



MARKETS

Aerospace & defence

Your trusted partner for high-reliability, high-performance
RF communications, electronic warfare, and radar sub-systems.

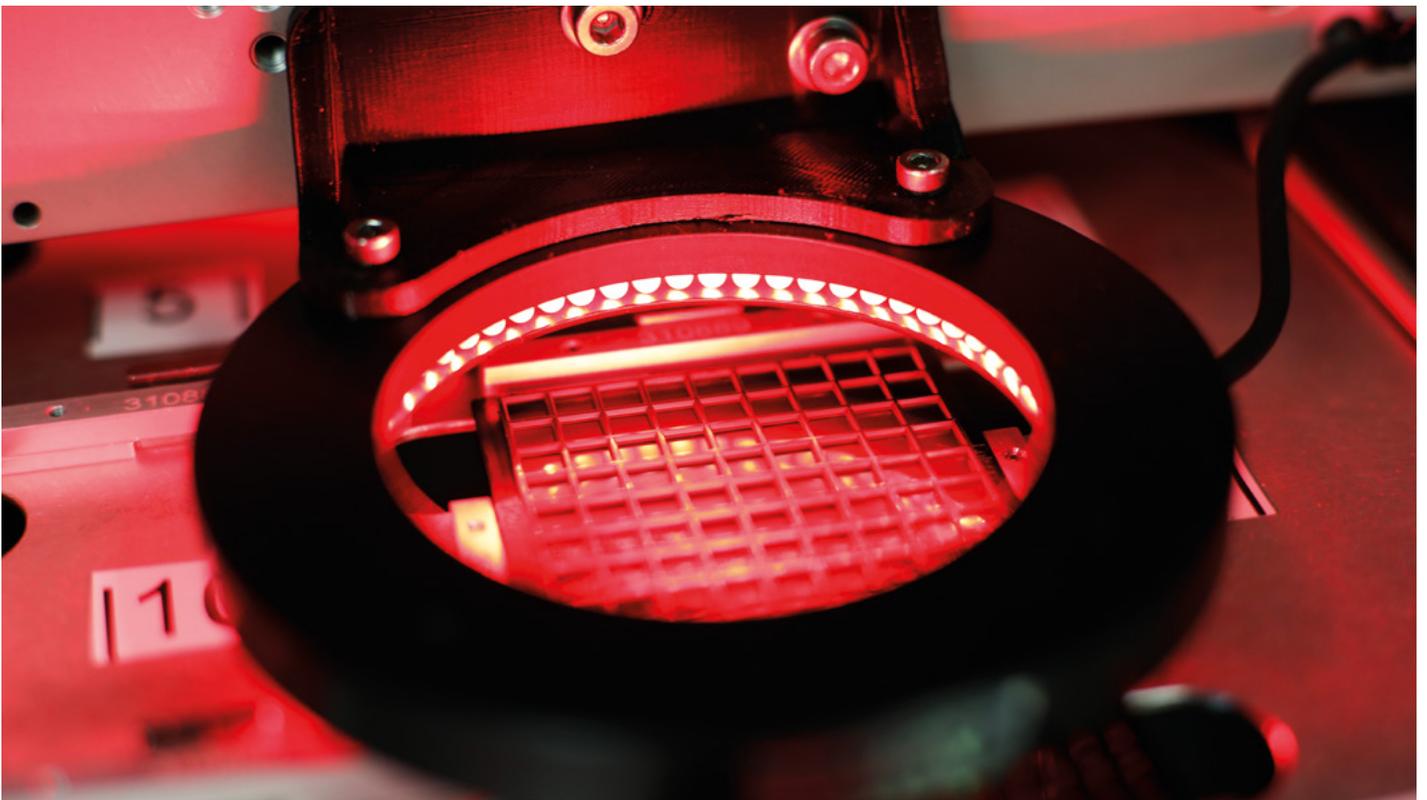




World-leading RF technologies for mission-critical communications

Filtronic is a world-leading radio frequency (RF) technology specialist. We design, manufacture and test advanced products that transmit, receive and condition radio waves in mission-critical systems worldwide.

