



Fig 1.a:
TC5 Top view

Size:
22 x 33 mm x 3.5 mm



Fig 1.b:
TC5 Bottom view

(Actual Size)

FEATURES & BENEFITS:

- **VHF Modem LOS:** Up to 256 kbps in 50 kHz
- **VHF Modem Mobile:** Up to 64 kbps in 50 kHz
- **Forward Error Correction:** CL-7 & CL-9 FEC
- **SWAP-C:** Optimal size, weight, power and cost
- **Low Cost:** Hardware Installation
- **Activation Keys:** Unlock Functionality
- **Low Power:** Hunt 650 mW, Lock 1100 mW (typ.)
- **Very Compact Size:** 22 x 33 x 3.5 mm

OTHER SOFTWARE OPTIONS (DATASHEETS AVAILABLE):

- **HF Modem:** 110C/D Wideband, SSB, 2-ISB
- **4G ALE / WALE^(F):** 141D App. G, incl. 2G & 3G
- **Digital Voice:** 700 to 2400 bps Vocoder
- **Encryption:** 56-bit for Data/Voice

RELATED PRODUCTS (DATASHEETS AVAILABLE):

- **EF-256 Embedded Functions for Secure Voice & Data:**
 - AES-256 Encryption
 - Vocoder (600 – 2400 bps) TWELP* or MELPe**
 - AUTO Data Rate Change, Best-in-class Modem
- **EF-300V Embedded 300 bps Voice:** TWELP* Vocoder
- **4G-R^(F) WB Modem:** LSU and Pkt (HF / VHF)
- **4G-R^(F) WB Modes:** FF / ECCM

* TWELP voice coding by DSP Innovations Inc.(www.dspini.com)

** MELPe for US customers only

(F) Future feature.

WIDEBAND HF DATA MODEM

The TC5 module is intended for radio manufacturers seeking to fully exploit the available spectrum for the highest speeds of mobile and Line of Sight (LOS) communications.

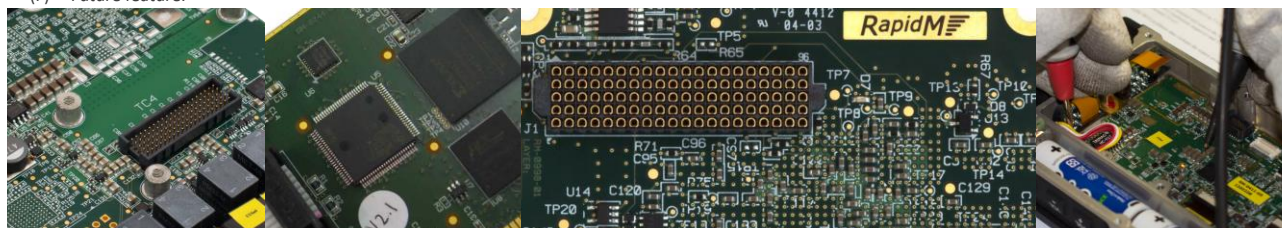
The TC5 can host a VHF Circuit Modem providing data rates from 300 to 16 000 bps in 3.125 kHz and 4800 to 256 000 bps in 50 kHz. For VHF modem operation in a 50 kHz bandwidth two adjacent 25 kHz channels are used. The VHF modem has been designed to operate in the 30 to 88 MHz (VHF1) band. The TC5 is intended for integration into new VHF radio designs.

All modes support AUTOBAUD. The modem features a high performance adaptive equalizer to deal with dynamic multi-path distortion associated with mobile communications. The latter ensures reliable operation over various mobile channels, e.g. rural, urban hilly and mountainous.

The built-in Doppler tracking capability ensures operation at relative speeds up to 250 km/h (VHF mobile channel).

ULTRA-COMPACT HARDWARE

The TC5 hardware is based on RapidM's new ultra-compact module footprint. The module is a plug-in replacement to the TC2. The TC5 extends the capabilities offered by the TC2 by also offering additional processing capabilities leading to a better performing VHF wideband modem.



WIDEBAND VHF CIRCUIT MODEM – RM PROPRIETARY (50 KHz MOBILE & LOS CHANNELS)

B/WIDTH	VHF CIRCUIT SWITCHED DATA MODEM (VHF1 BAND: 30 – 88 MHz)										SOFTWARE OPTION				
	1	2	3	4	5	6	7	8	9	10	V5	V6	V7	V8	V9
	BPSK	BPSK	QPSK	8-PSK	16-QAM	32-QAM	32-QAM	64-QAM	128-QAM	256-QAM					
3.125 kHz	300	600	1200	2400	3200	4800	8000	9600	12800	16000	✓	✓	✓	✓	✓
6.250 kHz	600	1200	2400	4800	6400	8000	16000	19200	25600	32000	✓	✓	✓	✓	
9.375 kHz	600	1200	2400	4800	9600	12800	24000	32000	38400	48000	✓	✓	✓		
12.50 kHz	1200	2400	4800	9600	12800	16000	32000	48000	51200	64000	✓	✓	✓		
18.75 kHz	1200	2400	4800	9600	19200	25600	48000	64000	76800	96000	✓	✓	✓		
25.00 kHz	2400	4800	9600	19200	25600	32000	64000	96000	102400	128000	✓	✓			
37.75 kHz	2400	4800	9600	19200	38400	51200	96000	128000	153600	192000	✓				
50.00 kHz	4800	9600	19200	38400	51200	64000	128000	192000	204800	256000	✓				

