6. Technical description

6.1 Main board

The main board can be divided into the following groups :
1. 406 MHz section
2. 121.5MHz section
3. Microcontroller section
4. Powersupply section
5. Antenna section
6. GPS interface board w/GPS receiver

6.2 406 MHz section.

The 406 transmitter consists of VCO (Q101), buffer amplifier (Q102) and power amplifier (Q103). The output power is 5W. The supply voltage is regulated and switched in the power supply section.
The output frequency is controlled by a PLL circuit (IC203), prescaler (IC204) and reference oscillator (IC205).
Modulation is applied to the reference signal by pulling the reference signals phase.

6.3 121.5 MHz section.

The 121.5MHz transmitter is Xtal controlled. The output power is approx. 200mW PEP. The output power is controlled by IC301 which senses the current in the output stage. The output signal is fed into the antenna via the matching network consisting of L308 and L307. 406 MHz signal is fed directly to the same antenna via pin diode D809. This diode is reverse biased when transmitting on 121.5MHz., by rectifying and inverting the modulation signal(D306).

6.4 Microcontroller section

This section consists of a microcontroller (IC401), EEPROM (IC402) for storing of programming data, a DIL switch, and an I/R interface for programming.

The DIL switch has the following function :

1. VHF modulation on/off
2. UHF repetition rate normal/fast
3. UHF on/off
4. VHF on/off

6.5 Power supply section

The main switch controls Q503 via reed relays Rel501, Rel502 and Rel503. The seawater circuit (IC503) is supplied from a separate reed in the battery compartment, to prevent it from working when placed in the bracket.

IC502 is the 5V main voltage regulator for the microcontroller. It is also reference voltage for the 406 supply witch/regulator.

The circuit to prevent continuos transmission on 406MHz consist of R512, C503, IC501B and Q504. If the transmission length exceeds a few seconds, Q504 is biased and the fuse F501 will be blown.

6.6 Antenna section

The antenna board is the actual antenna. It behaves as a quarter wave on 406 MHz. It is matched to 121.5 MHz as described in 121.5 MHz section.

The high voltage converter to the Xenon flash is also located on the antenna board. The Xenon bulb and test indicator (LED) is placed at the upper end of the antenna board.

6.7 GPS interface w/GPS receiver

The GPS interface is the connection between the GPS receiver and the main board. It consist of an microcontroller of type 16c622 and controls the ON/OFF of the GPS receiver, the update rate of the message (position data) and recalculates BCH1 and BCH2 depending of which protocol is used. Currently "Standard Location Protocol" and "User Location Protocol" is supported.

Test of GPS receiver without transmitters activated:

It is possible to test the GPS receiver without activating the 406/121.5 MHz transmitters:

- Turn DIL switch 1,3,4 in the lower position (OFF) and 2 in high position (ON)
- Activate the TRON40GPS outdoors with free sigth in all directions.
- Wait 10 minutes (To be shure)
- Turn off the beacon
- Move DIL switch 3 in upper (ON) position. (To turn on the 406 transmitter)
- Have a decoder ready to receive from the beacon.
- Pull the main switch on Tron40GPS to "TEST".
- After approx. 15 seconds the beacon will transmit the message with inverted frame sync and position in the data fields.
- Turn off the beacon, activate TEST again and "Default position data" will be in the position fields. (According to C/S T.001)

The only interface between the GPS interface board and the Main board is the signals on the I2C bus between the main board's microcontroller and the main boards EEprom. The microcontroller on the interface board use spare time on this bus to read/write position data directly to the EEprom (on the main board). When this is done, two blink in the GPS inteface's LED will indicate a write to this eeprom. The program in the main board is the same as in standard Tron40s, which was intended to have a GPS receiver when it was made same years ago.

The Interface board is made in such a way that 3 different GPS receivers can be used, either Connexant Jupiter LP, Motorola Oncore M12 or Trimble Lassen LP.

