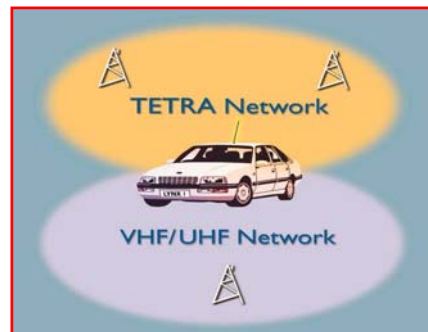
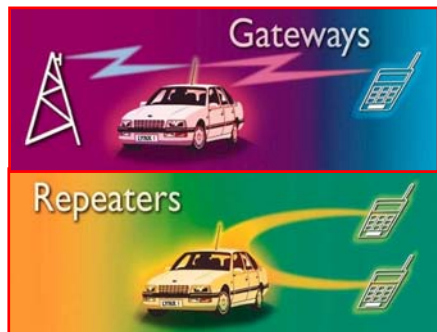


CM9000 ENHANCED TETRA MOBILE
featuring
DMO GATEWAY / REPEATER
VHF/ UHF DUAL- TRIPLE MODE OPTION



PRODUCT INFORMATION

CLEARTONE TELECOMS PLC

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NEWS

Cleartone DMO Gateway / Repeater mobiles using Tetra VHF/UHF dual mode adaptors have been in active service with UK Police Forces for over 1 year.

Proven technology.

Available to-day.



The Cleartone CM9000 enhanced Tetra mobile incorporates functions and features that have been specifically designed for use by the emergency services.

The range comprises mobile, motorcycle, base and transportable terminals that have options to operate in DMO Gateway / Repeater mode as well as Dual and Triple mode working with customers existing analogue VHF / UHF mobiles.

The use of DMO Gateway / Repeater options is proving an important tool where wide area coverage and penetration problems exist, ie in- buildings / underground car parks due to low power portables being unable to return signals.

Dual / Triple Mode Tetra / VHF-UHF operation combined into a single control head provides system flexibility for operations of mixed digital /analogue systems.

Cleartone Tetra products are currently being exported to various users around the World and the following UK Police Forces have selected or are currently using Lynx enhanced Dual / Triple Mode Tetra – VHF/ UHF mobile system.

North Yorkshire Police.

Thames Valley Police.

West Mercia Constabulary.

Hertfordshire Constabulary.

Bedfordshire Police

Greater Manchester Police

Cambridge Constabulary.

Dorset Constabulary

Avon & Somerset Constabulary.

Wiltshire Constabulary

Surrey Police.

Leicestershire Constabulary.

Derbyshire Constabulary.

Northumbria Police.

Metropolitan Police (roamers)

West Midlands Police

Gwent Police.

Devon / Cornwall Constabulary.

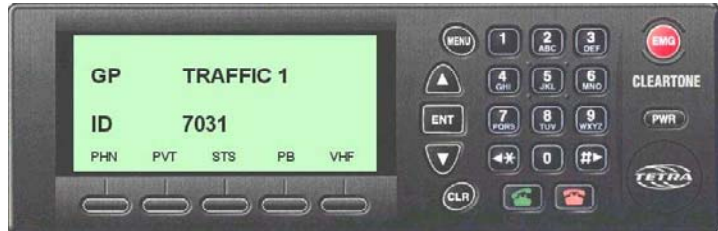
South Yorkshire Police.

Cleveland Police

Gloucestershire Constabulary.

Ministry of Defence Police

South Wales Police



TETRA – CM9000 Mobile

- 380 – 400 MHz
406 – 430 MHz
450 - 470 MHz
806 - 870 MHz
- Large illuminated display
- Dual mode TETRA and VHF / UHF option
- Trunked and direct mode operation
- Repeater and Gateway options
- PEI interface
- Transportable and desktop versions
- Motorcycle version
- Internal GPS option
- TIP approved
- 'e' marking approved

The CM9000 TETRA mobile is a state-of-the-art fully flexible mobile that has been developed to meet the demanding requirements and operational needs of the emergency services.

The display software, whilst packed with sophisticated features, is simple to use with easy to follow menus and shortcut keys to allow quick and easy access to all features. The CM9000 supports all of the voice and data services of the TETRA networks and the external socket on the control unit provides external data capability using the RS232 interface.

The control head software has the option to allow for dual mode operation between TETRA and existing VHF or UHF networks which is useful for existing radio systems that might need TETRA access to their private networks.

The TETRA specified air interface encryption option including TEA1 and TEA2 algorithm is fully supported in the CM9000 TETRA mobile. In the UK the encryption system has been approved by CESG.

The user interface has been designed to make all controls clear and easily operable by the user with instructions provided on the wide screen. The management software is easily upgradeable using a standard PC.

