HF TRANSCEIVER
ENVOY

KEY FEATURES

- Software Defined Radio
- 100 W RF output power
- Industry leading reliability
- Handset and Console control points
- Intuitive icon based large colour display
- Multi-language user interface
- IP/Ethernet/Wi-Fi/USB connectivity
- Exceptional RF performance
- 2nd generation digital voice (TWELP)
- Standards-based
  - CCIR 493-4 based Selcall (Codan and open standard)
  - MIL-STD-188-110A/B (STANAG 4539) Data (up to 19k2 bps)
  - FED-STD-1045
  - MIL-STD-188-141B ALE (JITC Certified)
  - 3G ALE (STANAG 4538)
- AES-256/ DES-56/CES-128 Encryption
  - Secure Interlop feature
- MIL-STD-810G compliant
- Multiple point control capable
- Virtual Control Point (VCP) compatible
- XTEND smartphone app compatible
- Wide range of support peripherals
- Worldwide Codan service and support

Codan's Envoy HF Radio delivers dependable, clear, trouble-free voice, messaging and data communications, without dependence on existing infrastructure. Now with Codan's second generation Digital Voice technology, Envoy provides outstanding voice clarity in conditions where competing HF radios fail.

EXCEPTIONAL DIGITAL AND ANALOG VOICE CLARITY

Codan's second generation Digital Voice (DV) technology provides a quantum leap in voice communications. It significantly reduces the hiss, crackle, pops, and multipath effects typical of HF. The vocoders used provide voice quality experience that is similar to cellular phones, and the modem technology ensures continued operation in degraded and fading channels. An optional open protocol version of Digital Voice is also available to enable interoperability between Codan and other vendor radios.

When analog SSB mode is needed, Envoy's patented Easitalk™ DSP algorithm works to actively remove background noise and interfering tones. During transmission, Codan's TalkPower feature dynamically compresses and shapes the frequency response of the voice signal to maximise transmit power and intelligibility. A syllabic squelch only opens the speaker mute when speech signals are present to eliminate background noise.

SOFTWARE-DEFINED ARCHITECTURE

Envoy uses 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 thousands of hours of operating in the field, Envoy delivers market-leading performance and future upgradability through software updates that support evolving standards and ensure sustainability.

IP / ETHERNET / USB CONNECTIVITY

Envoy IP / Ethernet connectivity enables centralised programming, maintenance and operation of network connected stations. Envoy handsets and consoles include USB ports for convenient programming and maintenance via conventional USB cable connection or via attached memory stick.

UNPARALLELED RF PERFORMANCE

Envoy's strong RF performance is paramount to effective long range communications. Unlike many Software-Defined Radios, Envoy provides specifications superior or equal to high-end analog products. For example, to maximise range, receiver sensitivity is a massive -125 dBm, and blocking is greater than 100 dB, minimising chances of interference from adjacent stations. Envoy's transmitter is also extremely clean, with carrier, spurious and harmonics more than 65 dB below PEP. Envoy also supports connection of dual antennas for short and long range propagation.

QUICK DEPLOYMENT AND INTUITIVE OPERATION

Codan's Microsoft Windows-based TPS-3250 Radio programming software can be used to build profiles, which can be conveniently deployed via direct connection, IP or USB memory stick. Once profiled, Envoy can be easily locked down using an administrator PIN, ensuring important settings are not tampered with.

Envoy's large high-resolution, sunlight-readable colour display, and intuitive menu system makes operation similar to modern smartphones. Making calls is as simple as navigating to your contact list, locating the desired contact and pressing the "call" button. Other common actions are supported through customisable hotkeys for single or multiple step operations.

For optimal user safety, Envoy includes a dedicated Emergency key. This can be configured to automatically contact one or more stations, embedding the Envoy's GPS coordinates into the emergency signal. To minimise training burden for non-English speaking users, Envoy's user interface is also made available in a variety of other languages.

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ALE AND SELCALL CALLING CAPABILITY

The Envoy includes provision for software upgrade to the latest generation 3G Automatic Link Establishment (ALE) technology providing the user with fast linking and data capabilities. Messages, including voice messages, are transferred securely by employing link protection and data encryption. Envoy supports current calling standards including CCIR compliant Selcall, FED-STD-1045 ALE and JITC Certified MIL-STD-188-141B ALE. Envoy enables concurrent operation of different calling systems, and automatically optimises channel scan times. This ensures full interoperability with earlier generation Codan, competitor and legacy radios.

