

MANPACK

SENTRY-H 6110-MP



CODAN
COMMUNICATIONS



Codan's Sentry-H 6110-MP delivers a rugged man-portable Software Defined Radio (SDR) solution for military organisations that demand uncompromised, secure voice and data communications, while on the move.

The 6110-MP forms an integral part of the Sentry-H product family that meets the demands of the modern battlefield whilst offering full backwards compatibility with legacy products. The 6110-MP is one of the smallest, lightest form factor manpack HF radios available, delivering a powerful 30W RF power and up to 55 hours of battery life in less than 5 kg of weight without compromise on any capabilities.

KEY FEATURES

- Software Defined Radio
- 30 W power output
- Man portable usage up to 55 hour battery life
- Rugged and waterproof MIL-STD-810G design
- Lightweight and compact
- Rugged smart handset with colour display and integrated GPS
- Dual handset control
- Intuitive icon based colour display
- Multi-language user interface
- Tactically aware: dedicated sound and light controls
- Embedded GPS
- Built in front panel speaker
- IP connectivity over Ethernet/Wi-Fi and USB
- Exceptional RF performance
- Digital voice message call
- Standards based:
 - MIL-STD-188-110A/B (STANG 4539) Data (up to 19k2 bps)
 - FED-STD-1045
 - MIL-STD-188-141B ALE
 - 3G ALE (STANAG 4538)
- AES-256/CES-128 COMSEC
- ECCM
- Designed for MOTS BB-2590 style battery
- Worldwide Codan service and support

PROVEN SOFTWARE-DEFINED ARCHITECTURE

Codan's 6110-MP uses the latest-generation high-performance Digital Signal Processor (DSP), Field-Programmable Gate Array (FPGA) and system on chip (SoC) technology.

Built upon a proven SDR platform with tens of thousands of hours of operation in the field, the 6110-MP delivers market-leading performance and future upgradability through software updates that support evolving standards and ensure sustainability.

IP/ETHERNET/USB CONNECTIVITY

The 6110-MP's IP based design facilitates remote access and the front panel or 2320 Handset USB port provide a convenient point for connecting the Codan TPS-M transceiver programming and Codan data applications. Alternatively, a conventional USB memory stick can be connected for radio profiling, COMSEC key fill and firmware upgrades in the field.

INTUITIVE INTERFACE AND LOCALISED LANGUAGES

The 6110-MP front panel and optional 2320 Handset user interfaces have been designed with ruggedness, and ease of configuration and operation as primary objectives. The intuitive icon-based menu system and easy to read colour screen layout, coupled with an ability to switch between multiple native languages (including data entry modes) ensures that you can focus more on your mission and less on complex radio operations and training.

Operator access to radio configuration parameters can be easily locked down or made available, depending on your mission requirements.

DUAL HANDSET CONTROL

The 6110-MP has full support for H-250 audio accessories but is also fully compatible with the 2320 Smart Handset. With a built in speaker and GPS, the 2320 handset provides direct access to core operations remote from the radio, highly suited to on the move communications.

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ADVANCED ALE

The 6110-MP includes the latest generation STANAG 4538 3G ALE technology providing the tactical user with fast linking and data capabilities. Mission critical messages are transferred securely by employing link protection and data encryption. Synchronised scanning provides more efficient use of available spectrum.

The 6110-MP is also fully interoperable with military transceivers using MIL-STD-188-141B ALE. You can initiate NET, GROUP, and WILDCARD selective calls, along with a number of advanced calls including, digital voice message, phone, message, GPS and status calls. Calls can be made ad-hoc or via fully pre-programmed entries in the contacts list.

LQA RAPID

Codan's proprietary enhancement to ALE waveforms provides improved performance through monitoring channel conditions over a 24 hour period. This ensures that users can rapidly establish communications on the best channel for the time of day, without the need to initiate updates to the LQA information prior to calling, thus increasing network availability and performance.

GPS SUPPORT

The 6110-MP has an integrated GPS antenna and receiver built in to the front panel and optional 2320 Handset with GPS, GLONASS and BEIDOU navigation systems supported. The front panel has a connection point for an external remote GPS antenna for challenging conditions.

Position data display format is user selectable and includes UTM, UPS and MGRS formats. Your distance and bearing from a remote HF station or waypoint can be displayed graphically via the user interface.

