

(Actual Size)

### KEY FEATURES:

- Low cost installation (Hardware)
- Activation keys unlock software
- Fast Link Setup (FLSU)
- Packet Data (xDL)
- Linking Protection
- Link Quality Assessment
- Radio Control
- Multiple Channel Operation
- STANAG compliance
- Low power consumption (1 W)
- Compact size (33 x 55 x 8 mm)
- Single 100-way connector
- Evaluation kit available
- LF & HF Modem Option (Datasheet Avail.)

### THIRD GENERATION HF

3G ALE is the best choice for interoperating advanced HF data and voice services, especially in adverse channel conditions.

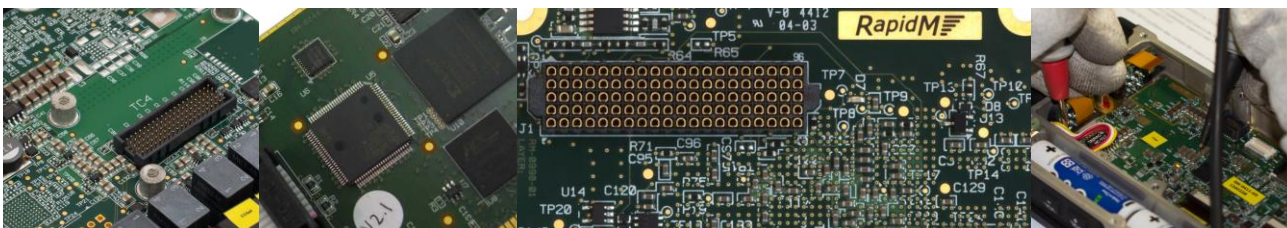
3G ALE software options offers Fast Link Setup (FLSU) and Packet Data (xDL) which can be combined with LF & HF Modem Options (M1 – M4).

### PACKET DATA

The xDL option offers a very adaptive robust packet data modem with very effective ARQ, especially for penetration of noisy and congested channels.

### LINK SETUP

In a single channel environment, 3G ALE offers very robust selective calling in support of data applications and voice. The 3G engine is even more effective in a multi-channel environment with increased effective bandwidth. 3G ALE offer more robust link setup compared with 2G ALE.



PRIMARY INTERFACES*	USE	DETAILS
UART 1	Data, Config, Control, Radio Control, or Raw Data (option)	Rate: 4800 to 115200 bps Electrical: 3.3V LVTTTL Flow Control (Raw data only): CTS/RTS, XON/XOFF
UART 2	Radio Control (Transceiver Protocol), or Remote Control (when UART1 is Raw Data)	Rate: 4800 to 115200 bps Electrical: 3.3V LVTTTL Flow Control: None
CODEC 1	Baseband Audio USB (Analogue)	Tx (output): 40 Ω unbalanced 2.0 V p-p Rx (input): 10 kΩ unbalanced 1.5 V p-p
CODEC 2	Baseband Audio LSB (Analogue)	Tx (output): 40 Ω unbalanced 2.0 V p-p Rx (input): 10 kΩ unbalanced 1.5 V p-p
McBSP 0	Data, Config, Control (option)	Synchronous serial I/F McBSP port
McBSP 1	Digital Baseband Audio (option)	Synchronous serial I/F McBSP port
DISCRETE OUTPUT	Radio Keyline	Active high
DISCRETE INPUTS	Radio PTT Sense PPS (GPS Time Sync.) Reset / Power Down	Active low Rising edge Active low
SPEED SELECT	Power Saving (Optional)	[3:0], Active low
POWER	Supply	3.3 V DC

\* All TC4 interfaces via a single 100-way fine pitch connector (Samtec YFT-20-xx-H-05-SB).

