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: $1.54 \times 10^{99}$
Including IV: $1.01 \times 10^{104}$

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: -20ºC to +60ºC (Methods 502.2(P.II); 501.2 (P.I))
Storage temp: -40ºC to +85ºC (Methods 502.2(P.I); 501.2 (P.I))
Humidity: MIL-STD-810D, Method 507.2 (Proc. III)
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:
±120Hz

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 +7.5dBm (selectable in 2.5dB steps)
- Receive -38.0dBm to +8.0dBm (selectable in 2dB steps)

Controls & Audible Indicators
Plain/Cipher mode toggle switch
- Large 90º 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
Technical Specifications

**DSP 9000 Base**

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

**Frequency Offset (HF-SSB):** Synchronization recovery range ±120Hz

**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
- 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

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**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 x 10^99
- Including IV: 1.01 x 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

**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)

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