filtronic

MARKETS

Telecommunications infrastructure

Precision-manufactured, high performance mmWave subsystems and components for mobile infrastructure networks.

At the forefront of the telecommunications infrastructure market

A world-leading radio frequency (RF) technology specialist, with advanced understanding of microwave and mmWave communication. Filtronic designs, manufactures, and tests advanced products that transmit, receive and condition radio waves for communications networks worldwide.

Trusted technology partner

Filtronic are high performance experts with a track record of delivering transceiver solutions that lower the overall cost per Gbps. We are the partner of choice for leading OEMs and mobile network operators looking for bespoke, microwave and mmWave components and subsystems for XHaul applications.

Experts in delivering highly linear backhaul solutions to an increasingly connected world where data is consumed in vast quantities, we provide key technologies at the heart of densification and disaggregation associated with 5G networks. Our products include ultra-high capacity mmWave transceivers that are deployed and field proven within some of the world's highest performance point to point radio links.

Cost-saving, quality-assured components

Filtronic are technology leaders within telecommunications infrastructure, they are experts in delivering highly integrated Size, Weight and Power (SWaP) improvements. With core capabilities within medium-volume, high-precision component manufacturing, Filtronic helps clients get to market quicker, improving their overall sales revenue and market share.

Filtronic have an enviable, field proven reliability record, with hundreds of thousands of products deployed worldwide. Our skills in module integration enable us to provide plug-and-play solutions eliminating the need for clients to develop in-house mmWave expertise. Our centralised engineering resources and production facilities, combined with efficient process engineering, offer clients exceptional quality and value.

Powered by RF innovators

Our highly specialised products are developed by our team of skilled engineers and designers, typically educated to PhD level, who understand the particular challenges of RF communications. Our engineering team thrive on taking unique challenges and providing customised solutions, lowering development & NRE costs and minimising the cost of quality.

Our advanced UK and US manufacturing facilities make us a trusted long-term supplier to the global telecommunications industry. Clients rely on our expertise, speed and agility to manufacture and test products at scale to push the boundaries of telecommunications technology – meeting demand for ever-increasing data rates and capacity.

2021

Design, manufacturing and testing

Bespoke component and sub-system design

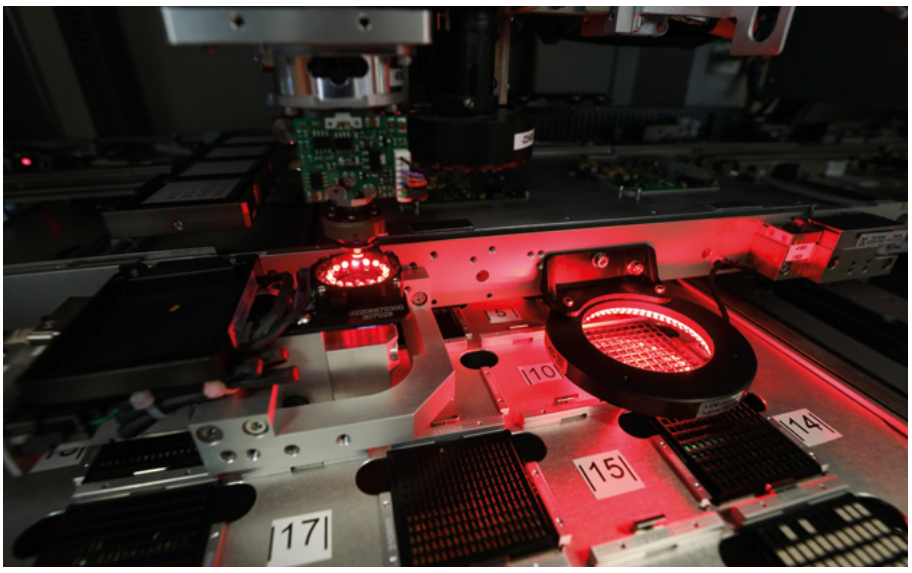
Our experienced team are experts in microwave and mmWave product design and integration. As well as developing our own products, we offer contract design services, collaborating with clients to enhance their system performance. Our designers have long established relationships with compound semiconductor foundries and have developed an exclusive range of proprietary microwave and mmWave ICs to ensure that highly competitive bespoke designs can be offered.

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.

Advanced microelectronic manufacturing

Our precision manufacturing facilities offer high-volume microelectronic production capabilities. Investments in hybrid assembly, advanced Microwave and mmWave test systems and full traceability have created a high-quality, high-security manufacturing environment. Our automated assembly lines enable MMIC die attach, wire, and ribbon bonding, combined with skilled manual assembly and hermetic sealing – all to the relevant IPC or mil standards.

We specialise in medium-volume production, achieving high yields through continuous improvement and lean manufacturing. That allows us to offer sustained cost reductions for clients requiring complex products manufactured to the highest quality standards.