DIGITAL VOICE

Codan's second generation digital voice technology utilises MELPe (Mixed-Excitation Linear Predictive enhanced) or TWELP (Tri-Wave Excited Linear Prediction) including latest addition of 300 bit/s and 480 bit/s vocoder rates to provide a major improvement in High Frequency (HF) voice communications. A fully digital mode, coupled with highly optimised vocoder technology, provides clarity and connectivity when traditional methods fail. Optional AES-256 encryption can be added to deliver a fully secure, high quality voice capability.

DATA WAVEFORMS

The 6110-MP is hardware ready for data mode and is delivered with the Codan 2400 bit/s robust data modem as standard. This data waveform is supported with the Codan Chat application providing peer-to-peer text chat, email, and file transfer with a simple GUI that supports multiple languages.

Codan Sprint Chat/Net application combined with optional STANAG 3G ALE capability provides robust and fast data solution exceeding MIL-STD-188-110B 2G data performance in real life conditions.

The 6110-MP may be software upgraded to full MIL-STD/STANAG data capability with data rates up to 19k2 bps (with ISB) using the Codan RC50-C HF email application.

COMSEC

A range of COMSEC options are available with the 6110-MP, from CES-128 grade voice encryption through to AES-256 encryption of digital voice, STANAG 4538 3G ALE and STANAG/MIL-STD data. The AES-256 encryption supports up to 255 secure keys with additional layers of protection possible by incorporating unique radio identifiers.

All voice encryption options can be activated by a single hotkey, and are fully integrated with core radio functions like Selcall and ALE calling to ensure simplicity of operation. The Secure Interop feature enables configuration of the 6110-MP to automatically control encryption on specified networks/channels.

Codan Key Management software is used to generate the key files, and Codan Key Fill software or a USB memory stick may be used to load the keys to the radio.

FREQUENCY HOPPING

The 6110-MP can be enabled with frequency hopping capability providing tactical networks with additional capability to prevent malicious jamming and signal interception. The user can select between up to 31 user programmable hop plans, each comprising a hop name, rate, bandwidth and encryption key.

Additional information security can be achieved with the use of one time session PINs, and also combining frequency hopping with CES-128 voice encryption.

WARRANTY, SERVICE AND SUPPORT

Codan provides proven product reliability and performance, backed up by our standard three year warranty. The ability to independently sustain your equipment, complimented by field upgradable unique option codes, enables you to truly utilise SDR technology should your mission change features can easily be enabled.

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SPECIFICATIONS

GENERAL

Frequency range	Transmit: 1.6 to 30 MHz Receive: 250 kHz to 30 MHz
Power output	30 W RF \pm 1dB (two-tone or voice), user-programmable in 1W steps (low/medium/high)
Channels	Up to 1000 entries
Contacts	Up to 500 entries
HF networks	Up to 20 networks (simultaneous scanning)
Input voltage range	13.8 V DC nominal, negative earth Functional range: 10 V to 17 V DC
Frequency stability	\pm 0.3 ppm for -30°C to $+60^{\circ}\text{C}$
Supply current	Transmit: output power 30 W, two-tone 3 A to 4.5 A CW or average speech 1.5 A for battery life calculations Receive: no signal < 0.3 A typical, 0.35 A maximum
GPS	Embedded receiver/antenna (GPS, GLONASS and Beidou)
Programming	TPS-M Radio Programming Software, USB memory device
Language support	English, Spanish, Russian, Chinese, French, Arabic, Dari, Pashto and Portuguese
Compliance	CE, FCC Part 90, AS/NZS 4770, AS/NZS 4355, MIL-STD 461-G, MIL-STD-188-141C. (Pending)

RF

Modes	Single Sideband USB, LSB (J3E), AM (H3E), CW (J2A), AFSK (J2B), FSK (F1B), ISB (B7D or B2B), Software Defined
Duty cycle	100% voice and data
Receive specifications	Sensitivity: SSB: -125 dBm (0.12 μV) for 10dB SINAD Selectivity: >65 dB at -1 kHz at -1 kHz +4 kHz SCF (USB)
Transmitter specifications	Spurious and harmonic suppression: >65 dB below PEP Intermodulation products: >31 dB below PEP

Values noted are typical. Equipment descriptions and specifications subject to change without notice or obligation.