A desktop local base station version of the CM9000 TETRA mobile is available together with a full range of options and accessories.

The mobile is fully type approved to all current specifications.

LYNX CM9000 TETRA MOBILE TECHNICAL INFORMATION

Frequency Bands:	380 - 400 MHz / 406 - 430 MHz / 450-470Mhz / 806-870Mhz other bands available
Operation Mode:	Trunked and Direct mode operation Direct mode / Repeater option Direct mode / Gateway operation Dual / Triple mode operation with VHF/ UHF using a single head
Power Supply:	13.8v (nominal)
Size:	Radio Unit: 45 mm (h) x 170 mm (w) x 220 mm (d) Control Head: 60 mm (h) x 180 mm (w) x 51 mm (d)
RF Power:	Software controlled up to 5 watts
Modulation:	$\pi/4$ DQPSK
Data Transfer Rate:	Maximum 28.8 k bits / second
Audio Output:	8 watts
Display:	F-STN display with icons and field strength indicator
Keypad:	Illuminated alpha-numeric / function key
Encryption:	TETRA air interface encryption TEA1 and TEA2 algorithms
Approvals	ETSI Type Approved for radio and EMC MoU Inter-operability approved to TIP3 MoU Inter-operability approved for Direct Mode Operation CESG TEA2 Encryption inter-operability
Options	Dual/ Triple mode Tetra / VHF-UHF working with either Cleartone or existing analogue mobile using the Tetra control head.



motorcycle installation



vehicle installation



DESKTOP FIXED STATIONS

The compact desktop unit version of the mobile provides full mobile operating options including DMO Gateway and Repeater options and operates from ac mains supply.



MARINE VERSION

The marine version which is based on the motorcycle version has a water resistant control head. Various versions of waterproof housing for the main equipment is available to meet customer specific needs.



AVL AND DATA SYSTEMS

The optional GPS module which is mounted inside the mobile has the full flexibility to operate with AVL and data control systems to provide a full range of information



TETRA / VHF-UHF REPEATERS

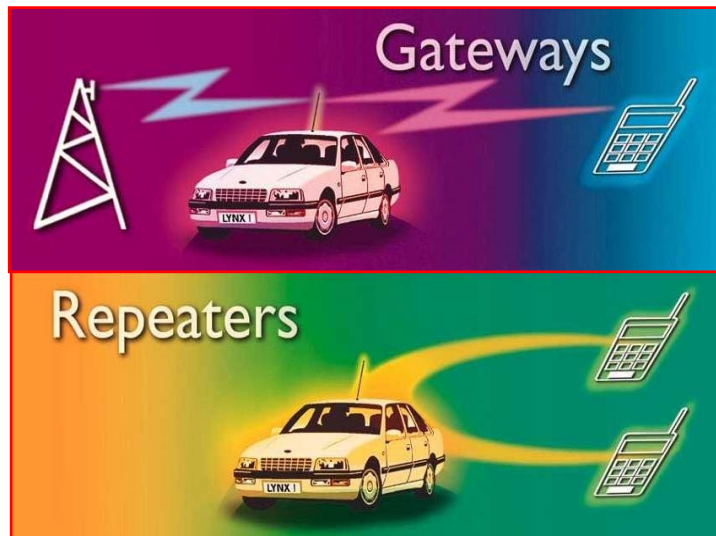
Transportable system provides Tetra and VHF or UHF repeater operation for use where inter-agency or extended coverage is required beyond the Tetra networks ie oil pipelines, marine applications.



TRANSPORTABLES

High power transportable with internal batteries, a separate mains charger unit and leather carry case. Remote alarm versions are available to customer specifications.

DIRECT MODE (DMO) GATEWAY AND REPEATER APPLICATIONS



PRODUCT INFORMATION

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Coverage and performance of Tetra portables operating trunked mode from inside buildings, underground car parks etc to the level demanded by emergency services need to be considered as operational tests indicate that problems exist.

Reception of trunked signals into certain types of building is causing problems which are unacceptable for emergency service users.