Selcall provides the capability to voice or message call an individual radio, group of radios, or broadcast to all radios. ALE also provides these capabilities, plus built-in intelligence to automatically select the optimum channel (frequency) to ensure the best chance of linking and the clearest signal. The MIL-STD ALE option adds NET calling (similar to Talkgroups), on-air Link Quality Assessment (LQA) exchange, and advanced addressing types.

Envoy's optional ALE also includes Codan Automated Link Management (CALM™). This technology is fully compatible with conventional standards-based ALE, but includes significant proprietary enhancements to improve performance. As an example, ALE LQA is internally recorded in a three-dimensional matrix against time. This results in far reduced on-air soundings and improved probability of linking. CALM™ also includes special call types including "first-in-list" for fastest possible link, and "best-in-list" for optimised data.

INTEGRAL DATA CAPABILITY

Envoy supports MIL-STD-188-110A/B high-speed data operation up to 9600 bit/s and up to 19k2 bps with the Independent Sideband (ISB) option.

The modem uses interleavers, tone-excision and turbo-decoding for optimum performance in difficult channels. When combined with Codan's STANAG 5066 compliant RC50-C Email software, email over HF can be achieved from standard SMTP/POP email clients such as Microsoft® Outlook. Emails are automatically compressed and the data rate is optimised to channel conditions.

Envoy also supports Codan's robust low-rate data modem waveform, which is compatible with our 3012 / 3212 external modems. This modem supports data operation to 2400 bit/s (typically 6000 bit/s including compression). It's available with Microsoft Windows based Email / Chat software, or can be used for custom data / telemetry applications via its standards-based AT command interface.

When combined with SprintChat/SprintNet application, the optional STANAG 3G ALE provides fast linking and data capability that is capable of exceeding the performance experienced with traditional MIL-STD-110B 2G data. Codan 3G ALE supports all radio call types, including SMS text (via SprintNet stations).

ENCRYPTION

Envoy has a choice of encryption options to suit the required level of communications security. For communications up to "top secret" classification, AES 256-bit security is available for both Digital Voice and data encryption, supported with up to 256 internally pre-programmed secure keys. Envoy has an option of a non export-controlled DES-56 encryption for digital voice and data with up to 256 secure keys.

For voice only applications, Codan's CES-128 DSP-based encryption option is available, with up to 97 16-digit user programmable keys. An additional layer of security is provided by assigning a PIN number during a secure communications session.

Both AES-256 and CES-128 options are supported by Codan's Key Management Software (KMS) application suite, which enables generation, management and deployment of keys. For convenience, keys can also be filled using a conventional USB memory stick. For basic voice security, the CIVS option provides a 32 code DSP-based scrambler.

All voice encryption options for Envoy can be activated by a single hotkey, and are fully integrated with core Radio functions like Selcall and ALE scanning to ensure simplicity of operation. Envoy can be configured to automatically set the encryptor type and key index per channel or network. This enables interoperability between Codan HF networks operating with disparate encryption types.

GPS SUPPORT

Envoy supports connection of GPS via NMEA0183 compatible GPS receivers. This enables polling and sending of GPS positions over air. Position data display format is user selectable and includes UTM, UPS and MGRS formats. Distance and bearing to other users or programmable waypoints can be displayed on an intuitive graphical display. When used with mapping software deployed mobiles vehicles can be graphically tracked.

OVER THE AIR WAYPOINTS

The user interface facilitates straightforward sharing of waypoints over the air with other users. The message call mechanism provides an intuitive method to select, include and transmit multiple waypoints from the waypoint list. Upon receiving a message call containing waypoints, the waypoints can be saved to the waypoint list, and also used for immediate distance & bearing plots. This feature greatly simplifies the process of sharing and tracking geo-location information amongst a group of radio users.

VERSATILE DESIGN FOR MOBILE, BASE AND COMPLEX SYSTEMS

Envoy is designed using a modular approach, with a handset for mobile applications and a desk console for bases. The use of IP over Ethernet enables geographical separation of radio and console, without the need for expensive adaptor devices. Envoy can also be supplied in rapidly deployable cases.

