drive Circuit

- Miniaturization
- High temperature reliability

## Semelab

### Power Inverter Modules



- Wide range of die types, pinouts & cooling options
- Lower NRE on existing outlines
- Lower cost materials for price-critical applications
- Fast turnaround
- Existing circuit implemented
- Standard designs available

### RF MOSFETS



- Ultra wide band - 1MHz to 1GHz
- Highest gain via reduced Miller Effect
- Gain of 20db VHf, 16db UHF
- Wide power range - 750mW to 400W
- Very Low  $R_{ds}$  (ON)
- Very low inter-electrode capacitance
- High efficiency >50% broadband
- Gold metalized
- Low feedback capacitance
- Excellent thermal stability
- Diamond enhanced performance

## BI Technologies

### Transformers and Inductors



- Custom design capability
- Designs meet industry safety requirements
- Compact packaging

### Potentiometers - 404 / 6137



- Tight linearity (down to +/- .05)
- Custom modification cap
- 5 million actuations (spring return 404 series)

### Resistors (High Value)



- High voltage capable
- High value
- Single and dual resistors
- Custom values capable

### Thin Film Resistor Networks (66x)



- Precision resistors
- Industrial standard packages
- Wire bond chip ability
- Tight resistance ratio and TCR tracking tolerances

## Welwyn Components

### CC Series



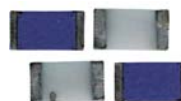
- Composition technology
- Ultra high surge density
- Ideal for defibrillator surge protection at value down to 1K $\Omega$
- Can be molded into cable yoke assemblies

### DSC Series



- Unique double-sided format
- Double surge capacity
- Compact SMD chip
- Ideal for defibrillator surge protection at values >50K

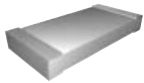
### HVC Series



- High voltage ratings to 3kV
- Compact SMD chip
- Low TCR
- Can be used in defibrillator voltage measurement

IRC

Current Sense (LRC / OARS / LOB)



- Low TCR resistive allow
- High current capability
- Non-standard resistor values
- Silver & precious metal free construction

High Voltage (SMC & GS-3)



- Inorganic construction
- Proven reliability

Precision (PFC)



- Precision
- Stability
- Moisture resistance

Precision Resistor Network (GUS / SIP / SON)



- Tight ratio tolerances
- Stability over time & temperature

SS077 SOIC



- High value, precision network reduces quiescent battery drain

Surge (AS / CHP / WDBR / RG / PWC)



- Reliability information
- Non-standard resistor value
- Unmatched surge/pulse withstand capability

TT electronics integrated manufacturing services

Capabilities

- Product design improvement
- PCB layout services
- Obsolescence management
- Electrical design
- Mechanical packaging design
- In-circuit test
- Automated test equipment
- Manual test equipment
- Functional test development & software
- Environmental and investigative test services
- Automated backplane test
- Cable harness testing
- AOI / X-ray
- Flying probe test capabilities

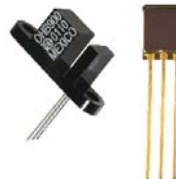
OPTEK Technology

Infrared Fluid Sensor



- Low cost vs. other technologies
- Fits a variety of tube sizes
- Available as a self-calibration module

Hall Effect Sensors



- Low current consumption
- Operates well in dirty environments
- Very long operating lifetime

Optoelectronic Hybrids & Microcircuits



- Low profile
- Surface mountable
- High resolution sensing
- Custom versions available

Infrared Discretes and Sensors



- Wide variety of output types
- Easily customizable
- SMT or through hole
- Wide variety of IRLED types

High & Low Voltage Optical Isolators



- Isolation voltage up to 50kV
- Analog or digital output
- Meets medical creepage requirement
- UL approved

Visible LED & Solid-State Lighting



- High efficiency
- Long life
- Large variety of colors
- Plug & Play assemblies available

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# Pharmaceutical Delivery & Dispensing Systems

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Growth of the medical market pushes innovative solutions for precise, reliable, accurate, and scalable pharmaceutical delivery and dispensing systems. These can range from direct delivery to the patient in a surgical or hospital suite, to pill counters in pharmacies and source dispensing of medication in various healthcare facilities. TT electronics plays a major role in designing solutions for pharmaceutical delivery and dispensing system applications worldwide.



