Keynet 2 - MPT1327 Solutions

Multisite, Modular Solution for Voice and Data Communications

- Tried, Tested, Proven
- In House Customisation for Widest Range of Pioneering Solutions
- Cradle to Grave Manufacturers Support
- All Frequency Bands available
- Reliable, Resilient and Robust

nqa. ISO 9001 Registered

Radio SYSTEMS

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Contents

1 Introduction

The purpose of this document is to give an overview of Radio Systems Keynet 2 MPT1327 radio communications systems.

Whereas for Keynet 3, design terms of reference were to focus costs solely upon components and functionality that would fulfill the majority of on site requirements with minimal redundant peripherals, Keynet 2 is a fully featured wide area system with multisite capability and enhanced functionality.

Nevertheless, Keynet 2 solutions retain the same modular approach and can therefore be easily scaled for initial preferred Grade of Service or loading and yet can have additional modules or sites added, as loading demands increase.

Keynet 2 is also fully MPT1327 compliant and as with Keynet 3, since all software is compiled by Radio Systems own in house development team, the areas of the MPT Standard that are prescribed for customisation permit bespoke software packaging. Radio Systems Commercial and technical philosophies work in parallel and each enquiry is judged on its merits and feasibility. This unique approach has made Keynet the system of choice where maximum functional potential and end user investment returns readily result.

2 Keynet 2 Component Parts

2.1 KF510 Base Station

The core of the Radio Systems in house infrastructure is the Key branded KF510 Base Station.

From a standard multifunctional hardware platform, the Radio Systems software suite has versions for PMR, MPT1327, voice, data, fast polling and telemetry applications.

Where Radio Systems supplies KF510 Base Stations configured for MPT1327 operation, the infrastructure is referred to as Keynet.

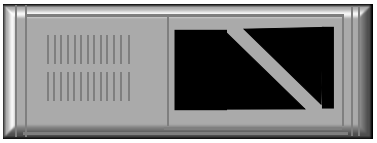
In excess of 1,000 KF510's are deployed in active systems in the UK and overseas with a reputation for MTBF often exceeding 5 years.

2.2 Power Supplies

The KF510 Base Station operates directly from a 12 volt DC supply. Radio Systems offer a range of power conversions, such that customer supplies in any industry standard dc or ac range can be accommodated.

Where maintained supplies to radio infrastructure are desirable and not available on site, Radio Systems offers a range of UPS options.

2.3 PC610 Site Controller



The KF510 logic board has been designed with enough processing power to support Keynet 3 functionality and hence, no additional site PC is required.

Due to Keynet 2 offering multiple sites and numerous interfaces to the outside world, an industrial PC is fitted to give the range of software flexibility required.

2.4 Port Expander

This is an extension of the PC610, in that it provides multiple RS232 serial ports via PCI slot expansion.

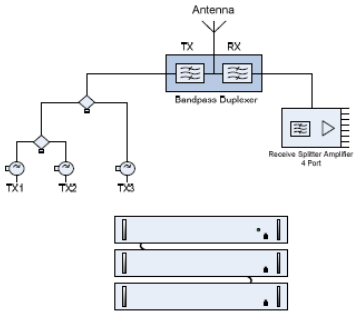
2.5 AMUX Switch

In simple terms, this device provides audio connectivity between the many traffic channels that might populate a Keynet 2 system and any external audio circuits, such as PABX and Keynet Computer Aided Voice Despatchers. It is under the control of software running on the PC610.

2.6 LIFU (LAN Interface Unit)

Keynet 2 has many interface options between sites and to the outside world. One is IP connectivity and where this is employed LIFU's are required, numbers being dependent upon the number of circuits. Again, in simple terms, the LIFU converts between analogue speech plus serial data used in Keynet 2 to IP traffic operating over LAN, WAN or the Internet.