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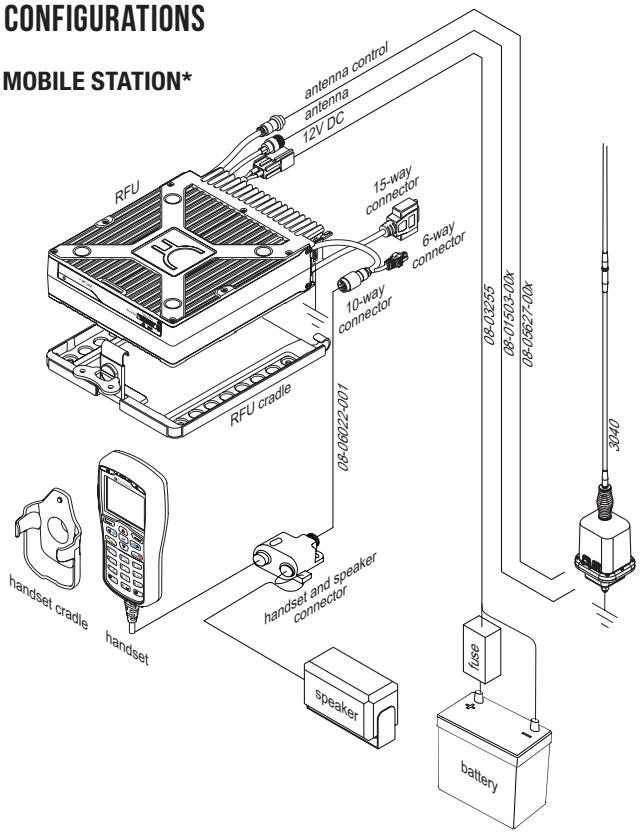
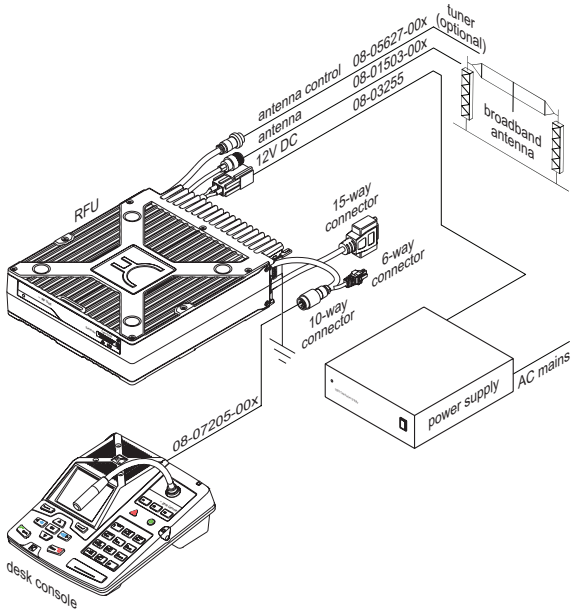
FEATURE	MODELS	
	ENVOY X1	ENVOY X2
Channels/Scan groups	400/20	1000/10
Contact list entries	250	500
GPS calling	Standard	Standard
Accessory serial port	N/A	Standard
Data modem	N/A	Optional
ALE	FED-STD (Optional)	FED/MIL-STD/3G ALE (Optional)

CONFIGURATIONS

MOBILE STATION*



BASE STATION*



*Note both diagrams represent typical configurations.

SOFTWARE APPLICATIONS

- TPS-3250 Radio Programming Software
- Radio Tracking Software (RTS)
- RC50-C Email (for high-speed modem)
- Codan Chat (for robust low rate modem)
- SprintChat and SprintNet

ANTENNAS

- 3040 Automatic Antenna Tuner
- 9300 Automatic Antenna Tuner
- 9320 Automatic Antenna Tuner
- 3049 Base Antenna Tuner
- 9390 Tuned Dipole base antenna
- 3048 Tuned Dipole base antenna
- 3240 1kW base antenna tuner
- Wide range of broadband base antenna solutions

ACCESSORIES

- 500 W/1 kW High Power Amplifiers
- 3033 Telephone Interconnect
- Dual-port Antenna Selector
- Vehicle installation kit (including dash-mount)
- Handset cradle mount
- Satellite/cellular modem for Codan Convoy
- 2240 Smartlink
- XTEND Smartphone app
- Virtual Control Point

LANGUAGE SUPPORT

- English
- Spanish
- Russian
- French
- Arabic
- Dari
- Pashto
- Portugese
- Polish

