



TMR6200

HF Naval Digital Transceivers



- One or Two High Performance 500 W/1 kW Transceivers in a Single Cabinet
- 125 W High Performance Transceiver In a 4U/19-inch Chassis
- Outstanding RF Performance Optimized for Severe Co-site Operation
- Multimode Operation Compatible with All Current Naval Standards
- DSP Technology and Built-in High Selectivity Pre/Post-selector
- Automatic Scanning of Channels and Frequencies
- Wide Range of Remote Control Facilities
- High MTBF and Comprehensive BITE

Series 6000—High Performance, Compact, Naval HF System Solutions.



TMR6200

HF Naval Digital Transceivers



THE TMR6200 family of transceivers is part of the cost-effective Series 6000 HF naval range that has been designed to meet the requirements of today's naval forces. Particular attention has been given to sensitivity, intermodulation, reciprocal mixing and wide band noise to achieve the RF performance required for severe co-site operation. DSP technology and a compact and robust design give all the flexibility required for easy integration within the communications system.

In keeping with all equipment in the Series 6000 HF naval range, the TMR6200 transceivers are designed to meet the ship-shore and ship-ship multimode communication requirements of the naval environment, particularly demanding in terms of radio electrical performance, environmental constraints and logistic support.

Ideally suited for use on submarines and on surface ships, from patrol boats to aircraft carriers, TMR6200 transceivers can operate independently or within a totally integrated end-to-end naval communications system offering voice, data and facsimile high speed transfer capability.

REMOTE CONTROL FACILITIES

Each Series 6000 radio function includes RS-485 and RS-232 interfaces.

The RS-485 bus provides a built-in multi-addressing capability of up to 99 slaved radio functions controlled by (1) the operator front panel of the Series 6000 radio, (2) the Series 6000 remote control unit (identical to the radio front panel), or (3) the Thales PC hosted, PC6000 Control Software.

Additionally each radio function can be connected to and managed by an external ALE/frequency hopping controller

RANGE OF CONFIGURATIONS

Available transceiver configurations are:

- Single 125 W transceiver (TMR 6201) in a 4U chassis
- Single 500 W and 1 kW transceivers in a 25U cabinet
- Dual 500 W and 1 kW transceivers in a 34U cabinet

EQUIPMENT CONFIGURATION

One or two independent exciter/receiver in one 4U chassis



GENERAL

Frequency Range

- Rx 10 kHz to 30 MHz in 1 Hz steps
- Tx 1.5 MHz to 30 MHz in 1 Hz steps

Tuning Time

- <20 ms to within 20 Hz

Frequency Accuracy

- Standard TCXO 3 parts in 10^7 (0°C–35°C)
- Optional high stability frequency reference (OCXO) in accordance with STANAG 5511 (Link-11)
- 10 MHz external frequency standard output
- External frequency input: 0.1, 1, 5 or 10 MHz
- Level between -13 dBm to +13 dBm

Modes of Operation

- CW A1A, A1B
- MCW A2A, A2B
- AM A3E, H3E
- FAX F1C, F3C
- FSK F1A, F1, F2B
- USB/LSB H2A, H2B, J2A, J2B J3E, R2A, R2B, RSE R2A, R2B, R3E
- ISB B7B, B8E, B9W
- MIL-STDs MIL-STD-188-110B, MIL-STD-188-141B (App A), MIL-STD-188-203
- STANAGs 4197, 4198, 4203, 4285, 4529, 4538, 4539, 5066, 5511, 5514, and 5522 compatible

Channel Store

- 1000 channels
- Parameters stored in non-volatile memory include frequency, mode AGC characteristics, filter selection, BFO/RIT and transmitter power

BITE

- Automatic detection to module level

EXCITER

In-band Noise

- <-90 dBc/Hz (within 300 Hz to 3 kHz of the carrier)

Wideband Noise

- The noise level is <-165 dBdHz for all frequencies removed by more than 5% from the tuned frequency

Carrier suppression

- >60 dB

Unwanted sideband suppression

- >60 dB

Spurious emissions

- Better than -80 dB at all frequencies removed by more than 5% from the tuned frequency