2.7 Antenna Configuration

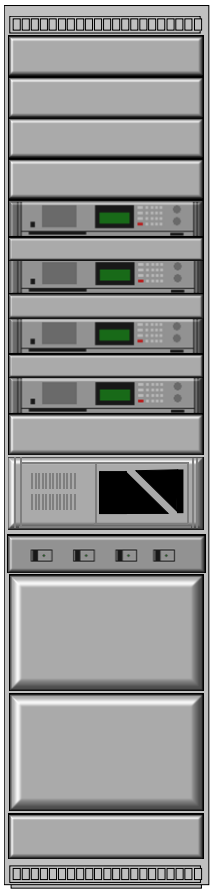


The KF510 Base Station has separate transmit and receive antenna connections.

In a single unit deployment, two antenna working can be used or for economy, Radio Systems can supply a Duplexer that enables single antenna working.

Where multiple KF510 or other Base Stations are deployed to a single site, inclusive of Keynet 2 configuration, Radio Systems is able to offer a variety of carefully calculated aerial combining options that enable single antenna working to comply with local licensing and site sharing Standards

3 Keynet 2 Architecture



3.1 A single Keynet 2 Site

Keynet 2 single site operation is an upgrade in terms of functionality from Keynet 3 in that a full range of audio and data peripherals can be connected with Keynet 2 software suites running the site. Typically, this can mean fast polling channels being in use, all channels having PABX connectivity and line connected despatchers being deployed.

