Features & Benefits:
- **SSB Data Modem**: 9600 bps in 3 kHz
- **ISB Data Modem**: 19200 bps in 2 x 3 kHz
- **MIL-STD 110C Modes**: 32,000 bps in 6 kHz
- **Standards Compliance**: MIL-STD & STANAG
- **Low Cost**: Hardware Installation
- **Activation Keys**: Unlock Functionality
- **Low Power**: 600 mW (typical)
- **Compact Size**: 22 x 33 x 3.5 mm

Other Software Options (Datasheets Available):
- **3G ALE**: STANAG 4538 FLSU
- **Packet Modem**: STANAG 4538 xDL
- **Digital Voice**: 2400 bps Vocoder
- **Encryption**: 56-bit for Data/Voice
- **VHF / UHF Modem**: Up to 128 000 bps (24 kHz)

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
  - Extended Range, const. amplitude modulation

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

High Performance – Low Power
The TC2 can host high-performance SSB, ISB and wideband HF data modems. It is intended for integration into LF & HF radio transceivers.

The TC2 is optimized for low power consumption. The module has DC coupled A/D inputs which are suitable to detect squelch break whilst the processor is clock rate is very low.

SSB & ISB Data Modem Options
The waveforms that are included in the TC2 can be customised by choosing the appropriate software option (M1 – M4). Please see the reverse page for more details and ordering information.

MIL-STD 110C Data Modem Modes
The wideband MIL-STD-188-110C modem modes for 3 kHz and 6 kHz bandwidth can be hosted on the TC2. The maximum coded data rate is 32,000 bps in a 6 kHz channel. These modes offer a performance advantage over 110A and 110B modems.

Data Modem Function
Adaptive equalization mitigates the effects of channel multipath. 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.
TC2 HARDWARE MODULE

TC2 HARDWARE

SIZE
33 x 55 x 6 mm (w x d x h)

POWER
3.3 VDC, (Standby < 650 mW), (Deep-Sleep < 50 mW), (Off < 1 mW)

TEMPERATURE
-40°C to +85°C (operating); -40°C to +85°C (storage)

CONNECTOR
3x40-way fine pitch Module Side: Hirose DF40C-40P-D-0.4V(S1), Host Side: DF40C-40DS-0.4V(S1)

PRIMARY INTERFACES NOMINAL USE

UART A
Data, Config, Control
Default Rate: 115200 bps (300 to 921600 bps) Electrical: 3.3V LVCMOS

UART B
Radio Control
Rate: 50 to 921600 bps, Electrical: 3.3V LVCMOS

UART C
Spare (Customisable)
Rate: 50 to 921600 bps, Electrical: 3.3V LVCMOS

ETHERNET
DTE (TX, RX, RTS, CTS, DTR, DSRI, DCO, TCLK, RCLK, RTCLK)
Rate: 128 000 to 300 bps in sync with modem
Electrical: 3.3V LVCMOS (for external EIA-530 A)

ANALOGUE AUDIO
Baseband Audio
Input: 1.4 Vp-p, -20 kΩ input impedance
Output: 2.2 Vp-p, -16 Ω min output load

Voice Microphone-In
Input: 1.4 Vp-p, -20 kΩ input impedance
Output: 2.2 Vp-p, -16 Ω min output load

Voice Line-Out
Input: 2.2 Vp-p, -600 Ω min output load

Microphone Bias
Analogue Input

MCSBP 0
Data, Config, Control (build option)
On-board PHY, only requires external connector with integrated magnetics for full 10/100 Base T

MCSBP 1
Baseband Audio (build option), Ear & Mic Audio (build option)
Synchronous serial I/F MCSBP port

DISCRETES INPUT
PTT Sense
Zeroize
Deep Sleep
Hold up Battery (RTC, Mem)

DISCRETE OUTPUT
Radio Keypad

TC2 W/FORMS

GENERAL
CHARACTERISTICS
Carrier capture range ±100 Hz.
Sync-on-Data Frequency tracking of up to 3.5 Hz per second (triangular sweep)

AUTOBAUD
All MIL-STD waveforms, STANAG 4539 and STANAG 4415

TONE EMISSION
Narrowband Interference cancellation of up to 4 tones for data rates < 300 bps, FSK cancellation, CW cancellation

PRESET
Factory and Custom Presets

SSB, ISB & 6 kHz 110C MODES – OPTIONS

<table>
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<th>WAVEFORM STANDARDS</th>
<th>MODULATION</th>
<th>DATA RATES &amp; CHARACTERISTICS</th>
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<tr>
<td>MIL-STD-188-110C App D</td>
<td>PSK/QAM</td>
<td>3 kHz: [75, 150, 300, 600, 1200, 1600, 2400, 3200, 4800, 6400, 8000, 9600, 12000, 16000 bps] (Coded) 6 kHz: [150, 300, 600, 1200, 2400, 3200, 6400, 9600, 12800, 16000, 19200, 24000, 32000 bps] (Coded)</td>
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<tr>
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<td>PSK/QAM</td>
<td>[3200, 4800, 6400, 8000, 9600 bps] (Coded)</td>
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<td>STANAG 4548</td>
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<tr>
<td>MIL-STD-188-110B</td>
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<tr>
<td>STANAG 4415</td>
<td>PSK</td>
<td>NATO robust: 75 bps (Coded)</td>
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<tr>
<td>STANAG 4285</td>
<td>PSK</td>
<td>[75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps] (Coded), 1200, 2400, 3600 bps</td>
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<td>STANAG 4529</td>
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<tr>
<td>STANAG 4481PSK</td>
<td>PSK</td>
<td>300 bps (Coded)</td>
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<tr>
<td>STANAG 5065 LF</td>
<td>FSK</td>
<td>75 bps (FSK) 300 bps (MSK) (Coded)</td>
</tr>
<tr>
<td>STANAG 4481 FSK</td>
<td>FSK</td>
<td>75 bps; (single channel / multi-channel, selectable carrier)</td>
</tr>
<tr>
<td>FSK VARIABLE</td>
<td>FSK</td>
<td>50, 75, 100, 150, 200, 300, 400, 600, 1200 bps; Mark &amp; Space Frequency: 350 to 3000 Hz</td>
</tr>
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</table>

SOFTWARE OPTIONS

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<td>TC2-02-HNAC-KEY</td>
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<td>TC2-SW-O-ED-6.5</td>
<td>SW MDL-COMSEC 8k6bit xDL/Voc</td>
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<tr>
<td>V/UHF Modem Lt (Wideband)</td>
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<tr>
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<td>TC2-SW-O-L2-6.5</td>
<td>SW MDL-L2 (VHF 53kHz 510kbps)</td>
<td>V6.5</td>
<td></td>
</tr>
</tbody>
</table>

EVALUATION KIT

TC2 Eval. Kit (Carrier Card, Break-out Cable, PSU) |

STOCK NUMBER | TC2-EV-0011-8PC | Bundle: TC2 Eval Kit (TC2 excl.) | V01 |

* Contact RapidM for Datasheets

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