Scimitar H – combat net radio of the 80s

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Summary The latest addition to Marconi Communication Systems' h.f product line is Scimitar H, a member of the Scimitar range of radios covering the spectrum from h.f to u.h.f, and representing the latest in advanced military combat net radio.

Scimitar H is a rugged, adaptable, military system which can easily be configured as either a manpack or vehicular radio and which includes a second generation ECCM capability as standard, whilst maintaining compatibility with current in-service equipment.

High-impact-strength polycarbonate construction together with large scale integration (LSI) and hybridization techniques, have produced a smaller, lighter more resilient radio which combines excellent r.f performance with improved overall maintainability and reliability.

Scimitar H includes two independent microprocessor control systems together with an interactive keyboard/display. These ensure minimal operator training and reliable operation whilst providing fast, automatic antenna-tuning, frequency agility and a powerful self-diagnosis Built-In Test Equipment (BITE) capability.

G. N. Hobbs

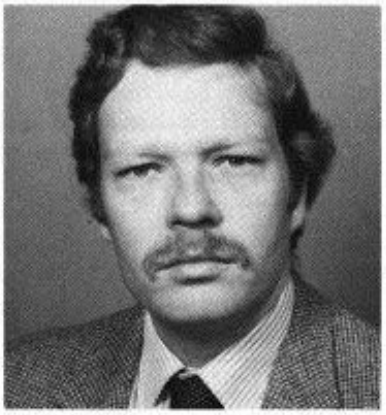
Graeme Hobbs joined the Marconi Company in 1974 as a student apprentice and subsequently gained an honours degree in Electronic Engineering from Bristol University in 1978.

He then joined the Naval Development Group B, part of the Radio Systems Division, as a Junior Engineer within a team working on a submarine communication system.

Later he joined the Military Radio Group with responsibility for overall system engineering and ECCM design for the Scimitar H radio.

Graeme continued his education in a part-time, Company-sponsored course and gained an M.Sc in radio communication systems from Birmingham University in 1982.

In 1983, Graeme was promoted to Section Leader within the Military Radio Group,



with responsibility for overall Scimitar System Engineering and r.f design, and, in May 1984, he was appointed Project Leader.

Introduction

Tactical communications

Traditionally, front-line, battlefield communications have been based on single-channel radios configured either as manpack or vehicular installations and formed into groups or nets.

These nets are based on a hierarchical structure which is mainly dependent on rapid and reliable intercommunication between levels and branches. Today, this structure presents a weakness which can be exploited by the enemy, whose war effort can be greatly assisted by monitoring, confusing or disrupting these vital communications. Such activities are termed Electronic Warfare (EW).

Market research

Market research showed that rugged and adaptable systems are required which are simpler, lighter and smaller, with protection against Electronic Counter Measures (ECM), maximum overall reliability and minimal maintenance and training requirements.

To meet these aims, 'normal operation', 'antenna tuning', 're-broadcast', etc, should be fully automatic, and a comprehensive self-diagnosis system down to replaceable sub-assemblies (RSA) is absolutely essential.

Scimitar – the family concept

The Marconi Company has developed a new range of advanced military combat net radios spanning the spectrum from h.f to u.h.f. Each member has been specifically designed to meet the modern, sophisticated army's requirements and combines excellent radio performance with techniques able to counter present and projected EW threats.

Scimitar M is a miniature, handheld u.h.f squad radio featuring encryption, whilst Scimitar V is an adaptable v.h.f radio system with powerful encryption and frequency-agile facilities. This article will concentrate on the h.f system – Scimitar H.

Scimitar H

The system

Current market forces dictate the basic need for a 20W manpack and a 100W vehicular installation with a simple remote-control facility capable of operating over 3km of twin cable.

Past systems have employed a manpack with integral power amplifier and antenna-tuning circuits, together with an add-on power booster/antenna-matching unit for vehicular installations (figure 1). This solution introduces redundant antenna circuitry with degraded distortion performance and system reliability, due to the manpack power amplifier, when in the vehicular configuration.

Scimitar H is based on a new concept centred on a common Receiver/Exciter which contains the high-performance receiver and low-level drive (figure 2).

The following modules may be added to meet the specific operational requirements:

1) 20W Power Amplifier/Antenna Tuning Unit (20W PA/ATU),

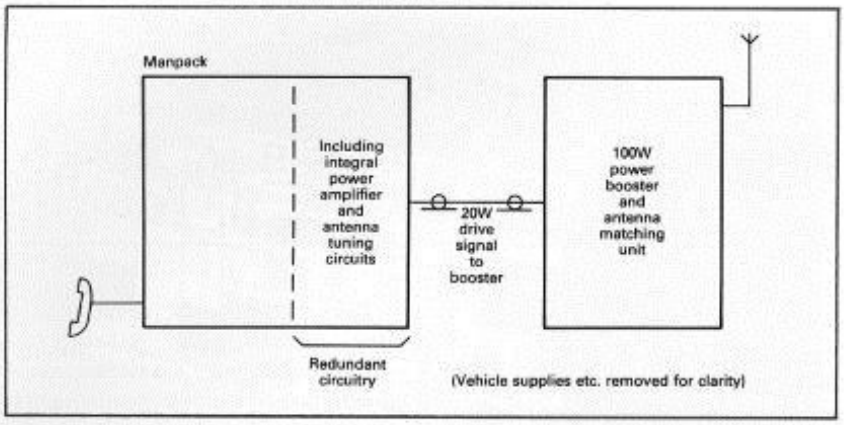


Fig. 1. Conventional vehicular installation

Fig. 2. Scimitar H Receiver/Exciter

2) Rechargeable or non-rechargeable battery pack,
3) 100W Power Amplifier (100W PA),
4) 100W Antenna Matching Unit (100W AMU),
5) Vehicle Applique Unit (VAU).

The manpack configuration is based on the Receiver/Exciter, 20W PA/ATU and the battery pack, whilst the vehicular installation requires the Receiver/Exciter, VAU, 100W PA and 100W AMU.

Features

The Scimitar H combat net radio is smaller, lighter and more flexible than previous radio systems and yet it meets the sophisticated modern army's stringent technical, environmental and operational requirements.