The governing factors on whether single or multiple site infrastructures are deployed are primarily coverage and operational area. Radio Systems can undertake propagation studies as part of the design process to identify optimum numbers and locations of both channels and sites.

3.2 Multisite Keynet 2 Infrastructure

Where propagation studies indicate the requirement for more than one site to give operational coverage, Keynet 2 supports up to 128 sites.

All Transmitter sites that comprise a system have to be interconnected if a common platform for all mobiles is required. Keynet is compatible with copper, fibre, microwave, E1, LAN, WAN and Internet connectivity.

Star, Daisy Chain, Ring and Cloud are all valid Keynet 2 system architectures.

3.3 Keynet 2 Applications

Keynet 2 single and multisite systems can provide all mandatory MP1327 functionality, however, given Radio Systems in house software development capabilities the parameters prescribed for customisation have been fully exploited to fulfill a whole range of customer specific solutions.

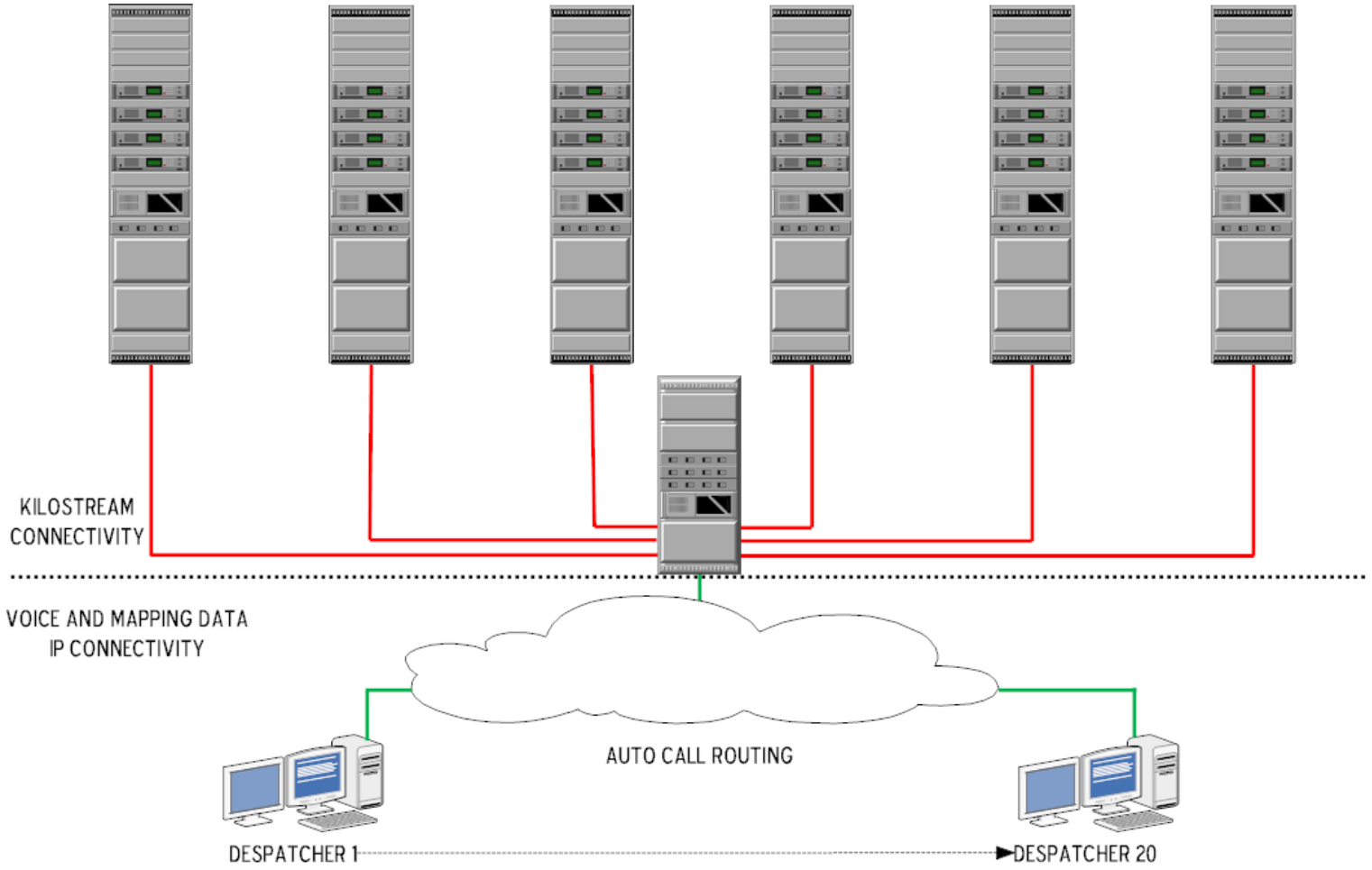
This approach has made Keynet 2 and Radio Systems the first choice for bespoke applications of MPT1327 technology.

