

NGT[®] Frequently Asked Questions



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Why are NGT transceivers easier to use?

NGT transceivers are easier to use because:

- they have a familiar user interface like a mobile phone
- the Codan Automated Link Management (CALM) system takes the guess work out of finding a channel
- the user interface can be customised to suit your needs

A key feature of NGT transceivers is that the handset has been designed to be more familiar and approachable, similar to a mobile phone. The familiar call/hang-up and up-down keys are all present.

An electronic address book is also included, enabling organisations to distribute transceivers with a built in 'corporate' phone book, rather than simply providing users with a transceiver and a printed address list.

To simplify options even further, it is possible to program 'hot keys' which can be used to provide 'one-touch-calling' capability (similar to a telephone speed dial), or even perform programmed sequences of operations. Hot keys can be programmed by the user or by the person responsible for installing the transceiver.

While there is a great deal of flexibility in the configuration of the handset, every transceiver leaves the factory ready to use, with a set of factory defaults that will satisfy most users.

The combination of an innovative handset geared specifically to the needs of the user, features such as hot keys, and flexible calling capabilities, make NGT transceivers significantly easier to use.

How do NGT transceivers make communication easier?

To make an HF call you must not only find an available channel, but one that works at the time you want to make the call. Codan's CALM system takes care of this channel selection problem by choosing the best available channel for you. Your transceiver informs you when it has established a link. Depending on the structure of your network, this can take as little as 10 seconds.

When you have established communications, the benefits of Easitalk (a digital noise reduction system) come into play, doing its best to improve the quality of your voice communications.

By combining a clever user interface, CALM and Easitalk, Codan has made HF communication as easy as using a telephone.

How do fixed–station applications benefit from NGT transceivers?

Features such as Easitalk, the newly designed NGT handset, Built In Test Equipment (BITE), the smart address book and CALM are beneficial to fixed–station applications. Codan has improved the specification performance of NGT transceivers to make them more suitable for fixed–station operation, particularly where there are co–located transceivers.

A base console has been developed with an integrated boom microphone, Press To Talk (PTT) button and loudspeaker specifically designed to make desk operation much more convenient.

NGT mobile and fixed–station components are identical, which means it is much easier to provide spares support for mixed fixed–station and mobile networks. NGT transceivers are also easier to rack–mount than 9323 or 9360 transceivers.

The NGT remote control interface will be completely “transparent” to the user, ensuring that the user interface of mobile and fixed stations remain identical.

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Do NGT transceivers have self–testing capabilities?

Yes. NGT incorporates BITE software, which provides the following capabilities:

- self–testing at power on
- continuous fault monitoring and reporting
- in–built test processes that can be initiated by users to test and report on certain aspects of their system’s performance

Are NGT transceivers easier to repair?

Yes. Each NGT system part incorporates a ‘Health Indicator’ that indicates which piece of equipment is faulty. Where possible, the BITE software will identify faulty modules within a unit that need to be replaced.

Each module within an NGT system has been designed to its own rigid interface specification so you can be sure that your NGT will be standard if any of its modules are replaced.

Each module contains its own identity information, enabling the complete NGT system to compensate for any changes in the build standards of a module.

Are NGT transceivers “ruggedised”?

No. “Ruggedised” is a term traditionally applied to commercial products that underwent some “ruggedisation” process to make them suitable for military operation.

In this sense, NGT transceivers are not “ruggedised”. However, one of their design parameters is that they pass the rigorous requirements of US MIL–STD–810E for shock and vibration. NGT transceivers, the 9350 Antenna and the 9323 or 9360 transceiver all meet or exceed the requirements of MIL–STD–810E for shock and vibration.

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No. NATO standards are designed to meet the needs of military users. If NGT transceivers were to meet NATO standards they would be more expensive, without providing any tangible benefits to non–military users.

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Can NGT networks be expanded to include other systems?

Yes. NGT transceivers have been designed with networking principles in mind. Each of the subsystems in an NGT transceiver is self-supporting and communicates with other subsystems via a standard hardware interface and a well-defined network protocol. The hardware interface and network protocol are collectively known as the Codan Interconnect Bus (CIB).

The most common NGT transceiver system consists of two subsystems: an RF Unit and a Junction Box/Handset combination. The use of this system delivers a very important benefit: “plug-and-play”.

“Plug-and-play” means that, at any time, a user can add new CIB-compatible devices to their NGT system and enjoy the benefits of that device without having to upgrade or reprogram the rest of their system. The new device will be able to make use of all the services provided by the existing system, such as CALM and selcall.