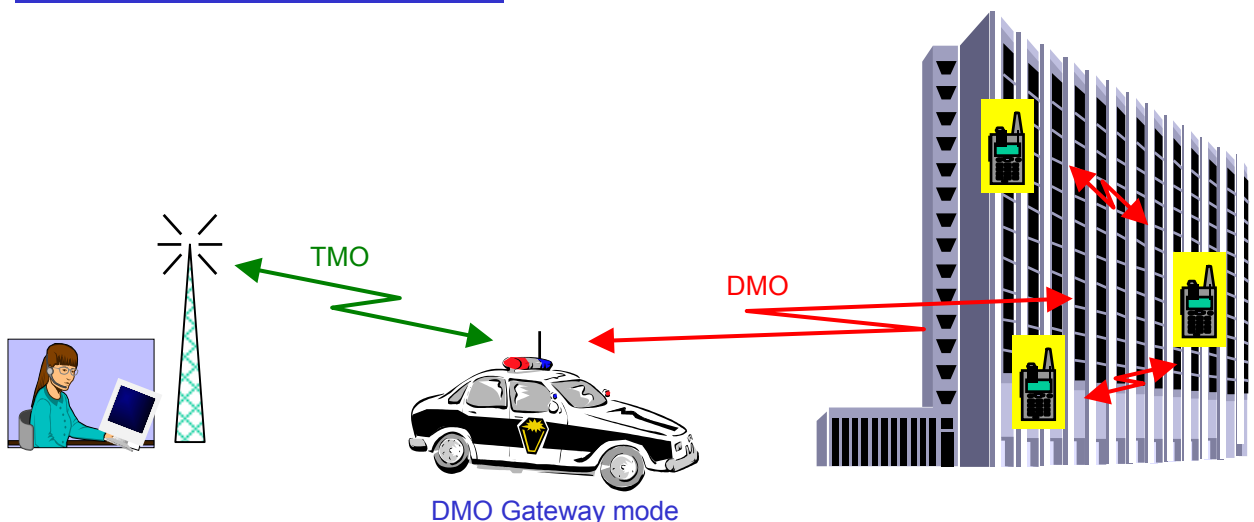
Uplifts in key locations is a solution but are expensive, and cannot, on a cost basis, be deployed at every poor signal location in the network.

The use of the Cleartone Tetra enhanced mobile with the DMO - Gateway option allows the mobile to be used without any restrictions at any location within the network, providing immediate on- scene confidence of that vital link for portables operating inside buildings or any doubtful radio coverage area.

Using mobile DMO - Gateways is an attractive cost effective option against the deployment of extra base stations needed to provide a total coverage network.

This upgradeable feature of the Cleartone enhanced Tetra mobile provides the user with valuable inbuilt insurance against future possible needs that may arise from operational experience.

MOBILE GATEWAY OPERATION



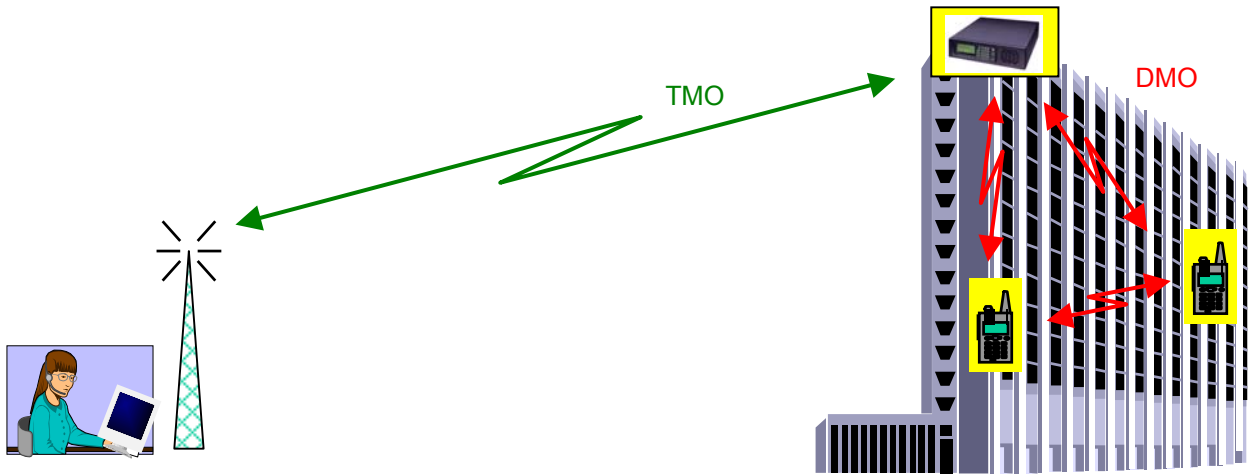
Portables in the same DMO talk-group are able to talk to each other and through the mobile Gateway to control when using vehicle DMO / Gateway mode which will relay signals between the handheld operating within the building and the control room.

Handportables will automatically switch from Direct Mode (DMO) into DMO Gateway mode as a vehicle at the incident activates the Gateway mode. Likewise the handportables will return to Direct mode when the mobile de-activates the mode.