The radio system offers u.s.b, l.s.b, a.m, c.w and automatic rebroadcast modes and includes the built-in, frequency-agile Electronic Counter Counter Measures (ECCM) facility as standard. In the vehicular installation, digital encryption and medium-speed frequency-agile facilities are available via the optional ECCM Unit.

The frequency coverage spans 1·6MHz to 29·9999MHz in 100Hz steps, with the additional search and clarify facility available to 1Hz, the

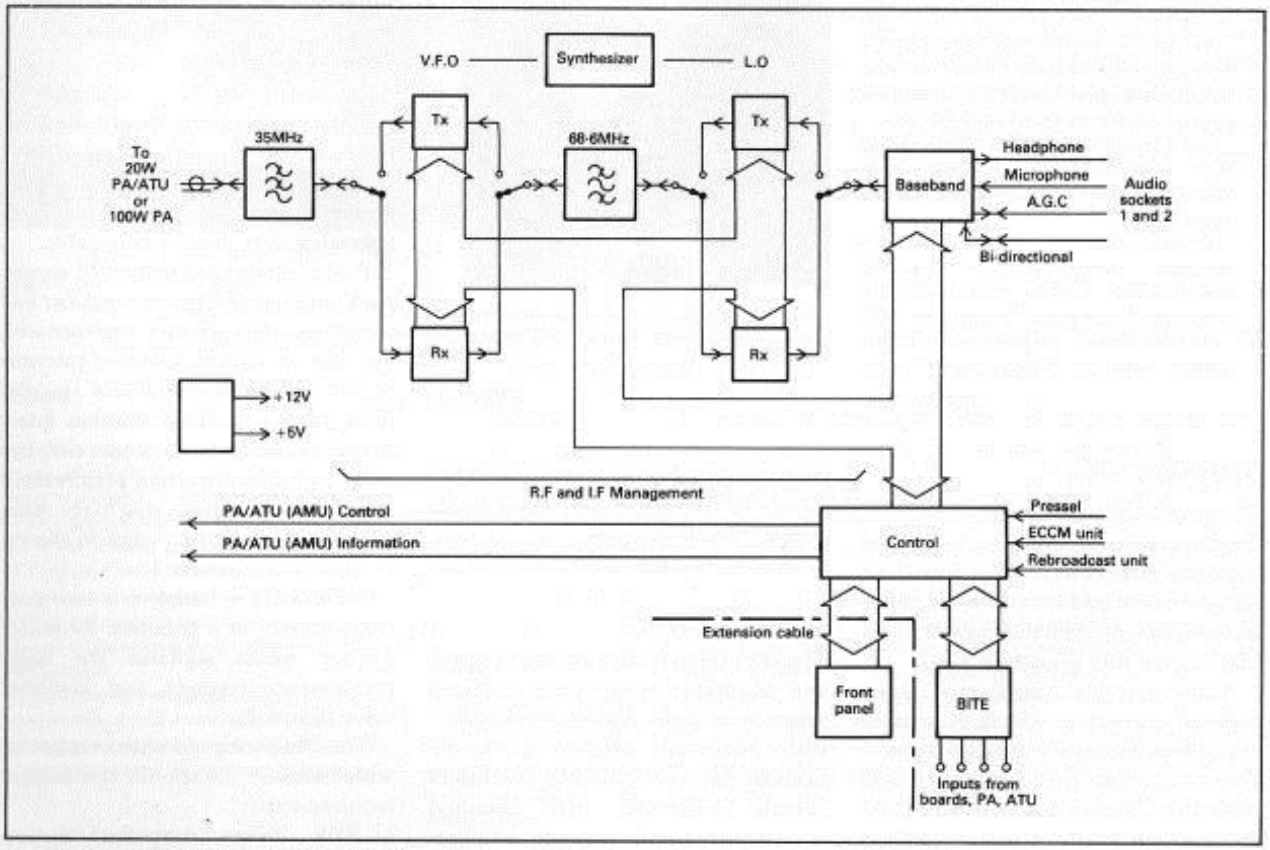


Fig. 3. Receiver/Exciter schematic diagram

local oscillators being locked to a digitally compensated 6MHz reference featuring 0·5ppm stability.

The operator is able to select one of 10, accidental-erasure-protected, preset channels, thus permitting rapid and reliable access to stored-mode and dual-frequency simplex information.

The Receiver/Exciter incorporates a single sideband squelch facility which can easily be set to one of 16 preset levels and which operates without the need of a pilot tone.

The radio system features a microprocessor control system to aid the operator, to eliminate ambiguous or incorrect demands and to continuously monitor the overall system performance using the comprehensive BITE facility. The BITE permits location of faults to assembly and module level, hence aiding operator confidence and minimizing repair time.

The radio system is controlled via the detachable front panel which employs an interactive keyboard/liquid crystal display (l.c.d) system on which current status, operating frequency and warning messages may be displayed.

The Scimitar H system provides two remote-control options. The first features audio and Pressel facilities over a 3km pair of wires. The second provides full remote control via the detachable front panel up to 10m away from the Receiver/Exciter, in the extended control configuration.

Both the manpack and vehicular antenna-tuning systems incorporate microprocessor control, enabling very fast, reliable and automatic tuning of a variety of common military h.f antennas. This fast-tuning capability permits dual-frequency simplex operation and full h.f band frequency agility, propagation constraints permitting.

The Receiver/Exciter

The simplified block diagram of the Receiver/Exciter shown in figure 3 outlines the main design areas. The Receiver/Exciter consists of a receiver with associated input protection, an exciter with automatic level control (a.l.c), a baseband system including receive a.g.c, a microprocessor-based control system, a comprehensive BITE system, and the synthesized local oscillators. All are subject to stringent size, power and environmental requirements whilst each must produce excellent overall performance.

The receiver

Modern battlefield communications demand receivers with high selectivity, reasonable noise figure, low local-oscillator noise, excellent intermodulation distortion (i.m.d) performance, minimal spurious responses and emissions, and a wide dynamic range. Furthermore, they must be unaffected by high interference levels due to co-sited transmitters, and all with minimal power consumption. Even with the present state of the art, some of these requirements are mutually exclusive; however Scimitar H provides a simple, reliable and effective solution to these conflicting needs.

The receiver r.f and i.f sections are based on the standard double superheterodyne technique employing i.fs of 68·6MHz and 500kHz to minimize inband spurious responses.

