

TECHNICAL DESCRIPTIONS

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1. CIRCUIT DESCRIPTIONS

1.1 NTE-182 AIS Transponder

NTE-182 AIS Transponder consists of VHF antenna, LNA UNIT, TRX UNIT, PS UNIT and CONTROL UNIT.

The VHF antenna is whip type and used for transmit and receive VHF signals. The signal from the antenna is send to the TRX Unit.

The LNA UNIT includes a GPS antenna and a low noise amplifier. The GPS antenna receives GPS signal, the signal is send to low noise amplifier section. The amplifier section amplifies the GPS signal and the output is sent to GPS receiver section in the CONTROL UNIT.

The TRX UNIT includes 1 transmitter section, 2 TDMA receiver sections and 1 DSC receiver section.

The transmitter section converts from IF signal of 111.525MHz to desired frequency of the range from 156.025MHz to 162.025MHz, and amplifies the signal to desired power: 12.5W or 2W. The amplified signal is applied to the VHF antenna.

The received signal from VHF antenna is send to TRX UNIT. In the TRX unit, the received signal is distributed to 3 receiver sections: 2 TDMA receiver sections and 1 DSC receiver section.

The 2 TDMA receiver sections receive signals of frequency range from 156.025MHz to 162.025MHz. These receivers employ double superheterodyne type. One receiver's intermediate frequencies are 50.75MHz and 450kHz, and another receiver's ones are 38.85MHz and 450kHz. Both receiver sections output 450kHz signal and these IF signals are applied to MODEM section of the CONTROL UNIT.

The DSC receiver section receives fixed frequency of 156.525MHz (channel 70). The DSC receiver section also employs double superheterodyne type. The intermediate frequencies are 45MHz and 450kHz. The receiver section output 450kHz signal and the IF signal is applied to MODEM section of the CONTROL UNIT.

The PS UNIT includes a splitter section and a power supply section. The splitter section split modulated control data from power supply line for data receiving, and or combines modulated control data on to power supply line for data transmitting. The power supply section converts voltage from 24Vdc to 9Vdc, 3.3Vdc and these voltages are applied to

each circuit.

CONTROL UNIT includes MODEM section, GPS receiver section, data processor section. The MODEM section modulates and demodulates TDMA and DSC signals. For TDMA transmission, MODEM section converts NRZI signal generated in the data processor section to in-phase and quadrature signals of GMSK modulation. These signals are applied to the transmitter section in the data processor section TRX UNIT. For DSC transmission, MODEM section converts from DSC logic signal generated in the data processor section to in-phase and quadrature signals of AFSK modulation. For TDMA reception, the MODEM section converts frequency and demodulates the IF signals applied from the TRX UNIT to NRZI signals. For the conversion the FPGA is employed. For DSC reception, the MODEM section converts frequency and demodulates the IF signal applied from the TRX UNIT to DSC logic signal. For the conversion the FPGA is employed.

The GPS receiver section employs JRC's original receiver unit. The GPS receiver unit converts the signal applied from the LNA UNIT to time and position data. These data are send to the data processor section. The GPS receiver also generates Pulse Per Second (PPS) signal used for TDMA synchronization and applies it to the data processor section.

The data processor section processes signals from/to MODEM section and these signals are communicated between Connection Box.

1.2 NQE-3182 Connection Box

NQE-3182 Connection Box consists of I/O CONTROL UNIT, TERMINAL UNIT, JUNCTION UNIT, and NSK UNIT.

I/O CONTROL UNIT processed data between AIS transponder and external equipment. The I/O CONTROL UNIT processes the data sent from the AIS Transponder as reception signals, and outputs to auxiliary display ports and MKD ports. I/O CONTROL UNIT processes the data applied from external equipment or AIS Controller, and send to the AIS Transponder as transmission signals.

TERMINAL UNIT employs terminal blocks for external equipment connection and AIS Controller connection.

JUNCTION UNIT employs terminal blocks for AIS Transponder connection with multi wire cable.

NSK UNIT consists of convert section and terminal block section.

The convert section converts step/synchronized heading signal to serial signal.

The terminal block section employs terminal blocks for gyro compass connection.

1.3 NCM-779 AIS Controller

NCM-779 AIS Controller consists of CONTROL UNIT, PANEL UNIT, and LCD UNIT.

The CONTROL UNIT processes the data sent from the AIS Transponder via Connection Box as reception signals, displays the data on the LCD UNIT.

PANEL UNIT employs panel key switch for user input interface.

LCD UNIT employs a 320x240 dots display with LED back lights. The LCD UNIT is controlled by the CONTROL UNIT. The LED back light can be dimmer controlled by 3 steps.