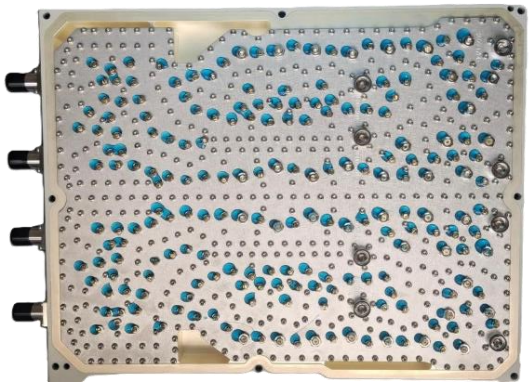
Model: TCF-RU

RF Multi-Channel Cavity Filter

Product Type: Filter

Application:
Cellular Radio Units, Base Stations, Wireless Transmission Systems

Description:
The multi-channel cavity filter is a high-performance RF filtering component designed for integration inside Radio Units. It provides channel separation, interference suppression, and optimal in-band performance while maintaining low insertion loss and high isolation between transmit and receive paths. Designed for outdoor telecom environments with excellent thermal and mechanical stability.



Part No.: TCF-RU03

Key Features

- Multi-channel bandpass / duplex / multiplex configurations
- High selectivity with low insertion loss
- Compact aluminum cavity structure for excellent heat dissipation
- Excellent temperature & vibration stability
- Precision tuning with adjustable coupling screws
- Outdoor-grade environmental sealing (IP65/IP67)
- Compatible with standard Radio Unit mechanical interfaces
- ROHS-compliant materials

Mechanical Specifications

Parameter	Sym.	Rx	Tx	Unit
Frequency Range	$f_1 – f_2$	1710 ~ 1735	1805 ~ 1830	MHz
Insertion Loss	IL	≤ 1.45 （@ +25℃） ≤1.65 （@ -40℃/+55℃）	≤1.3 （@ +25℃） ≤1.5 （@ -40℃/+55℃）	dB
Channel Isolation	Iso	≥ 90 @1710 ~ 1735 MHz & 1805 ~ 1830MHz		dB
TX power capacity	P_{max}	TX: 40W（average），700W（peak value）		W
Ripple	—	≤1.0		dB
Impedance	Z_0	50		Ω

Mechanical Specifications

Parameter	Specification
Housing Material	Aluminum Alloy
Surface Finish	Anodized / Powder-coated / Chromate
Connector Type	N-female / 4.3-10 / SMA-female
Mounting Type	Integrated to Radio Unit chassis
Dimensions (L×W×H)	425 × 335 × 30 mm
Weight	18.75 Kg
Cooling	Conduction / Natural convection
Tuning Method	Mechanical screws / sealed tuning ports

Environmental Characteristics

Parameter	Condition	Value
Operating Temperature	—	–40 °C to +85 °C
Storage Temperature	—	–55 °C to +100 °C
Humidity	Non-condensing	≤ 95% RH
Ingress Protection	With sealing	IP65 / IP67
Vibration	IEC 60068-2-6	Telecom-grade
Shock	IEC 60068-2-27	Telecom-grade
MTBF	—	> 1,000,000 h

Performance Characteristics (Typical)

- Passband 1: 1805 ~ 1880 MHz or 925 ~ 960 MHz
- Passband 2: 1710 ~ 1785 MHz or 880 ~ 915 MHz
- Insertion Loss: ≤ 1.2 dB
- Isolation: ≥ 45 dB
- Return Loss: ≥ 18 dB
- Power Handling: 40W per channel