The second generation, full h.f band, medium-speed frequency-agile facility requires a wideband receiver input. Scimitar H employs a wide dynamic range front end which exhibits excellent linearity at high signal levels, with subsequent selectivity introduced by the high-performance bandpass filters at the two intermediate frequencies.

Finally the filtered and amplified 500kHz i.f signal is demodulated within the baseband system and is also used as the basis for the a.g.c/squelch system.

A.G.C

Modern military receivers must operate effectively within a harsh electromagnetic environment, especially one which features high impulsive interference.

Scimitar H's a.g.c system employs a dual-peak detection system operating at the second i.f. One detector has a response featuring a fast attack/fast decay whilst the other detector exhibits a slow attack/slow decay. The control signal corresponding to the larger of the two detector outputs is less susceptible to impulsive noise and is subsequently applied to the previous r.f/i.f gain stages.

Squelch

V.H.F radios have, for some time, standardized on a tone-operated squelch system which enables reliable and effective automatic re-broadcast facilities.

No comparable system exists at h.f as, in an s.s.b transmission, the tone would produce a significant and unacceptable signature as well as reducing available talk power.

However Scimitar H provides an effective and reliable squelch system which operates purely on the receive signal without the necessity for uniqueness of transmission.

The system operates in conjunction with the a.g.c signal. A 16-step manually-presettable voltage source is used to limit the minimum a.g.c voltage and hence the receiver's gain. An i.f magnitude detection system is then used to mute the receive audio when signals do not exceed the necessary threshold.

When automatic re-broadcast is selected, this mute signal is the basis of the necessary interlock logic and corresponding transmit commands. Hence fully automatic re-broadcast facilities, normally associated only with v.h.f radios, are now available with Scimitar H. This capability provides even greater operational flexibility as both h.f/h.f and h.f/v.h.f re-broadcast modes now become available.

The exciter

This system amplifies, processes and frequency translates the modulated signal to produce the 250mW transmit drive signal for either of the two linear power amplifiers. Due to the necessary power, size and cost constraints many of the items are shared between the receive and transmit paths, with the exciter being essentially the inverse of the receiver.

The a.l.c system

The h.f band spans five octaves making closely defined frequency responses difficult and expensive. To ensure constant transmit power over the frequency range, an automatic level control (a.l.c) sequence is initiated once the antenna system has been tuned.

A low-power pilot tone is transmitted and the forward power level monitored at the appropriate power amplifier whilst i.f attenuation is steadily reduced. Once the rated power output is achieved, the sequence is halted and traffic reinstated. Obviously a pilot tone is transmitted during the a.l.c sequence but it is at low power and of less than 10ms duration.

Output power is selected using 6dB stages of switched attenuation within the 500kHz i.f, enabling simple manual and automatic control of output power. A 60dB fast r.f mute facility is

also included within the 500kHz i.f to mute the r.f drive signal rapidly during relay switching etc.

The baseband system

The Scimitar H radio is an extremely adaptable system. Not only can it be configured as a manpack or a vehicular installation with frequency agile, rebroadcast, remote and harness facilities, but it can also be expanded to include further, more powerful ECCM capabilities. On mode selection, the radio system is automatically reconfigured, greatly reducing operator demand and allowing him to concentrate on the mission.

Each individual system capability requires appropriate audio interfaces and interlock control logic. The very small space available has necessitated the extensive use of l.s.i and hybridization techniques to enable all these facilities to be offered.

The baseband filter provides the third stage of selectivity whilst in receive mode, and limits the immediate spectrum whilst in transmit mode. This high performance, 300Hz to 3050Hz, low-pass filter is implemented using switched capacitor techniques to ensure very small size relative to performance and defined and repeatable characteristics.

S.S.B modem

The 500kHz i.f enables the polyphase technique for s.s.b modulation and demodulation to be exploited. The modem avoids bulky, expensive crystal filters and is simple to implement using hybridized RC networks, with the additional advantages of small size and simple logic control of sideband selection. The technique is based on a four-phase mixer and the selected recombination of phase-shifted quadrature-sampled signals depends on the desired modulation or demodulation mode.

Local oscillators

The Scimitar Receiver/Exciter requires three local oscillator signals as shown in figure 4. Two of these are fixed frequency sources at 69·1MHz and 500kHz, whilst the third is a variable frequency oscillator (v.f.o) spanning 70·2MHz to 98·599999MHz.

All three sources are derived from the 6MHz reference crystal oscillator, which has low power consumption, high stability and is digitally compensated.

The variable-frequency oscillator

Frequency information for the v.f.o is received as serial data and is reformatted into parallel binary coded decimal (b.c.d). The v.f.o must rapidly settle to within 1Hz resolution for frequency agility which is a conflict of requirements in normal single phase-locked loop (p.l.l) realization techniques. Scimitar H employs a newly developed and patented fractional-N synthesis technique with the necesary low step size and high-speed locking.

The v.f.o noise characteristics define the receiver's reciprocal mixing performance. The source is designed to minimize phase noise to less than −120dBc/Hz and −140dBc/Hz at 20kHz and 5% carrier offset respectively.

Space within the Receiver/Exciter is obviously very limited with only 65mm×225mm available for the v.f.o. This small size has necessitated a multilayer board together with extensive use of l.s.i and hybridization techniques.

