

# KAIROS

Base Station/Repeater



Professional infrastructure  
for Digital Mobile Radios



## Key Features

### DUAL MODE

It performs the automatic switching between analog and digital modulation, according to the type of incoming signal.

### IP MULTISITE MULTICAST AND SIMULCAST

It integrates all the necessary algorithms (such as, IP interfaces, voting system, automatic equalization, protocol coherence, synchronization recovery, network managing, etc.) to realize professional multisite networks.

### UHF LINKING

It provides RF interconnections among sites where the IP backbone is not available, carrying analog and digital signals. It is a mixed linking network (IP+UHF).

### SYSTEM REDUNDANCY

It can be assembled as 1+1 (Main + Stand-by) and it can support the backup Master functionality (a Slave station that automatically replaces the failed main Master, restoring all network functions). Its LINUX platform allows a distributed elaboration in the system, thus increasing its flexibility and reliability.

### SOFT DIVERSITY RECEPTION

It is a receiving technique based on the vectorial treatment of two or more incoming signals. It strongly enhances the covering range and the clearness of a digital mobile communication system, removing fading holes.

### SIP/RTP-IP PORTS

This direct connection with the radio network offers a wide range of benefits to Control Rooms, such as SIP/RTP-IP dispatching systems; automatic roaming between different networks and/or repeaters (mobility); automatic phone/radio bridging, etc.

### POWERFUL REMOTE CONTROL

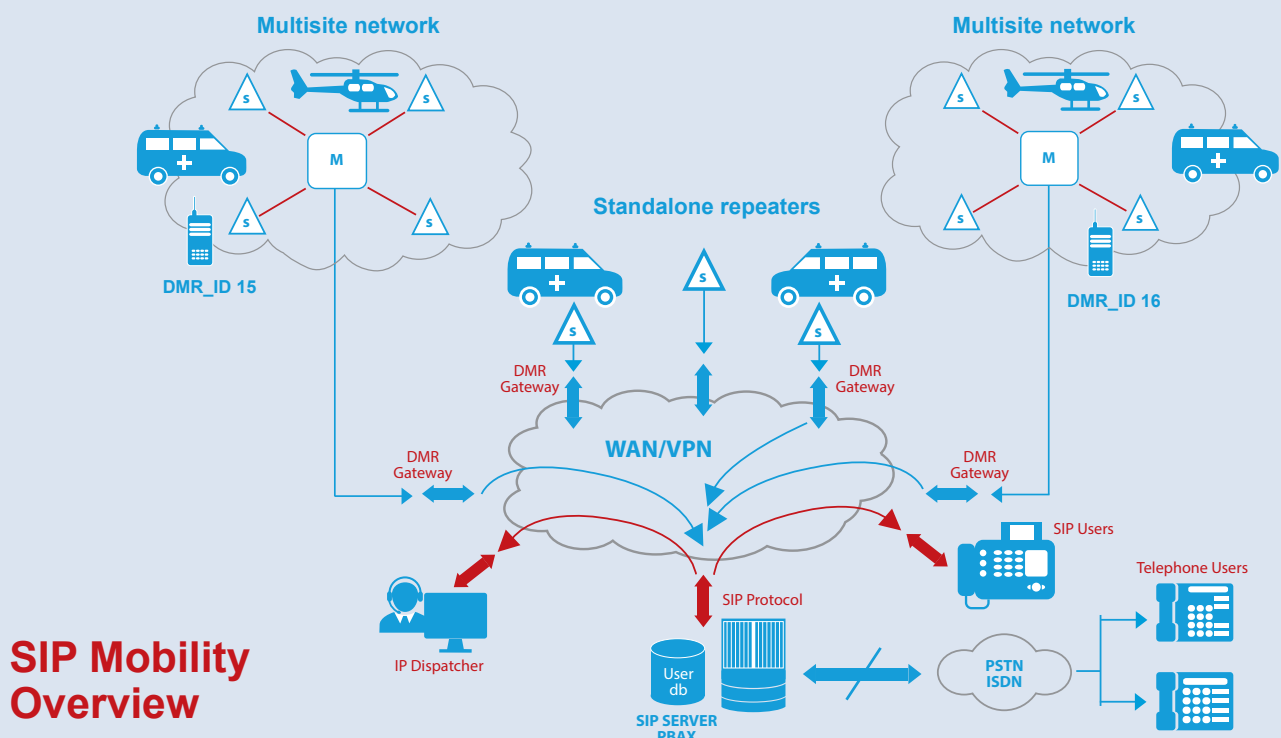
Thanks to its remote detailed monitoring and configuration tool, setup and network maintenance operations are simplified and sped up. The remote control tool also ensures secure software upgrades, IP backbone diagnosis and a continuous assessment of the entire radio system. KAIROS also supports the SNMP protocol for direct reporting to a generic surveillance system.

### LIGHT AND RUGGEDIZED

It sports a very compact size and weight. Thanks to its environmental robustness, KAIROS can perform in uncomfortable sites, and thanks to its low power consumption, it is considered a "green" solution, as it can be powered simply by a small solar panel.