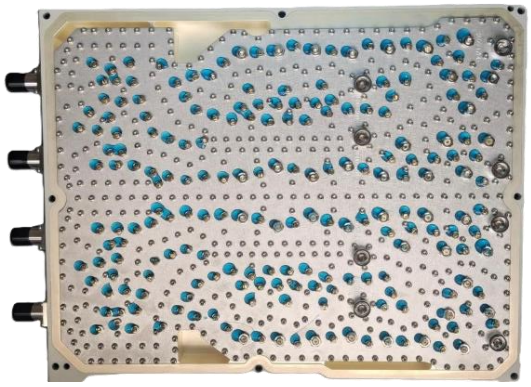
Model: TCF-RU

RF Multi-Channel Cavity Filter

Product Type: Filter

Application:
Cellular Radio Units, Base Stations, Wireless Transmission Systems

Description:
The multi-channel cavity filter is a high-performance RF filtering component designed for integration inside Radio Units. It provides channel separation, interference suppression, and optimal in-band performance while maintaining low insertion loss and high isolation between transmit and receive paths. Designed for outdoor telecom environments with excellent thermal and mechanical stability.



Part No.: TCF-RU08

Key Features

- Multi-channel bandpass / duplex / multiplex configurations
- High selectivity with low insertion loss
- Compact aluminum cavity structure for excellent heat dissipation
- Excellent temperature & vibration stability
- Precision tuning with adjustable coupling screws
- Outdoor-grade environmental sealing (IP65/IP67)
- Compatible with standard Radio Unit mechanical interfaces
- ROHS-compliant materials

Mechanical Specifications

Parameter	Sym.	Rx	Tx	Unit
Frequency Range	$f_1 - f_2$	880 ~ 915	925 ~ 960	MHz
Insertion Loss	IL	≤ 1.45 (@ +25℃) ≤1.65 (@ -40℃/+55℃)	≤1.3 (@ +25℃) ≤1.5 (@ -40℃/+55℃)	dB
Channel Isolation	Iso	≥ 90 @ 880 ~ 915 MHz & 925 ~ 960 MHz		dB
TX power capacity	P_{max}	TX: 40W (average), 700W (peak value)		W
Ripple	—	≤1.0		dB
Impedance	Z_0	50		Ω

Mechanical Specifications

Parameter	Specification
Housing Material	Aluminum Alloy
Surface Finish	Anodized / Powder-coated / Chromate
Connector Type	N-female / 4.3-10 / SMA-female
Mounting Type	Integrated to Radio Unit chassis
Dimensions (L×W×H)	425 × 335 × 30 mm
Weight	18.75 Kg
Cooling	Conduction / Natural convection
Tuning Method	Mechanical screws / sealed tuning ports

Environmental Characteristics

Parameter	Condition	Value
Operating Temperature	—	–40 °C to +85 °C
Storage Temperature	—	–55 °C to +100 °C
Humidity	Non-condensing	≤ 95% RH
Ingress Protection	With sealing	IP65 / IP67
Vibration	IEC 60068-2-6	Telecom-grade
Shock	IEC 60068-2-27	Telecom-grade
MTBF	—	> 1,000,000 h

Performance Characteristics (Typical)

- Passband 1: 1805 ~ 1880 MHz or 925 ~ 960 MHz
- Passband 2: 1710 ~ 1785 MHz or 880 ~ 915 MHz
- Insertion Loss: ≤ 1.2 dB
- Isolation: ≥ 45 dB
- Return Loss: ≥ 18 dB
- Power Handling: 40W per channel

Model: MMP4T4R
Mixed Mode TRX &Processing Board
Product Type: TRX and Processing Board

Part No.:
MMP4T4RR02

Application:
Cellular RAN Module, Distributed Base Stations, Small Cells

Description:
The Mixed Mode TRX & Processing Board is a compact, high-performance SDR-based module engineered for multi-standard wireless access networks.
It integrates advanced software-defined radio (SDR) processing with a wideband RF transceiver subsystem to support both LTE and GSM air interfaces within a unified hardware platform.
As the core signal-processing element within radio units, the board manages RF transmission, reception, digital up/down conversion, modulation, demodulation, and baseband interfacing with high stability and accuracy.
The MMP4T4R configuration enables 4T4R operation and is fully aligned with 3GPP specifications for LTE and GSM.