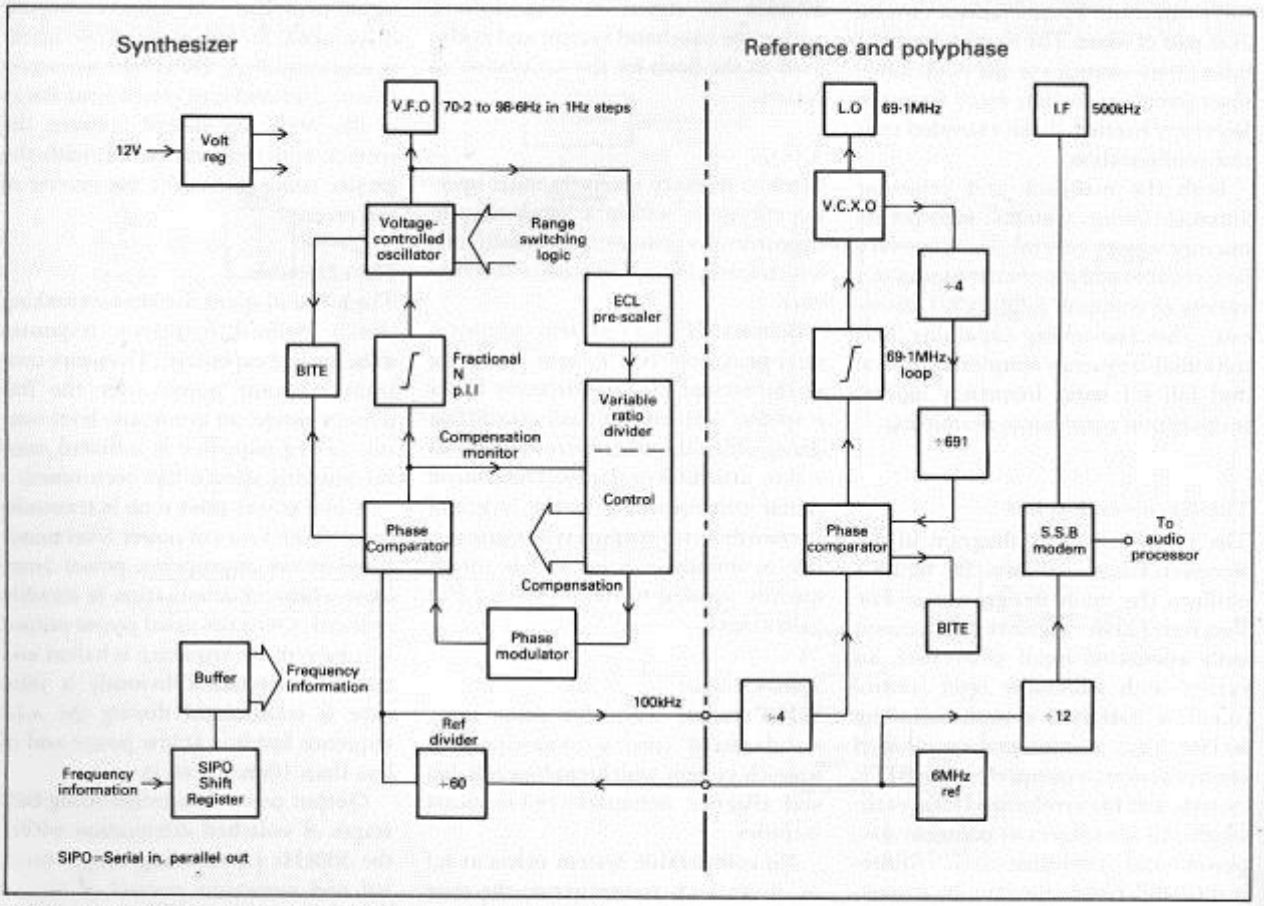


Fig. 4. Synthesizer frequency management

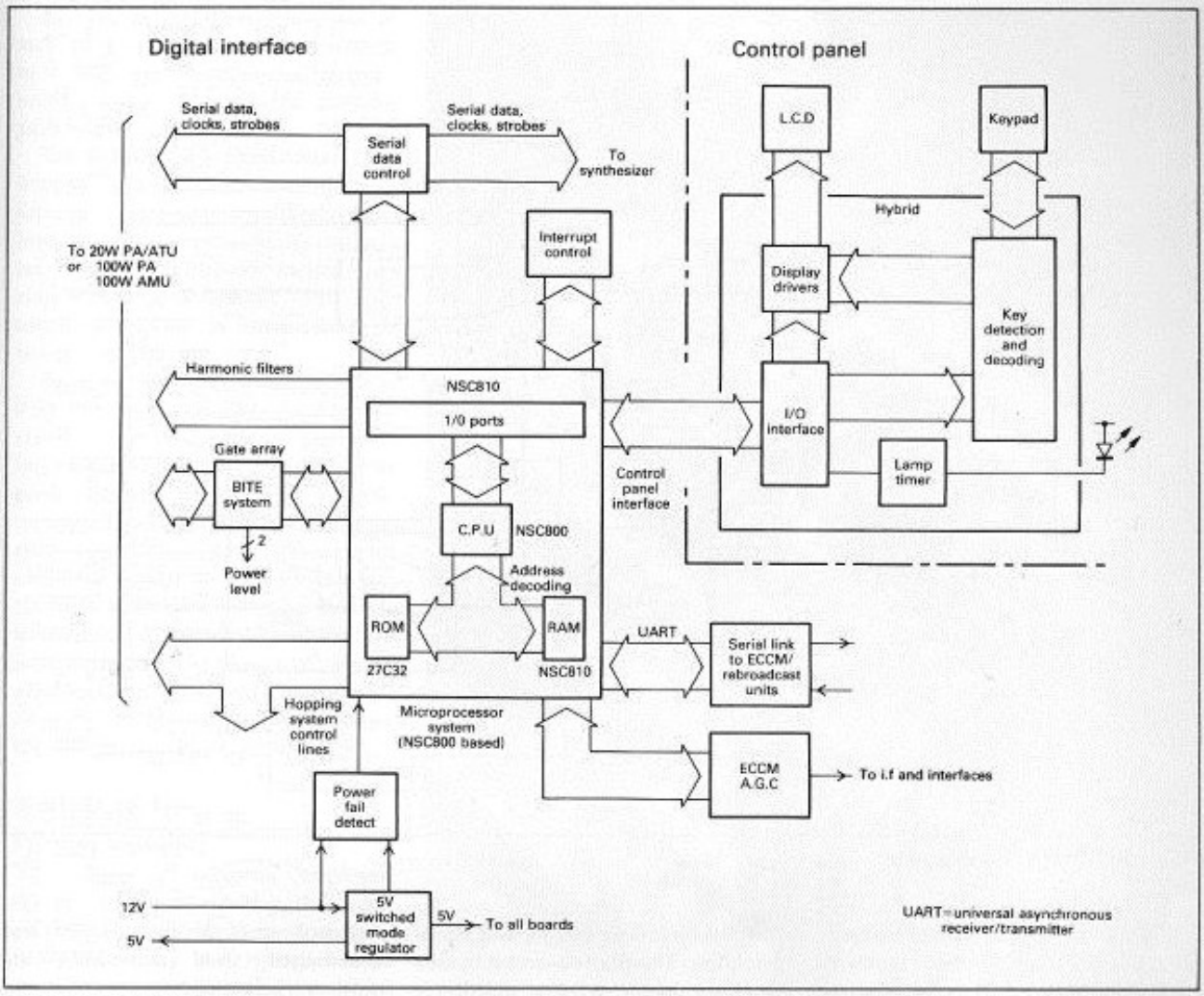


Fig. 5. Control management

Control – why a microprocessor?