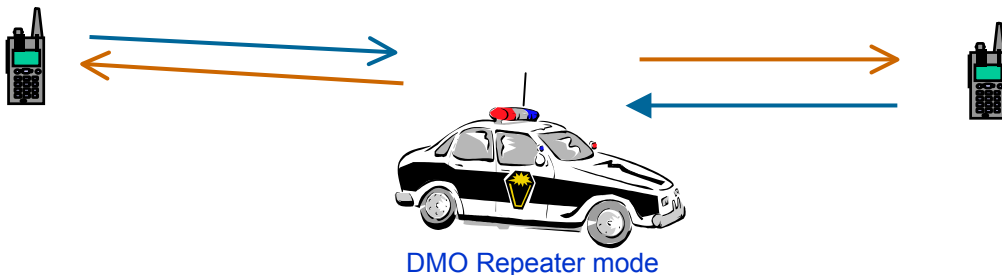
TRANSPORTABLE / FIXED GATEWAY OPERATION

Problems with in-building coverage can also be overcome by the installation of a Cleartone transportable / fixed DMO-Gateway equipment which would be strategically placed inside a building from where it can be activated by the control room at any time, by an address, to provide DMO handportable coverage inside the building.

The control room is able to monitor / record the DMO operation and have two way communication with the handportables.