Founded by Professor David Rhodes at Leeds University in 1977, Filtronic initially worked on telecommunications components for the Tornado aircraft. The company grew quickly and became the largest ever to be spun out of a UK university. Until 1989 our operations were entirely in electronic warfare.





Intelligent design, precision manufacturing

We design and manufacture complex transmit and receive modules (TRMs), RF converters, filters and other RF components and sub-systems for aerospace and defence applications. We also provide hybrid manufacturing services for clients, producing and testing their precision components at scale to individual specifications in our state-of-the-art facilities.

Filtronic work collaboratively with clients to build trust, communicate openly, ensure compliance, and deliver exemplary products that provide reliable, best-in-class performance. Through our leading RF knowledge we are able to identify ways in which our clients can improve their products, often improving their premium through improved competitive advantage.

Long-term partnerships built on excellence

Our mission is to build sustainable partnerships with our clients in the aerospace and defence sector. We commit to the long-cycle collaborative development processes that are necessary before any volume manufacturing can begin. Our world-leading design and engineering expertise, state-of-the-art microelectronic manufacturing facilities and rigorous testing capabilities deliver technically advanced RF components and sub-systems across multi-year programmes.

Trust Filtronic to perform – every time

Filtronic have a proven performance record in providing market-leading design and hybrid manufacturing services for some of the world's largest defence primes.

Our highly qualified and vastly experienced RF engineering team work with our clients, engineer to engineer. Our expertise enables us to customise high-performance products to meet specific challenges and deliver value for money through better whole life costs.

Our UK-based design and manufacturing facilities make us a trusted supplier to the European defence industry, offering the speed and agility to manufacture and test products at scale to meet stringent reliability and performance parameters.





High-performance aerospace & defence technology

Filtronic has invested in full turnkey manufacturing operations to produce intricate components at high-volume at our UK site.

For the aerospace and defence industry, we design, manufacture and test a range of advanced components and sub-systems, typically used in:

- AESA Radar – fire control, target acquisition and high-resolution imaging.
- Electronic warfare (EW) and electronic countermeasures (ECM).
- Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), and Anti-access Area Denial (A2/AD).
- Unmanned systems and counter unmanned systems.
- Ultra-wide band digital systems.
- Co-site interference mitigation.
- Avionics.
- New space RF payload equipment.





Solutions for the full RF spectrum:

Our engineers are world-leading RF experts, working with clients to solve complex problems across the full spectrum of RF, microwave and mmWave systems. The products we design and manufacture for aerospace and defence applications include:

Transmit and receive modules (TRM)

Transmit and receive modules are the core components of an active electronically scanned array radar (AESA). Using microwaves this latest generation radar system enables the electronic steering of radio waves in multiple directions without moving the antenna. The TRM modules allow multiple signals to be transmitted and received simultaneously. Filtronic have been manufacturing TRM's since 2011 and have a capacity for over 8,000 modules per month.

RF filters

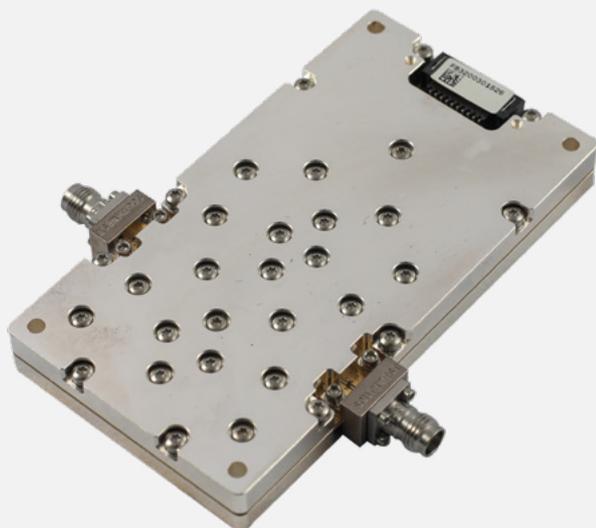
We have extensive expertise in developing microwave filters, selecting the most optimum technology in the trade-off between size and performance. Our products include combline and interdigital metal cavity filters, ceramic, lumped element, suspended substrate, waveguide and thinfilm filters. We are experts in filter topology, offering rapid prototyping and reduced development cycles.