3.4 Keynet 2 Case Studies

This section illustrates through practical reference sites, the wide and varied nature of Keynet 2 solutions.

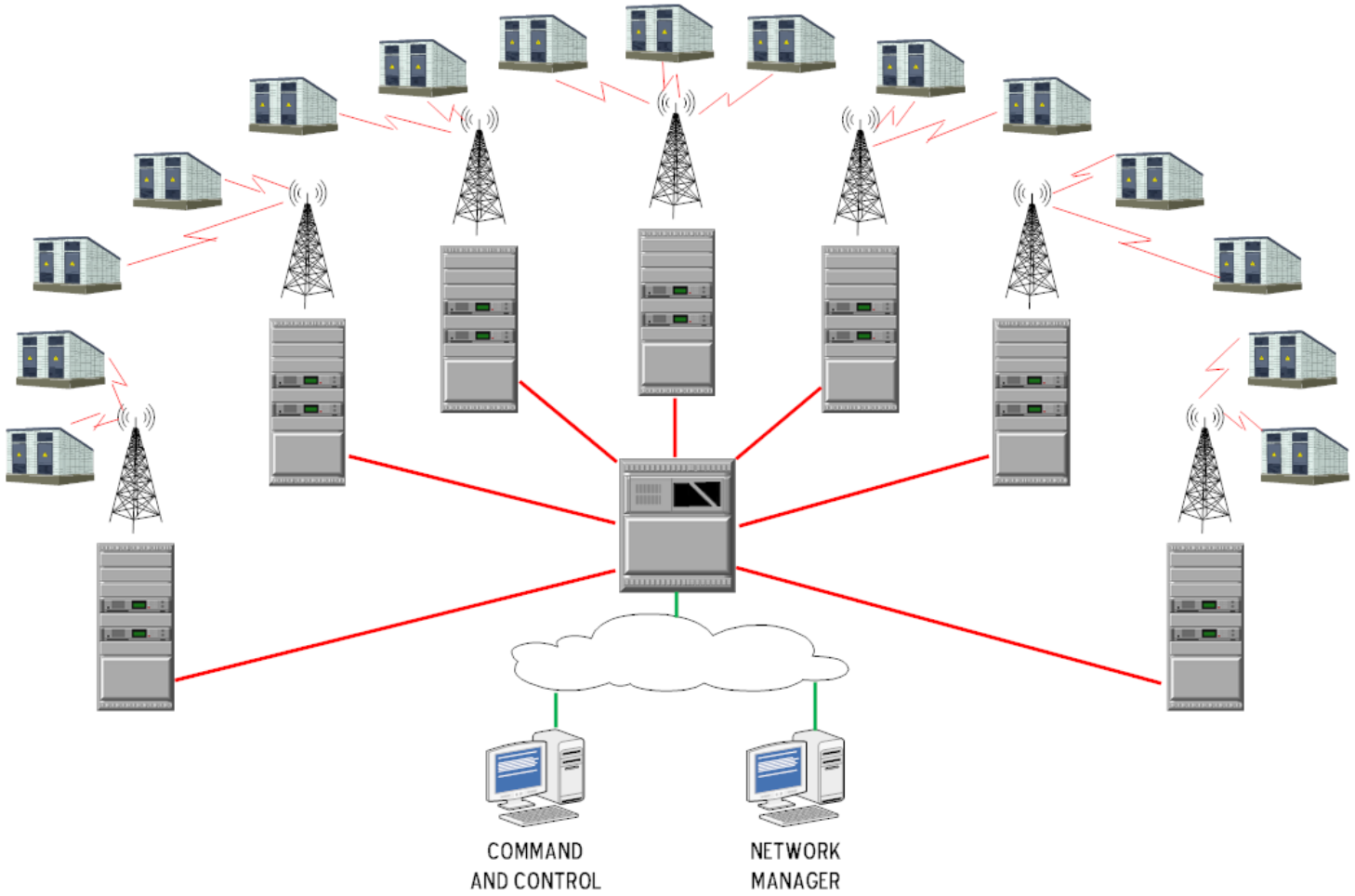
Case Study 1- 6 Keynet sites. Bus transport solution