### RELIABLE

The power supply input is protected from short circuit, under/over/inversion voltage and transient. Its RF power devices are protected from reverse power, over temperature and over current, allowing a 100% duty cycle.



## SIP Mobility Overview

# KAIROS

## Base Station/Repeater

*Designed and manufactured in Italy*

“Kairos” is an ancient Greek word meaning the right moment in which everything happens. Perfect timing is the secret of Radio Activity digital simulcast technology. Years of research and field experience enabled us to fix the right moment in the core of our KAIROS series of radio base stations.



Designing mobile radio infrastructures is an art that requires thorough knowledge. Our products result from our vast experience and the best Italian tradition, for which all details, also the hidden ones, are important.

This professional transceiver was conceived and designed as the right building block for a number of applications, ranging from a simple stand-alone repeater to a nation-wide system. We increased its versatility to accommodate your creativity.

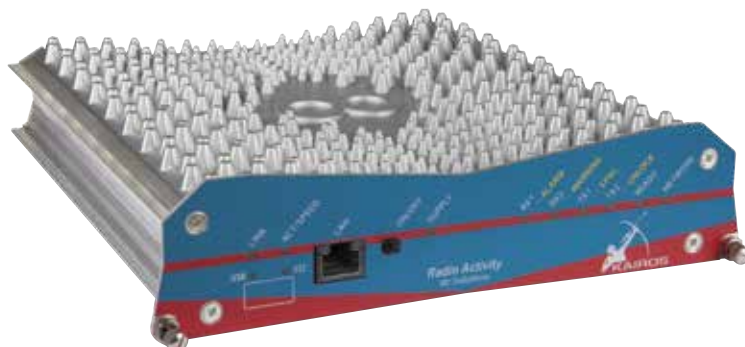
### Main Characteristics

KAIROS is a multi-protocol repeater that implements all mo-demodulation and filtering processes via software by a Digital Signal Processor (DSP), following the “soft radio” concept. This technique provides repeatability, perfect matching among repeaters, and can handle different types of protocols, depending on the incoming type of signal. The initial economic investment has a great return, since the addition of a new protocol or standard just consists in a software upgrade.

KAIROS’ sophisticated software and hardware platforms make it a powerful embedded workstation. It is based on a LINUX core which, thanks to the continuous

development from thousands of users around the world, naturally interfaces IP devices and networks and easily allows a high level of customization, without heavily impacting development efforts.

KAIROS radio performance is at the highest level in the market. It is designed for infrastructure applications where radio frequency pollution is a well-known issue: KAIROS’ excellent resistance to adjacent channels and blocking, its noiseless transmitter, and soft diversity reception reduce in-field problems, thus providing excellent coverage and clean communications.

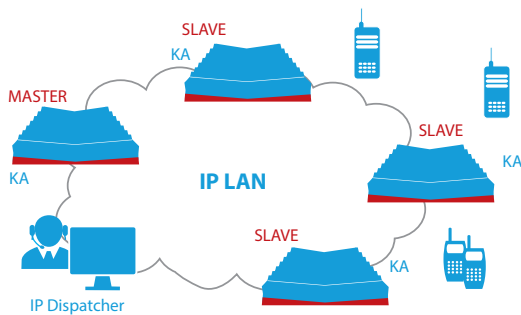
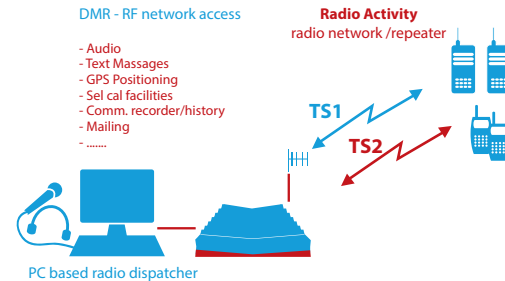


## Main Applications

All configurations shown below are available both in multicast and in simulcast technology. They all support dual mode (analog/digital) functionality; an IP-connected or a conventional dispatcher; a phone patching, and SIP mobility.

### Dual Timeslots Fixed Station/Repeater

KAIROS can manage two DMR timeslots, using a single antenna. From a dispatching point, it can be configured to supply access to an external radio network. By simply adding a duplexer, KAIROS can be configured as a standalone repeater.