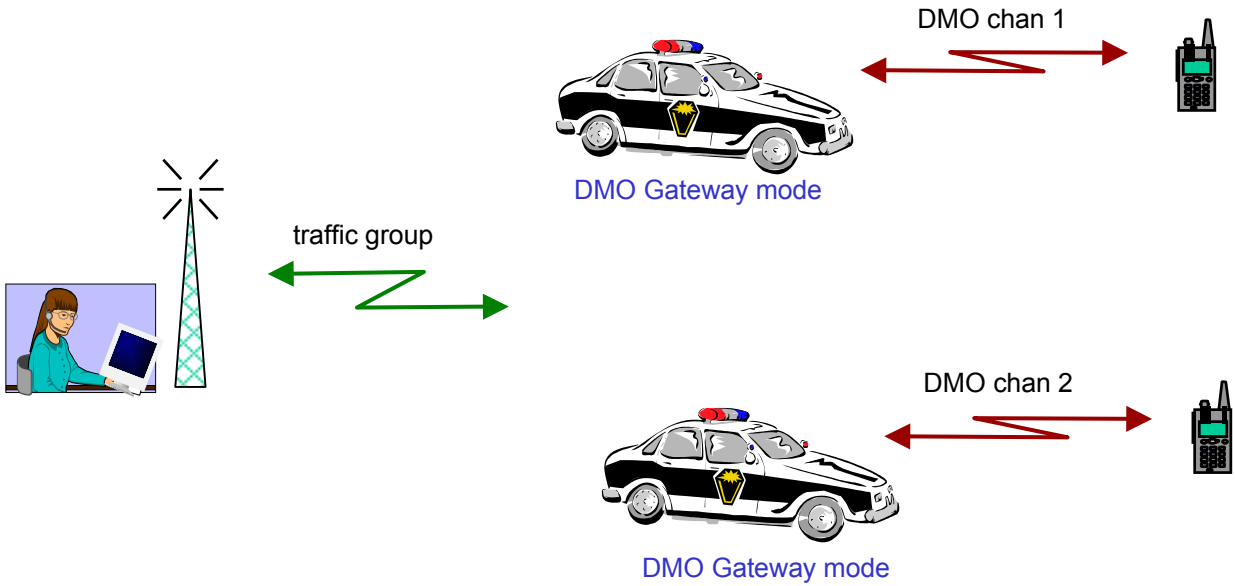


REPEATER OPERATION

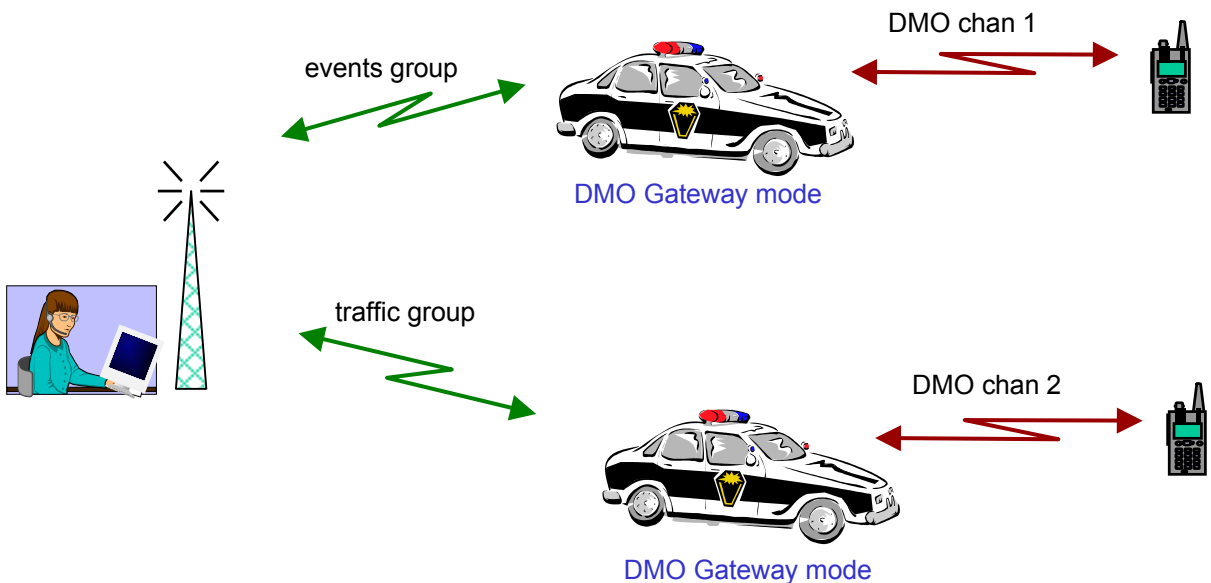


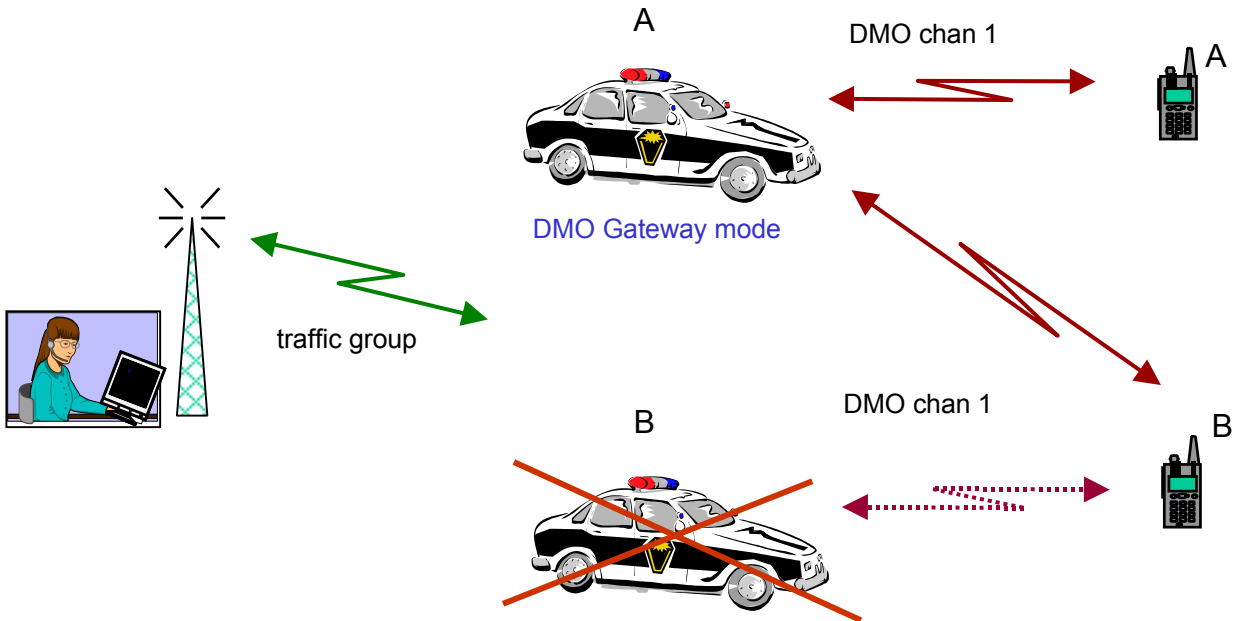
Portables communicate through the mobile when in DMO / Repeater mode. The Repeater 1B format (2 frequency) is adopted to avoid possible frequency interference at incidents where multiple DMO systems are in use.

Below is an example where multiple vehicles are located at an incident with DMO Gateway activated on each vehicle using different DMO channels to talk into the same trunked mode (TMO) talk group.



This example shows the situation where multiple vehicles located at an incident are using DMO Gateway mode activated to operate on different DMO channels into different Trunked mode (TMO) talk-groups.





The Cleartone mobile DMO - Gateway uses enhancements to stop the possibility of mobile Gateway's clashing in multiple Gateway scenarios when using the same DMO R.F channel and talk-group.

In the example above mobile 'A' is the first vehicle to arrive on scene of the incident and selects DMO Gateway mode. Mobile 'B' arrives at the scene and selects DMO Gateway using the same DMO frequency. Mobile 'B' will detect the 'presence signal' of mobile 'A' and automatically switch itself from Gateway to DMO mode.

Even though mobile 'B' cannot switch to Gateway mode, portable 'B' is able to communicate to the SwMi via mobile 'A' Gateway. Mobile 'B' continually checks the presence signal and will revert automatically to Gateway mode if no 'presence signal' is detected.

