KENWOOD

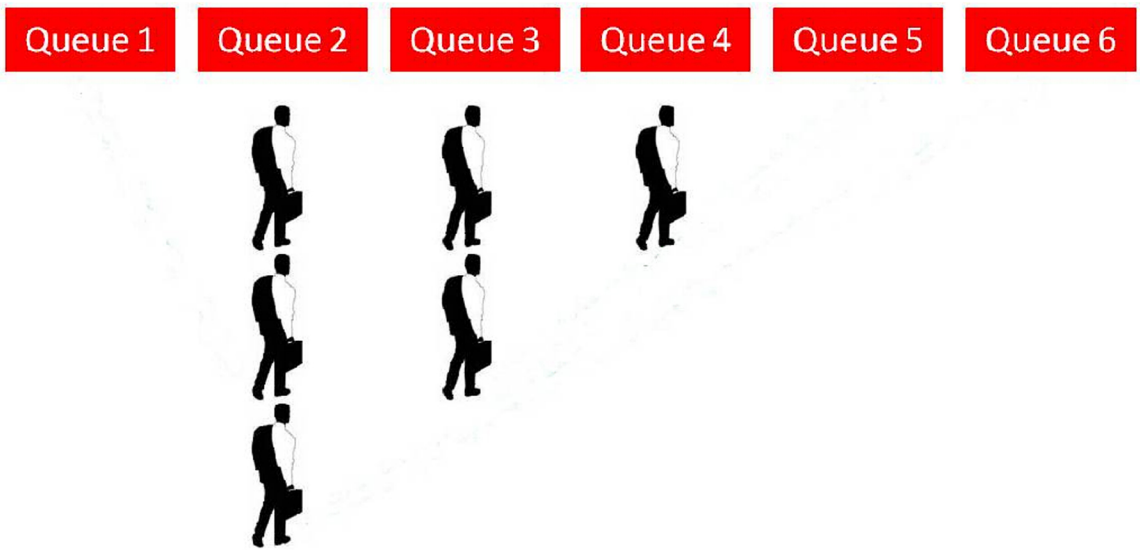
NEXEDGE®
KENWOOD DIGITAL SYSTEMS

The benefits of NEXEDGE® Trunked Digital Two-Way Radio Systems

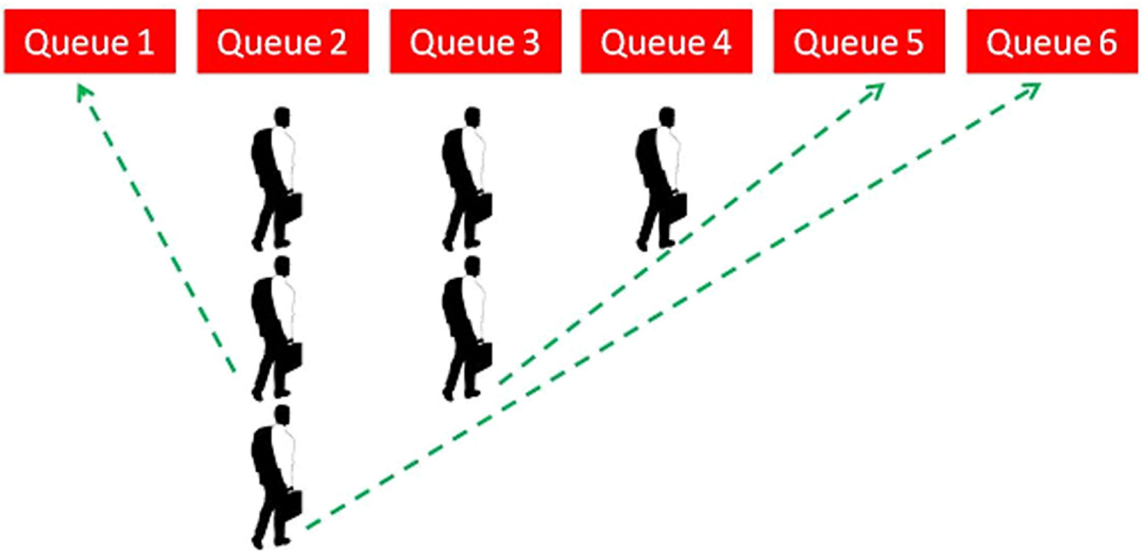
What is trunked two-way radio?

