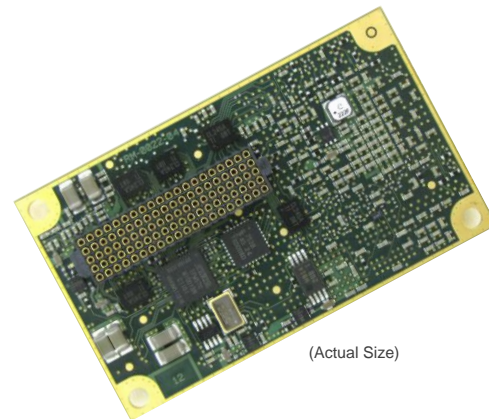


HF Modem

2G ALE

3G ALE

V/UHF Modem



(Actual Size)

## EQUIP YOUR TRANSCIVER WITH DIGITAL RADIO TECHNOLOGY

### FEATURES & BENEFITS:

- **HF Data:** Up to 9 600 bps (SSB), 19 200 bps (ISB)
- **Low Cost:** Hardware Installation
- **Unlock Functionality:** Activation Codes
- **Standard Compliance:** MIL-STD & STANAG
- **Low Power:** 1 W (typical)
- **Compact Size:** 33 x 55 x 8 mm

### COMBINE WITH:

- **2G ALE:** MIL-STD-188-141B/C App A & B
- **3G ALE:** STANAG 4538 FLSU
- **Packet Data:** STANAG 4538 xDL
- **VHF / UHF Data:** Up to 96 000 bps (24 kHz)

### HIGH-SPEED MODEM MODULE

The TC4 is a compact high-performance LF & HF data and voice modem module and 2G & 3G ALE controller. It is intended for integration into LF & HF radio transceivers.

For more than a decade, radio maker have used the TC4 in their radio design to provide standards compliant data modem and ALE capabilities.

### MODEM SOFTWARE OPTIONS

The waveforms that are included in the TC4 can be customised by choosing from four LF/HF modem software options (M1-M4). Please see the reverse page for more details and ordering information.

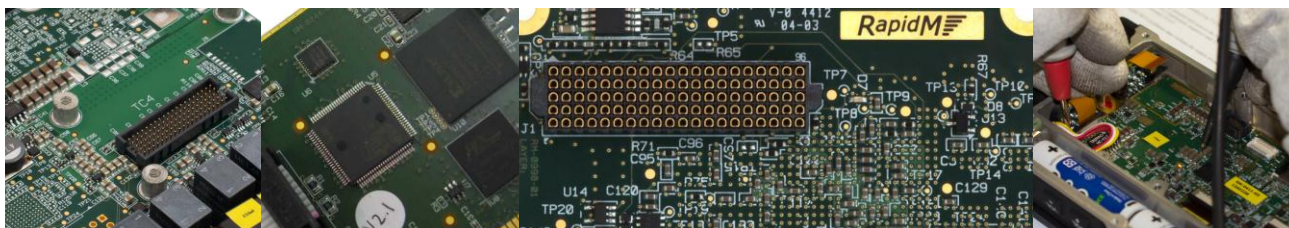
### DATA MODEM FUNCTION

Adaptive equalization mitigates the effects of channel multi-path. Convolutional encoding and soft-decision Viterbi decoding provides forward error correction.

Cancellation of narrowband co-channel interference is accomplished via adaptive tone excision capable of eliminating up to four signals.

### EVALUATION KIT AVAILABLE

The TC4 Evaluation Kit provides a reference system for testing familiarisation.