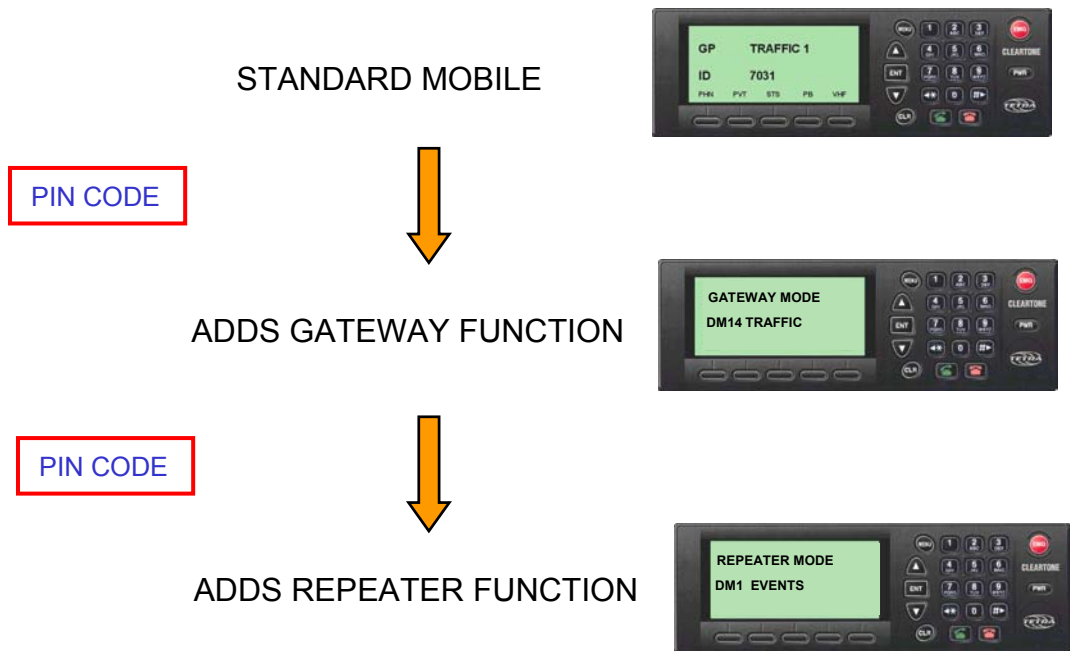
Motorola and Sepura portables fully support the mobile DMO Gateway and Repeater operation, and when the 'presence signal' is detected they will automatically switch from DMO mode to Gateway mode and a suitable indication is displayed on the portable that a gateway is now in use.

If no 'presence signal' is detected the portables automatically revert back to standard MS-MS DMO operation.

The mobile can be upgraded without any re-programming to operate DMO- Gateway / Repeater mode by simply entering a PIN number into the mobile via the keyboard.

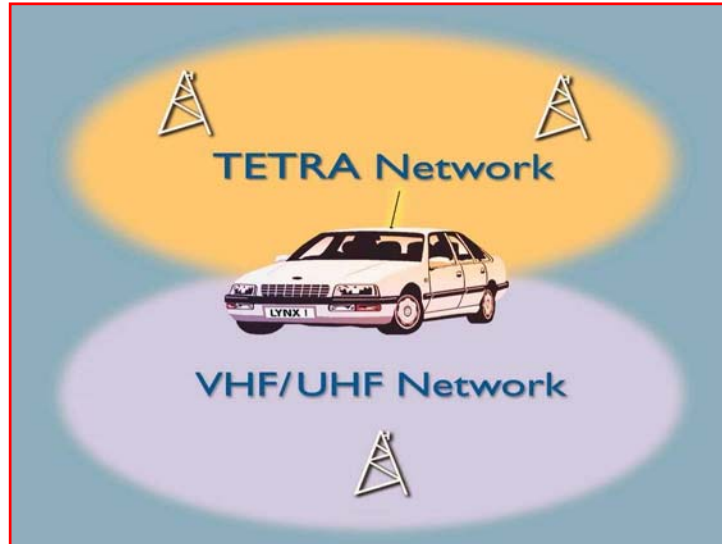
Activation is simple and immediate and is ideal for users who are not sure whether they will need these functions when initially purchasing the product and subsequently find that under operational conditions they will need to use DMO Gateway/ Repeater mode.

This upgradeable feature of the Cleartone enhanced Tetra mobile provides the user with valuable inbuilt insurance for future possible needs.



The compact mobile includes as standard within the equipment (no add-on boxes), the ability to operate DMO- Gateway and DMO- Repeater modes.