## Medical Applications

- Anesthesia
  - Anesthesia Equipment
  - Clinical Infusion
  - Insulin Delivery
  - Medical Pump
  - Medication Dispensing
  - Pain Management
  - Pain Management Equipment
  - Pain Therapy
  - Pharmaceutical Dispensing
  - Ventilators
  - Water Cleansing
-



# Product Technology

## BI Technologies

### Magnetics



- Custom design capability
- Utilization of world class global material suppliers

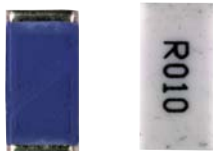
## TT electronics integrated manufacturing services

### Capabilities

- Product design improvement
- PCB layout services
- Obsolescence management
- Electrical design
- Mechanical packaging design
- In-circuit test
- Automated test equipment
- Manual test equipment
- Functional test development & software
- Environmental and investigative test services
- Automated backplane test
- Cable harness testing
- AOI / X-ray
- Flying probe test capabilities

## Welwyn Components

### LR Series



- Current sense chip resistors
- Runs cool for high reliability
- Ideal for small motor control
- Compact SMD format

## IRC

### Precision (PPS / CHP)



- Low TCR
- Superior surge handling capability

### Precision (SOT23 / PFC / PFC-D)



- Small size
- Lightweight
- Precision divider

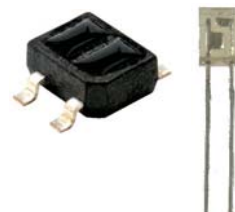
## OPTEK Technology

### Infrared Assemblies



- Wide variety of output types
- Wide variety of mounting configurations
- Wired or PCB Mount
- Circuit isolation

### Infrared Sensors



- Wide variety of output types
- Easily customizable
- SMT or lead through
- Wide variety of IRLED types

### Visible LED Assemblies & Solid-State Lighting



- High efficiency
- Long life
- Large variety of colors
- Plug & Play assemblies available

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# Patient Monitoring

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Patient monitoring measures, displays, and documents information obtained immediately or over time from sensors attached - directly or indirectly - to the patient. Patient monitoring is vital to health care and is used in both hospital and non-hospital environments. TT electronics is dedicated to working with our medical device and equipment manufacturers to provide innovative technologies that deliver reliable, accurate information at affordable cost targeted to continuously improving patient diagnosis and outcomes.



## Medical Applications

- Blood Pressure Monitoring
  - Brain Monitoring
  - Diabetes Management Equipment
  - DISP Monitor Pad
  - Glucose Monitoring
  - Home Monitoring
  - Mobile Medical Monitoring
  - Monitoring Equipment
  - Wireless Glucose Monitor
-



# Product Technology

## AB Mikroelektronik

### Encapsulated Heating Element

- On aluminum oxide
- Temperature range +/-1°C
- Homogeneous temperature distribution
- Extrusion-moulded ceramic and inserts

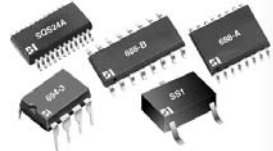
## BI Technologies

### Transformers and Inductors



- Small compact SMD package
- Low power losses

### Thin Film (NQS, SQS)



- Precision
- Stability
- Compact
- Wide range of resistance values

## OPTEK Technology

### IR Assemblies & Hybrids



- Wide variety of output types
- Wide variety of mounting configurations
- Wired or PCB mount
- Circuit isolation

## Welwyn Components

### HR Series



- High ohmic values to 50G
- Ideal for high gain amplification in monitors
- Solder, adhesive, or wirebond
- Customizable to control parasitics

