



Technical Specifications

DSP 9000 Handset

DSP 9000 Key Generator Design

Highly non-linear

DSP 9000 Key Generator

Local Key
Network Key
System Key
Initialization Vector

Total Key Diversity

Excluding IV: 1.54×10^{99}
Including IV: 1.01×10^{104}

Internal Key Storage

Local keys:

- Two independent keybanks of 100 keys (200 total)
- Stored in EEPROM

Network key (also in EEPROM)

System keys – maintained in an EPROM device

IVs – Generated in software at each PTT sync actuation

All keying materials under end-customer's control and management

Key Fill Device Support

SmartModule — stores one or both Keybanks

Enhanced Domain Transform (EDT) Processing

Cryptographically-controlled

Three distinct DSP-based audio manipulations

Retains 3kHz bandwidth containment

Environmental & EMI/EMC

Operational temp: -20°C to $+60^{\circ}\text{C}$ (Methods 502.2(P.II); 501.2 (P.II))

Storage temp: -40°C to $+85^{\circ}\text{C}$ (Methods 502.2(P.I); 501.2 (P.I))

Humidity: MIL-STD-810D, Method 507.2 (Proc. III)

Immersion: MIL-STD-810D, Method 512.1 (Proc. I)

Vibration: MIL-STD-810D, Method 514.3 (Proc. I)

Shock: MIL-STD-810D, Method 516.3 (Proc. I)

EMI: MIL-STD-461C, (CE01/CE03/CS02/CS06/RE02/RS02)

Frequency Offset Synchronization Recovery Range:

$\pm 120\text{Hz}$

Frequency Reference / Control: TCXO Crystal Oscillator

Synchronization Method

Frequency shift keying: In-band sync burst: 74-bits

- Single path autonomous (simplex) 'PTT sync' mode
- Sync burst transmitted at each PTT
- Cryptographically authenticated sync bursts (16-bit MAC)

Audio Channel Bandwidth Requirement (Minimum / Optimum)

400Hz to 2,500Hz (3dB) / 200Hz to 2,800Hz (3dB)



Black (Encrypted Audio) Interface

Handset Connector (6-pin circular MIL-C-55116 circular)

SmartModule-Programmable, Audio Amplitude Range Selection:

- Transmit -42.5dBm to $+7.5\text{dBm}$ (selectable in 2.5dB steps)
- Receive -38.0dBm to $+8.0\text{dBm}$ (selectable in 2dB steps)

Controls & Audible Indicators

Plain/ Cipher mode toggle switch

- Large 90° throw lever with excellent positional tactile feel

Keypad – 21 push-button switches (3 x 7 array):

- Volume settings
- Key Erase
- Key / Keybank (manually executed changes)
- Manual Keypad Local (or Network) Key Entry
- Key Fill and Configuration SmartModule load execution
- Test Key selection / de-selection
- Built-In Test execution

Audio Prompts:

- Plain mode warning tone
- Test key on warning tone
- Key/keybank change tones
- Various alarm / error / warning tones

Key Management

Symmetric / black (encrypted) manually distributed Local Keys
TCC automated Crypto Management System (CMS-9000)

Physical Design

Rugged, high impact plastic and aluminum enclosure

Lightweight: 0.48kg / 1.05 pounds (less attached cord)

DC Prime Power

9V to 36VDC @ 0.75Watt (nominal)

Other

Half duplex

Select Call mode —allows the radio operator to selectively send a ciphered transmission to only one receiving decryptor, creating a point-to-point secure radio link

DSP 9000 Base



DSP 9000 Key Generator Design

Highly non-linear

DSP 9000 Key Generator

Local Key
Network Key
System Key
Initialization Vector

Total Key Diversity

Excluding IV: 1.54×10^{99}
Including IV: 1.01×10^{104}

Internal Key Storage

Local keys:

- Two independent keybanks of 400 keys (800 total)
 - Stored in battery-backed, anti-tamper protected RAM
- Network key (also in battery-backed RAM)
System keys – maintained in an EPROM device
IVs – Generated in software at each PTT sync actuation

All keying materials under end-customer's control and management

Key Fill Device Support

SmartModule — each stores half keybank

Enhanced Domain Transform (EDT) Processing

Cryptographically-controlled
Three distinct DSP-based audio manipulations
Retains its original 3kHz audio channel bandwidth

Analog-encoded Data Security

Data mode supports up to 1,200 bps modem data exchanges

Available Configurations

Half duplex

Full duplex:

- A rear radio connector version is also available
- Half duplex/radio airborne
Remote control unit
TX impedance compensator module

Environmental & EMI/EMC

Operational temp: -20°C to +70°C (Methods 502.2(P.II); 501.2(P.II))
Storage temp: -40°C to +85°C (Methods 502.2(P.I); 501.2(P.I))
Humidity: MIL-STD-810D, Method 507.2 (Proc. II)
Vibration: MIL-STD-810D, Method 514.3 (Proc. I)
Shock: MIL-STD-810D, Method 516.3 (Proc. I)
EMI: MIL-STD-461C, (CE01/CE03/CS02/CS06/RE02/RS02)

MTBF

Exceeds 10,000 hours (per MIL-STD-756)

Frequency Offset (HF-SSB): Synchronization recovery range $\pm 120\text{Hz}$

Frequency Reference / Control

Highly accurate/stable crystal oscillator
Continuous secure call time: 40 min. (typical)

Synchronization Method

Frequency shift keying: In-band sync burst: 74-bits

- PPT sync (simplex/single path autonomous: broadcast)
- Manual dual retrosync (two party, bi-directional)
- Manual single sync (shared sync: broadcast)

Audio Channel Bandwidth Requirement (Minimum / Optimum)

400Hz to 2,500Hz (3dB) / 200Hz to 2,800Hz (3dB)

Red (unencrypted Audio) Interfaces

Handset connector (standard 5-pin/6-pin MIL circular)
Radio connector (600 balanced: 19-pin MIL circular)

- Mic_Source_Select (menu set: RADIO or HANDSET)
Range: -50 dBm to +7 dBm (selectable in 1dB steps)

Black (Encrypted Audio) Interface

Radio connector (600 balanced: 19-pin MIL circular)
Range: -50 dBm to +7.0 dBm (selectable in 1dB steps)

Remote Control Interface (crypto status and operational controls)

Radio connector via discrete 5V logic & PTT_In/PTT_Out

Displays/Indicators

Front panel display, cover protected: 2-line by 16 character LCD

Audio input overdrive LED: services both transmit and receive paths

Key Management

Symmetric / black (encrypted) manually distributed Local Keys
TCC automated Crypto Management System (CMS-9000)

Physical Design

Rugged, heavy gauge extruded aluminum enclosure
Front panel latched cover (protects LCD; keypad; and key fill port)

Anti-tamper: Network and Local Keys zeroized when case is opened

Standard 19" rack mount with optional mounting tray

DC Prime Power

9V to 32VDC
1-watt (nominal) half duplex
2-watts (nominal) full duplex

Other: Optional Select Call mode