

FEATURES & BENEFITS:

- AES-256 Encryption
- Vocoder (600 – 2400 bps) TWELP* or MELPe**
- AUTO Data Rate Change
- Best-in-class Voice Modem
- Assured Voice Clarity
- Extended Range
- Low Power Consumption

EVALUATION KIT AVAILABLE

An evaluation kit is available to provide a reference for testing and familiarisation.

SECURE VOICE & DATA

Beyond-Line-Of-Site (BLOS) communication is vulnerable to eavesdropping due to the vast areas covered. Radio makers can provide a means to secure communications by integrating RapidM **EF-256** Embedded Functions for Secure Voice and Data into new and existing transceiver designs.

EF-256 is intended for integration into radio transceivers and other communication device. These embedded functions are suitable for commercial, industrial, governmental, security, paramilitary and even military communication systems. The Secure Voice & Data Embedded Functions brings high-end digital radio capabilities to any radio design.

LOW RATE VOCODER

The internal Vocoder digitizes the voice. The data is encrypted and converted to an in-band signal by the built-in high performance modem. The Vocoder dramatically improves voice quality in adverse channel conditions, extending the range of voice communications.

AES-256 ENCRYPTION

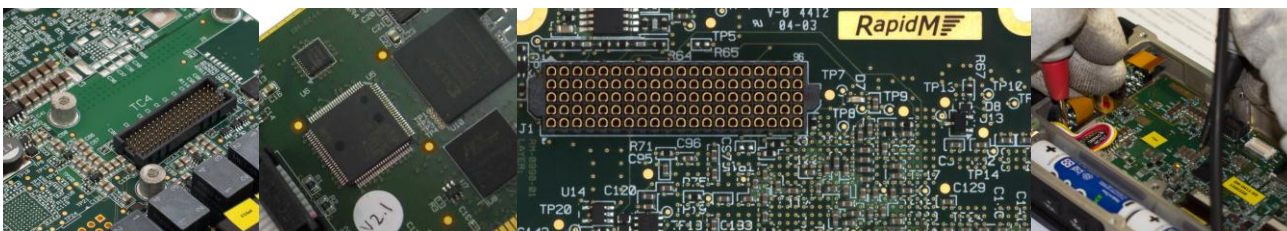
Built-in AES encryption means that all digital voice and data communications are secured by a trusted algorithm.

AUTOMATIC DATA RATE SELECTION

The SDV function has AUTO DRC (Data Rate Change) capability. The optimal transmission data rate is automatically selected based on current channel conditions.

LOW-RATE SECURE DIGITAL VOICE			
BANDWIDTH:	3 kHz	MODULATION:	BPSK, CA
DATA RATES [bps]:	2400	1200	600
LATENCY [ms]:	450	1400	1400

* TWELP voice coding by DSP Innovations Inc.(www.dspini.com)
** MELPe for US customers only



EF-256: AES-256 ENCRYPTION & LOW RATE VOCODER (HF & V/UHF)

ENCRYPTION				
ALGORITHM & KEY LENGTH	Advanced Encryption Standard (AES); 256-bit Key Length			
KEY STORAGE	Up to 256 keys; Keys are securely stored (encrypted). Zeroize function to permanently erase all stored keys.			
KEY FILL	Key Management System (PC Application) or RAP1 control protocol			
ENCRYPTED TRAFFIC	HF Digital Voice HF Modem Data HF 3G Packet Data	V/UHF Digital Voice V/UHF Modem Data		
DIGITAL VOICE				
VOCODER	MELPe: TWELP:	Mixed Excitation Linear Prediction enhanced (US & NATO end-users, subject to approval) Tri-Wave Excited Linear Prediction. (TWELP voice coding by DSP Innovations Inc. www.dspini.com)		
MODEM	HF-2:	RapidM proprietary digital voice modem. Insures tight coupling between vocoder, encryption and modem.		
PERFORMANCE	VOCODER RATE [BPS]	LATENCY [ms]	PESQ	CHANNEL USE
	2 400	450	3.1	Gnd/W
	1 200	1400	2.9	Sky/W
	600	1400	2.4	Sky/W
SPEECH QUALITY	SDV Performance on a Gaussian Channel (Groundwave & Line-of-Sight)			
	<p>The graph shows Intelligibility (Y-axis: Unusable, Just Usable, Difficult, Acceptable, Good, Very Good, Excellent) versus SNR (X-axis: -6dB to +15dB). TWELP 2400bps (blue) shows the highest performance, reaching 'Excellent' at +6dB. TWELP 1200bps (green) reaches 'Good' at +3dB. TWELP 600bps (purple) reaches 'Acceptable' at 0dB.</p>			
SPEECH QUALITY	SDV Performance on a CCIR Poor Channel (Skywave)			
	<p>The graph shows Intelligibility (Y-axis: Unusable, Just Usable, Difficult, Acceptable, Good, Very Good, Excellent) versus SNR (X-axis: -6dB to +15dB). TWELP 2400bps (blue) reaches 'Very Good' at +12dB. TWELP 1200bps (green) reaches 'Good' at +9dB. TWELP 600bps (purple) reaches 'Acceptable' at +6dB.</p>			

