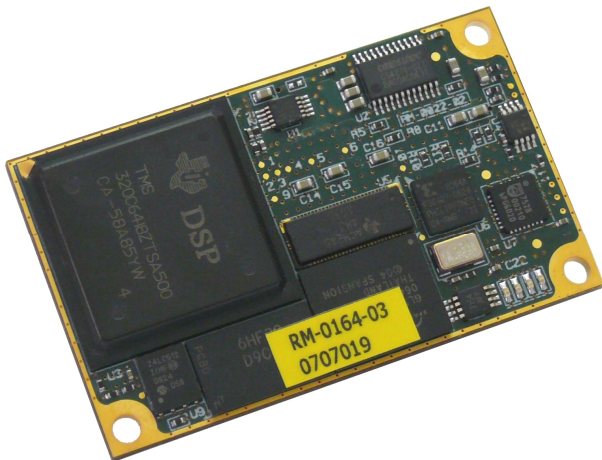


TC4: 3G ALE (STANAG 4538) Option [Prelim.]

3G ALE Option

The **3G ALE** controller is available as a software option for the **TC4** LF & HF Modem Module.



Key Features & Benefits

- 3G ALE Controller (STANAG 4538)
- Software option for TC4 software packs M1, M2, M3 and M4.

Automatic Link Establishment

- Fast Link Setup (FLSU)
- Data transmitted as packets
- LDL & HDL Data Link Protocols
- Circuit Link Controller (CLC)
- Linking Protection
- Occupancy Detection
- Includes 2G ALE Controller (backwards compatibility)
- Radio control for channel scanning

3G Link Establishment

The **TC4** offers advanced 3rd Generation ALE (STANAG 4538) link setup for HF networks. 3G ALE technology provides the following advantages over 2G ALE:

- Faster link setup time.
- Linking at lower signal-to-noise ratios.
- Improved network channel efficiency.
- Higher throughput for short and long data messages.

Two link setup methods are available:

- Fast Link Setup (FLSU) - Intended for smaller networks.
- Robust Link Setup (RLSU)(future) - Intended for large networks & heavy traffic loading.

Both synchronous and asynchronous link setup methods are supported. Call and traffic frequencies can be separate or shared.

Packet Switched Data

The data link protocols ensure efficient error-free IP packet data delivery.

- High rate Data Link protocol (HDL)
 - Suitable for large data volumes
 - High data throughput
 - Optimized for good channel conditions
- Low-latency Data Link protocol (LDL)
 - Small data volumes
 - Optimized for adverse channel conditions.

Circuit Switched Data

The **TC4** offers improved circuit switched operation by using 3rd Generation link setup. The selection of waveforms is determined by the **TC4** software pack. Please the reverse page for more details.

Control Protocol

The **TC4** uses a sub-set of the RAP1/RIPC Control Protocol (available at RapidM). This covers the following:

- General Hardware commands
- Audio commands
- Waveform, ALE control commands

The **TC4** control protocol also enables the user to log key communication parameters:

- Signal to noise ratio
- Bit Error rate (for data rate change decisions)
- Channel parameters (Doppler offset, Doppler spread, multi-path spread, number of paths etc.)

Radios Supported

The control protocols for various radios are embedded (selectable via remote control command).

The following radios are currently supported:

- Rohde & Schwarz XK2000 family
- Yaesu System 600
- Vertex Standard 600
- Barrett 950, 2050
- ICOM Amateur and Marine
- Kenwood TS-50, TS-480, TS-2000
- SGC 2000 Power Talk 150
- JRC JSB-196GM (High-sea)

New radio types are added from time to time on customer request.

STANAG 4538		
LINK SETUP	FLSU / FTM (or RLSU), BW0 & BW1	
TRAFFIC	LDL	Single-tone, 8PSK, up to 600 bps, BW3
	HDL	Single-tone, 8PSK, up to 4800 bps, BW2

CIRCUIT SWITCHED WAVEFORMS (AS PER SELECTED SOFTWARE PACK)							
STANDARD	CODING MODULATION		DATA RATES & CHARACTERISTICS	SOFTWARE PACK			
				M1	M2	M3	M4
MIL-STD-188-110B APPENDIX C	C	PSK/QAM	3200, 4800, 6400, 8000, 9600 bps	•	•	-	•
	U		12800 bps	•	•	-	•
STANAG 4539	C	PSK/QAM	75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps	•	•	-	•
	U		12800 bps	•	•	-	•
MIL-STD-188-110B	C	PSK/QAM	75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, bps	•	•	-	•
MIL-STD-188-110B APPENDIX F	C	PSK/QAM	ISB: 9600, 12800, 16000, 19200 bps	•	-	-	-
MIL-STD-188-110A § 5.3	C	PSK	75, 150, 300, 600, 1200, 2400 bps	•	•	•	•
	U		4800 bps	•	•	•	•
STANAG 4415	C	PSK	<i>NATO robust: 75 bps</i>	•	•	•	•
STANAG 4285	C	PSK	75, 150, 300, 600, 1200, 2400 bps	•	•	•	-
	U		1200, 2400, 3600 bps	•	•	•	-
STANAG 4529	C	PSK	75, 150, 300, 600, 1200 bps	•	•	•	-
	U		600, 1200, 1800 bps	•	•	•	-
STANAG 4481 PSK	C	PSK	300 bps	•	•	•	-
STANAG 5065	C	FSK MSK	75 bps (FSK) 300 bps (MSK)	•	-	-	-
STANAG 4481 FSK	U	FSK	<i>Single channel: 75 bps</i>	•	•	•	-
			<i>Multi-channel: 75 bps selectable carrier</i>	•	•	•	-
FSK VARIABLE	U	FSK	<i>Data Rates: 50, 75, 100, 150, 200, 300, 400, 600, 1200 bps</i> <i>Mark & Space Frequency: 350 to 3000 Hz</i>	•	•	•	-

GENERAL
Carrier capture range ± 200 Hz. Sync-on-Data
Frequency tracking of up to 75 Hz changing at 3.5 Hz per second (triangular sweep)
Comprehensive BIT (Built-In-Test), Continuous error detection
20 Factory Presets, 20 Custom Presets
Transceiver AGC control is necessary for optimum performance of QAM W/Fs
All W/Fs and 2G/3G ALE settings are remote controllable via Remote Control Port
All PSK waveforms except for STANAG 4285 & 4529. Sync-on-Data capability.
Narrowband Interference cancellation of up to 4 signals

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