Made-to-order contract manufacturing

Our hybrid manufacturing services enable clients' advanced components to be manufactured and tested at scale in our facilities. Robust proprietary 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.

High-quality testing for reliable performance

Our exhaustive testing procedures ensure that Filtronic products meet the toughest regulatory standards and customer specifications. Dependent on customer requirement, every element of every component that goes into our complex products may undertake rigorous testing, including:

- Electrical testing DC to 110GHz
- Environmental & stress screening
- 100% electrical characterisation over full operating temperatures
- Destructive and non-destructive tests
- Die level MMIC wafer acceptance testing and characterisation
- Pre and post-lid tests
- Module calibration
- Fully automated, software controlled volume testing

Electronic engineering for challenging applications

As well as being a long-established supplier to the telecommunication infrastructure industry, we design and manufacture advanced RF solutions for critical communication applications in other key markets.

Critical communications

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 Tower Top Amplifiers (TTAs) which deliver best-in-class performance.

Aerospace and defence

Filtronic is a trusted long-term partner to clients supplying the aerospace and defence industry. We supply transmit and receive modules (TRMs) for the latest AESA radars, other RF components and subsystems where our engineering, design and highly specialised manufacturing capabilities add significant value.

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 10Gbps.

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

Providing internet connections to under-served communities is a high priority for many countries. Filtronic is 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 mmWave frequencies supporting wideband links.

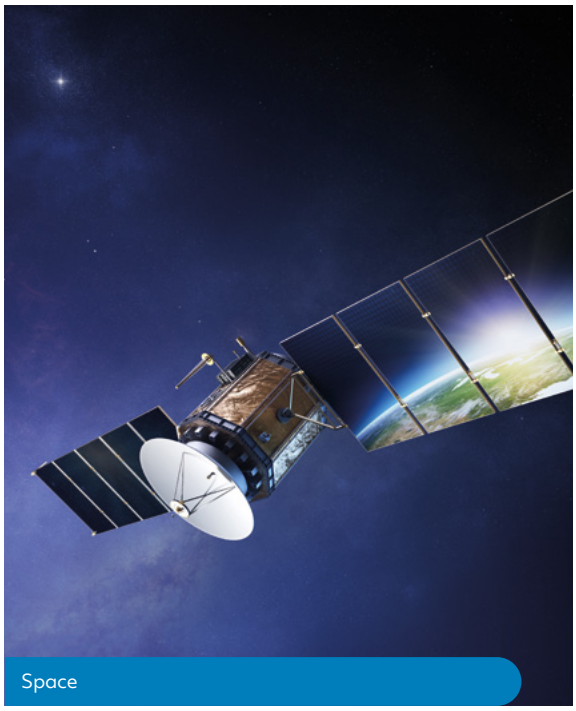
Test and measurement

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 – 90GHz.

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 our E-Band transceivers for financial services markets.

Critical communications



Space

Where we excel

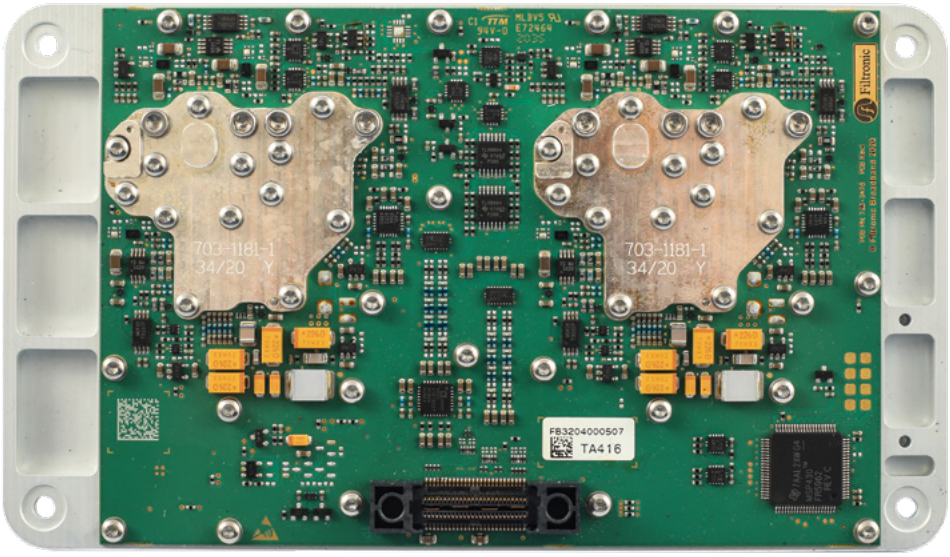
- We help our clients get to market quicker – increasing their sales revenues and market share.
- Our capabilities and technologies reduce the overall cost of data communication, lowering the cost per Gbps.
- Taking unique challenges & providing a customised solution, we lower development & NRE costs, 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.