7. Automatic Release Mechanism

7.1 Float Free Bracket FB4

When the Tron40GPS is mounted in the FB4 release mechanism, it operates as a float free automatic unit.

Therefore it is important that the bracket is mounted in a place where there are no obstructions that can endanger the automatic release of the beacon.

The location where the bracket is mounted should be as high as possible on the vessel, protected from environmental conditions such as direct sea spray, chemicals, oil, exhaust and vibrations. The location must also be easily accessible for testing and maintenance.

7.2 Mounting the FB4

Bolt the unit to the vessel using the mounting holes.

7.3 Mounting of Tron40GPS in the FB4

Place the lower part of Tron40GPS on the grip in the bracket. Then push the beacon into the bracket and fold the clamp over the upper part. Place the retaining rod into the corresponding holes in the clamp and the plastic bolt.
Replace the locking pin.

7.4 Replacement and mounting of the Hydrostatic Release Mechanism

- While holding the Tron 40GPS in its place, pull out the locking pin on clamp on the top of the bracket.
- Fold the clamp away.
- Lift the Tron 40GPS out of the bracket.
- Now the H20 unit is accessible. Unscrew the plastic bolt and remove the unit.
- Replace the old unit with a new one . Screw the new plastic bolt on. Make sure the distance piece is in place on the plastic bolt.
- Mount the Tron 40GPS as described earlier.

8. Drawings

Main Board :

Circuit diagrams: E-97738-1
E-97738-2
E-97738-3
E-97738-4
E-97738-5

Component Layout KP-97738-1
KP-97738-2

Antenna Board :

Circuit diagrams: E-92718

Component layout KP-92718-1
KP-92718-2

GPS inteface Board :

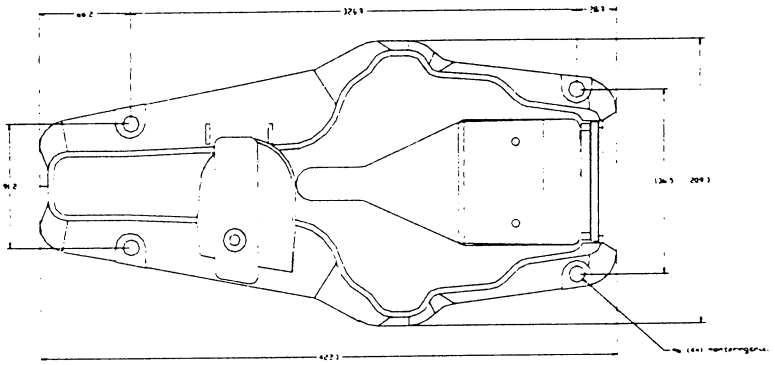
Circuit diagrams: E-99750

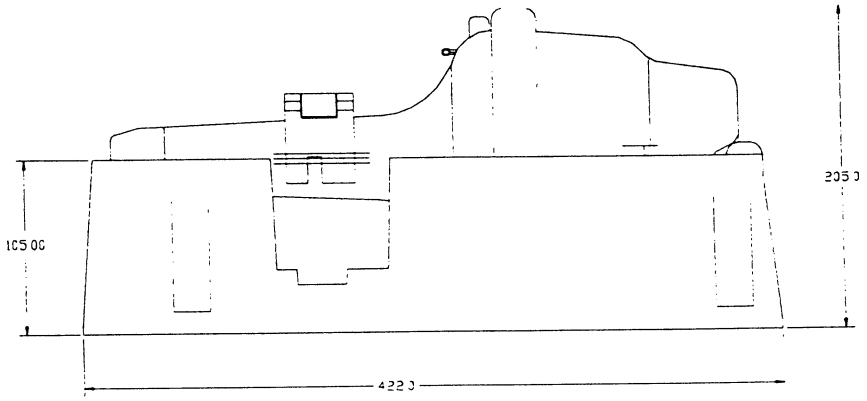
Component layout KP-99750-1
KP-99750-2

Battery unit: E-97780

Outline drawing: Tron40GPS

Outline drawing: FB4





Outline drawings FB4