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SPECIFICATIONS

GENERAL

Channels and Scanning	Up to 1000 simplex or semi-duplex. Up to 20 scan groups. Simultaneous scanning for Selcall (ALE/CCIR) and voice. Dwell time 125 ms to 9.9 s, adjustable
Contacts List	Up to 500 entries
SDR processing architecture	DSP: 456 MHz, 32-bit. FPGA: 500,000 gate. MCU: ARM9, 300 MHz, 32-bit
Interfaces	USB (via Handset or Console). Serial RS232 (supports NMEA-0183 GPS). Ethernet (TCP/IP, supports remote control). Auxiliary GPIO (audio in/out, PTT, RS232) on Envoy X2 model
Audio response	Less than 3 dB variation from 300 Hz to 3 kHz (with optional 2.7 kHz filter)
Compliance	CE, FCC, IC, AS/NZS 4770:2000, AS/NZS4355:2006
Temperature range and Humidity	–30 to +60°C; 95% RH maximum, non-condensing

RF

Frequency range	**Tx:** 1.6 to 30 MHz; Rx: 250 kHz to 30 MHz **Frequency stability:** ±0.3 ppm from –30°C to +60°C
Modes	Single sideband (J3E), USB/LSB, ISB (B7D or B2B) AM (H3E), CW (J2A, J2E), AFSK (J2B), FSK (J2D, F1B), Digital Voice and Data (G1D) (software defined)
Output power	100 W PEP ±1 dB (two-tone or voice), user-programmable in 1 W steps (low/medium/high)
Duty cycle	100% Voice/Data with optional Fan
RF output impedance	50 Ω
Filter bandwidths	2.4 kHz standard (500 Hz, 2.7 kHz, and 3 kHz optional)
Transmitter specifications	**Spurious and harmonic emissions:** Better than <69 dB below PEP **Intermodulation products:** 40 dB below PEP **Carrier suppression:** Better than 65 dB below PEP **Sideband suppression**: 70 dB below PEP
Receiver specifications	**Sensitivity:** 0.12 µV, –125 dBm for 10 dB SINAD **Selectivity:** >70 dB at –1 kHz and +4 kHz ref SCF USB **Blocking:** >100 dB at ±50 kHz I**mage rejection:** >95 dB **Spurious response:** >85 dB **Intermodulation:** Unwanted signal >92 dB below desired signal **Intercept point:** +38 dBm
Switching speed	<25 ms (Tx:Rx or Rx:Tx)

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

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SPECIFICATIONS

ELECTRICAL AND MECHANICAL

Operating range	10.8 to 15 V DC (12 V Nominal)
Supply current	**Rx:** 500 mA (backlight min, audio muted) **Tx:** Two-tone 12.5 A typical, average speech 8 A
Protection	Over-voltage/under-voltage/over-temperature/reverse polarity
Size and weight	**2210 RF Unit:** 210 x 270 x 65 mm (8.3 x 10.6 x 2.6 in) 2.8 kg (6.2 lb) **2220/1 Handset:** 75 x 32 x 151 mm (3.0 x 1.3 x 5.9 in) 0.3 kg (0.7 lb) **2230 Console:** 190 x 228 x 79 mm (7.5 x 9.0 x 3.1 in) 1.1 kg (2.4 lb)
Ingress protection	MIL-STD-810G method 510.5
Environmental standards	MIL-STD-810G (Dust, Shock, Vibration, Humidity, Fungus, Altitude)

OTHER

Data modem (robust low rate)	CHIRP/QPSK, 2400 bit/s (up to 6000 bit/s using in-built compression)
Data modem (high speed)	MIL-STD-188-110A/B, STANAG 4539, 75 to 19200 bit/s
Encryption	CES-128, 97 x programmable 16-digit keys, 4-digit PIN (Voice only) AES-256, 256 x programmable 256-bit keys (Voice/Data) DES-56, 256 x programmable 56-bit keys (Voice/Data, non export-controlled)
Vocoder	MELPe (1200/2400 bit/s); TWELP (600/1200/2400 bit/s)
Vocoder (open protocol)	TWELP (600/700/1200/2400 bit/s) Note: Actual vocoder rate combinations are dependent on other Export/Non-export controlled capabilities that may also be enabled

PRODUCT TYPE NUMBER

Product type numbers	RF Unit: 2210, Full Handset: 2220, Limited Key Handset: 2221, Console: 2230

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ENVOY radio's Export Commodity Classification (ECCN) under the Commerce Control List (CCL) is 5A002.a

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