• 2,000 buses fitted with Key mobiles • Operational and emergency voice • Short Data Messaging • Every bus position polled every 30 seconds	• Over 4 million data transactions per day • 20 bus depot Keynet voice and data despatchers • IP connectivity to despatchers • Automatic routing of voice and data to despatchers



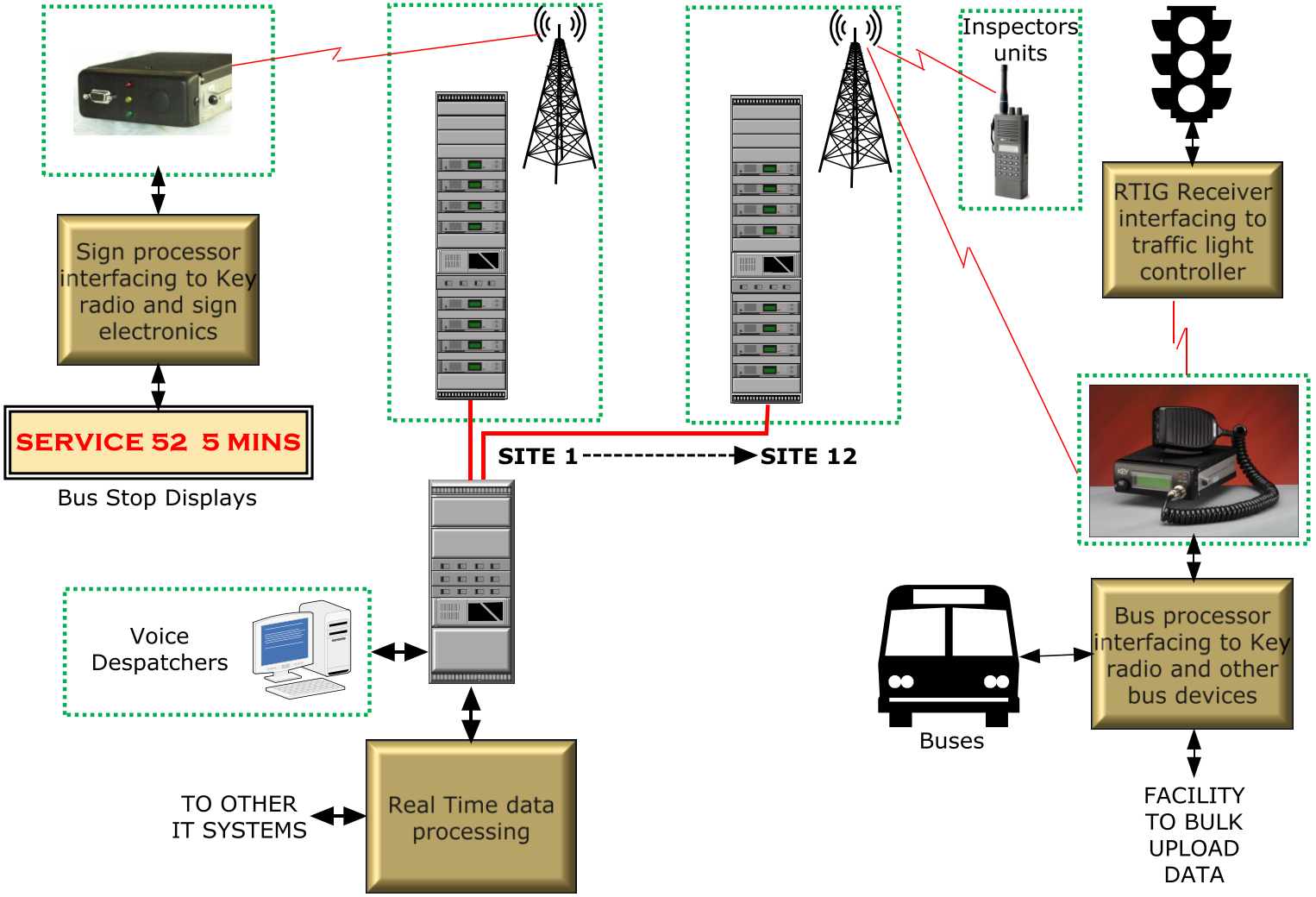
Case Study 2 – 40 Keynet sites. Electricity sub station monitoring and control of switchgear