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WAVEFORMS

Automatic Link Establishment (ALE)	FED-STD-1045; MIL-STD-188-141B; STANAG 4538 3G ALE
Data	MIL-STD-188-110A/B (STANAG 4539) data capability with data rates up to 19k2 bps
Selcall	CCIR 493-4 proprietary and open standard
Digital voice	TWELP 2400 bit/s, 1200 bit/s, 600 bit/s, 480 bit/s, 300 bit/s MELPe (STANAG 4591) 2400 bit/s, 1200 bit/s
Encryption	AES-256 digital voice and data (256 keys, direct entry and programmable via Codan KMS/KFS & USB memory stick) CES-128 voice (97 x 16-digit keys, direct entry and programmable via Codan KMS/KFS & USB memory stick, 4-digit session PIN)
ECCM	6/12/25 hops per second

ELECTRICAL AND MECHANICAL

Size	284mm (without handles, 324 with handles) x 246 mm x 96 mm (L x W x H) including battery compartment
Weight	Less than 5 kg including battery
Interfaces	Handset Interface, DC supply (battery), USB (front panel and Handset), H-250 Audio (powered), GPS antenna, Antenna, Ethernet via adaptor (TCP/IP, supports remote control)
Temperature range	Operational at -30 to +60°C; 95% RH maximum, non-condensing
Environmental standards	MIL-STD-810G (Immersion, Shock, Drop, Vibration, Humidity, High temp, Low temp, Blowing Dust, Salt Fog, Fungus, Contamination, Altitude)
Supported batteries	BB-2590, BA-3590, BB-390
MTBF	141,000 hours (16 years)
MTTR	Less than 30 minutes

Values noted are typical. Equipment descriptions and specifications subject to change without notice or obligation.

MANPACK

2110



Codan's Patrol 2110 Manpack is the next generation of manpacks in the 2110 series. Building on the quality and reliability of Codan Manpacks, Patrol has a new rugged handset that offers extended capability and flexibility to users for their tactical requirements.

The Patrol smart handset enables remote operation of the Manpack, with all the capability of the front panel now available in the palm of your hand. The handsets built-in speaker automatically switches to a loud mode when stowed in its custom designed cradle meaning calls can be heard when the handset is not being held to the operator's ear.

KEY FEATURES

- Rugged smart handset with an internal display, microphone and speaker
- Custom designed handset accessories for flexible configurations
- Tough and lightweight HF radio
- Digital Voice for clear communications
- Secure voice and data communications (AES-256)
- Advanced ALE calling standards, including 3G ALE (STANAG 4538)
- Over 60 hours of battery life
- Interoperability with other military transceivers
- Smart, fast and fully automatic antenna tuner
- GPS location and tracking
- 3 year warranty
- Worldwide training and support

DIGITAL VOICE

Codan's second generation Digital Voice technology provides a quantum leap in High Frequency (HF) voice communications. A full digital mode coupled with highly optimised vocoder technology provides voice quality similar to that experienced with cellular phones. Optional AES-256 encryption can be added to deliver a fully secure, high quality voice capability.

ADVANCED ALE

The Patrol 2110 Manpack includes the latest generation 3G ALE technology providing the tactical user with fast linking and data capabilities. Mission critical messages are transferred securely by employing link protection and data encryption. Synchronised scanning provides more efficient use of existing bandwidth.

The Patrol Manpack is fully interoperable with military transceivers using JITC certified MIL-STD-188-141B ALE. You can initiate NET, GROUP, and WILDCARD selective calls, along with a number of advanced calls including, Phone, Message, GPS, and Status Calls. The Patrol 2110 is also interoperable with a number of commercial HF transceivers that are used by many non-government and humanitarian organisations.

FLEXIBLE CONFIGURATIONS

The Patrol's rugged handset provides extended capability for numerous Manpack configuration scenarios. When carrying the manpack on your back, the handset provides quick and full control without having to stop moving or having to access the front panel. For vehicle deployments, the handset offers the flexibility for the transceiver to be located anywhere in the vehicle, with a 6m extension cable to allow the handset to be located in the optimal position for accessibility.