The ability to “plug-and-play” has even greater benefits for organisations operating large NGT networks. For example, if Codan introduces a new CIB device such as new modem, alternative user interface or remote control, organisations can take advantage of this without having to replace existing equipment, and without having to retrain their operators.

The use of a networked user interface also means that third-party vendors who choose to support the CIB will also be able to deliver tightly integrated products that add value to HF systems.

Why is an NGT system easier to manage and maintain?

There are several factors that make an NGT system easier to manage than previous HF systems:

Customisation: Organisations can customise their transceivers to suit their needs. For example, they can provide their users with transceivers that have a pre-programmed channel list, electronic address book and pre-programmed hot keys.

Training: Access to settings that users should not use or change can be restricted by hiding or locking settings. This, combined with ease of use, reduces the amount of training required.

Network Expansion: New stations added to an existing network communicate with other stations in the network to exchange details of their respective configurations. This means that a new station can be added to a network without having to reprogram any other station.

Field Software Upgrades: The NGT network structure is designed to reduce to an absolute minimum the need to upgrade software in NGT subsystems. In the event that a software upgrade is required this can be done via a programming port on the handset, without requiring the transceiver to be taken out of service.

NGT System Programmer (NSP) software: NSP software is capable of programming all parameters for any CIB device, and also handles software upgrades should they be required.

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Why is a self-managing network important?

A self-managing network automates the processes of adding or deleting a system from a network. A self-managing HF radio network is important because stations are often scattered over wide distances and it is difficult or impossible to visit each station in order to update network information.

If the stations in a network cannot be updated, the performance of the network will diminish over time. An alternative to this gradual degradation is to equip each station with the necessary computer hardware, software and training so operators can upgrade their own stations.

This latter case can significantly increase the effective cost of an ALE station (because it requires computer hardware and software). It also undermines one of the fundamental benefits of an ALE-equipped station, namely that of simplifying the use of the radio equipment.

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What is ALE and what is CALM?

Automatic Link Establishment (ALE) is a system used with HF radios where the radio, rather than the user, selects the best channel on which to make a call. It is a US government standard (FED–STD–1045 ALE) that was developed to suit military command communication networks. While it serves these networks well, it has several deficiencies when used in a commercial environment, particularly in mobile operations.

To address these shortcomings, Codan has developed a series of extensions and enhancements to ALE. The ALE standard and Codan’s extensions are collectively known as CALM.

Why does CALM work better than FED–STD–1045 ALE?

ALE deficiency	CALM solution
<p>ALE does not record the time of day at which sounding was taken, so soundings are taken more often than necessary in an attempt to track live signal propagation conditions. For this reason, transceiver equipment must be switched on for a significant period of time before ALE becomes effective.</p>	<p>Because signal propagation conditions vary at different times of the day and night, CALM records the time at which a sounding was taken and, with the information received, builds up a profile of the most suitable channels to use at different times. This means that when you make a call at 3pm your transceiver selects a channel based on information received at the same time of day rather than information that could be out of date. It also means that CALM is ready to go the moment your transceiver is switched on.</p>
<p>Most FED–STD–1045 ALE systems require station details to be pre-programmed by a network manager. This also means that a new station or frequency cannot be added to the network without reprogramming every station in the network. Many users do not have the resources to accommodate this requirement.</p>	<p>CALM incorporates automated network management facilities. When a new station is added to a network the stations automatically provide each other with the information necessary to optimise network performance.</p>

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ALE deficiency	CALM solution
FED–STD–1045 ALE is incompatible with other signalling systems, so it can be difficult to integrate with other signalling products such as modems and telephones, etc.	CALM readily accommodates a variety of signalling systems including ALE, selcall and 9001/2 modems. The channel scan rates are automatically adjusted to ensure that each system is allocated sufficient listening time.
FED–STD–1045 ALE functions are usually independent of other signalling systems. For example, when an ALE unit is connected to a transceiver it cannot recognise that a modem may also be attached.	All Codan selcall function have CALM equivalents (Message call, Phone call, Channel Test call, etc.)
The FED–STD–1045 ALE sounding mechanism assumes that the transmit and receive paths are equal (i.e. it assumes reciprocity). This false assumption can lead to inappropriate channel selection.	CALM uses its knowledge of other participants in the network to optimise channel selection.
The FED–STD–1045 ALE does not feature Virtual Service Addressing.	CALM can allocate virtual addresses to each piece of equipment attached to a transceiver. For example multiple handsets can be individually addressed but all share the same Link Quality Analysis (LQA) information.
As the number of stations in an ALE network increases, the amount of FED–STD–1045 ALE sounding activity increases, resulting in interference.	CALM uses sounding information to build a propagation profile. The result is that the same ALE performance can be achieved with up to an 80% reduction in sounding activity.