A modern, advanced radio system must provide many complex facilities to meet the battlefield requirements. Examples include unambiguous entry and retrieval of stored channel information, performance monitoring BITE, baseband reconfiguration and ECCM facilities.

Apart from the ECCM requirements, these examples would be possible with pure hardware, but would tend to be difficult, non-adaptable and inelegant.

The Scimitar control system

The powerful radio control system (figure 5) is based on a low-power CMOS microprocessor, and provides all the above requirements including the standard ECCM capability, as well as producing a user-friendly radio system capable of effective use by an unskilled operator.

The control system, which is primarily input/output (i/o), is centred around the detachable front panel, which features an interactive l.c.d and a tactile feedback, membrane keypad (figure 6).

In normal operation the display shows the radio's current status. When a key is pressed, the display responds by prompting the next expected action so that further correct keys must be pressed to execute the desired function. Any incorrect key sequence is ignored and appropriate invalid commands are displayed.

Fig. 6. Detachable front panel

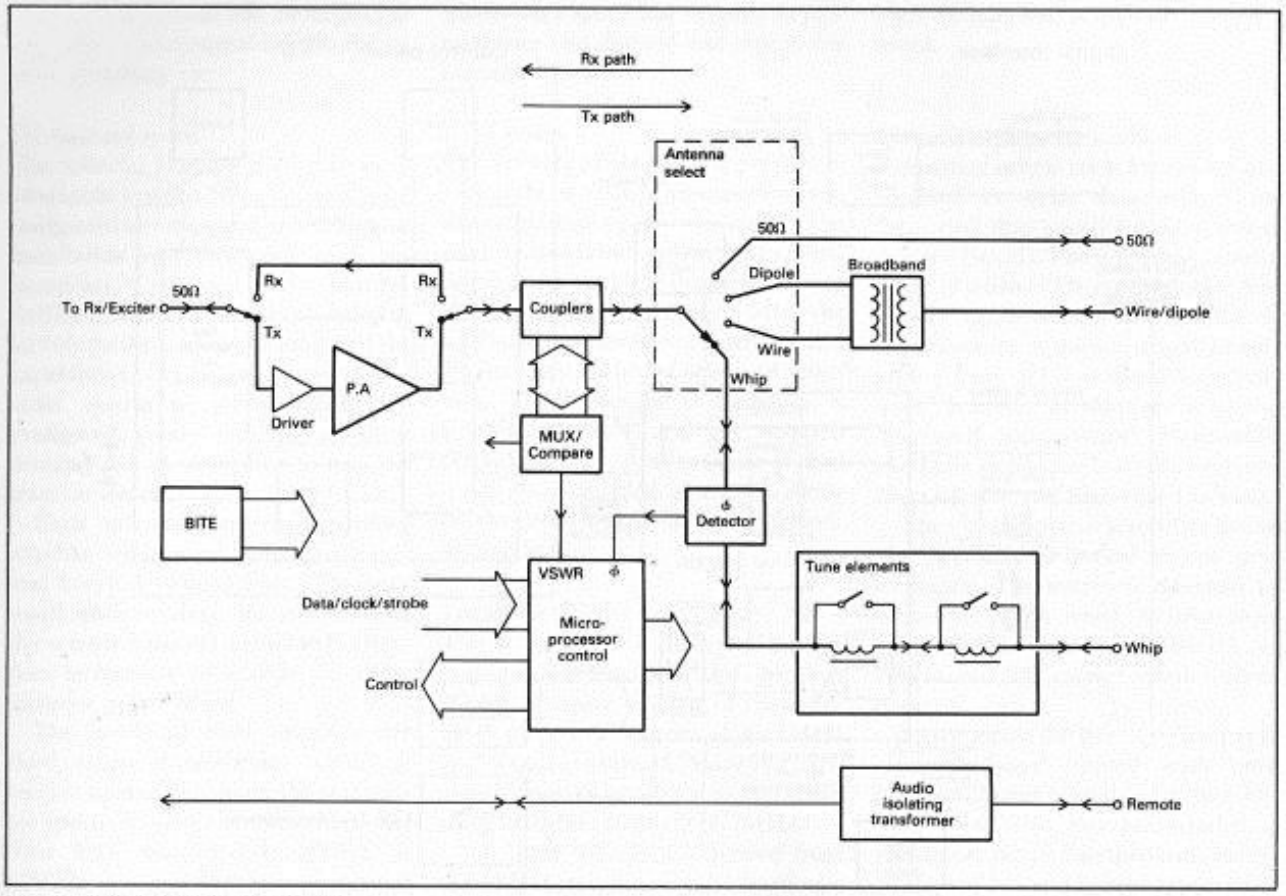


Fig. 7. 20W PA/ATU management

The microprocessor system controls the radio via the serial data highway passing around the Receiver/Exciter and either the 20W PA/ATU or the 100W AMU, with the appropriate feedback via the various system i/o ports.

Physical characteristics

Electromagnetic compatibility (EMC) requirements place immediate electrical and mechanical constraints which are further compounded by rough military handling and extreme environmental conditions.

Much research went into the manpack design because of the severe size and weight limitations. After considering cost, impact strength, resilience, fabrication and weight, it was clear that a polycarbonate moulding internally metalized with a copper/nickel/tin/lead plating produced the optimum solution.

Fortunately for the vehicular installation, weight is less critical and the higher dissipation necessitated the use of aluminium castings for the 100W PA, AMU and VAU.

A modular, replaceable subassembly approach has been used to aid reliability, fault finding and maintainability. The printed-circuit boards are either double sided or multilayer with conventional style components being used wherever possible to lower cost and improve maintainability. Where performance and size constraints have dictated, specialist circuitry has been implemented using custom l.s.i/hybrid circuits fabricated by Marconi Electronic Devices Ltd.