Key Features
- Integrated SDR baseband processing and wideband RF transceiver
- Multi-standard support: LTE + GSM
- Multi-band, multi-carrier RF capability
- High-resolution DUC/DDC, digital filtering, and modulation processing
- Compatible with external DPD/CFR when paired with a PA module
- Precision timing, synchronization, and local oscillator generation
- Real-time digital and analog signal processing framework
- On-board monitoring for voltage, temperature, and RF performance
- Compact mechanical format optimized for radio units and outdoor radio enclosures
- Designed for extended temperature environments (–40°C to +85°C)

Functional Architecture

SDR Processing Section
- Digital up/down conversion
- Signal modulation/demodulation (LTE+GSM)
- DPD/CFR algorithms
- High-speed interfaces (CPRI)

Mechanical Specifications

Parameter	Symbol	Typical	Unit	Remarks
Input Voltage	VDC	28	V	Telecom standard
Control Interface	—	CAN / I²C / SPI / Ethernet	—	Telecom standard

Mechanical Specifications

Parameter	Specification
Form Factor	Integrated board module
Weight	500 g
Cooling	Conductive to chassis (baseplate or fins)
Mounting Method	Direct to RAN Unit chassis (screw or press-fit)
Housing Material	Aluminum alloy with EMC shielding
Surface Finish	Anodized / Chromate / Conductive coating

Environmental Characteristics

Parameter	Condition	Value
Operating Temperature	—	–40 °C to +85 °C
Storage Temperature	—	–55 °C to +100 °C
Humidity	Non-condensing	≤ 95% RH
Ingress Protection	—	IP65 (with enclosure)
Vibration	IEC 60068-2-6	Telecom-grade
MTBF	—	> 100,000 h

Model: TBA-4G-2G

Telecommunication Network (grid) Control System Board

Product Type: RAN Grid Control

Application:

RAN Processing Units for multi-band cellular systems/ Hybrid 4G/2G communication platforms/ Private and enterprise wireless network infrastructure

Description:

This processing board is a high-performance hardware module designed to enhance the computational and fronthaul capabilities of radio access equipment operating in Band 3 and Band 8.

It functions as an intelligent interface between the digital processing section and the RF subsystem, handling intensive real-time signal operations and enabling efficient high-speed data transport over CPRI/eCPRI links.

The board integrates advanced DSP, FPGA, and network acceleration technologies to execute waveform processing, protocol handling, and fronthaul management with low latency and high reliability.

Its modular design supports scalable deployment across various telecom processing units, reducing the load on the central controller while providing consistent multi-band performance.

Part No.: TBA-4G-2G

Key Features

- Engineered for multi-band 4G/2G communication processing
- Multiple CPRI interface for direct connection to remote radio units
- High-performance multicore processor for time-critical control and signal tasks
- Compact module optimized for processing chassis installation
- Cooling options: conduction or forced-air via chassis airflow
- Secure chassis-mounted design for industrial telecom environments
- Power-efficient architecture for improved thermal stability
- High-speed PCIe interface for integration into system control backplanes
- Modular hardware form factor allowing expansion with multiple boards
- Fully optimized for Band 3 and Band 8 FDD operation

Functional Description

- System Controller: Manages operational control, startup sequencing, monitoring, and health reporting
- Timing & Sync: Supports IEEE 1588v2 PTP, SyncE, and external GPS timing inputs
- Communication Interface: Provides high-bandwidth links to processing modules and remote radio units

Mechanical Specifications

Parameter	Min	Typ.	Max	Unit
Input Voltage	-	12	-	VDC
Dimensions	100 × 135			mm

Mechanical Specifications

- Form Factor: Compact plug-in module for telecom processing chassis
- Cooling: Forced-air cooling via system fan tray
- Connector Options: PCIe edge connector / RJ45 / SFP

Model: TRA-4G-2G

Radio wave Power amplifier

Product Type: RF Power Amplifier Board with Integrated Heat Sink

Part No.: TRA-4G-2G03

Application:

RAN Units, Small Cells, Radio Transceivers, Wireless Access Systems

Description:

The Power Amplifier Board is a high-efficiency RF amplification module designed for telecommunication systems. It integrates RF power stages, driver amplifiers, monitoring circuits, and a thermal heat sink assembly to deliver stable output power in demanding outdoor telecom environments. The module is optimized for multi-carrier LTE and GSM waveforms, ensuring high linearity, efficiency, and reliability.

