

(Actual Size)

FEATURES & BENEFITS:

- **2G ALE:** MIL-STD-188-141B/C App A & B
- **Linking Protection:** MIL-STD-188-141B/C App B
- **Link Quality Assessment:** LQA
- **Radio Control:** Transceiver Protocol
- **Low Cost:** Hardware Installation
- **Activation Keys:** Unlock Functionality
- **Low Power:** 600 mW (typical)
- **Compact Size:** 33 x 55 x 6 mm

OTHER SOFTWARE OPTIONS (DATASHEETS AVAILABLE):

- **HF Modem:** Up to 9 600 bps SSB, 19 200 bps ISB
- **MIL-STD 110C Modes:** 32,000 bps in 6 kHz
- **3G ALE:** STANAG 4538 FLSU & xDL Packet Data
- **VHF / UHF Modem:** Up to 64 000 bps (15 kHz)

AUTOMATIC LINK ESTABLISHMENT

The *TC4* offers massive enhancement of radio capabilities with minimal integration cost.

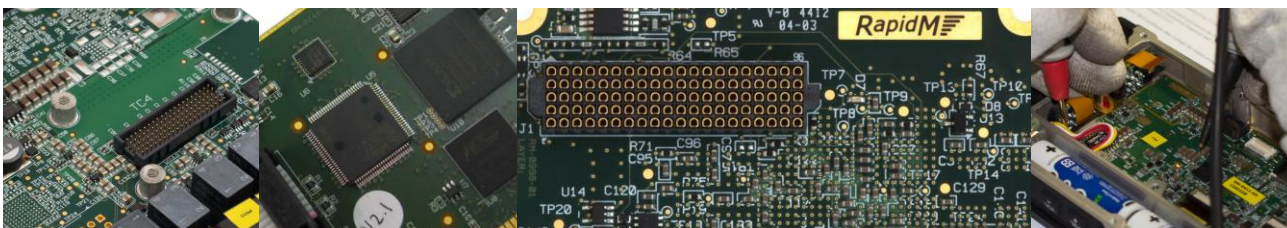
The 2G ALE controller is available as a software option for the *TC4*. 2G ALE can be combined with LF & HF Modem Options (M1 – M4).

NO OPERATOR INTERVENTION

Embedded ALE allows linking with other HF stations without operator intervention. A number of frequencies can be used to overcome variable HF propagation conditions.

Backward Compatibility

The *TC4* 2G ALE Software Option allows new transceiver designs backward compatibility with legacy HF radio systems.



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).

AUTOMATIC LINK ESTABLISHMENT	
STANDARD	MIL-STD-188-141C App A, App B Compliant
WAVEFORMS	8-FSK according to MIL-STD-188-141C App A. & FED-STD 1045 Doppler lock and track (capture range up to ± 100 Hz, configurable) Adaptive multi-path tracking, Soft Golay decoding Adaptive triple word-phase synchronization, lock and track Linking probability performance 2-3 dB better than MIL-STD-188-141C specification No LP mode degradation Concurrent operation with other RM waveforms
PROTOCOL	Calling (IND, GRP, NET, All, Any, Wildcard Call), UUF, AMD, DTM(with or without CRC), (excluding: DBM, AQC-ALE) Calling POLLING, INLINK, RELINK (ALM support commands) Link Quality Analysis (LQA), Scanning (2 or 5 channels per second), Auto Sounding Automatic Hand-Off to internal Modem
OCCUPANCY DETECTION	Traffic: MS 110A/B, S4539, S4285, S4415, S4529, S4481, 8-FSK, SSB Voice Duration: Variable

LINKING PROTECTION	
STANDARD	MIL-STD-188-141C App B FED-STD 1049
PROTECTION LEVEL	AL-0 (Clear) AL-1 AL-2
TIME SYNCHRONISATION	GPS as Time Source Time Exchange Protocol (Over the Air)
KEY STORAGE	2 x 32 LP Keys
KEY SELECTION	Manual Auto Advance (Daily)

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)
2G ALE SOFTWARE OPTION	TC4-SW-O-2G-5.3	SW MDL-2G ALE / MS 141B, App. A, B 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
3G ALE (STANAG 4538) FAST LINK SETUP	TC4-SW-O-3G-5.3	SW MDL-3G ALE 4538 FLSU, Rad. Ctrl V5.3
3G ALE (STANAG 4538) xDL PACKET DATA	TC4-SW-O-3D-5.3	SW MDL-3G ALE 4538 xDL Pckt Modem 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

Distributed by:

Rapid Mobile Pty (Ltd)
Tel: +27 12 349 0000
Fax: +27 12 349 0010
Email: info@rapidm.com
Web: www.rapidm.com

Apex Corporate Park
Quintin Brand Street
Perseuor Park
Pretoria, South Africa
0020



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