TC4 HARDWARE		
SIZE	33 x 55 x 8mm (w x d x h)	
WEIGHT	14.1 g	
POWER	3.3 V (DC), <= 1 W (typ.)	
TEMPERATURE	-40°C to +85°C (operating); -40°C to +90°C (storage)	
CONNECTOR	Single 100-way fine pitch connector (Samtec YFT-20-xx-H-05-SB)	
PRIMARY INTERFACES	USE	DETAILS
UART 1	Data, Config, Control, or Raw Data (build option)	Default Rate: 115200 bps (4800 - 115200) Electrical: 3.3V LVTTTL Flow Ctrl (Raw Data): CTS/RTS, XON/XOFF
UART 2	Radio Control, or Config, Control (build option)	Rate: 4800 to 115200 bps Electrical: 3.3V LVTTTL Flow Ctrl: None
CODEC 1	Baseband Audio SSB/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), or Ear & Mic Audio (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 (build option)	Synchronous serial I/F MCBSP port
MCBSP 1	Digital Baseband Audio (build option), or Digital Ear & Mic Audio (build option)	Synchronous serial I/F MCBSP port
DISCRETE OUTPUT	Radio Keyline	Active high
DISCRETE INPUTS	PTT Sense Input	Active low
	PPS (GPS Time Sync.)	Rising edge
	Reset / Power Down	Active low
SPEED SELECT	Power Saving (Optional)	Active low, 4 pin input

WAVEFORM STANDARDS	MODULATION	DATA RATES & CHARACTERISTICS	SOFTWARE OPTIONS			
			M1	M2	M3	M4
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-188-110B APP F	PSK/QAM	ISB: [9600, 12800, 16000, 19200 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)	✓	✓	✓	✓
STANAG 4285	PSK	[75, 150, 300, 600, 1200, 2400 bps] (Coded), 1200, 2400, 3600 bps	✓	✓	✓	-
STANAG 4529	PSK	[75, 150, 300, 600, 1200 bps] (Coded), 600, 1200, 1800 bps	✓	✓	✓	-
STANAG 4481 PSK	PSK	300 bps (Coded)	✓	✓	✓	-
STANAG 5065 LF	FSK MSK	75 bps (FSK) 300 bps (MSK) (Coded)	✓	-	-	-
STANAG 4481 FSK	FSK	75 bps; (single channel / multi-channel, selectable carrier)	✓	✓	✓	-
FSK VARIABLE	FSK	50, 75, 100, 150, 200, 300, 400, 600, 1200 bps; Mark & Space Frequency: 350 to 3000 Hz	✓	✓	✓	-

GENERAL	
CAHRACTERISTICS	Carrier capture range ±200 Hz. Sync-on-Data Frequency tracking of up to 75 Hz changing at 3.5 Hz per second (triangular sweep) Narrowband Interference cancellation of up to 4 signals for Data Rates < 300 bps
AUTOBAUD	All PSK waveforms except for STANAG 4285 & 4529. Sync-on-Data capability.
TONE EXCISION	Narrowband Interference cancellation of up to 4 signals
PRESET	Factory and Custom Presets

ORDERING INFORMATION	STOCK NUMBER	DESCRIPTION
TC4 SDM (Hardware & Bootloader)	TC4-05-M-M0-5.3	Module: TC4 SDM M0 (B/loader only) V5.3
Hardware Activation (Required)	TC4-05-HWAC-KEY	License: H/W Activation Key
HF Modem M1 Software Option	TC4-SW-O-M1-5.3	SW MDL-M1 (HF 110B, F ISB 2x9600) V5.3
HF Modem M2 Software Option	TC4-SW-O-M2-5.3	SW MDL-M2 (HF S4285, S4539 9600) V5.3
HF Modem M3 Software Option	TC4-SW-O-M3-5.3	SW MDL-M3 (HF 110A, 4415 2400 ) V5.3
HF Modem M4 Software Option	TC4-SW-O-M4-5.3	SW MDL-M4 (HF MdM S4539 9600 bps) V5.3

OTHER SOFTWARE OPTIONS	STOCK NUMBER	DESCRIPTION
2G ALE	TC4-SW-O-2G-5.3	SW MDL-2G ALE / MS 141B, App. A, B V5.3
3G ALE Fast Link Setup	TC4-SW-O-3G-5.3	SW MDL-3G ALE 4538 FLSU, Rad. Ctrl V5.3
3G ALE xDL Packet Data	TC4-SW-O-3D-5.3	SW MDL-3G ALE 4538 xDL Pckt Modem V5.3
VHF / UHF Modem V1	TC4-SW-O-V1-5.3	SW MDL-V1 (VHF B≤24kHz ≤96000 bps) V5.3
VHF / UHF Modem V2	TC4-SW-O-V2-5.3	SW MDL-V2 (VHF B≤12kHz ≤48000 bps) V5.3

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