Are CALM and FED–STD–1045 ALE compatible?

Yes. CALM and FED–STD–1045 ALE are completely compatible. However, when communicating with non–CALM equipped stations, automatic network management facilities are lost and overall CALM performance is degraded back to normal ALE levels.

Do I need selcall if I have CALM?

CALM provides all the functions of selcall. If you are installing a completely new system you do not need selcall. However, if your organisation already has selcall-equipped stations, or needs to communicate with selcall equipped systems, you will need selcall to communicate with these stations. The alternative is to upgrade these stations with FED-STD-1045 ALE or CALM.

Is CALM compatible with my existing ALE equipment e.g. Harris, Siemens, Datron, Thomson, Racal?

Yes. CALM is fully compatible with any equipment that implements FED-STD-1045 ALE. However, while the systems are completely compatible, the non-Codan equipment cannot take advantage of CALM features.

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Virtual Addressing

What is Virtual Addressing?

Consider the case where an ALE station supports both fax and voice operation. Ideally, when you send a fax to that station the fax system should answer and handle the call without troubling the user at that station. Similarly, when you wish to make a voice call to that station the fax system should not answer. The best way to support this mode of operation is to create separate voice and fax addresses.

With Virtual Addressing CALM exchanges information about all of the addresses available at a particular station. Every CALM station then knows that there is a fax and voice address at the one location, and that sounding information received from either address is to be added to the same LQA database entry.

A standard ALE system has no way to determine that the fax system and the voice system are located at the same physical location and that the same station information and LQA database entry should be used when making a fax or voice call to that station. Consequently, the station needs to transmit sounding information for both addresses, doubling the air-time used for sounding, or doubling the time between updates. Imagine how bad the problem becomes where there are many addresses. Some systems have up to 20 different addresses!

Non-CALM stations can still call either address so compatibility is maintained, though performance achieved by the non-CALM stations will not be as good as that of CALM stations.

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Easitalk

What is Easitalk?

Easitalk is a feature of NGT transceivers that removes noise and interference from incoming voice signals. Easitalk works by applying Digital Signal Processing (DSP) techniques to incoming voice signals. These techniques are similar to those used with digital mobile telephones and satellite telephones.

Easitalk is simple to use because it is integrated into the transceiver—it is not in a separate unit. No tuning is required, just an on/off control.

Listening trials indicate that Easitalk outperforms other noise reduction products, and it has been successfully trialed with a wide range of languages.

By integrating speech processing within the transceiver, Codan has not only made speech processing more effective but, more importantly, has made it useful in the hands of the user. For the first time, mobile users will now be able to enjoy the benefits of noise reduction technology.

Does Easitalk offer any benefits over Lincompex?

Yes. In networks that use Lincompex (LINK COMPression and EXpansion), each system in the network needs to be equipped with Lincompex software. With NGT, a single transmitter with Easitalk can be used within a network and still be able to communicate with other systems, but those systems won't benefit from the features of Easitalk.

For a continuous signal, Lincompex provides no discernible improvement over any other compression scheme. During inter-word quiet periods, the Lincompex receiver effectively prevents background noise levels from rising (this provides Lincompex's apparent improvement). During continuous or substantially continuous speech, no improvement is noted.

Under poor conditions, interfering signals may distort the recovered Lincompex control signal. Under very poor conditions the control signal cannot be properly decoded and the signal recovery mechanism breaks down completely.

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Codan Interconnect Bus

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What are the benefits of the Codan Interconnect Bus?

The Codan Interconnect Bus (CIB) is a standard interface to which all new Codan HF equipment adheres to. It provides:

- a “plug-and-play” function for CIB-compatible devices
- networking support for CIB-compatible devices
- standard cables and connectors for all equipment
- increased installation flexibility

Data communications on the CIB are designed according to modern networking principles and any device can communicate with any other device on the CIB. This helps to support the “plug-and-play” philosophy of NGT. The signalling system used is based on the very robust CAN (Controller Area Network) system developed for automotive use.

The use of multi-channel audio means that pre-and post-speech processing and scrambling of the receiver audio can exist simultaneously and are available to all devices.

Each user interface device that requires a speaker has access to the system audio on the CIB and can control its own volume levels, mute and noise reduction settings.