A trunked radio system is fundamentally different from a conventional two-way radio system in that it pools all available channels and allocates capacity as required, whereas a conventional radio system employs a dedicated or fixed channel for each individual group of users and when channel capacity is reached, the user will have to wait until it becomes free.

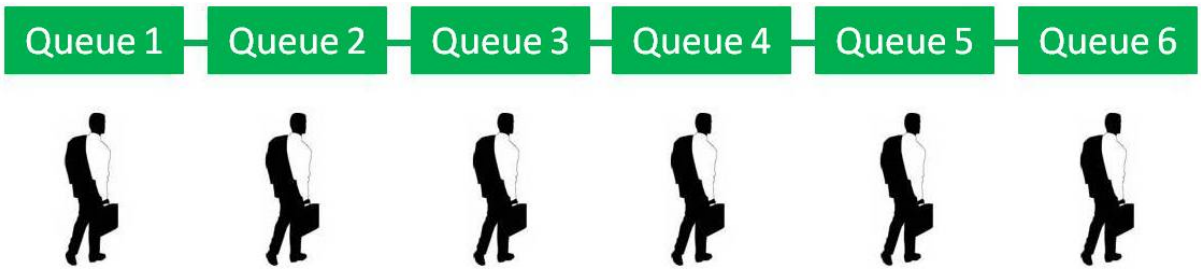
This may sound a little complex, but you can liken it to a queue for tickets at a railway station where those in each queue have to stay in their line.



Now, if those waiting in line could move to the free ticket booths, there would be no queue, better utilisation of the available resources and most importantly, each customer is dealt with immediately.



Put simply, where a conventional system is limited by the number of users calling on its capacity at the same time, a trunked system allows you to create virtually unlimited users groups and provides the most efficient use of the radio frequencies and channels allocated to a system.



When you place a call on a trunked system, a channel is allocated to all participants, once the call is completed, the channel is returned to the pool for other users. This sharing of the channel capacity increases the availability of the system to all radio users, maximising availability, especially important at times of peak utilisation.
A trunked radio system is configured on the basis that with any given number of users, not all of them will require channel access at the same time, so fewer individual radio channels are required, providing a number of benefits including savings in the cost of channel licences, the ability to accommodate more users and user groups, the flexibility to configure access between user groups, increased security against eavesdropping and not least, increased availability of the system at all times.

How does a trunked two-way radio system work?

Where conventional two-way radio communications take place on one frequency a trunked system employs multiple frequencies and is able to scan all the frequencies used in the network to prioritise and allocate availability.

A database lies at the heart of a trunked radio system where it controls access to talk groups and the rules applied to individual users and groups at all times. Typically, at least one frequency will be assigned as a control channel to manage the hand-portable or mobile in-vehicle radios telling them which frequency to monitor for incoming and outgoing transmissions.

When a user makes a call by depressing the Push-To-Talk (PTT) button on their handset, the control channel will automatically find and allocate a free channel and send a message to the radio units involved in the talk group instructing them to change to the free channel. This means a conversation can take place via any available channel rather having to wait for a particular channel to be available.

The control channel is a vital instrument in the seamless management of a trunked radio system, ensuring seamless operation in all situations. It can be used to transmit small data messages between radios even if all other channels are occupied and it provides pre-emptive call handling to ensure radio access in case of emergencies.

When renewing your analogue trunked radio system or upgrading to a digital trunked system, you should specify it to include a dedicated control channel which offers better resilience and the ability to send messages even in the event of equipment failure.

What equipment is required for a trunked digital two-way radio system?

In its most basic form, a digital trunked radio system will comprise of:

- A PC (system manager) to manage and configure the systems' software and network operation (this is only required for configuration).
- An Ethernet Switch link to a base station repeater.
- Base Units (Up to 30 in per site).
- An antenna system to provide radio coverage.
- Hand portable walkie-talkie and/or in-vehicle mobile units deployed in the field.

