TVS-2 Hopping Code Scrambler

TVS-2™

High-Level Hopping Code Scrambler

Midian's TVS-2 is a high-level tactical voice scrambler that protects two-way radio communications from eavesdropping by casual and determined listeners. By using true frequency hopping rather than frequency sweeping, the TVS-2 provides the highest level of rolling code voice privacy.

The TVS-2 is protecting communications worldwide in systems for Armed Forces, Intelligence Services, Public Safety (Police, Fire, Ambulance), Fleets (Taxi, Towing, Fishing, etc.), Industrial and Utility users.

The TVS-2 radio encryption can be installed into virtually any model of two-way radio and into most any type of radio system. In fact, Midian supports many radios from the most popular radio manufacturers with plug-in modules.

Applications

Midian's voice scramblers can be used to protect communications for:

Public Safety: Police, Fire and Ambulance (HIPAA)

Government: Armed Forces and Homeland Security

Fleets: Taxi, Towing, Fishing, etc

Utilities: Electrical, Water and Gas

Industrial: Mining, Chemical, etc.

Shown: TVS-2

Features

Security: The TVS-2 offers 5 user-programmable levels of security, including 4 hop rates and voice inversion.

- Level L4: 12-25 hops per second
- Level L3: 6-12 hops per second
- Level L2: 1.2-2.4 hops per second
- Level L1: 0.8-1.2 hops per second
- Voice Inversion (Dual Mode Option Only)

Voice Quality: Midian's TVS-2 provides excellent voice quality and speaker recognition between scrambled and clear audio.

Plug-In Modules: Midian offers plug-in modules for Icom, Kenwood, Motorola, Tait and Vertex radios. For radios without an options connector, Midian's TVS-2 will wire into the radio. Midian offers many application notes for installation into various radios.

Midian's Kryptic Signaling: Midian's Kryptic is a digital form of signaling that offers the following features when used with Midian's CAD-300 and DDU-300:

- ANI & Emergency ANI
- Selective Calling
- Radio Kill
- Spy
- Radio Check
- Over-The-Air-Reprogramming (OTAR) of the security keys

Use in Most Systems: Midian's TVS-2 can be used in conventional, trunked and voted systems. For HF and simulcast systems Midian recommends using the VS-1200 or VS-1100 scramblers.

Automatic Detection: The TVS-2 can be programmed to automatically detect scrambled and clear conversations. This eliminates the need for the receiving radio's operator

TVS-2: General Specifications

Operating Voltage	Varies on Module
Operating Current	< 9 mA
Operating Temperature	-30 to +60 C
RX Input Level	Varies on Module
TX Input Level	Varies on Module

TVS-2: Security Specifications

Total Code Combinations	+40 Trillion
Security Keys	+4 Billion
System ID's	10,000
# of Selectable Keys	4
Rolling Code Type	Hopping
Minimum Length of Hop	300 Hz
Export Controls	Minimal

TVS-2: Kryptic Signaling Specifications

ANI	0000-9999
Emergency ANI	Yes
Status	00-99
Location	100 (10 x 10 grid)
Selective Calling	Yes
OTAR of Security Keys	Yes
Radio Kill	Yes
Spy	Yes

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Hopping versus Sweeping Rolling Code Scramblers: Midian's TVS-2 uses the hopping type of rolling code scrambling, instead of the sweeping type, for higher security. Both types of scramblers claim a certain number of hops per second. Sweepers imply a higher level of security because they "hop" hundreds of times per second. However, it is the length of the hop that is important rather than the number of hops per second. Each "hop" of a sweeper is approximately 1 Hz in length whereas each hop of a true hopping scrambler is at least 300 Hz. Therefore it would take ~300 hops of a sweeper to equal the change of a true hopper in one hop. Because of the negligible frequency change of a sweeper, sweepers are susceptible to attack by tracking the sweeping with a phase lock loop (PLL) circuit.

Midian's Frequency Hopper

MAX   Inversion Frequency

Time

MIN   Notice the discontinuous random jump & random dwell

Competitive Frequency Sweepers

MAX   Inversion Frequency

Time

MIN   Notice the continuous non-broken frequency sweep