All external connections exhibit inline filtering and both O-ring and r.f gaskets are employed to provide air and r.f sealing between cover plates and chassis.

Power amplification

The 250mW low-level drive from the Receiver/Exciter is amplified to a maximum of 20W or 100W depending on whether the configuration is manpack or vehicular.

20W power amplifier

This is housed within the 20W PA/ATU assembly and consists of a 15dB class A driver stage followed by a 6dB class B output stage (figure 7). Whilst in receive, the amplifier is switched out of the antenna path and deactivated, thus maintaining the receiver's sensitivity.

Once in transmit, forward and reverse power detectors are used for setting the output power during the a.l.c sequence and to monitor the antenna tune status.

Overload protection circuits monitor supply current and heatsink temperature, in order that abnormal or fault conditions may rapidly be identified. Should either of these factors exceed safe limits, then a 6dB reduction in drive level is automatically introduced and the condition rechecked on each subsequent transmit command.

Should further abnormal heating occur, the Class A bias current is automatically reduced, which lowers heatsink dissipation. This degrades the signal quality but has the great advantage of ensuring that the transmitter is always available for use.

100W power amplifier

This is housed within a cast aluminium heatsink and consists of the power amplifier, harmonic filter and overload protection circuits.

The power amplifier, consisting of an 11dB Class A driver stage followed by a 15dB Class B output stage, is activated and switched into the antenna path whilst in transmit.

The vehicle's d.c supply may vary from 22V to 33V which is subsequently limited to 25V via the amplifier's linear regulator. Four automatically controlled harmonic filters are included to ensure that predominant third harmonic distortion is maintained to below −40dBc.

As in the 20W PA, extensive overload protection circuitry is incorporated to avoid amplifier damage during extreme abnormal or fault conditions. Should the supply current, reverse r.f power or heatsink temperature exceed initial limits, indicating an abnormal condition, then an automatic 6dB reduction in drive level is introduced. However if temperature and current then exceed a second extreme limit, indicating a fault condition, the amplifier is de-activated until the system reverts to receive.

Antenna tuning

Military antennas

The choice of antenna employed depends on the installation, the necessary mobility and the desired range of communication. H.F manpacks are specified to operate into 2·4m whips whilst vehicular installations use 3m or 4m whips. For local installations, long wire or dipole antennas cut to less than $\lambda/4$ may be used.

All these antennas have different resonant frequencies within the h.f band but are predominantly capacitative below resonance and inductive above.

The basic technique

Ideally, for maximum power transfer, the power amplifier should drive a resistive 50Ω load. Hence an appropriate passive network, based on inductors and capacitors, is necessary to compensate for the antenna's complex impedance.

The desired compensation network may be implemented within milliseconds by digital switching from a binary weighted bank of inductors and capacitors. This technique enables microprocessor control of antenna tuning together with 'look-up' tables of frequency versus the desired circuit configuration, hence enabling a very fast, adaptable tuning system capable of full band frequency agility.

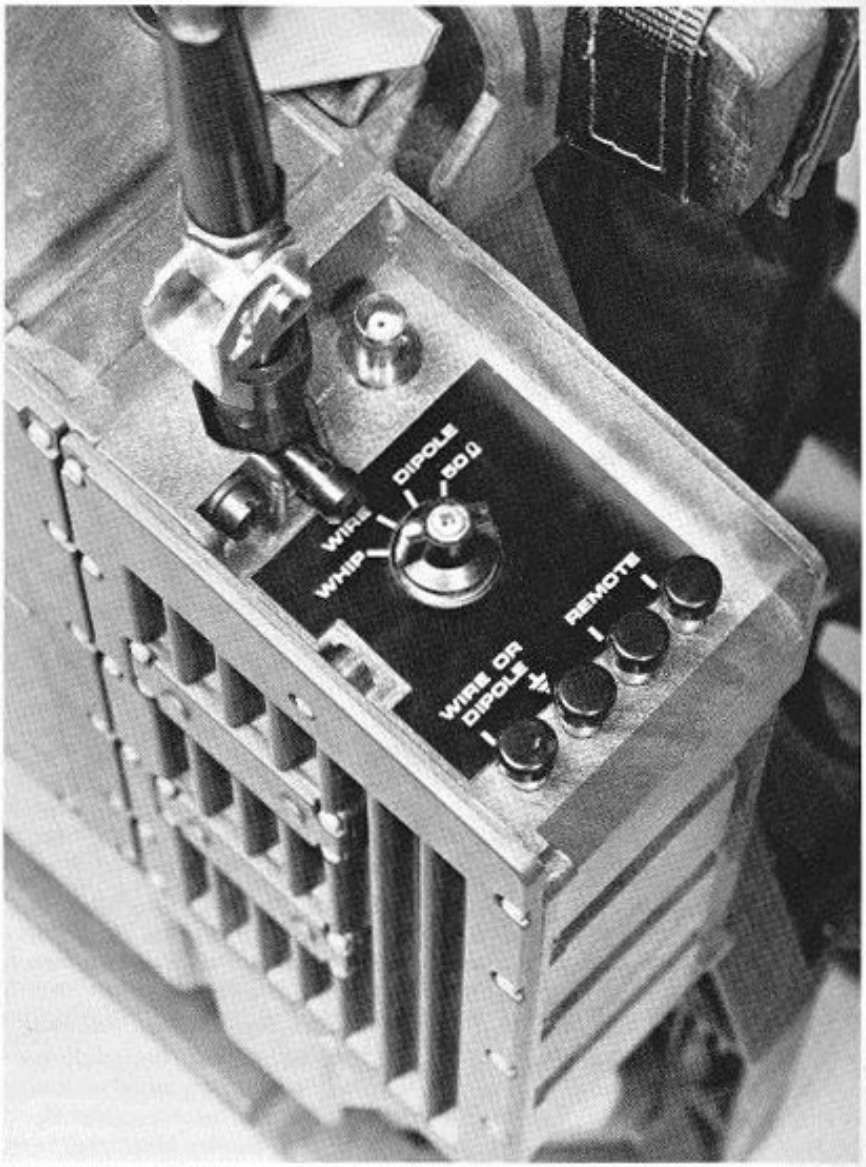


Fig. 8. 20W PA/ATU

20W ATU

This unit caters for all antennas normally associated with a manpack installation, and will ensure that an acceptable impedance of typically less than 3:1 v.s.w.r is presented to the 20W power amplifier.