All signals on the CIB are balanced to improve noise immunity. A benefit of this is that a CIB cable can be run in parallel to a transceiver battery cable without causing audio distortion, making vehicle installation much more convenient.

Is CIB an open standard?

CIB is a unique Codan standard based on several industry standards. Manufacturers who want to provide CIB-compatible equipment should contact Codan for further details.

Digital voice

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Do NGT transceivers provide digital voice?

No. NGT transceivers do not provide digital voice for the following reasons:

- It is incompatible with existing HF radio equipment.
- It is an expensive technology which provides the user with degraded voice performance, and presently it provides no benefit except for those users operating in high security environments. In future, it is anticipated that the cost of the technology will fall and the performance will rise, at which time Codan will consider introducing a digital voice capability.
- A higher bandwidth with standard International Telecommunications Union (ITU) channel allocations may be required. Currently, licenses for these bandwidths are not normally available to commercial users.

Two techniques are sometimes incorrectly referred to as digital voice:

- received audio processed by DSP devices, either at baseband or using a DSP Intermediate Filter (IF)
- analogue scramblers that use DSP methods to scramble the analogue voice signal

What is available to protect against eavesdropping?

A range of external scramblers that can protect against eavesdropping are available. Contact your Codan representative for further information.

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How compatible are NGT transceivers with 8528, 9323 and 9360 transceivers?

Voice communication: Voice communications between NGT and 8528/9323/9360 transceivers are completely compatible. NGT users have the additional benefit of Easitalk to reduce noise and interference on incoming signals.

Selcall: NGT selcall facilities are completely compatible with all 8528, 9323 and 9360 transceivers.

CALM: NGT CALM is compatible with 8528, 9323 and 9360 transceivers that use 9300 or 9600 ALE controllers. However, CALM extensions such as Virtual Addressing and the self-managing network are not available for 9300 or 9600 ALE controllers.

Data modems: NGT-based 9001/9002 systems are completely compatible with 8528, 9323 and 9360 transceiver based 9001/9002 systems.

I have many vehicles already wired for 8528, 9323 or 9360 transceivers. Can I use existing mountings for wiring an NGT transceiver?

Yes. A kit is available to convert 8528, 9323 and 9360 installations to accommodate NGT transceivers. This kit includes:

- a mechanical adaptor which enables an NGT transceiver to be installed in the existing transceiver cradle
- a CIB cable to replace the control head cable used with 8528, 9323 and 9360 transceivers as the grade of cable used with 8528, 9323 and 9360 is unsuitable for use with NGT transceivers
- an adaptor to connect the existing 9350 cable to an NGT transceiver

NGT is mechanically and electrically different to 8528, 9323 and 9360 transceivers in the following ways:

- the antenna control connector has been changed from a 15-way D-type to a 6-pin round-style connector
- NGT unit is physically much smaller than the 8528, 9323 and 9360 transceivers
- the 8528/9323/9360 transceiver control head cable (15-way D-type connectors) has been replaced by CIB cable which uses 8-way round-style connectors

The extension speaker, the Radio Frequency (RF) and Direct Current (DC) cable connections remain the same.

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Why are there different connectors on NGT and 8528/9323/9360 transceivers?

NGT connectors are more robust than those on the 8528, 9323 and 9360 transceivers and it is easier to run the cables through bulkheads. An adaptor kit is available to enable 9323 or 9360 users to convert their installations to accommodate NGTs. A universal installation kit is available to enable vehicles to be pre-wired to accept 8528, 9323, 9360 and NGT transceivers.

I am having a vehicle pre-wired to accept a Codan radio. Can the vehicle be wired to accept any of the Codan range?

Yes. A universal installation kit is available to suit your needs. It includes:

- a standard 8528/9323/9360 transceiver mounting cradle
- a mechanical adaptor cradle that enables an NGT transceiver to be installed in a 8528/9323/9360 transceiver mounting cradle
- a CIB-grade cable wired for connection to NGT
- an 8528/9323/9360 control head cable
- a 9350 antenna cable wired for connection to an NGT transceiver, and an adaptor to enable connection to an 8528 or 9323/9360 transceiver
- comprehensive installation instructions

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Do NGT transceivers replace 9780, 9323 and 9360 transceivers?

The 9780 transceiver has been phased out. In addition to the standard 9780 features, the NGT *VR* transceiver has the benefits of Easitalk and NGT's handset, performance and ease of installation.

