TC5 WIDEBAND HF MODEM – 24 KHz DATASHEET

FEATURES & BENEFITS:
- MIL-STD 110C Compliant: Up to 120 kbps in 24 kHz
- SSB Data Modem: 9600 bps in 3 kHz
- ISB Data Modem: 19200 bps in 2.3 kHz
- Standards Compliance: MIL-STD & STANAG
- 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. WBHF)
- Very Compact Size: 22 x 33 x 3.5 mm

OTHER SOFTWARE OPTIONS (DATASHEETS AVAILABLE):
- 4G ALE / WALE\(^{(f)}\): 141D App. G, incl. 2G & 3G
- Digital Voice: 700 to 2400 bps Vocoder
- Encryption: 56-bit for Data/Voice
- VHF Modem: Robust Mobile & LOS, up to 256 kbps, 50 kHz

RELATED PRODUCTS (DATASHEETS AVAILABLE):
- EF-256 Embedded Functions for Secure Voice & Data:
  - AES-256 Encryption
  - Vocoder (600 – 2400 bps) TWELP* or MELPe**
- 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.

Fig 1.a: TC5 Top view
Size: 22 x 33 m x 3.5 mm

Fig 1.b: TC5 Bottom view

WIDEBAND HF DATA MODEM
The TC5 module is intended for users seeking to fully exploit the available spectrum for the highest speeds of BLOS and HF surface wave communications.

The TC5 can host Wideband HF Modem functions that fully comply with MIL-STD-188-110C App. D up to 24 kHz audio bandwidth.

The modem receiver engine has advanced WB tone excision capability coupled with agile channel estimation and high-performance equalization functions with expanded Doppler and multi-path spread envelopes. The modem BER performance exceeds the specifications by a healthy margin.

NARROWBAND HF DATA MODEM
The wideband modem includes pre-existing 3kHz SSB and 2x3 kHz 2-ISB modem modes for backward compatibility with MIL-STD-188-110B, STANAG 4539, 4415 and 4285 modems.

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 Wideband HF capabilities up to 24 kHz bandwidth. The TC5 also features very low power consumption for a Wideband HF Modem.

EMBEDDED FUNCTIONS FOR SECURE VOICE/DATE, ECCM
The TC5 hardware will be able to host RapidM’s own 4G-R embedded software functions in future. The RapidM 4G-R will offer secure voice and data in fixed frequency as well as ECCM modes. The suite will offer HF and VHF waveforms with far greater resistance to noise, adverse channel conditions, interference, detection and jamming.
Wideband HF Mode Specifications – MS110C Appendix D (24 kHz)

<table>
<thead>
<tr>
<th>B/WIDTH</th>
<th>WBHF CIRCUIT SWITCHED DATA MODEM (MIL-STD-188-110D APPENDIX D)</th>
<th>SOFTWARE OPTION</th>
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<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
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<tr>
<td>3 kHz</td>
<td>Walsh</td>
<td>BPSK</td>
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<td>6 kHz</td>
<td>150</td>
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<td>600</td>
</tr>
<tr>
<td>24 kHz</td>
<td>600</td>
<td>1200</td>
</tr>
</tbody>
</table>

Narrowband HF Mode Specifications

Additional Model Waveforms (Included with Wideband HF Modes)

2-15B (2x3 kHz)  STANAG 4539 / MIL-STD-188-110B Appendix F


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(S1), Host Side: DF40C-40DS-0.4V(S1) |

PRIMARY INTERFACES

| UART A | Data, Config, Control (Typical) (Customisable) |
| UART B | Radio Control (Typical) (Customisable) |
| UART C | Spare (Customisable) |

USART

| DTE (TX, RX, RTS, CTS, DTR, DSR, DCD, TCLK, RCLK, RTCLK) |
| Rate: 256 000 to 50 384 bps in sync with modem |
| Electrical: 3.3 VVC MOS (for external ISA-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 Keystore Ready

Evaluation Kit

TC5-EV-0011-SPC Bundle: TC5 Eval Kit (TC5 excl.)

* Contact RapidM for Datasheets