Front-end modules

Filtronic design and manufacture fully integrated complex front-end switching and up/down converter modules over a wide frequency range, up to and including mmWave. Our highly integrated subsystems optimise Size Weight and Power (SWAP) to provide class-leading performance.

Switched filter banks

Clearing a cluttered environment with high-performance, miniature filterbanks requires a holistic design approach where a close relationship with the customer – often co-engineering to derive the specification – provides a superior solution. Attention to detail in the selection of filter technology and proprietary techniques for integrating with switching and control circuitry allow very high levels of isolation and linearity to be achieved whilst minimising insertion losses.





Integration and hybrid manufacturing

Packaged sub-systems for optimum performance

We develop integrated RF solutions for a range of mission-critical environments. Our expertise in system integration enables reductions in component size, improved reliability, and improved overall system performance. Integrating multiple components in a single module minimises losses between circuits, providing for optimal matching. Our specialities include developing high power amplifiers (HPAs), transceivers, MCPs, System in package (SIP), and filters operating from DC to over 100 GHz.



Contract manufacturing to client specifications

Our hybrid manufacturing services enable clients' precision components to be manufactured and tested at scale in our highly automated microelectronic production facilities. We have demonstrated our world-class product quality and reliability in contract manufacturing by successfully deploying more than 500,000 transceiver modules and 700,000 filter products in the field.

Our manufacturing facilities include highly automated production assembly lines, which enable MMIC die attach, wire, and ribbon bonding, together with skilled manual assembly and hermetic sealing – all to military/IPC standards.