Robust Mobile Channel Receivable

Mobile Channel Receivable

LOS Channel Receivable

HARDWARE SPECIFICATIONS

TC5 HARDWARE			
SIZE	22 x 33 x 3.5 mm (w x d x h)	POWER	3.3 VDC, (Hunt < 650 mW), (Off < 1 mW), (Full-Power < 1100 mW)
TEMPERATURE	–40°C to +85°C (operating); –40°C to +85°C (storage)		
CONNECTORS	3x40-way fine pitch connector, Module Side: Hirose DF40C-40DP-0.4V(51), Host Side: DF40C-40DS-0.4V(51)		
PRIMARY INTERFACES	NOMINAL USE	DETAILS	
UART A	Data, Config, Control (Typical) (Customisable)	Default Rate: 115200 bps (300 to 921600 bps) Electrical: 3.3V LVCMOS	
UART B	Radio Control (Typical) (Customisable)	Rate: 50 to 921600 bps, Electrical: 3.3V LVCMOS	
UART C	Spare (Customisable)	Rate: 50 to 921600 bps, Electrical: 3.3V LVCMOS	
USART	DTE (TX, RX, RTS, CTS, DTR, DSR, DCD, TCLK, RCLK, RTCLK)	Rate: 256 000 to 50 bps in sync with modem Electrical: 3.3V LVCMOS (for external EIA-530-A)	
ETHERNET	Data, Config, Control (Optional)	On-board PHY, only requires external connector with integrated magnetics for full 10/100 Base T solution	
McBSP 0	Data, Config, Control (build option)	Synchronous serial I/F McBSP port	
McBSP 1 / McASP	Digital Baseband Audio (build option), and/or Digital Ear & Mic Audio (build option)	Synchronous serial I/F McBSP port	
DISCRETES INPUTS	PTT Sense Deep Sleep	Zeroise PPS (GPS Time Sync.)	Reset Hold-up Battery (RTC, Mem)
DISCRETE OUTPUTS	Radio Keyline Ready		

ORDERING INFORMATION	STOCK NUMBER	DESCRIPTION
TC5 (Hardware only)	TC5-02-M-M0-V06	Module: TC5 V2 SDM M0 (H/W) V06
Hardware Activation (Required)	TC5-02-HWAC-KEY	Key: TC5 H/W Activation (required)
VHF Wideband Modem V5 (50 kHz)	TC5-SW-O-V5-V06	SW MDL-V5 (VHF 50kHz 256kbps CL9) V06
VHF Wideband Modem V6 (25 kHz)	TC5-SW-O-V6-V06	SW MDL-V6 (VHF 25kHz 128kbps CL9) V06
VHF Narrowband Modem V7 (12.5 kHz)	TC5-SW-O-V9-V06	SW MDL-V9 (VHF 12kHz 16kbps CL9) V06
VHF Narrowband Modem V8 (6.25 kHz)	TC5-SW-O-V9-V06	SW MDL-V9 (VHF 6kHz 16kbps CL9) V06
VHF Narrowband Modem V9 (3.125 kHz)	TC5-SW-O-V9-V06	SW MDL-V9 (VHF 3kHz 16kbps CL9) V06
OTHER SOFTWARE OPTIONS*	STOCK NUMBER	DESCRIPTION
HF Wideband Modem W1 (MS110C, 24 kHz)	TC5-SW-O-W1-V06	SW MDL-W1 (110C 24kHz 120kbps) V06
HF Modem M1 (MS110B 3 kHz SSB, 2x3 kHz 2-LSB)	TC5-SW-O-M1-V06	SW MDL-M1 (HF 110B, F ISB 2x9600) V06
3G ALE Fast Link Setup (MS141C App C, S4538 FLSU)	TC5-SW-O-3G-V06	SW MDL-3G ALE 4538 FLSU, Rad. Ctrl V06
3G Packet Modem (S4538 xDL)	TC5-SW-O-3D-V06	SW MDL-3G ALE 4538 xDL Pckt Modem V06
2G ALE (MS141B App A & B)	TC5-SW-O-2G-V06	SW MDL-2G ALE / MS 141B, App. A, B V06
Digital Voice 700, 1200, 2400 bps (see EF-256 for 600 bps)	TC5-SW-O-D7-V06	SW MDL-DV 700 to 2k4 bps Voc, Mdm V06
Encryption 56-bit (see EF-256 for AES-256)	TC5-SW-O-ED-V06	SW MDL-COMSEC 56bt HVM/xDL/Voc V06
EVALUATION KIT*	STOCK NUMBER	DESCRIPTION
TC5 EVAL. KIT (CARRIER CARD, BREAK-OUT CABLE, PSU)	TC2-EV-0011-SPC	Bundle: TC2 Eval Kit (TC2 excl.)

* Contact RapidM for Datasheets

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