Aerospace and defence

Technology for telecommunications innovation

The speed and capacity demands placed on mobile telecommunications infrastructure are increasing exponentially. By 2023, fixed broadband speeds are expected to more than double, while 5G speeds will be 13 times higher than the average mobile connection. Filtronic plays a vital role in equipping global telecommunications networks for the future.

As experts in designing components for 5G XHaul, we support the industry in moving up the frequency spectrum from E-Band to W-Band and D-Band, to deliver the extra bandwidth required.



Transceivers

Our device-agnostic mmWave transceivers are high-performance, competitively priced modules that significantly reduce client time to market. They are produced using our unique high-capacity fully automated chip-and-wire manufacturing technology, offering high reliability and low cost.

These highly integrated, ultra-high-capacity transceiver modules, including Morpheus II, Hercules and Orpheus, deliver carrier-class multi-gigabit connectivity for mobile XHaul and enterprise networks. They simply drop-in between the baseband modem module and the antenna, providing a turn-key solution. Each module contains all the transmit and receive functions necessary for the RF section of an E-Band link and provides a simple connection to a high data rate full duplex modem.

Flexible channel widths from 62.5MHz up to 2000MHz can be accommodated, facilitating operation at data rates up to 10Gbps per channel. The modules feature baseband Tx/Rx inputs/outputs, integrated diplexers, frequency synthesis and an embedded microprocessor which takes care of all gain adjustments and frequency controls for simple integration into OEM outdoor units.

High power amplifier modules

Cerus power amplifiers provide market-leading linear mmWave power. Available in single to N-way configurations, they deliver unparalleled performance for long range E-Band communications.

Cerus is available in 8-way (amplifier module), 4-way or 2-way configurations each designed to deliver maximum power through efficient waveguide combining techniques. The compact, lightweight design can be easily integrated with Filtronic transmitter or transceiver modules. The design is scaleable to other mmWave frequencies.

RF filters

We have extensive expertise in developing microwave and mmWave filters for telecoms applications. Our products include metal cavity filters, ceramic, combline, interdigital, lumped element, suspended substrate, waveguide and thin-film filters. We are experts in filter technology, offering rapid prototyping and reduced development cycles.

Pushing the boundaries

Bridging the digital divide by satellite

At Filtronic, our passion for innovation and connectivity is driving us to explore new markets. Low Earth Orbit (LEO) satellite constellations and High altitude pseudo-satellites (HAPS) operating in the stratosphere are now beginning to be deployed to provide internet connections to every part of the Earth's surface. To deliver the full promise of 5G and address the 'digital divide', these systems are essential to enable coverage in low population areas where terrestrial mobile networks are not viable.

Filtronic is a pivotal mmWave technology provider to the HAPS industry, playing a key role in developing the high-performance RF components required for these communications systems. mmWave frequency bands are expected to form a key part of the solution for the links between satellites, HAPS and -ground terminals. The use of mmWave bands presents technological challenges for semiconductor devices, RF systems, antennas and network architectures. Filtronic has participated in successful large-scale trials of long range mmWave links with data rates of up to 40Gbps achieved with multi-channel solutions, supplying transceiver modules customized to interface with our clients' modems in these trial systems.

Next stop: reliable trackside-to-train communications

Providing high-speed, high-capacity, high-reliability internet connections on rail journeys has become a strategic objective of both governments and rail operators around the world. However, providing these services on highspeed trains presents technical and commercial challenges, and railway passengers are frequently frustrated by the poor connectivity they experience while traveling.

Filtronic has been working in collaboration with an international manufacturer to assess the use of E-Band mmWave transceivers as key components in trials of data communications links between trains and the side of the track. These trials, using Filtronic E-Band transceivers integrated into our partners radios, have successfully demonstrated the suitability of line-of-sight E-Band links for establishing broadband connections to high-speed trains, providing a reliable connection at data rates greater than 10Gbps.

D-Band exploration – the next frontier for XHaul

Filtronic has been involved in a collaborative project with the UK National Physical Laboratory (NPL) on next-generation mmWave technology up to 175GHz – to enable emerging 5G wireless XHaul requirements up to 100Gbps. Moving up the frequency spectrum from E-Band to W-Band and D-Band systems, where huge amounts of further bandwidth are available, is seen as part of the solution to increasing data capacity to meet global demand.

The project with NPL furthered previous research work on D-Band components, developing methods for integrating these into a transmit-receive module for use in high-speed links. It focused on developing a robust method for making low loss connections between the active circuits in the module and the external interface, which is generally a waveguide port connected to an external antenna. Filtronic explored designs and assembly techniques to provide low loss D-Band transitions between MMICs and various external circuits. The collaboration with NPL developed new methods of on-wafer calibration and measurement, and included trials of hot via technology that eliminate excess bond wire inductance and allow MMICs to be surface mounted.

Filtronic continues to cooperate with NPL on D-Band measurements, and is also an industrial partner within the UK EPSRC "DLINK" project, led by Lancaster University and the University of Glasgow, established to explore use cases within D-Band.

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