**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
- 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(r) WB Modem: LSU and Pkt (HF / VHF)
- 4G-R(r) WB Modes: FF / ECCM

* TWELP voice coding by DSP Innovations Inc (www.dspini.com)
** MELPe for US customers only
(r) Future feature.

**Wideband HF Data Modem**
The TC5 module is intended for users 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.

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.
### VHF Circuit Switched Data Modem (VHF1 Band: 30 – 88 MHz)

<table>
<thead>
<tr>
<th>B/WIDTH</th>
<th>V5</th>
<th>V6</th>
<th>V7</th>
<th>V8</th>
<th>V9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.125 kHz</td>
<td></td>
<td>300</td>
<td>600</td>
<td>1200</td>
<td>2400</td>
</tr>
<tr>
<td>6.250 kHz</td>
<td></td>
<td>600</td>
<td>1200</td>
<td>2400</td>
<td>4800</td>
</tr>
<tr>
<td>9.375 kHz</td>
<td></td>
<td>1200</td>
<td>2400</td>
<td>4800</td>
<td>9600</td>
</tr>
<tr>
<td>12.50 kHz</td>
<td></td>
<td>1200</td>
<td>2400</td>
<td>4800</td>
<td>9600</td>
</tr>
<tr>
<td>18.75 kHz</td>
<td></td>
<td>1200</td>
<td>2400</td>
<td>4800</td>
<td>9600</td>
</tr>
<tr>
<td>25.00 kHz</td>
<td></td>
<td>2400</td>
<td>4800</td>
<td>9600</td>
<td>19200</td>
</tr>
<tr>
<td>37.5 kHz</td>
<td></td>
<td>2400</td>
<td>4800</td>
<td>9600</td>
<td>19200</td>
</tr>
<tr>
<td>50.0 kHz</td>
<td></td>
<td>4800</td>
<td>9600</td>
<td>19200</td>
<td>38400</td>
</tr>
</tbody>
</table>

**Software Option**
- V5: Yes
- V6: Yes
- V7: Yes
- V8: Yes
- V9: Yes

### 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)
  - Default Rate: 115200 bps (900 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: 256000 to 500 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, 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

#### Discrete Inputs
- PTT/Sense
- Deep Sleep
- Zerosize
- PPS (GPS Time Sync.)
- Reset
- Hold-up Battery (RTC, Mem)

#### Discrete Outputs
- Radio Keyline
- Ready

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### Ordering Information

<table>
<thead>
<tr>
<th>TC5 (Hardware only)</th>
<th>Stock Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC5-02-M00-V06</td>
<td>Module: TC5 V2 SDM M0 (6-W)</td>
<td>V06</td>
</tr>
<tr>
<td>TC5-02-M01-V07</td>
<td>Module: TC5 V2 SDM M0 (10-W)</td>
<td>V07</td>
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</tbody>
</table>

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### Other Software Options

<table>
<thead>
<tr>
<th>TC5 Wideband Modem W1 (MS110C, 24 kHz)</th>
<th>Stock Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC5-SW-O-W1-V06</td>
<td>SW MDL-W1(110C 24kHz 120kbps)</td>
<td>V06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TC5 Wideband Modem M1 (MS110B 3 kHz 55B, 2x2 kHz 2-08)</th>
<th>Stock Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC5-SW-O-M1-V06</td>
<td>SW MDL-M1 (MS110B 3 kHz 55B, 2x2 kHz 2-08)</td>
<td>V06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TC5 Wideband Modem V8 (3.21 kHz)</th>
<th>Stock Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC5-SW-O-V8-V06</td>
<td>SW MDL-V9 (VC 12kHz 16kbps CL9)</td>
<td>V06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TC5 Wideband Modem V9 (3.125 kHz)</th>
<th>Stock Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC5-SW-O-V9-V06</td>
<td>SW MDL-V9 (8kHz 16kbps CL9)</td>
<td>V06</td>
</tr>
</tbody>
</table>

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### Evaluation Kit

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC2-EV01-SBC</td>
<td>Bundle: TC2 Eval Kit (TC2 excl.)</td>
</tr>
</tbody>
</table>