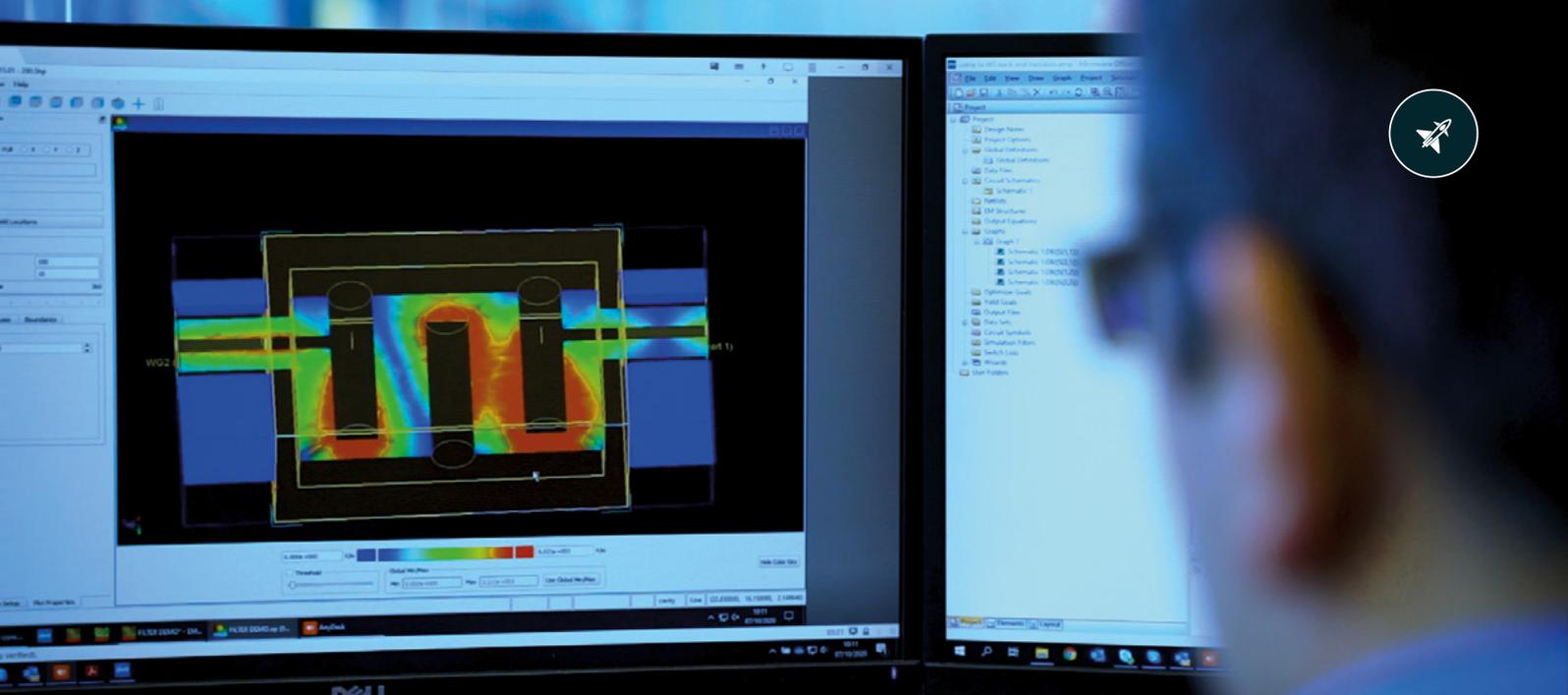
Robust web-based process control systems support material traceability, inventory management, WIP tracking, statistical process control (SPC), yield reporting and on-time delivery. Our services include a range of order fulfilment options, such as manufacturing close to market, inventory hubbing and site-kitting.

Minimise risks through dual sourcing

Our contract manufacturing services support dual sourcing, reducing the risk of disruption to schedules, while offering the chance to rapidly increase or decrease volumes without incurring extra costs. Dual sourcing offers the potential for faster lead times, scalability and more consistent supply. Partnering with Filtronic as a second source gives clients the ability to ramp up production without compromising on quality.

Industry associations





Design, manufacturing and testing

Design ingenuity for every challenge

We offer bespoke design services for a broad range of applications up to 175GHz. Our team have a track record of market-leading innovation, with more than 200 years of combined experience in microwave and mmWave product design and integration. Our designers have access to an exclusive range of in-house designed GaN FETs or multifunction microwave and mmWave ICs, reducing the costs of our bespoke designs. We have a full range of Computer Aided Design (CAD) systems for microwave circuit design, system simulation, thermal design, mechanical design and automated test programme development.

Manufacturing to exacting military standards

Our precision manufacturing facilities offer high-volume microelectronic component production capabilities. Our investments in cyber security, ERP, hybrid assembly, advanced microwave test systems, military standard processes and full traceability, provide a high-quality, high security manufacturing environment. Even with high-volume throughput, we typically achieve yields of more than 98% through continuous improvement and lean manufacturing. That enables us to offer sustained cost reductions for clients requiring complex, high mix products manufactured to high reliability and quality levels.

Rigorous testing for complete quality assurance

Aerospace and defence clients demand high quality, robust and reliable products to perform in critical military applications, our exhaustive testing offers all the assurances required. All our complex products can be tested to MIL-STD-883 and MIL-STD-750 standards. Every product is tracked via a unique serial number ID, providing full end-to-end process control and traceability.