## IRC

### Current Sense (LRC / OAR / OARS-XP)



- Low TCR resistive alloy
- High current capability
- Very low inductance <0.2nH
- Silver & precious metal free construction

### High Voltage (GS-3 / HVC)



- Rated to 1000 volts

### Precision (PFC / SOT-23)



- Precision
- Stability
- Moisture resistance

### Precision Network (SON)



- Tight ratio tolerances
- TCR tracking
- Excellent for multiple dividers

## Semelab

### Radiation Dose Measurement



- Measures in the rad to megarad range
- Microscopically small sensor volume

### DLCC - Diode Leadless Chip Carrier



- Replacement for MELF-style standard product
- Castellated design
- Thermal vias incorporated in design
- Rectangular design
- Custom devices available

### Multi-chip arrays (MCAs)



- 29 times more reliable than discrete plastic alternatives
- Better thermal matching
- Products for small signal & power
- Active, passive or mixed device technology
- Improved electrical characteristics
- Space saving
- Cost effective

---

# Core Product Technology and Certifications:

## AB Mikroelektronik

- Thick film hybrid circuits and sensors on a variety of substrates
- Power modules for high current/high voltage applications
- Chip and wire microelectronic assemblies
- Patchwork® hybrid circuits integrating power and control on a single substrate
- LED submounts/modules
- Printed thick film resistive heating elements on ceramic substrates

Certifications: ISO/TS 16949, ISO 9001 and ISO 14001

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## BI Technologies - ECD

- Precision potentiometers
- Trimming potentiometers
- Panel potentiometers
- Tactile switches
- Turns-counting dials
- Rotary binary encoders
- Custom contacting and non-contacting sensors
- Hybrid microelectronic assemblies and custom integrated assemblies
- Precision thin film resistor networks
- Integrated passive components and networks
- Steering sensors

Certifications: ISO 9001:2000, ISO/TS 16949:2002

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## BI Technologies - MCD

- Power transformers and inductors
- Pulse transformers
- Antenna coils
- Common mode chokes
- Chip inductors and beads
- Networking transformers
- Toroidal and bobbin manufacturing capability
- Surface mount and through-hole packaging

Certifications: Kuantan, Malaysia location: ISO 9001:2000, ISO/TS 16949:2002

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## IRC - AFD

- SMT precision chips and networks
- SMT current sense chip resistors
- SMT voltage dividers
- SMT military chips
- Leaded precision networks
- SMT resistor-capacitor networks
- SMT temperature sensors
- SMT wire-bondable chips and networks
- SMT igniters
- SMT low pass filters
- Hybrid substrates
- SMT ball grid arrays

Certifications: ISO90001, QS9000, ISO14001, and ISO/TS16949

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## IRC - WAFT

- Complete family of leaded wirewound products
- Complete family of leaded metal film products
- Many custom resistive options are available
- Full complement of surface mountable film and wirewound products
- Custom thick film on steel technology products

Certifications: ISO9001, QS9000, and ISO14001

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## OPTEK Technology

- Infrared optoelectronics
  - Photodarlington
  - Photodiodes
  - Photologic®
  - Phototransistor
  - Pill Pack
  - Reflective devices
  - Slotted devices
  - Surface mount
- Optical coupled isolators
  - Flexible linkage
  - LED/Photologic
  - LED phototransistor
  - Surface mount & chip carrier
- Special package configurations
- Optocouplers
  - Analog and digital
  - Packages (DIP, SPO, SSOP)
  - High Speed Function (DIPS)
- Solid-state relays
  - LED - triac
  - Bridge rectifier - double triac
  - LED photodarlington
  - Panel mount (SIP)
  - High power
  - AC or DC switching
- Magnetic sensors
  - Hall effect
- VCSELs
  - Base components
  - ST connectorized
- Fiber optic devices
  - Emitters
  - Sensors
- Visible LEDs
  - Custom application solutions
  - Components
  - Complete SSL lab
- Encoders
- Ultraviolet LEDs
- High Reliability / COTS Plus
- Custom assemblies