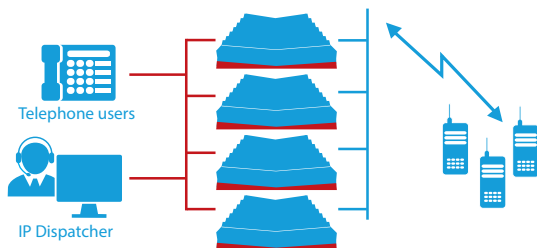
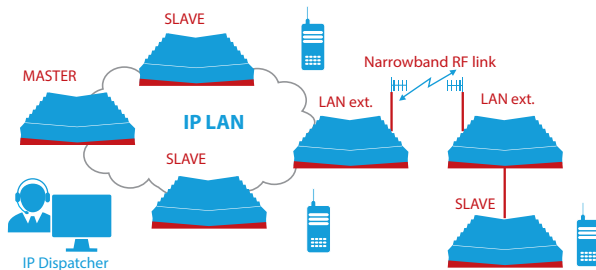


### Analog and DMR Tier II Simulcast or Multi-frequency IP-linked Base Station

KAIROS supports IP connections among base stations to achieve multisite hierarchical systems. The role of a device can be set as Master, Secondary Master, Slave or Backup Master. A Master manages up to 32 Slaves/Secondary Masters, allowing unlimited expansion of a radio network.

### Analog and DMR Tier II Simulcast or Multi-frequency RF-linked Base Station

KAIROS can be configured as a "LAN extender" supporting the RF narrowband connection among different sites. It is the perfect solution when the connecting distance is very large, or when the radio link path is not in line of sight.

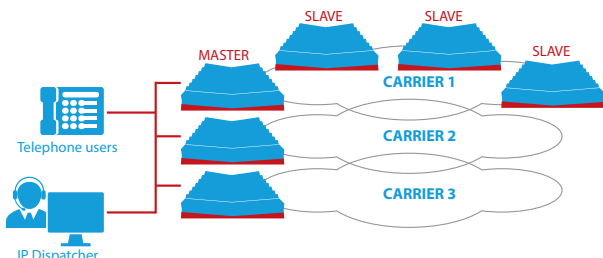


### Single site DMR TIER III Trunking System

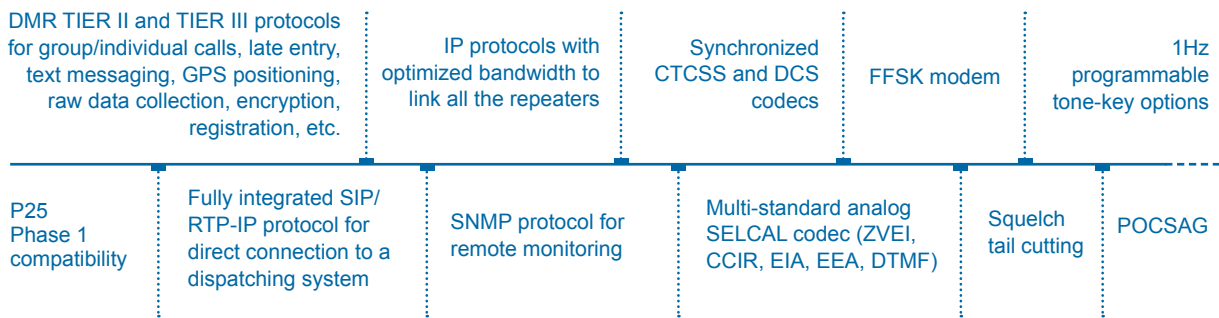
With a built-in SW Agent Tier III Controller, channels can be efficiently shared among all users, according to the ETSI standard Tier III Trunking protocol. No additional HW is needed for small and medium size systems. An external TSC needs to be added only to large and complex networks.

### Multisite Simulcast or Multi-frequency DMR TIER III Trunking System

The TIER III Controller can manage a group of IP-linked networks, thus realizing a multisite, multicarrier (simulcast or multi-frequency) system.



## Built-in Signaling & Protocols



## Mounting Options

### Accessories:

- Standard 19" - 6U rack for vertical mounting;
- Proprietary 19" - 2U rack for horizontal mounting.



## Technical Specifications

Available Models	Model	KA-080	KA-160	KA-350	KA-450	KA-500	KA-900
	MHz	66-88	136-174	350-400	400-470	450-527	806-941
Channelization	25/20/12,5/6,25 KHz						
RF output power	1-25 W / 100% duty cycle / selectable per channel						
Synthesis step	50Hz						
Frequency stability	0,5 p.p.m. (without GPS)						
Synchronization sources from	Internal, GPS/GLONASS, 2-wire, Digital RX, External, PTP based on IEEE1588						
Operating temperature	-30°C ÷ +60°C						
Power supply (negative ground)	Min.	Typ.		Max.			
	11V	13,8V		15V			
Power consumption	TX: 60 W @25W RF / RX: 5 W @Main+Div enabled						
Dimensions & weight	160x200x45mm / 1.35 Kg						
Audio lines	2 x (4-wire + E&M) - 1 x timeslot						
LAN port	Ethernet 10BT/100TX (auto MDI/MDI X) on an RJ45 socket						
IP multisite traffic	70 kb/s in analog to/from Master 24 kb/s in DMR to/from Master (both DMR timeslots)						
Maximum tolerable IP delay	1,14 s (round trip)						
Aux I/O	3xIO + 2xAnalog input						

Specifications are subject to change without notice, due to enhancements in technology.

For more information, please contact your local Radio Activity representative:



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