STANAG 4538 FAST LINK SETUP (FLSU)	
FLSU PROTOCOL	Excellent performance in degraded HF channels by means of robust burst waveforms. Automatic channel selection. Synchronous and asynchronous link set up. Point-to-point, multicast and broadcast calls. Combined or separate calling and traffic channels. Combined and simultaneous link set up and traffic set up. Channel quality estimation by means of LQA sounds and LQA exchanges. Handover to circuit data waveform or voice.
LINKING PROTECTION	SoDark 3 and 6 Time-of-day distribution by HF means, as a backup to GPS time-of-day distribution.
WAVEFORMS	BW1, BW2, BW3, BW4, BW5, BW6 and BW7 according to STANAG 4538. Doppler lock and track (capture range up to +/- 100 Hz, configurable) Adaptive multi-path tracking (up to 10 ms spread, for FLSU & LDL) Linking probability performance 2-3dB better than MIL-STD-188-141C specification
OCCUPANCY DETECTION	Occupancy detection (listen before transmit) in accordance with STANAG 4538 MS 110A/B, STANAG 4539 / MS 110B, MS 110A, S4415 S4285, FSK, ALE 2G (8-FSK), SSB voice

STANAG 4538 xDL PACKET MODEM	
GENERAL	Integrated with STANAG 4538 FLSU (Required)
LDL	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.
HDL	High-rate Data Link, reliable packet transfer HDL-3, HDL-6, HDL-12, HDL-24.

GENERAL	
STANDARD	STANAG 4538 Compliant
INTEROPERABILITY	Tested
CONFIGURATION & CONTROL	Protocol: RAP1/RIPC (RapidM Proprietary). Persistent configuration (via EEPROM (last MIB), via FLASH (MIB presets)).

RADIO CONTROL	
PROTOCOL	RAP1/RIPC (integrated with modem control), or Transceiver Protocol (custom implementation possible)

INSTALLATION	
SIZE	33 x 55 x 8mm (w x d x h)
POWER	3.3V DC, <= 1 W (typ.)

ENVIRONMENTAL	
TEMPERATURE	-40°C to +85°C (operating) -40°C to +90°C (storage)

ORDERING INFORMATION	STOCK NUMBER	DESCRIPTION
TC4 HARDWARE	TC4-5A-M-M0-5.3	Module: M0 V5A (B/loader only) V5.3
HARDWARE ACTIVATION (REQUIRED)	TC4-5A-HWAC-KEY	Key: TC4 H/W Activation (Required)
3G ALE FLSU SOFTWARE OPTION	TC4-SW-O-3G-5.3	SW MDL-3G ALE 4538 FLSU, Rad. Ctrl V5.3
3G ALE xDL SOFTWARE OPTION	TC4-SW-O-3D-5.3	SW MDL-3G ALE 4538 xDL Pckt Modem V5.3

OTHER TC4 SOFTWARE OPTIONS*	STOCK NUMBER	DESCRIPTION
HF MODEM M1	TC4-SW-O-M1-5.3	SW MDL-M1 (HF 110B, F ISB 2x9600) V5.3
HF MODEM M2	TC4-SW-O-M2-5.3	SW MDL-M2 (HF S4285, S4539 9600) V5.3
HF MODEM M3	TC4-SW-O-M3-5.3	SW MDL-M3 (HF 110A, 4415 2400 ) V5.3
HF MODEM M4	TC4-SW-O-M4-5.3	SW MDL-M4 (HF MdM S4539 9600 bps) V5.3
2G ALE (MIL-STD-188-141B)	TC4-SW-O-2G-5.3	SW MDL-2G ALE / MS 141B, App. A, B V5.3
V/UHF MODEM V1 (24 kHz)	TC4-SW-O-V1-5.3	SW MDL-V1 (VHF B≤24kHz ≤96000 bps) V5.3
V/UHF MODEM V2 (12 kHz)	TC4-SW-O-V2-5.3	SW MDL-V2 (VHF B≤12kHz ≤48000 bps) V5.3

\* Contact RapidM for Datasheets

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