1. Power on/off button
2. Unique one-touch programmable Emergency Call button
3. Backlist display shows radio status, battery information, and GPS
4. Three soft keys to access frequency used functions
5. Channel and menu navigation buttons
6. Volume up/down
7. Recessed front panel protects keypad buttons
8. Clearly labelled backlit keypad provides one key access to standard functions

*Please note that the picture shown (above) is not to scale

RUGGED SMART HANDSET

Custom designed to suit operational scenarios, the Patrol smart handset is manufactured from high-grade plastic polymers to meet users requirements for functionality and aesthetics. Built for the world's toughest environments, the handset meets MIL-STD-810G environmental standards for shock, vibration, dust, humidity and IP67 for water and immersion. With an internal microphone and speaker, custom-built cradle, storage bag, tamper resistant fasteners and extension accessories, the Patrol smart handset is designed to give the user the best performance from their Manpack.

DESIGNED FOR THE USER

The Patrol smart handset was designed in consultation with customers worldwide to ensure we meet their operational needs. The handset features a high contrast clear LCD which is readable in all light conditions. The keypad has been designed for reliable activation and use by a gloved hand and is resistant to contaminants such as sweat, dirt and grease; the keypad labels are resilient to heavy use, and the earpiece is ergonomically designed for comfort during extended periods of use.

LONG BATTERY LIFE

Using state-of-the-art technology, the Patrol 2110 has by far the lowest current consumption of any available HF manpack transceiver. This enables continuous operation for many days on a single battery charge, which can save some users the burden of carrying spare batteries.

LIGHTWEIGHT & RUGGED DESIGN

The Patrol 2110 Manpack Transceiver is designed for harsh field conditions and to comply with the most demanding environmental standards including MIL-STD-810F.

The transceiver and battery compartments are made from lightweight alloys and high impact plastics. Both are capable of withstanding immersion to a depth of one metre.

MIL-STD-188-141B ALE

The Patrol 2110 offers JITC certified MIL-STD-188-141B ALE as an option. With this option, Patrol offers up to 600 channels and 20 networks.

Alternatively, the Patrol Manpack offers FED-STD-1045 ALE capability. It comes with Codan's advanced link management technology (CALM™), which improves the performance of normal FED-STD ALE by maintaining channel quality information (LQA) on a 24 hour basis. This results in significantly less soundings and enables the Transceiver to select the most suitable channel from the moment it is turned on.

VOICE & DATA SECURITY

A range of COMSEC options are available with the 2110, from CES-128 grade with voice encryption through to full AES-256 encryption of digital voice and STANG/MIL-STD/36 ALE data. The AES-256 encryption supports 256 by 256bit keys with additional layers of protection possible by incorporating unique radio identifiers.

CLEAR COMMUNICATIONS WITH DSP NOISE REDUCTION – EASITALK™

Codan's Digital Signal Processing (DSP) techniques greatly reduce the effect of interference and channel noise to provide clearer communications. Easitalk™ operates at the press of a button and the result is a loud and clear signal in otherwise difficult situations.

INTEROPERABILITY WITH ADVANCED CALLING FACILITIES

With Codan's advanced ALE capabilities, the Patrol 2110 Transceiver is interoperable with other military and commercial equipment complying with these standards.

Other advanced ALE features supported include:

- Automated message processing capability including Remote Diagnostics, GPS polling and position sending, Phone and Emergency Calls
- Listen-Before Transmit capability preventing ALE transmission on channels that are already occupied
- Legacy mode enabling simultaneous 2G / 3G network operation

INTELLIGENT BATTERY SYSTEM

Codan's unique battery management technology continuously monitors the battery condition and remaining capacity. The handset and front panel show remaining operating hours, reassuring users of their ability to communicate in mission critical operations.

The intelligent monitoring system also monitors battery charging and prevents batteries from being overcharged. This ensures maximum battery life and minimises operational costs.

The battery can be charged via the transceiver's front panel while operating the manpack, or when detached using a fast charger.

The Patrol 2110 Manpack can be supplied with a range of battery charging solutions for either AC or DC sources.

INNOVATIVE USER-FRIENDLY INTERFACE

Codan's intuitive interface is easy to use right from the start and minimises training time and costs. The transceiver's menu driven interface includes a smart address book containing up to 200 names, call locations, and even pre-programmed text messages. It also features one key access to standard functions and pre-programmed sequences.