RECEIVER

Sensitivity

- LSB, USB, ISB: A signal of -113 dBm (1 μ V EMF) in a 3 kHz bandwidth gives a (S+N)/N of 10 dB for the frequency range 0.1–30 MHz
- The corresponding noise figure is 16 dB. High sensitivity position also available

AGC

- <3dB change in output for input signals between -103 dBm and +13 dBm
- Attack Time: <10 ms and <25 ms
- Decay time
 - Fast, medium, slow-compatible with all modes
 - Fully compliant with Link-11 standards

IF Filter

- The equipment has digital filters with the following bandwidths (symmetrical or non-symmetrical) 0.3 kHz, 1.1 kHz, 2.3 kHz, 2.4 kHz, 2.75 kHz, 3.1 kHz, 5 kHz, 6 kHz

BFO/RIT

- BFO Tunable \pm 8 kHz in 10 Hz steps
- RIT Tunable \pm 3 kHz in 1 Hz steps

In-band Intermodulation Products

- In SSB and in ISB modes, for two 141 mV EMF carriers, resulting in audio outputs at 1100 Hz and 1700 Hz, all intermodulation products and harmonics are 50 dB or more below each tone

Out of Band Intermodulation Products

- Between 1.5 MHz and 30 MHz for two equal signals removed from the tuned frequency by 5 and 10%, the 3rd order intercept point is +55 dBm

Cross Modulation

- A 30% modulated unwanted signal A3 (400) removed by at least 20 kHz from a wanted signal of 1.0 mV EMF can have a level up to 700 mV EMF before 3% cross modulation occurs

Blocking

- A -53 dBm wanted signal is not compressed by more than 1dB by an interfering carrier of +6 dBm removed by not less than 20 kHz from the tune frequency

IF Rejection

- The rejection of all IF frequencies is \geq 100 below the wanted signal (1.5 to 30 MHz)

Image Rejection

- The rejection of both the first and second image frequencies is >100 dB below the wanted signal

Spurious Rejection

- At frequencies more than 20 kHz from the tuned frequency, the spurious signal rejection is at least 80 dBV and >105 dB at frequencies >5% from the tuned frequency

Internally Generated Spurious

- Fewer than 50 3 kHz channels have spurious levels above -121 dBm referred to the input in the range 100 kHz to 30 MHz.
- No channels have spurious responses above -112 dBm

Mute and de-sense

- Typically 126 dB (minimum 110 dB) of de-sense is available in <2 ms. Re-sensitization occurs in <4ms

Scan mode

- Channel scan between designated channels with selected dwell time on each channel (0.1 s to 9.99 s)
- Scanning may be stopped on detection of a signal above a programmable threshold
- The receiver has a tape recorder activate line when a signal is detected

Metering

- RF level indication provided

INTERFACES

(Interfaces with * are duplicated in a dual exciter/receiver)

Receiver Antenna input*

- Input impedance 50 Ohms nominal
- No damage is caused by input signals up to 100 V EMF from a 50 Ohms source at any frequency between 60 kHz and 30 MHz with the power supply connected or disconnected

Antenna radiation

- The level of any discrete frequency component radiated in the range 0–100 MHz measured into 50 Ohms does not exceed -87 dBm

IF output*

- 452.5 kHz IF output with 10 kHz bandwidth

AF outputs*

- One line output for each sideband Level adjustable from -20 dBm to +10 dBm into 600 Ohm balanced
- User facility to switch the lines

Sidetone inputs*

- One line input for each sideband
- Level adjustable from -20 dBm to +10 dBm into 600 Ohm balanced



TMR6200

HF Naval Digital Transceivers



Tape Recorder Interface*

- Closing contact when signal exceeds programmed threshold

Exciter RF Output*

- Load impedance: 50 Ohms
- Power output: 17 dBm \pm 1 dB

PA Interface*

- RS-485 serial control interface
- Optional RS-232

AF Inputs*

- One line input for each sideband
- Level adjustable from -20 dBm to +10 dBm into 600 Ohms balanced
- User facility to switch the lines

Sidetone Outputs*

- One line input for each sideband providing -20 dBm to +0 dBm into 600 Ohms balanced
- Level adjustable -20 dBm to +10 dBm