Filtronic testing capabilities

- Electrical testing DC to 100GHz.
- Thermal HASS (Highly Accelerated Stress Screening) and life testing.
- Destructive and non-destructive tests, including wire pull, ball bond shear and die shear.
- Pre-lid tests for packaged systems.
- Gross and fine leak tests.
- Die level MMIC wafer acceptance testing and characterisation.
- Acceleration.





Applied expertise for multiple markets

As well as being a long-established supplier to the aerospace and defence industry, we develop advanced RF technologies for critical communication applications in other key markets.



Telecommunications infrastructure (XHaul)

Filtronic is a valued supplier to leading players in the mobile

telecommunications infrastructure market, and we are the partner of choice for advanced mmWave applications. In the 5G backhaul market, we offer highly integrated, fully calibrated transceiver modules, which eliminate the need for clients to develop in-house mmWave expertise.



Track-to-train communications

We work with partners in trackside-to-train communications to deliver high-speed,

high-capacity, high-reliability internet connections on rail journeys, enabling communication speeds of up to 10GB/sec.



Test and measurement

The specialist manufacturing capability and know-how Filtronic

has developed over many years of manufacturing its own products are highly valued by many companies in our market. We have worked on a range of test and measurement devices across the spectrum, enabling our clients to test with rigor their own products. We have a range of expertise, but our core competency is for test equipment 20 – 55GHz.



Critical communication

Reliability, availability and security are critical attributes for public safety communications

networks, used by emergency services. Filtronic products meet the demand for higher resilience and longer-range systems, and include OEM-agnostic Tower Top Amplifiers (TTAs) which deliver best-in-class performance.



Space - High altitude pseudo-satellites/low earth orbit satellites (LEO)

Providing internet connections to under-

served communities is a high priority for many countries. Filtronic is an expert in the design, development and delivery of next-generation, high-performance transceiver modules, enabling high-capacity HAPS-to-ground and inter-HAPS data transmission using E-band frequencies.

Low latency private networks

Low latency financial networks are becoming essential in reducing transaction times for automated high-frequency trading systems. Filtronic designs and supplies customised versions of Orpheus E-band links for financial services markets.





Critical communications



Space

Where we excel

- We help our clients get to market quicker – increasing their sales revenues and market share.
- Our capabilities and technologies reduce the overall cost of data communication, lowering the cost per Gbps.
- Taking unique challenges & providing a customised solution, we lower development & NRE costs, minimising the cost of quality for our client.
- We solve problems, engineer to engineer, we drive down whole life costs.
- We like to know our clients inside out, identifying ways to improve their products, increasing their premium & providing them with a competitive advantage.



Test and measurement





Pushing the boundaries

Filtronic works at the cutting-edge of electronic engineering for RF communications. Our restless innovation enables us to continuously realise new possibilities and extend the capabilities of RF electronics and materials. Recent successes and innovations include:

Box build electronic warfare, designed for volume

Our client was looking for a turnkey solution for battlefield comms equipment. They wanted a partner with the capability of supporting UK defence related contracts. Filtronic were able to take an early TRL prototype and develop it into a technology suitable for volume manufacture.

Filtronic developed all the microwave elements as well as digital control. The design process was collaborative and involved a complete redesign to facilitate a product that could be manufactured at volume to the quality standards our client expected. The timescales involved were aggressive and Filtronic delivered cost effectively within 9 months of the original order.

Outstanding performance in volume manufacturing

Under a contract manufacturing arrangement, Filtronic has produced six different variants of transmit and receive modules (TRM) for a European defence client supplying electronically scanned AESA radar systems. We have manufactured more than 60,000 modules in just three years.

The client made the strategic decision to dual source these TRM modules with Filtronic, removing the risks of single sourcing and building a more resilient supply chain. The client appointed Filtronic for our ability to provide a robust, high quality and cost-effective solution, along with our proven performance record. We have since won multiple contracts with the same client and are now considered an integral supply chain partner. The client recently awarded Filtronic a special commendation for outstanding supply chain contribution.





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