The long wire and dipole antennas are cut to the length appropriate to the operating frequency and are subsequently matched to 50Ω via fixed ratio transformers.

The 2·4m whip is predominantly capacitive over the range 1·6MHz to 30MHz and is rapidly tuned, typically within 50ms, using base loading inductance, with a fixed ratio transformer to provide the optimum resistive load.

Serial data, consisting of frequency and tune command information, from the Receiver/Exciter is decoded by the microprocessor system. This information enables the microprocessor to execute the appropriate tuning algorithm in conjunction with the v.s.w.r and phase-monitoring system. The phase detector defines whether inductance should be added or subtracted, whilst the v.s.w.r detector defines when an acceptable, i.e,<3:1 ratio, has been achieved. A view of the 20W PA/ATU is shown in figure 8.

100W AMU

This unit must cater for complex antennas which resonate within the h.f band and is based on a digitally switched matching network of inductor/capacitor combinations under microprocessor control. Figure 9 shows the r.f cavity within the 100W AMU and clearly shows the digital switching together with the discrete capacitors and inductors.

The control system similarly receives frequency and tune command

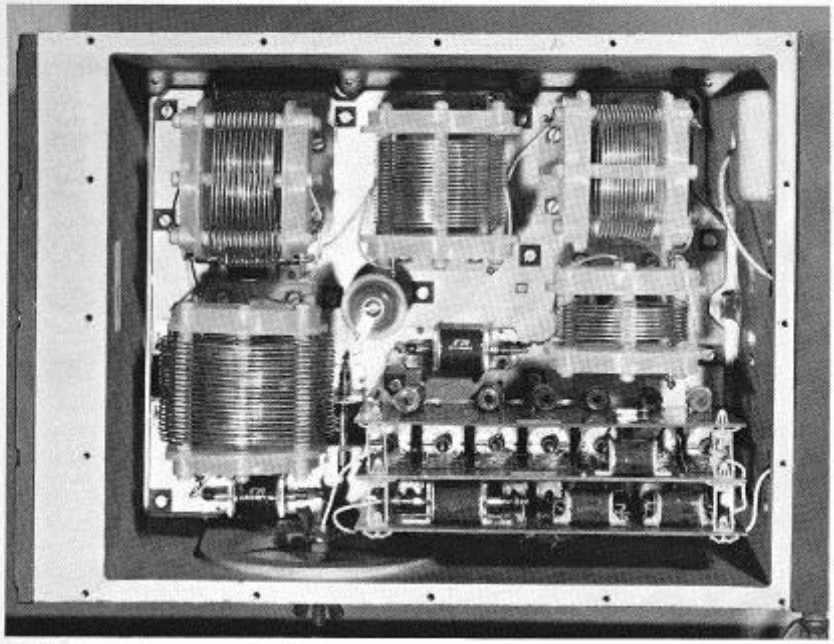


Fig. 9. The r.f cavity in the 100W AMU

information but also employs v.s.w.r, resistance and phase monitoring systems to achieve fast, reliable matching.

The matching circuit, based on digitally selected, discrete inductance and capacitance, may be configured as either an inductive 'L', capacitative 'L' or π network. The appropriate matching network is selected both manually by the front panel antenna select switch and by the control algorithm.

A match is obtained by firstly correcting the phase until a resistive load is achieved as indicated by the phase detector. The resistance discriminator is then monitored and a single adjustment made to correct the load's resistance towards 50Ω. The phase is then readjusted to achieve a resistive load and a further resistive correction made. This cycle is repeated continuously at very high speed until the impedance presented to the 100W power amplifier is typically less than 1·5:1 v.s.w.r. The entire match process is rapidly executed and is generally completed in less than 400ms from a change of frequency.

The unit also features electrically alterable, non-volatile, mass data storage which enables the initial matching 'look-up' tables to be updated, if desired, when a new antenna has been successfully matched.

A view of the 100W AMU assembly together with its whip antenna is shown in figure 10.

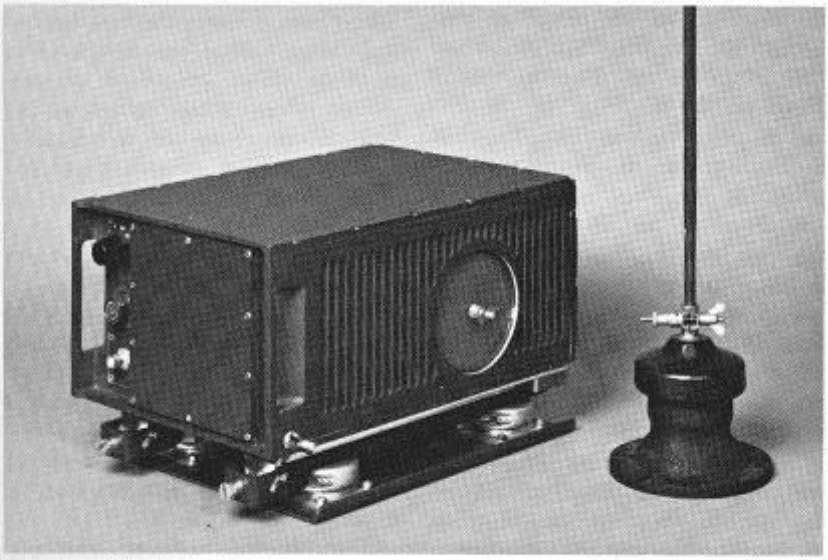


Fig. 10. 100W AMU with whip antenna

Scimitar BITE philosophy

BITE is required to increase operator confidence and to reduce mean time to repair (m.t.t.r) without significantly degrading mean time between failure (m.t.b.f). Due to its flexibility, the BITE has been extended to include special production test functions, hence reducing test times and costs.

The BITE hardware is based on GO/NOGO logic signals and/or measuring analogue voltages using an internal analogue-to-digital converter. The system is configured to enable diagnosis down to assembly or module level if desired.

The microprocessor undertakes a continuous check of assembly status, and detected faults are indicated via the front panel's l.c.d. Specific manual tests are available to enable detailed diagnosis, and non-catastrophic failures may temporarily be 'masked' to allow the mission to continue.