The front panel includes an internal speaker, a full alpha-numeric keypad and large display that are white backlit for covert night time operations. Backlighting may also be completely disabled. The front panel backlighting is also NVG compatible.

The Patrol Manpack is highly configurable and supports both user and administrative access levels. This includes the ability to simplify the user interface by restricting a user to only those functions that are necessary to operate the transceiver and support the mission.

INTERNAL HIGH SPEED DATA MODEM

The Patrol 2110 can be optioned with a fully integrated internal high speed data modem with AES-256 bit encryption.

MIL-STD-188-110 A/B and STANAG 4539 waveforms are supported, with auto adaptive data rates of up to 9600 bps achieved. To ensure long operational use the internal modem auto-detects when a PC has been disconnected and switches to a power-save mode.

INTEGRATED GPS RECEIVER

To enable the user to know their location, Patrol comes with an integrated GPS receiver which shows current coordinates and with the GPS Tracking option, enables monitoring of distance and bearing from other HF radios in the network. All GPS data can be encrypted so positions are only seen by authorised users.

SMART, FAST & FULLY AUTOMATIC ANTENNA TUNER

The Patrol 2110 features an integrated antenna tuner that automatically detects the antenna and tunes it to the operating frequency. Initial tuning typically occurs within 2.5 seconds and takes only 50 milliseconds when tuning from memory. Silent Tuning is supported when changing channels.

The tuner is fully protected against unexpected antenna loads and mismatches, and overvoltage. A separate 50 ohm BNC connection is also available for broadband antennas.

OPTIONS

- Digital Voice (2400/1200 and 600bps vocoder rates supported)
- Internal 9600bps Data Modem
- 3G (STANAG 4538) ALE
- MIL-STD-188-141B ALE
- Encryption
- CES-128 bit encryption(Voice)
- AES-256 bit encryption (Voice / Data)
- Morse Key
- GPS Tracking
- External GPS antenna
- 2700 Hz Bandwidth Filter*

* Required for use with Data and Digital Voice



SPECIFICATIONS

Channel capacity	With MIL-STD-188-141B ALE (JITC waveform) option: 600 channels, 20 networks Without MIL-STD-188-141B ALE option: 400 channels, 10 networks
Scanning	Configurable up to 8 channels per second
Linking and data	3G ALE (STANAG 4538) including FLSU, HDL, LDL, CAST (Codan Adaptive Signalling Technology), MIL-STD-188-141B ALE, MIL-STD-188-110A/B, STANAG 4539, 75 to 9600 bit/s
Vocoder	MELPe (1200/2400 bit/s); TWELP (600/1200/2400 bit/s)
Operating temperature range	-40 to +70°C, full spec -30 to +60°C
Frequency stability	±0.5 ppm
Clarifier	10 Hz
Power source	12 V DC (10.8 to 15 V operational)
Size	Transceiver: 245 mm W x 250 mm D x 92 mm H, with battery 245 mm W x 350 mm D x 92 mm H Smart handset: 70 mm W x 210 mm L x 72 mm H
Weight	Transceiver: 2.9 kg (5.0 kg with 8 Ah NiMH battery) Smart handset: 0.3 kg
Environmental	Per MIL-STD-810F including shock, vibration, humidity, immersion (1 hr at 1 m), altitude, fungus, salt fog, sand and dust, blowing dust, and rough handling
EMC	Complies with MIL-STD-461
Cooling	Convection from case
Transceiver conformance	Exceeds or meets requirements of AS/NZS 4770:2003, CE, NTIA and FCC
Interfaces	USB (full opto-isolation) or RS232
Approximate battery life	Approx. 50 hr (13 Ah NiMH), 1:9 Tx:Rx; Approx. 65 hr (17 Ah Li-FePO4), 1:9 Tx:Rx