TETRA / VHF - UHF DUAL AND TRIPLE MODE APPLICATIONS



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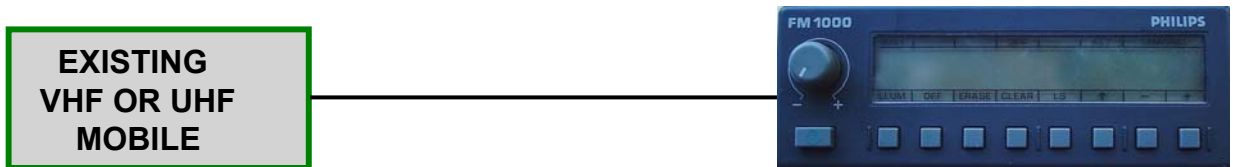
The Lynx Tetra mobile is able to operate Dual Mode Tetra / VHF– UHF using the standard Tetra control head which makes vital vehicle cabin space saving as one head will control both mobiles.

Both the Tetra and analogue mobiles are controlled by a microprocessor interface unit which provides on the control head clear and simple details of the relevant conditions of both units. All legacy equipment button functions and display information including selcal etc is replicated on the Tetra screen.

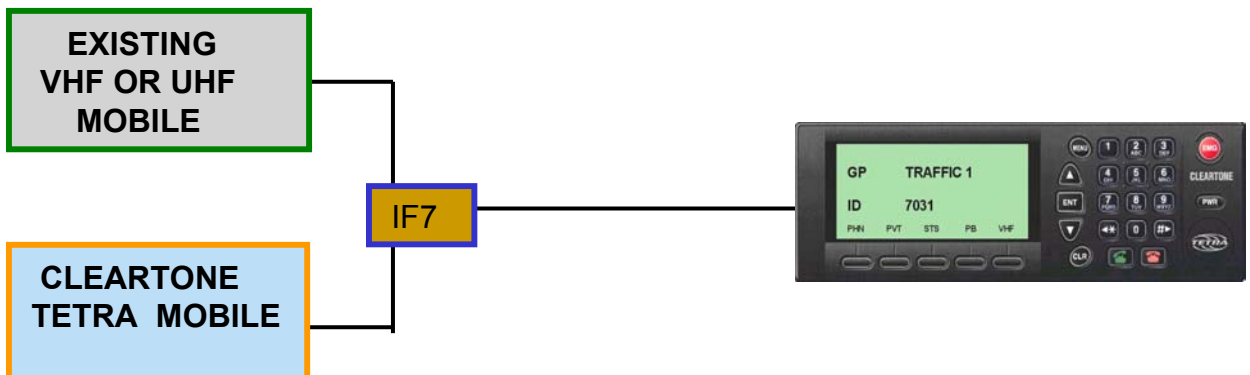
It is also possible to re-use the existing customers VHF/ UHF analogue mobiles, ie Motorola, Bosch, AEG, etc in dual mode by using one of our comprehensive range of Dual Mode interface adaptors

The Dual Mode configuration provides for systems that need to provide full inter-operability with other agencies using VHF/ UHF analogue systems as well as users who need communications beyond the Tetra networks such as pipeline networks.