Remote Control*

- One single RS-485 addressable bus (up to 99 radios and control units on the bus)
- Data rate selectable from 300 to 38,400 bits/s asynchronous interface
- RS-232 serial point to point control interface also available

Power supply

- 85–132 and 170–264 VAC autoranging, 47–63 Hz

MISCELLANEOUS

Temperature range

- MIL-STD-810E
- Methods 500.3, 501.3, 502.3
- Operating: -5°C to +50°C
- Storage: -30°C to +70°C

Humidity

- MIL-STD-810E, Method 507.3
- 88% at 40°C

Vibration

- MIL-STD-810E cat 9 Random vibration

Shock

- MIL-STD-901D 30 g, 25 ms

EMC/EMI

- MIL-STD-461/462

MTBF

- MIL-HDBK-217F at 25°C NS
- >4100 hrs to 8200 hrs depending on the configuration

Size (H x W x D)

- 7 x 19 x 18 inches
(178 (4U) x 483 x 460 mm)

Weight

- 28–42 lbs
(13–19 kg depending on the configuration)

Options

- Single or Dual transceivers in a 4U chassis
- Operator or Passive front panel
- High Stability Frequency Standard
- Full duplex operation – single variants only

SERIES 6000—500 W AND 1 KW POWER AMPLIFIERS

SPECIFICATIONS

Frequency Range

- 1.5 MHz to 30 MHz in 1 Hz steps

Forward Intermodulation Products

- 38 dB, typically >41 dB below PEP

Inter-transmitter Intermodulation Products:

- Based on an 18 dB coupling between two equal power transmitters (through a CAW or on the air through coupling between whips), third order inter-transmitter intermodulation products are <-45 dBc and typically <-50 dBc with the standard low pass filter fitted
- With band pass filter option, -80 dBc is achievable if the transmitters are operating in different frequency bands, or when operating in same frequency band, for the products which fall outside the band

BITE

- To module level

RF Output Power

- 1000 W Amplifier
 - 1000 W \pm 1 dB into 1.05:1 VSWR
 - >600 W into 2:1 VSWR
- 500 W Amplifier
 - 500 W \pm 1 dB into 1.05:1 VSWR
 - >300 W into 2:1 VSWR
- Power reduction down to 1 W in 3 dB steps

Power Supply (3-phase)

- 440 V, 3-phase, 3-wire, 47 - 63 Hz

Required Power

- 1000 W amplifier 5 kW (power factor 0.9)
- 500 W amplifier 2.7 kW (power factor 0.9)

Temperature Range

- MIL-STD-810E, Methods 500.3, 501.3, 502.3
 - Operating: -5°C to +50°C
 - Storage: -30°C to +70°C
- Operation to +55°C at reduced duty cycle or AM services

Humidity

- MIL-STD-810E, Method 507.3
- 88% at 40°C

Vibration

- MIL-STD-810E cat 9, Random vibration

Shock

- MIL-STD-810D, 30 g, 25 ms

EMC/EMI

- MIL-STD-461/462

MTBF

- MIL-HDBK-217F at 25°C NS
 - Single 1000 W >3700 hrs
 - Single 500 W >3800 hrs

Cooling

- Fan-assisted with front entry and exhaust
- Water cooling (option)

Acoustic Noise

- <72 dBA at 1 m

Transceiver Cabinet

	1 kW Single	1 kW Dual	500 W Single	500 W Dual
Height (in)	48.0	64.12	23.6	31.5
Weight (lbs)	7.87	8.66	9.25	10.83

Transmit Antennas

- Can be operated with whip antennas (via AEA177 fast antenna tuning unit), loop antennas (AS6000) or wideband antennas (via CA6000 common aerial working system)

Options

- 500 W and 1 kW in single and dual variants
- Low Pass or Band Pass output filter
- Water Cooling





TMR6200

HF Naval Digital Transceivers



Thales Communications, Inc.

22605 Gateway Center Drive, Clarksburg, MD 20871
Toll-Free: 1.800.258.4420 | Phone: 240.864.7000 | Fax: 240.864.7920
E-mail: naval.maritime@thalescomminc.com
Website: www.thalescomminc.com