RF

Frequency range	Transmit: 1.6 to 30 MHz, 10 Hz steps Receive: 250 kHz to 30 MHz, 10 Hz steps Frequency Stability: ±0.5 ppm from -30°C to +60°C
Modes	USB/LSB (J3E), AM (H3E), AFSK (J2A), CW (J1A)
RF input/output impedance	Whip/long wire antenna via internal Automatic Antenna Tuner, or 50 Ω nominal
Antenna tuner	Tuning: 2.5 s typical first tune (fully automatic), 50 ms for memory recall Last tune stored for 100 frequencies
Transmitter specifications	Power output: 25 W PEP (High)/5 W PEP (Low) selectable Duty cycle: 50% with over temperature protection Audio bandwidth: 300 to 2700 Hz (standard filter) 300 to 3000 Hz (optional 2.7 kHz BW filter) Operating current: 120 mA typical (speaker muted) Sensitivity: 0.14 µV for 10 dB SINAD
Receiver specifications	Image & IF rejection: 85 dB Spurious response: ≥70 dB Mute: Syllabic Voice Detect Audio output: Waterproof internal speaker; 0.5 W into 8 Ω, 10% THD, External speaker on GPIO connector; 1 W into 4 Ω, 10% THD

ENCRYPTION

CES-128, 97 x programmable 16-digit keys, 4-digit PIN
AES-256, 256 x programmable 256-bit keys

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MANPACK 2110M



Codan's Patrol 2110M Manpack is the next generation of manpacks in the 2110 series. Building on the quality and reliability of Codan Manpacks, Patrol has a new rugged handset that offers extended capability and flexibility to users for their tactical requirements.

The Patrol smart handset enables remote operation of the Manpack, with all the capability of the front panel now available in the palm of your hand. The handsets built-in speaker automatically switches to a loud mode when docked in its custom designed cradle meaning calls can be heard when the handset is not being held.

KEY FEATURES

- Rugged smart handset with an internal display, microphone and speaker
- Custom designed handset accessories for flexible configurations
- Tough and lightweight HF radio
- Digital Voice for clear communications
- Secure voice and data communications (AES-256)
- Advanced ALE calling standards, including 3G ALE (STANAG 4538)
- Over 60 hours of battery life
- Interoperability with other military transceivers
- Smart, fast and fully automatic antenna tuner
- GPS location and tracking
- 3 year warranty
- Worldwide training and support

DIGITAL VOICE

Codan's second generation Digital Voice technology provides a quantum leap in High Frequency (HF) voice communications. A full digital mode coupled with highly optimised vocoder technology provides voice quality similar to that experienced with cellular phones. Optional AES-256 encryption can be added to deliver a fully secure, high quality voice capability.

COMMUNICATIONS SECURITY

The Patrol 2110M can be fitted with internal Frequency Hopping and encryption options that can prevent third party monitoring of communications that may jeopardise an operation.

Codan's Frequency Hopping option is user configurable to enable selection of individual hop rates, either 6/12/25 hops per second, along with a unique 18 digit security hopping key. Frequency Hopping can offer you additional protection to malicious jamming and signal interception. When combined with Codan's AES-256 or CES-128 bit encryption options, you can be assured sensitive information remains private and secure.

FLEXIBLE CONFIGURATIONS

Patrol's rugged handset provides extended capability for numerous Manpack configuration requirements. When carrying the manpack on your back, the handset provides quick and full control without having to stop moving or having to access the front panel. For vehicle deployments, the handset offers the flexibility for the transceiver to be located anywhere in the vehicle, with a 6 m extension cable to allow the handset to be located in the optimal position for accessibility.

MANPACK 2110M



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DESIGNED FOR THE USER

The Patrol smart handset was designed in consultation with customers worldwide to ensure we meet their operational needs. The handset features a high contrast clear LCD which is readable in all light conditions. The keypad has been designed for reliable activation and use by a gloved hand and is resistant to contaminants such as sweat, dirt and grease; the keypad labels are resilient to heavy use, and the earpiece is ergonomically designed for comfort during extended periods of use.

LONG BATTERY LIFE

Using state-of-the-art technology, the Patrol 2110M has by far the lowest current consumption of any available manpack transceiver. This enables continuous operation for many days on a single battery charge, which can save some users from carrying spare batteries.

LIGHTWEIGHT & RUGGED DESIGN

The Patrol 2110M Manpack Transceiver is designed for harsh field conditions and to comply with the most demanding environmental standards including MIL-STD-810F.

The transceiver and battery compartments are made from lightweight alloys and high impact plastics. Both are capable of withstanding immersion to a depth of one metre.