Key Features

- High-efficiency GaN or LDMOS RF power amplifier stages
- Wideband linear amplification optimized for LTE and GSM multi-standard operation
- Integrated aluminum heat sink for effective conduction cooling
- Compatible with Digital Predistortion (DPD) for improved linearity when used with supporting SDR modules
- Comprehensive protection features: over-voltage, over-current, over-temperature
- Built-in directional coupler for real-time output power and VSWR monitoring
- Robust, outdoor-grade mechanical design suitable for telecom radio unit environments
- Compact form factor enabling seamless integration into radio units and multi-band radio units
- Constructed from RoHS/REACH-compliant materials

Functional Description

The Power Amplifier board includes:

- **RF Input Stage** – Low-noise driver amplifier with gain control and optimized matching for LTE and GSM bands.
- **Main PA Stage** – High-power RF transistors configured for Doherty or linear operation, delivering high efficiency across LTE and GSM frequency ranges.
- **Output Network** – Harmonic filtering, impedance matching, and integrated directional coupler for RF performance monitoring.
- **Thermal Management System** – Thermally optimized baseplate paired with an aluminum heat sink to dissipate heat under continuous high-power operation.
- **Monitoring & Protection** – Incorporated temperature sensors, current measurement circuits, and forward/reflected power detection for safe operation and fault response.
- **Control Interface** – Analog control lines and optional digital interfaces (I^2C, CAN, SPI) for amplifier control, telemetry reporting, and integration with system management.

Electrical Specifications

Parameter	Symbol	Typical	Unit	Remarks
Frequency Range	f	B3: 1710-1785 /1805-1880	MHz	GSM/LTE

Output Power	Pout	40	W	Per channel
Gain	G	48	dB	Band 3
Gain Flatness	—	1	dB	Peak to peak
Linearity (ACLR)	—	≤46	dBc	With DPD
Input VSWR		1.5	-	—
Output VSWR		1.5	-	—
Supply Voltage	VDC	28	V	
Supply Current	IDC	4	A	At rated power

Mechanical Specifications

Parameter	Specification
Operating Temperature	**-25 to +60**
PCB Material	High-grade FR-4 or hybrid laminate
Dimensions	335 × 515 × 110 mm
Connector Type	Board-to-board / terminal block / power lug
Cooling	Conduction to chassis or integrated heat spreader
Mounting Method	Screw-mounted to enclosure

Model: TRA-4G-2G

Radio wave Power amplifier

Product Type: RF Power Amplifier Board with Integrated Heat Sink

Part No.: TRA-4G-2G08

Application:

RAN Units, Small Cells, Radio Transceivers, Wireless Access Systems

Description:

The Power Amplifier Board is a high-efficiency RF amplification module designed for telecommunication systems. It integrates RF power stages, driver amplifiers, monitoring circuits, and a thermal heat sink assembly to deliver stable output power in demanding outdoor telecom environments. The module is optimized for multi-carrier LTE and GSM waveforms, ensuring high linearity, efficiency, and reliability.

Key Features

- High-efficiency GaN or LDMOS RF power amplifier stages
- Wideband linear amplification optimized for LTE and GSM multi-standard operation
- Integrated aluminum heat sink for effective conduction cooling
- Compatible with Digital Predistortion (DPD) for improved linearity when used with supporting SDR modules
- Comprehensive protection features: over-voltage, over-current, over-temperature
- Built-in directional coupler for real-time output power and VSWR monitoring
- Robust, outdoor-grade mechanical design suitable for telecom radio unit environments
- Compact form factor enabling seamless integration into radio units and multi-band radio units
- Constructed from RoHS/REACH-compliant materials

Functional Description

The Power Amplifier board includes:

- **RF Input Stage** – Low-noise driver amplifier with gain control and optimized matching for LTE and GSM bands.
- **Main PA Stage** – High-power RF transistors configured for Doherty or linear operation, delivering high efficiency across LTE and GSM frequency ranges.
- **Output Network** – Harmonic filtering, impedance matching, and integrated directional coupler for RF performance monitoring.
- **Thermal Management System** – Thermally optimized baseplate paired with an aluminum heat sink to dissipate heat under continuous high-power operation.
- **Monitoring & Protection** – Incorporated temperature sensors, current measurement circuits, and forward/reflected power detection for safe operation and fault response.
- **Control Interface** – Analog control lines and optional digital interfaces (I^2C, CAN, SPI) for amplifier control, telemetry reporting, and integration with system management.