• 650 substations fitted with Key mobiles over wide area • Mission critical • Keynet software interface suites (DNP3, IEC104 etc.) to electricity Remote Terminal Units (RTU) • Industry typical RTU's supported e.g. Remsdaq, Schneider	• Fully alarmed with customised Keynet management • Minimum latency to restore outages and avoid Regulator fines • Keynet component resilience with typical practical MTBF >5years



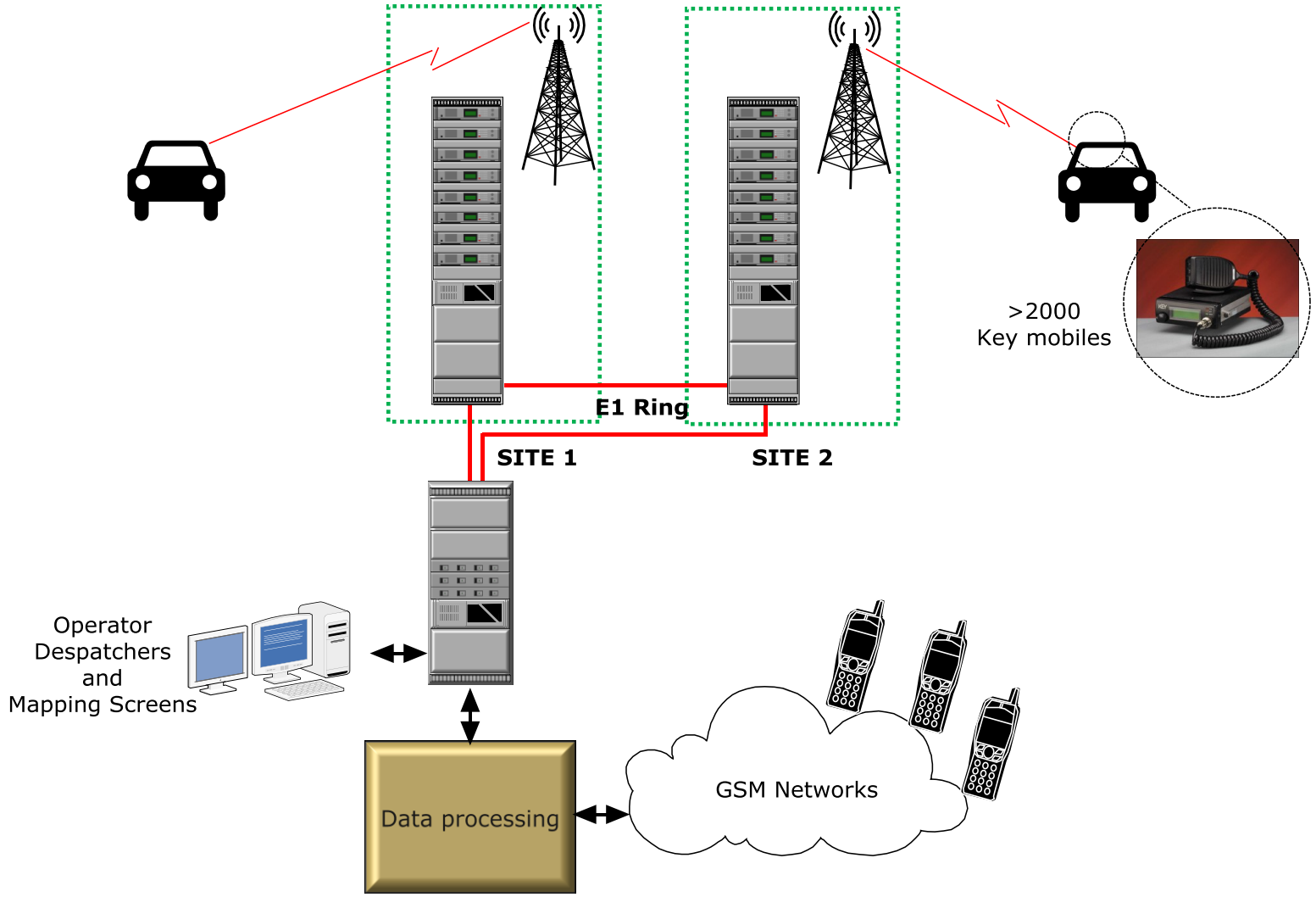
Case Study 3 – 12 Keynet sites. Real Time Passenger Information system

• 2000 buses plus 500 depot and street displays fitted with Key mobiles • Voice plus GPS data between control and buses • Data between buses and displays	• Traffic light priority signalling • 99+% availability • Over 4 million data transactions per day



Case Study 4 – 2 Keynet London city centre sites. Providing voice and data communications for Europe's largest minicab fleet

• Over 2,500 minicabs supported • Polling every cab, every 30 seconds for GPS data • Data feed into automatic 'nearest cab allocation' software • Individual and All Call voice communications	• Data input for sending 'cab due' texts to mobile phones • Dead mileage minimised and 15 minute guarantee of pick up in central London



4. Keynet 2 Peripherals

4.1 Mobile Terminals

Radio Systems designs and manufactures the Key range of mobiles in a wide variety of formats with software suites customized to a whole range of end user applications. Generally the Key brand is recommended, however, where it is beneficial to a potential customer to use an alternative, Radio Systems is happy to recommend and supply the most effective solution.

A separate document describes the full features available with the mobile; *The KM4000 Mobile Radio Features.*

In addition to its own Key range, Radio Systems is an authorised distributor for most radio communications manufacturers, with access to the widest range of quality equipment to provide optimum solutions.

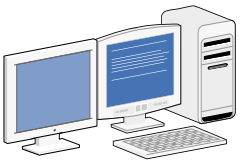
Whatever the challenge, Radio Systems selects the best solution through unbiased in-house evaluation of quality, durability and ease of use to provide dependable, cost effective communications.

In excess of 20,000 Key branded mobiles are currently in active use in a wide variety of voice and data applications. This was the mobile that pioneered voice and data communications within both the bus and electricity supply industries.