Systems requiring more channels (more user groups) will feature additional base units/repeaters or where increased range is required, for example in a regional, national or international network, the system manager could be fixed to an IP connection to link up to 48 digital trunked sites together for wide area roaming and calling capabilities. There are many companies specialising in the design and installation of bespoke private digital two-way radio networks, you can find them by clicking on this link.

Advantages of NEXEDGE® trunked digital two-way radio systems

The Kenwood NEXEDGE® trunked digital radio system provides all the benefits of a generic digital trunked system including increased capacity, enhanced call capabilities, improved security and faster communications over conventional systems, but it also offers a number of unique advantages:

- The ability to configure up to 3,000 Unit and Group IDs per network provides ample unit and fleet organisation capability. Both group and individual calls enjoy complete privacy as other users in the system cannot monitor the calls unless they are within the talk group.

- A NEXEDGE® trunked digital system may be set up to provide:
  - peer-to-peer private speech calls (individual calls)
  - multiple talk group calls (radios can be designated as members of individual or multiple talk groups)
  - fleet calls to communicate with all radios on a network
  - priority calling
  - radio-to-telephone (PSTN/PABX)
  - telephone (PSTN/PABX)-to-radio
  - pre-emptive emergency calls
  - automatically queuing in the unlikely event that the network is busy on a first come first serve or assigned priority basis
  - call back capability to connect to people missed calls
  - sending of pre-programmed status messages (e.g. passenger onboard, arrived on site, area clear etc)

- A 'Priority Monitor' feature will monitor up to 4 high priority talk groups and switch users to those calls in progress to ensure that important calls are not missed, while during peak usage hours, the system's

Call Queuing feature stacks call requests and processes them the instant capacity becomes available. System operators can assign important individuals higher queue priority and even pre-empt lower priority users for more important dispatch and emergency calls.

- NEXEDGE® extends the life of current radio system assets. All NXDN® digital radio models use the same Class power amplifiers and site management equipment used for current analogue stations, ensuring return on investment (ROI) and a multitude of supplier choices. Current analogue and NXDN® digital fleets can share a NEXEDGE® base/repeater station in 12.5 kHz conventional "Mixed Mode," which provides uninterrupted service as long as needed and a straightforward migration path to the benefits of a full digital system. NEXEDGE® trunked traffic channels can be shared with existing external analog conventional or trunked logic controllers, extending service to fleets as a transition to NXDN® trunking is underway.

- NEXEDGE® trunked networks are fully scalable to accommodate larger numbers of talk groups spread over wide areas across multiple sites (local, regional, national and international) through the use of base stations, repeaters and IP connectivity.

- NEXEDGE® multi-site network operators can automatically validate individual subscriber radio hardware by ESN (a unique factory-embedded Electronic Serial Number) rather than changing the system's unit and group ID lists in the event a unit is lost, stolen, or removed permanently or temporarily from service.

- The NEXEDGE® System Manager for NXDN® trunked sites and networks reduces operational and maintenance costs with remote terminal programming, infrastructure firmware uploading, subscriber unit privileging, monitoring and diagnostics capabilities all from a secure user-friendly Windows® based application via direct connection, dial up modem, or IP connection.

- NEXEDGE® digital two way radios can provide voice, data and tracking on the same network at the same time allowing you to monitor staff movements and deploy resources effectively.

- NEXEDGE® digital two way radios can be programmed for both “Emergency” mode (push a pre-programmed key to transmit a data alert message) 'Man Down' and “Lone Worker” mode (where the radio automatically transmits an alert if it isn’t used within a preset period), giving your staff confidence in challenging situations knowing there will be backup at hand.

- NEXEDGE® digital two way radios operate in 25 and 12.5 kHz analogue and 12.5 & 6.25 kHz NXDN® digital modes. With radio spectrum becoming a scarce resource, you should invest in a true spectrum efficient 6.25kHz digital radio system. A NEXEDGE® digital system that can be scaled from a small single channel system to a nationwide trunked radio system, offers true 6.25 kHz efficiency (not just 6.25kHz equivalent) and control channel facilities.