Certifications: ISO/TS 16949:2002, BS EN ISO 9001:2000, ITAR Registered, operates to TSAT, MIL-PRF-19500, MIL-PRF-38535, and Mil-STD-750/883 performance requirements

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## Semelab

- DLCC - Diode Leadless Chip Carrier
- SIC - Silicon Carbide High Temp Devices
- MOSFETs
  - MOSFETs, JFETs
  - MOSFET Modules
  - RF MOSFETs
  - New 50V RF MOSFETs
  - Custom package/preform options
  - Second source modern hermetics
  - Diamond performance FETs
- Bipolar
  - Discrete Bipolar Transistors
  - Hi-Rel arrays
  - Traditional metal packages
- IGBTs
  - IGBT modules
  - Custom power modules
  - Multi-chip arrays
  - Opto sensor modules
- Diodes
  - Hi-Rel discrete
  - Diode modules
  - Diode arrays
  - Gallium arsenide
- Hi-Rel Voltage Regulators
  - Low drop-out regulators
  - -50V/-60V regulators
  - +50/+60V regulators
  - Dual voltage regulators

Certifications: ISO 9001:2008, M/0103/CECC/UK, BS 9000 1360/M, DSCC Qualified Manufacturers List (VQC-03-003050, VQC-03-003049), Defence Supply Center Columbus (Cage Code U3158), European Space Agency Qualification 253, MOD Registration 2M8502, and COG - Members of the Component Obsolescence Group

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## TT electronics integrated manufacturing services

- Design & development engineering
- SMT & conventional PCB assembly
- Backplane assembly
- System build integration
- Final unit assembly
- Ruggedized electronics
- Global procurement
- Design for Manufacture & Test (DfM)
- Test solution development
- Automated SMT and PTH technologies
- Production volume manufacturing
- Prototype and NPI services
- Cable & interconnect assembly
- Cable harness manufacturing
- Box-build and build higher-level assembly
- High power systems assembly
- RoHS compliant process
- Global manufacturing facilities across three continents

Certifications: ISO/TS 16949:2002, BS EN ISO 9001:2000  
ISO 13485:2003 locations certified: Perry Ohio; Suzhou, China; Kuantan, Malaysia; and Rogerstone, South Wales

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## Welwyn Components

- Microelectronic assemblies and thick film substrates
- Chip and wire assemblies
- High-frequency/high density microelectronic assemblies
- Power wirewound, thick film and metal element current sense resistors
- Precision wirewound and thin film resistors
- Patchwork hybrid circuit integrating power and control on a single substrate
- Custom resistor assemblies

Certifications: ISO9001

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## Global Operating Locations:

### AB Mikroelektronik

#### Company profile:

AB Mikroelektronik provides technology development and manufacturing services for advanced application-specific microelectronic assemblies on ceramic, metallic and alternative substrates. Power modules and custom thick film circuits from AB Mikroelektronik are used in medical, automotive, and industrial electronics applications ranging from motor control to lighting control systems.

#### Contact Information:

AB Mikroelektronik GmbH  
Josef-Brandstaetter-Strasse 2  
5020 Salzburg, Austria

Tel. +43-662-44991 0  
Fax. +43-662-420489 10

Email: [info@ab-mikro.at](mailto:info@ab-mikro.at)

[www.ab-mikro.at](http://www.ab-mikro.at)

### BI Technologies - ECD

#### Company Profile:

BI Technologies' Electronic Components Division is a leading supplier of thick and thin film resistive components, potentiometers, trimmers, contacting and non-contacting automotive and industrial sensors and hybrid microelectronic assemblies. BI-ECD's thin film resistor networks provide precision performance on either ceramic or silicon substrates, and the company offers one of the industry's most extensive lines of precision and trimming potentiometers, panel pots and tactile switches. BI-ECD also has the capability to design, develop and manufacture custom precision potentiometers, and microelectronic assemblies for advanced sensing and control applications.