3G ALE (STANAG 4538)

The 2110M Manpack includes the latest generation 3G ALE technology providing the tactical user with fast linking and data capabilities.

Mission critical messages are transferred securely by employing link protection and data encryption. Synchronised scanning provides more efficient use of existing bandwidth.

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MIL-STD-188-141B ALE

The 2110M offers JITC certified MIL-STD-188-141B ALE as an option. With this option, the Patrol 2110M offers up to 600 channels and 20 networks.

Alternatively, the Patrol 2110M Manpack offers FED-STD-1045 ALE capability. It comes with Codan's advanced link management technology (CALM™), which improves the performance of normal FED-STD ALE by maintaining channel quality information (LQA) on a 24 hour basis. This results in significantly less soundings and enables the Transceiver to select the most suitable channel from the moment it is turned on.

The Patrol 2110M Manpack Transceiver is fully interoperable with military transceivers using JITC certified MIL-STD-188-141B ALE. You can initiate NET, GROUP, and WILDCARD selective calls, along with a number of advanced calls including, Phone, Message, GPS, and Status Calls.

The Patrol 2110M is also interoperable with a number of commercial HF transceivers that are used by many non-government and humanitarian organisations.

INTEROPERABILITY WITH ADVANCED CALLING FACILITIES

With Codan's advanced ALE capabilities, the Patrol 2110M Transceiver is interoperable with other military and commercial equipment complying with these standards.

Other advanced ALE features supported include:

- Automated message processing capability including Remote Diagnostics, GPS polling and position sending, Phone and Emergency Calls
- Listen-Before Transmit capability preventing ALE transmission on channels that are already occupied
- Legacy mode enabling simultaneous 2G / 3G network operation

INTELLIGENT BATTERY SYSTEM

Codan's unique battery management technology continuously monitors the battery condition and remaining capacity. The handset and front panel show remaining operating hours, reassuring users of their ability to communicate in mission critical operations.

The intelligent monitoring system also monitors battery charging and prevents batteries from being overcharged. This ensures maximum battery life and minimises operational costs.

The battery can be charged via the transceiver's front panel while operating the manpack, or when detached using a fast charger.

The Patrol 2110M Manpack can be supplied with a range of battery charging solutions for either AC or DC sources.

INNOVATIVE USER-FRIENDLY INTERFACE

Codan's intuitive interface is easy to use right from the start and minimises training time and costs. The transceiver's menu driven interface includes a smart address book containing up to 200 names, call locations, and even pre-programmed text messages.

It also features one key access to standard functions and pre-programmed sequences.

The front panel includes an internal speaker, a full alpha-numeric keypad and large display that are green backlit for covert night time operations. Backlighting may also be completely disabled. The front panel is also NVG compatible.

The Manpack is highly configurable and supports both user and administrative access levels. This includes the ability to simplify the user interface by restricting a user to only those functions that are necessary to operate the transceiver and support the mission.

INTERNAL HIGH SPEED DATA MODEM

The Patrol 2110M can be optioned with a fully integrated internal high speed data modem with AES-256 bit encryption. MIL-STD-188-110 A/B and STANAG 4539 waveforms are supported, with auto adaptive data rates of up to 9600 bps achieved. To ensure long operational use the internal modem auto-detects when a PC has been disconnected and switches to a power-save mode.

INTEGRATED GPS RECEIVER

To enable the user to know their location, Patrol comes with an integrated GPS receiver which shows current coordinates and with the GPS Tracking option, enables monitoring of distance and bearing from other HF radios in the network. All GPS data can be encrypted so positions are only seen by authorised users.

SMART, FAST & FULLY AUTOMATIC ANTENNA TUNER

The Patrol 2110M features an integrated antenna tuner that automatically detects the antenna and tunes it to the operating frequency. Initial tuning typically occurs within 2.5 seconds and takes only 50 milliseconds when tuning from memory. Silent Tuning is supported when changing channels.

The tuner is fully protected against unexpected antenna loads and mismatches, and over-voltage. A separate 50 ohm BNC connection is also available for broadband antennas.

The Patrol supports connection to a number of external antenna tuners including Codan's 3046 and 9300 Automatic Antenna Tuner solutions.