EXAMPLE OF EXISTING INSTALLATION



REVISED INSTALLATION

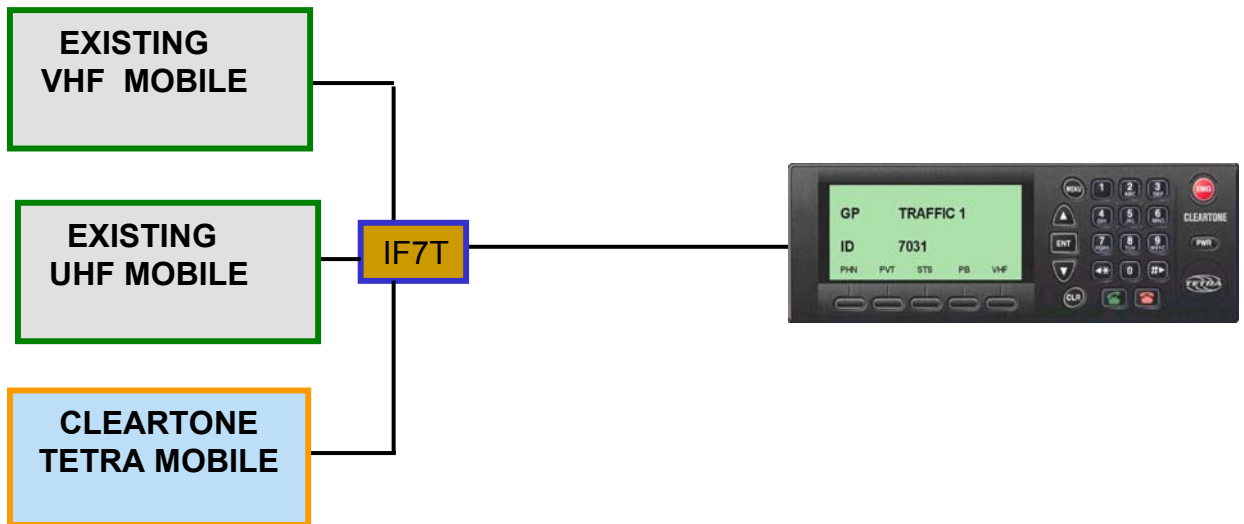


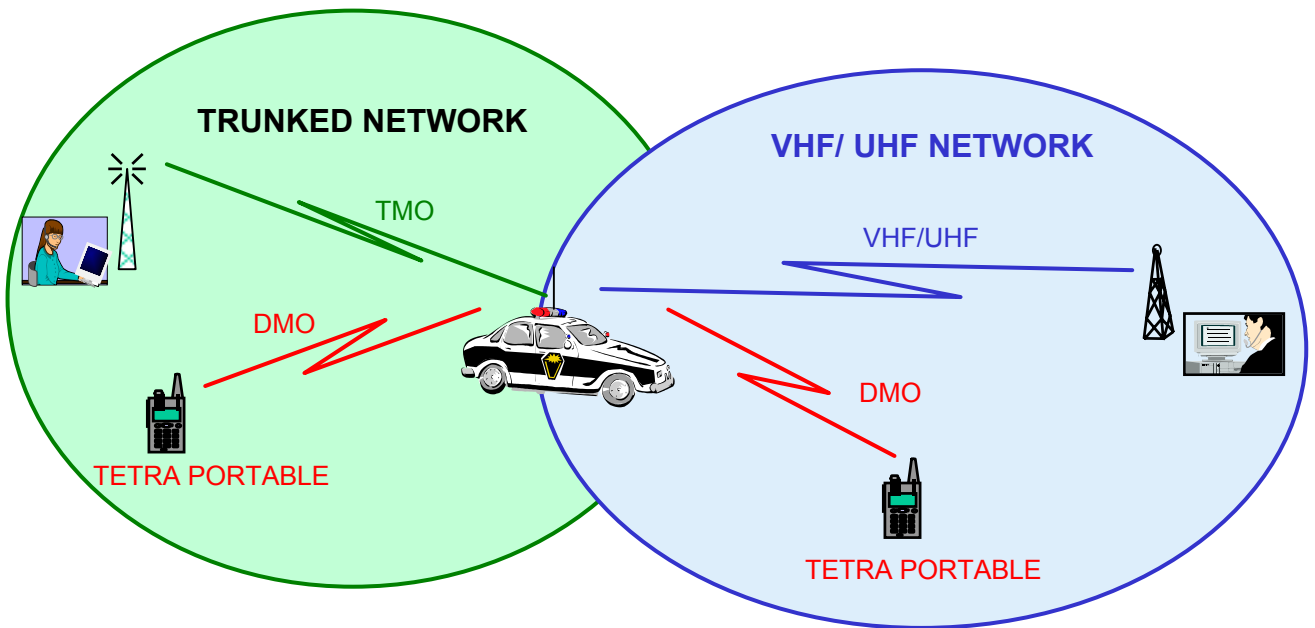
The Lynx Tetra mobile is able to operate Triple Mode Tetra / VHF– UHF using the standard Tetra control head which makes vital vehicle cabin space saving as one head will control all 3 mobiles.

Both the Tetra and analogue mobiles are controlled by a microprocessor interface unit which provides on the control head clear and simple details of the relevant conditions of all units. All legacy equipment button functions and display information including selcal etc is replicated on the Tetra screen.

It is also possible to re-use the existing customers VHF/ UHF analogue mobiles, ie Motorola, Bosch, AEG, etc in dual mode by using one of our comprehensive range of triple mode interface adaptors

The triple mode configuration provides for systems that need to provide full interoperability with other agencies using VHF/ UHF analogue systems as well as users who need communications beyond the Tetra networks such as pipeline networks.





TETRA / VHF- UHF TRANSPARENT COMMUNICATIONS

Seamless communications is available to the mobile operator when using a Cleartone Tetra / VHF-UHF Dual or triple mobile as it will provide the following communication functions and features.

1. Separate **Tetra** and **VHF/ UHF** communications.
2. **Tetra DMO** -Gateway and Repeater operation.
3. Gateway connectivity between **VHF/ UHF** and **Tetra**.
4. **Tetra** handsets can be used in **VHF/ UHF** networks.

DUAL / TRIPLE MODE ADAPTORS CURRENTLY AVAILABLE

- IF 8 / 9 series..... used with Cleartone mobiles*
- IF 7 series..... used with Marconi mobiles.*
- IF 6 series..... used with Burndept mobiles.*
- IF 5 series..... used with Bosch mobiles.*
- IF 4 series..... used with AEG mobiles.*
- IF 3 series..... used with Motorola mobiles. **
- IF 2 series..... used with Philips mobiles.*
- IF 1 series..... used with Yaesu mobiles.*