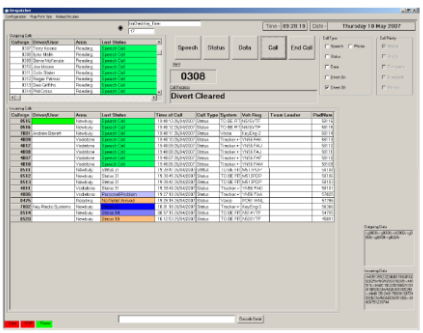
Over 10,000 are fitted to buses and signs in the UK, to provide Real Time Passenger Information to the public, in line with UK Government policies.

Key mobiles were the first in the world to utilise MPT1327 technology and their inherent interface capabilities to enable the monitoring and control of over 4,500 electricity sub stations and switchgear for London Electricity. Updated and evolved versions are now deployed in both Yorkshire and the North West of England.

4.2 Computer Aided Despatchers



Whilst mobiles can be supplied with power supplies for use in offices and depots, there are occasions where enhanced fleet management facilities are required.



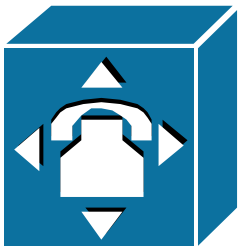
Radio Systems own in house despatcher software packages can be configured to operate equally with either Keynet 3 or the more complex Keynet 2.

The PC software is offered in two formats voice plus MPT data or voice, plus MPT data, plus asset tracking. Asset tracking is accomplished with a second screen and street level mapping.

Separate Operator manuals give full details but in either case packages are fully featured and permit user customisation.

4.3 Telephone Connect

Keynet 2 can interface directly into a PABX or to PSTN terminations, enabling two way telephone to radio call dialing and conversations.



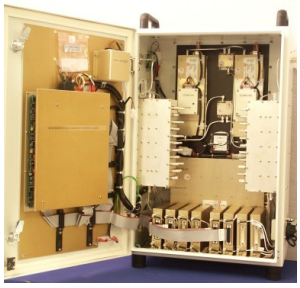
Unlike Keynet 3, where individual KF510 channels have to be PABX equipped or not, with the inclusion of the AMUX Switch (2.4) performing call by call audio patching, all Keynet 2 Traffic Channels become telephone connect enabled.

A number of telephone circuits can be specified with a range of connectivity options from analogue to digital to VOIP.

4.4 Management Terminal

Although not essential, it is recommended that a Keynet 2 system should be equipped with management hardware and software, e.g. for validation, remote monitoring, alarms etc. A Keynet Management Terminal is available for this.

4.5 Coverage Enhancements



Even with the best planning for optimum siting, it is not always possible to achieve the desired blanket coverage even from multiple Keynet 2 sites, examples being within metal clad buildings or basements.

Rather than using additional local infill sites, Radio Systems can supply Enhancers that in effect boost signals both to and from difficult areas without the need for additional complete sites, links and switching.

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5. Radio Systems Services

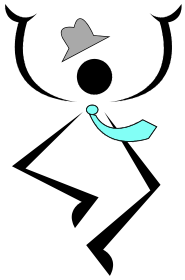
The success and effectiveness of any project is reliant upon a whole range of skills and no matter how good the building blocks of a system might be, without those essential skills, projects can still fail to deliver.

The Radio Systems team is qualified, experienced and moreover understands all the critical steps necessary for a first class delivery.

- Requirements capture and documentation
- Site surveys and propagation studies
- Feasibility studies
- Project Management and Budget Control
- Risk analysis and mitigation
- Preferred component procurement

- In house software and hardware development
- Component manufacturing facilities in ISO9000 environments
- Quality Management and Control
- Factory assembly of systems

- Originating and implementing Factory Acceptance Test Documentation
- Production of Method Statements and Risk Assessments
- Site preparation
- Site installation
- Site commissioning



- Originating and implementing Site Acceptance Test Documentation
- As Built document pack production
- Escrow Agreements
- Warranty
- Maintenance and Support contracts

6. Radio Systems Certification

Radio Systems adheres to all current UK and EU legislation, has been certified by NQA and is regularly audited for continued compliance.

ISO9001 Quality Certification

OHSAS18001 Health and Safety Certification

ISO14001 Environmental Certification

Compliant with Waste Electrical and Electronic Equipment Regulations 2006

7. Contacts

The Radio Systems team is always ready to adopt a no obligation consultative sale approach.

For initial discussions, contact details are as below.

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