#### Contact Information:

BI Technologies Electronic  
Components Division  
4200 Bonita Place  
Fullerton, CA 92835 USA

Tel. +714-447-2345  
Fax. +714-447-2400

Email: [sales@bitechnologies.com](mailto:sales@bitechnologies.com)

[www.bitechnologies.com](http://www.bitechnologies.com)

### BI Technologies MCD

#### Company Profile:

BI Technologies' Magnetic Components Division supplies miniature surface mount power inductors and transformers with high current ratings, signal transformers, common mode chokes, and toroidal inductors, as well as innovative design solutions to meet custom inductor and transformer needs. In addition to its headquarters' location in Fullerton California, the company maintains a manufacturing facility in Kuantan Malaysia, with global sales support offices in Singapore, India, and China, as well as additional sales support from BI Technologies' sister division in the USA.

#### Contact Information:

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Components Division  
4200 Bonita Place  
Fullerton, CA 92835 USA

Tel. +714-447-2345  
Fax. +714-447-2400

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[www.bitechnologies.com](http://www.bitechnologies.com)

### IRC AFD

#### Company Profile:

IRC's Advanced Film Division is a leading supplier of thin and thick film resistive technologies on ceramic, silicon and metallized substrates for a wide range of applications. IRC's moisture-resistant TaNFilm® tantalum nitride thin film resistive elements provide the industry's only "self-passivating" resistor material for ultra-stable performance in high reliability applications. IRC offers a range of thick film power and current sense resistors; high frequency resistors and attenuators characterized to 40GHz; and Anotherm® anodized aluminum substrates are used extensively for LED thermal management

#### Contact Information

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Email: [afdsales@ircct.com](mailto:afdsales@ircct.com)

[www.ircct.com](http://www.ircct.com)

### IRC WAFT

#### Company Profile:

IRC-WAFT provides a comprehensive range of wirewound, thick film and metal element resistive technologies for a wide variety of applications. WAFT's advanced thick film on steel (TFS) technology, as well as Anotherm® aluminum substrates, provide "on-demand" heating, dynamic braking and thermal management. IRC offers surface mount cylindrical power and metal element current sense resistors for high wattage power management and voltage regulation. The company also offers commercial-grade wirewound and film resistors for high volume applications.

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### OPTEK Technology

#### Company profile:

OPTEK is a leading manufacturing and solutions provider for sensing and illumination covering the infrared, visible and ultraviolet spectrum. We offer standard as well as application specific products for a variety of markets, including, but not limited to office machines, industrial equipment, encoders, automotive electronics, military and high-reliability applications, medical diagnostic equipment and solid-state lighting.

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## Semelab

### Company Profile

Semelab has been a leading provider of high-end, innovative electronic solutions since 1974. A diverse, worldwide customer base benefits from our design innovation, our manufacturing strength, and our total commitment to quality. Semelab specializes in power modules, power diodes and MOSFETs, high reliability and long-lifetime products, standard and custom discrete solutions, as well as high performance RF MOSFETs.

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## TT electronics integrated manufacturing services

### Company Profile

Named, The '2009 EMS Manufacturer of the Year', TT electronics-integrated manufacturing services is an award-winning provider of low-volume, high-mix solutions, comprehensive electronics design, manufacturing and product management services to global electronic and technology companies. With more than 1500 employees and four global manufacturing sites strategically located across Europe, North America and Asia, TT electronics integrated manufacturing services provides comprehensive, customized solutions to companies in the medical, telecommunications, and aerospace/defense and sectors.

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## Welwyn Components

### Company Profile

Welwyn Components is Europe's leading supplier of advanced resistive technologies and custom microelectronic assemblies. Welwyn provides a wide range of resistive components, including power and precision wirewound and film components in a variety of packages and lead configurations, as well as comprehensive microelectronic design, development and manufacturing capabilities with extensive application engineering and technical support for customers.

### Contact Information

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