Electrical Specifications

Parameter	Symbol	Typical	Unit	Remarks
Frequency Range	f	B8: 880 – 915 /925 – 960	MHz	GSM/LTE
Output Power	Pout	40	W	Per channel
Gain	G	48	dB	Band 8
Gain Flatness	—	1	dB	Peak to peak
Linearity (ACLR)	—	≤46	dBc	With DPD
Input VSWR		1.5	-	—
Output VSWR		1.5	-	—
Supply Voltage	VDC	28	V	
Supply Current	IDC	4	A	At rated power

Mechanical Specifications

Parameter	Specification
Operating Temperature	**-25 to +60**
PCB Material	High-grade FR-4 or hybrid laminate
Dimensions	335 × 515 × 110 mm
Connector Type	Board-to-board / terminal block / power lug
Cooling	Conduction to chassis or integrated heat spreader
Mounting Method	Screw-mounted to enclosure

Model: TMB-4G-2G

Telecommunication Network (grid) Control System Board

Product Type: Central Control System Board for Multi-Standard Radio Networks

Application:
LTE + GSM network control platforms / multi-band radio communication systems (Band 3 & Band 8) / Distributed and centralized telecom processing environments / Private, enterprise, and public wireless communication systems

Part No.: TMB-4G-2G

Description:
The Network Control System Board is the primary coordination and processing module within a telecommunication grid system. It manages system-wide control, synchronization, message handling, and communication between processing, fronthaul, and radio modules.
Designed for LTE + GSM operation in Band 3 and Band 8, the board ensures reliable multi-standard performance, efficient resource management, and seamless inter-module connectivity in modern radio access systems.

Key Features

- Multi-standard control engine supporting LTE + GSM
- Optimized for Band 3 (1800 MHz) and Band 8 (900 MHz)
- High-performance multicore processor for system management and signaling
- Integrated hardware engine for real-time scheduling and protocol handling
- Support for high-speed transport interfaces (CPRI, Ethernet)
- IEEE 1588v2 and SyncE synchronization support
- Intelligent diagnostics and health monitoring
- Secure boot and integrity verification
- Low-power design with advanced thermal efficiency
- Modular architecture supporting expansion and future upgrades
- Fully compliant with telecom-grade environmental and reliability standards

Functional Description

The system board can support essential network control and coordination, including:

Processing & Control Layer

- Centralized call processing and signaling
- Protocol stack management for LTE + GSM
- Real-time control loop for radio and transport elements

Synchronization & Timing Layer

- High-stability clock generation
- Support for IEEE 1588v2 PTP, SyncE, and GPS-based synchronization
- System-wide timing distribution to subordinate modules

Communication Interfaces

- High-speed fronthaul and backhaul connections
- Multi-port Ethernet/optical interfaces
- Interface management for transport protocols and system messaging

System Management & Monitoring

- Built-in sensors for voltage, temperature, and status telemetry
- Fault detection and automatic recovery mechanisms
- Remote software update and configuration support

Mechanical & Electrical Specifications

Parameter	Value
Input Voltage	12 VDC
Processing Architecture	Multicore CPU + hardware accelerators
Timing Support	IEEE 1588v2, SyncE
Communication Ports	Ethernet / Optical / High-speed serial
Dimensions	200 × 260 mm
Cooling	Forced air or chassis conduction
Material	High-grade PCB with telecom-grade components

Environmental Specifications

- Operating Temperature: –40°C to +85°C
- Humidity: ≤95% non-condensing
- Shock & Vibration: Telecom-grade (IEC 60068 series)
- Compliance: RoHS/REACH, EMC/EMI compliant