The 9323/9360 has been phased out. However, the NGT *AR* and NGT *SR* offer the features of the 9323 and 9360 transceiver with the benefits of Easitalk, CALM, and network management, and NGT's handset, performance and ease of installation.

Can I buy an NGT *VR* transceiver now and upgrade it to an *SR* later?

No. The NGT *VR* transceiver, like the 9780 transceiver before it, cannot be upgraded to support more sophisticated non-voice applications.

Why should I change to NGT transceivers when our organisation has just standardised on the 9323 or 9360 transceiver?

NGT transceivers offer many advantages in terms of size, use and performance which can benefit any organisation, particularly those using mobile equipment. NGT transceivers are completely compatible with 9323 or 9360 transceivers, so NGTs can be added to your existing network at any time without compromising network performance or requiring modification to your existing 9323 or 9360 transceivers.

Should you decide to introduce NGTs into your existing 9323 or 9360 transceiver network, NGT users will benefit from NGT's added features. If you also decide to introduce CALM signalling into your network, this can be integrated with your existing selcall signalling.

Codan offers a range of adaptor kits and training materials to make the transition process from 9323 or 9360 to NGT transceivers as simple as possible.

How much of my existing equipment can I use with an NGT transceiver if I upgrade from an 8528, 9323 or 9360 transceiver?

The NGT transceiver is a completely new design both mechanically and electrically. However, the following equipment can be used with an NGT system:

- 9350 Antenna (a new cable or adaptor cable is required)
- 9001, 9002 modems (new transceiver interface cables and a software upgrade are required in the 9001 or 9002 modems if CALM support is required)
- 9113B, 9114 Power Supplies
- RTU–282 Telephone Interconnect (a new interface cable is required)
- GPS receivers (a new interface cable is required)
- any Computer Interface Command Set (CICS) compatible system, such a Internav GPS Tracking (a new RS232 cable is required)

A full range of cables and adaptors is available.

NGT transceivers are not compatible with the 8570/71 Remote Control System, 8580 Automatic Repeat Request (ARQ) modem or the IPC–500 Telephone Interconnect.

Will it be easy to upgrade NGT software?

Yes. The operating software in every NGT unit is stored in FLASH ROM (reprogrammable read only memory) and can be upgraded via a serial port download from a computer or other programming device. No covers or screws need be removed from the NGT unit. In fact, the NGT unit does not need to be removed from service.

The move to software–based upgrades means that, in emergencies, new software versions can be delivered from Codan to the field in a matter of hours rather than days or weeks.

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Is an NGT transceiver easier to install in a mobile station than other transceivers?

Yes! In modern vehicles there is an ever-decreasing amount of space in which to install an HF radio. NGT transceivers address this problem in the following ways:

- The handset can easily be located on the dashboard.
- The RF unit, which is much smaller than other transceivers, can be conveniently mounted under the front seat of a vehicle. Its mechanical construction can be made splash-proof and ford-proof.
- The mounting cradle has been designed so that you do not need to allow space for sliding the RF unit into and out of the cradle (“short-throw”).
- The RF unit connectors are on flying leads. This means that the cables can be connected or disconnected while the transceiver is fixed in its cradle.
- The junction box can be installed without regard to accessibility or visibility, such as behind or below the dashboard.
- The electronic design has been enhanced to overcome the need to separate the control head and power cables.

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Term	Meaning
ALE	Automatic Link Establishment
ARQ	Automatic Repeat Request
BITE	Built-In Test Equipment
CALM	Codan Automated Link Management
CAN	Controller Area Network
CIB	Codan Interconnect Bus
CICS	Computer Interface Command Set
D-type	A style of interface connector
DC	Direct Current
DSP	Digital Signal Processing
Easitalk	A digital noise reduction system
FED-STD-1045 ALE	A US government standard for Automatic Link Establishment equipment
FLASH ROM	A type of electrically reprogrammable ROM
GPS	Global Positioning System
HF	High Frequency
Hot key	A key on the NGT user interface assigned to a specific function or functions
IF	Intermediate Frequency
ITU	International Telecommunications Union
Lincompex	Link Compression and Expansion equipment
LQA	Link Quality Analysis
LQA database	A database of LQA values for each possible user for each possible radio link
MIL-STD-810E	A US military standard for shock, vibration and other environmental conditions
NGT	New Generation Transceiver
NGT AR	NGT Australia
NGT SR	NGT System Radio
NGT VR	NGT Voice Radio
NSP	NGT system programmer
PTT	Press To Talk
RF	Radio Frequency
ROM	Read Only Memory

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