HF DATA MODEM & ALE CONTROLLER OPTIONS

HF DATA MODEM M4	MODULATION	DATA RATES & CHARACTERISTICS
MIL-STD-188-110B App C	PSK/QAM	[3200, 4800, 6400, 8000, 9600 bps] (Coded)
STANAG 4539	PSK/QAM	[75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps] (Coded)
MIL-STD-188-110B	PSK/QAM	[75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, bps] (Coded)
MIL-STD-188-110A § 5.3	PSK	[75, 150, 300, 600, 1200, 2400 bps] (Coded), 4800 bps
STANAG 4415	PSK	NATO robust: 75 bps (Coded)
2G ALE	MIL-STD-188-141C App A, App B Compliant	
3G ALE (S4538 FLSU)	STANAG 4538 Compliant	
PACKET MODEM (S4538 xDL)	Low-Latency Data Link, reliable packet transfer LDL-32, LDL-64, LDL-96, LDL-128, LDL-160, LDL-192, LDL-224, LDL-256, LDL-288, LDL-320, LDL-352, LDL-384, LDL-416, LDL-448, LDL-480, LDL-512.	
	High-rate Data Link, reliable packet transfer HDL-3, HDL-6, HDL-12, HDL-24.	

BUNDLE VARIANTS

EMBEDDED FUNCTION BUNDLE VARIANTS			AES DATA MODEM			AES DIGITAL VOICE	
			ADM	ADM & 2G	ADM & 3G	ADV	ADV & 3G
ENCRYPTION	AES-256		✓	✓	✓	✓	✓
DIGITAL VOICE	Low-Rate Vocoder & Modem					✓	✓
2G	ALE	2G ALE (Datasheet Available)		✓			
	DATA	HF Modem (M4) (Datasheet Available)	✓	✓			
3G	ALE	3G ALE (S4538 FLSU) (Datasheet Available)			✓		✓
	DATA	Packet Modem (S4538 xDL) (Datasheet Available)			✓		✓
HARDWARE	TC2 or TC4-LP (Datasheet Available)		✓	✓	✓	✓	✓

ORDERING INFORMATION – INCLUDING TC2 HARDWARE	STOCK NUMBER	DESCRIPTION
Embedded AES Data Modem (incl. TC2)	TC2-CF-M400CAES	EMB FUNC: AES-256 Modem on TC2
Embedded AES Data Modem & 2G ALE (incl. TC2)	TC2-CF-M42GCAES	EMB FUNC: AES-256 Modem, 2G on TC2
Embedded AES Data Modem & 3G ALE (incl. TC2)	TC2-CF-3D3GCAES	EMB FUNC: AES-256 Modem, 3G on TC2
Embedded AES Digital Voice (incl. TC2)	TC2-CF-LV00CAES	EMB FUNC: AES-256 Low-R Voc on TC2
Embedded AES Digital Voice & 3G ALE (incl. TC2)	TC2-CF-LV3GCAES	EMB FUNC: AES-256 Low-R Voc, 3G on TC2
TC2 Eval. Kit (Carrier Card, Break-out Cable, PSU)	TC2-EV-0011-SPC	Bundle: TC2 Eval Kit (TC2 excl.) V01
ORDERING INFORMATION – INCLUDING TC4-LP HARDWARE	STOCK NUMBER	DESCRIPTION
Embedded AES Data Modem (incl. TC4-LP)	TC4-CF-M400CAES	EMB FUNC: AES-256 Modem
Embedded AES Data Modem & 2G ALE (incl. TC4-LP)	TC4-CF-M42GCAES	EMB FUNC: AES-256 Modem, 2G
Embedded AES Data Modem & 3G ALE (incl. TC4-LP)	TC4-CF-3D3GCAES	EMB FUNC: AES-256 Modem, 3G
Embedded AES Digital Voice (incl. TC4-LP)	TC4-CF-LV00CAES	EMB FUNC: AES-256 Low-Rate Vocoder
Embedded AES Digital Voice & 3G ALE (incl. TC4-LP)	TC4-CF-LV3GCAES	EMB FUNC: AES-256 Low-Rate Vocoder, 3G
TC4-LP Eval. Kit (Carrier Card, Break-out Cable, PSU)	TC4-EV-0000-SPC	Bundle: TC4 Eval Kit (TC4 excl.) V02

Note: EF-256 requires an export license. Please consult RapidM for details.

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