ECCM capability

Scimitar H provides not only excellent conventional radio performance but also includes two levels of protection against ECM.

The first level is available as standard within the basic Receiver/Exciter assembly, and enables frequency agility around a selected hopset. Three hopsets are available from a group of 16 individual user-presettable frequencies which may be situated anywhere within the h.f band.

The software supports the basic frequency hopping functions of hailing, synchronization, transmission and extended radio silence but also permits the radio to operate in a conventional clear mode whilst maintaining hopset synchronism.

The 'hailing' facility enables a new net participant to call an agile net which is observing radio silence. The called net has two options depending on the operational situation. The first option is for the net commander to transmit, hence enabling the new participant to synchronize to the net. The second option, which is more likely on a mission, is for the net commander to revert to a conventional clear channel, whilst maintaining his hopset synchronism, and to verify the caller's credentials. Once verified, the net commander can revert to the agile mode and a transmission made to synchronize the new participant.

The system exhibits a fast lock time and is resilient to conventional jamming and eavesdropping. Once synchronized, the net can be managed in a similar fashion to a conventional h.f simplex communications link.

For the highly sophisticated user requiring the latest in h.f ECCM technology, a second level of protection is available via an optional ECCM unit designed specifically for use within the vehicular radio system. This is a powerful unit which provides both high-grade digital encryption and medium-speed frequency agility about an extended hopset, if desired.

Conclusion

The Marconi Company has developed the highly advanced Scimitar range of military radios covering the radio spectrum from h.f to u.h.f.

Scimitar H represents the latest design and technology in h.f frequency agile, adaptable combat net radios and is presently in production.

The vehicular system has since been adapted for naval use as the Makaira system which provides secure, frequency-agile h.f communication for fast patrol boats and other small vessels.

Scimitar H's advanced microprocessor control system promotes overall maintainability and reliability and ensures simple operation with minimal training requirements. The Receiver/Exciter includes second generation frequency-agile, ECCM facilities as standard, with further more powerful facilities, including medium-speed frequency agility and encryption available via the optional ECCM unit. This capability permits Scimitar to offer reliable communication even whilst subjected to an EW environment.

The radio has undergone extensive design proving, and groundwave/skywave trials have been carried out both at home and abroad.

Already the vehicular system has been sold to a NATO armed force whilst the entire package is presently under evaluation by several other armies, with further large sales expected.

RÉSUMÉ

La dernière addition à la série d'appareils HF des systèmes de communication Marconi est le Scimitar H qui fait partie de la gamme des radios couvrant les fréquences HF à UHF et illustre les plus récents progrès accomplis dans le domaine des radios de réseau de combat militaires.

Scimitar H est un système militaire adaptable et robuste qui peut facilement être configuré comme une radio portative ou une radio de véhicle et qui comprend une fonction ECCM, qui est une deuxième création, en tant que caractéristique standard, tout en étant compatible avec le matériel en service.

Le polycarbonate à haute résistance aux chocs ainsi que les méthodes d'intégration à grande échelle (LSI) et d'hybridation ont permis de construire une radio plus petite, plus légère et plus résistance, à excellentes performances RF et dont la maintenance et la fiabilité effectives sont supérieures.

Scimitar H comprend deux systèmes de commandes par microprocesseur indépendant avec un clavier/écran interactif., Grâce à ceux-ci l'opérateur n'a besoin que d'une formation minimale, la radio est fiable, l'accord d'antenne automatique et rapide, l'agilité des fréquences considérable et la radio est munie d'un appareillage d'essai automatique autodiagnostique (BITE).

RESUMEN

La última adición al tren de producción H.F, del sistema de telecomunicaciones de Marconi es el Scimitar H, miembro de la gama Scimitar de radios que abarca el espectro desde H.F. hasta U.H.F. y representa lo último en radiocomunicación de red avanzada de combate.

El Scimitar H es un sistema robusto militar adaptable que puede configurarse fácilmente ya sea como equipo de mochila o de radio vehicular, y el cual incluye una capacidad de neutralización de contramedidas electrónicas de segunda generación como standard, mientras mantiene su compatibilidad con los equipos en servicio actual.

La construcción de policarbonato de gran resistencia al impacto, junto con los métodos de integración en gran escala (L.S.I.) y de hibridación, han producido un radio más pequeño, más ligero y más elástico que combina el excelente funcionamiento de R.F. con absoluta servabilidad y fiabilidad perfeccionadas.

El Scimitar H incluye dos sistemas independientes de control con microprocesador, junto con un teclado/visualización interactivo. Estos aseguran un mínimo de entrenamiento para el operador y un funcionamiento fiable, a la vez que suministra sintonización rápida automática de antena, agilidad de frecuencia y una potente capacidad de equipos de pruebas incorporadas (BITE), autodiagnósticos.

ZUSAMMENFASSUNG

Scimitar H, eins in der Reihe der Scimitar Funkgeräte für den HF/UHF-Bereich, das neueste im fortschrittlichen Militärfunknetz für den Gefechtseinsatz, ist der jüngste Zuwachs zur HF-Palette der Marconi Kommunikationssysteme.

Scimitar H ist ein robustes und anpassungsfähiges System für Militäranwendungen und eignet sich ohne weiteres entweder als Rucksackgerät oder für den Einbau in Fahrzeuge; in der Normalausführung bietet das Gerät elektronische Abwehrmassnahmen der zweiten Generation bei gleichzeitiger Verträglichkeit mit laufend im Dienst stehenden Geräten. Der Aufbau aus hochzähem Polycarbonat mit Schaltungen in Hochintegration (LSI) und Hybridtechnik führte zu einem kleineren Funkgerät mit geringerem Gewicht und größerer Elastizität, bei dem eine ausgezeichnete HF-Leistung mit insgesamt verbesserter Wartungsfähigkeit und Zuverlässigkeit verein sind.

Scimitar H enthält zwei von einander unabhängige Mikroprozessor-Steuersysteme sowie eine für Dialogbetrieb ausgelegte Tastatur und Anzeige. Dadurch wird weniger aufwendige Personalausbildung und zuverlässige Bedienung gesichert, während schneller automatischer Antennenabstimmung, flinke Frequenzumschaltung und eine leistungsfähige eingebaute Selbstdiagnose-Prüfeinrichtung (BITE) auch vorgesehen sind.