OPTIONS

- Digital Voice (MELPe and TWELP vocoders)
- AES-256 bit (Voice /Data)
- Frequency Hopping
- MELPe 2400/1200 bps Vocoder
- Internal 9600 Data Modem
- Morse Key
- 3G (STANAG 4538) ALE
- GPS Tracking
- MIL-STD-188-141B ALE
- External GPS antenna
- Encryption
- 2700 Hz Bandwidth Filter
- CES-128 bit (Voice)

*Required for use with Data and Digital Voice

MANPACK 2110M



SPECIFICATIONS

Channel capacity	With MIL-STD-188-141B ALE (JITC waveform) option: 600 channels, 20 networks Without MIL-STD-188-141B ALE option: 400 channels, 10 networks
Scanning	Configurable up to 8 channels per second
Linking and data	3G ALE (STANAG 4538) including FLSU, HDL, LDL, CAST (Codan Adaptive Signalling Technology MIL-STD-188-141B ALE, MIL-STD-188-110A/B, STANAG 4539, 75 to 9600 bit/s)
Vocoder	MELPe (1200/2400 bit/s); TWELP (600/1200/2400 bit/s)
Operating temperature range	-40 to +70°C, full spec -30 to +60°C
Frequency stability	±0.5 ppm
Clarifier	10 Hz
Power source	12 V DC (10.8 to 15 V operational)
Size	Transceiver: 245 mm W x 250 mm D x 92 mm H, with battery 245 mm W x 350 mm D x 92 mm H Smart handset: 70 mm W x 210 mm L x 72 mm H
Weight	Transceiver: 2.9 kg (5.0 kg with 8 Ah NiMH battery) Smart handset: 0.3 kg
Environmental	Per MIL-STD-810F including shock, vibration, humidity, immersion (1 hr at 1 m), altitude, fungus, salt fog, sand and dust, blowing dust, and rough handling
EMC	Complies with MIL-STD-461
Cooling	Convection from case
Transceiver conformance	Exceeds or meets requirements of AS/NZS 4770:2003, CE, NTIA and FCC
Interfaces	USB (full opto-isolation) or RS232
Approximate battery life	Approx. 50 hr (13 Ah NiMH), 1:9 Tx:Rx; Approx. 65 hr (17 Ah Li-FePO4), 1:9 Tx:Rx

RF

Frequency range	Transmit: 1.6 to 30 MHz, 10 Hz steps Receive: 250 kHz to 30 MHz, 10 Hz steps Frequency Stability: ±0.5 ppm from -30°C to +60°C
Modes	USB/LSB (J3E), AM (H3E), AFSK (J2B), CW (JIA)
RF input/output impedance	Whip/long wire antenna via internal Automatic Antenna Tuner, or 50 Ω nominal
Antenna tuner	Tuning: 2.5 s typical first tune (fully automatic), 50 ms for memory recall. Last tune stored for 100 frequencies
Transmitter specifications	Power output: 25 W PEP (High)/5 W PEP (Low) selectable Duty cycle: 50% with over temperature protection Audio bandwidth: 300 to 2700 Hz (standard filter) 300 to 3000 Hz (optional 2.7 kHz BW filter)
Receiver specifications	Operating current: 120 mA typical (speaker muted) Sensitivity: 0.14 µV for 10 dB SINAD Image & IF rejection: 85 db3 Spurious response: ≥70 dB Mute: Syllabic Voice Detect Audio output: Waterproof internal speaker; 0.5 W into 8 Ω, 10% THD, External speaker on GPIO connector; 1 W into 4 Ω, 10% TH

MANPACK

2110M



CODAN
COMMUNICATIONS

FREQUENCY HOPPING

Hop rate	6 / 12 / 25 hops per second (user programmable)
Hop modes	Wideband Hopping, Band Limited Hopping, List Frequencies, ALE Link
Hopping plans	31 user selectable
Hopping keys	128-bit user programmable
Synchronisation	Internal Encryption Synchronisation Unit (ESU)

ENCRYPTION

Operating range	CES-128, 97 x programmable 16-digit keys, 4-digit PIN AES-256, 256 x programmable 256-bit keys
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Values noted are typical. Equipment descriptions and specifications subject to change without notice or obligation.