



Tron UNIDEC

406 MHz Cospas-Sarsat
Beacon Tester





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AMENDMENT RECORDS

Amendment no	By	Date	Page(s)	Vers.	Reason for change
1	ES	20.02.2006	25	A	New Manual
2	ES	23.02.2006	9,10,15-18, 21-22	B	Corrections
3	ES	29.05.2006	Total 32	C	Removed notes Incl. PDA
4	ES	10.04.2007	Total 32	D	New company name and logo
5	ES	11.09.2007	21-22	E	New SW ver.3.3.4
6	ES	19.01.2009	16	F	Change to month
7	ES	01.10.2010	Total 36	G	Layout changes
8	ML	08.02.2012	Total 20	H	Text update
9					





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EC Declaration of Conformity, available at www.jotron.com

ABBREVIATIONS AND DEFINITIONS

BAUD

Transmission rate unit of measurement for binary coded data (bit per second).

BIT

Short form of Binary Digit. The smallest element of data in a binary-coded value.

COSPAS

COsmicheskaya Sistyema Poiska Avariynich Sudov (Space System for the Search of Vessels in Distress)

DEFAULT

A condition that the navigator assumes automatically if no other condition is initiated by the operator.

406 MHz Beacon

Emergency Position Indicating Radio Beacon

ELT

Emergency Locator Transmitter (for aviation)

GPS

Global Position System

IEC

International Electro-technical Commission.

IMO

International Maritime Organization

INTERFACE

Electronic circuits that permit the passage of data between different types of devices;



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ITU

International Telecommunication Union.

PLB

Personal Locator Beacon (on land or sea)

SARSAT

Search and Rescue Satellite-Aided Tracking System

SSAS

Ship Security Alert System (terrorist alarm)

The information in this book has been carefully checked and is believed to be accurate. However, no responsibility is assumed for inaccuracies.



CAUTION!

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Jotron AS does not take any responsibility for improper disassembling/assembly of the equipment. We strongly recommend all service to be done by authorized Jotron AS agents. In addition to normal service, Jotron AS agents have the necessary equipment and education to test the operational functions of the beacon.



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1 GENERAL DESCRIPTION

1.1 DESCRIPTION

The Tron UNIDEC is a decoding unit for COSPAS –SARSAT (C-S) 406 MHz Beacon`s and other beacons, and is made for use with a external computer.

The Tron UNIDEC meets the new demands for testing with measurements of frequency and power of the 406 MHz Beacon / beacon. It supports both short (112 bit) and long (144 bit) message. The Tron UNIDEC is upgradeable to allow support for new frequencies dedicated for the Cospas-Sarsat system in the future.

The Tron UNIDEC software is tested to run under Windows 2000 ,Windows XP, Windows Vista and Windows 7

TECHNICAL SPECIFICATION

STANDARDS EN 50081-2:1992 and EN 50082-2:1992

ENVIRONMENTAL

Temperature range -20°C to +55°C (operating)
-40°C to +70°C (storage)

GENERAL

Internal battery voltage 1,5 - 3VDC
Lifetime 10 hours when activated, with 1,5V alkaline battery
0.25 A at 24VDC
0.25 A at 24VDC
Frequency range 406.000 – 406.100 MHz
Resolution 5Hz
Accuracy < 100Hz when calibrated
Calibration At Jotron AS
Calibration intervals Every 24 month
Power measurement Relative, in dB with internal or external antenna
Decoding 112 and 144 bit
Interface Serial port 38400 baud, 8 data bit, 1 stop bit, no parity, hardware handshake.
Dimension 120 (L) x 60 (W) x 30 (H)
Weight 125g without battery
Material housing ABS, UL94-V0 flame retardant



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2 FUNCTIONAL DESCRIPTION

2.1 GENERAL

The electronics of the Tron UNIDEC is enclosed in a plastic box with room for internal battery and internal antenna.



Figure 3.1a Tron UNIDEC front side



Figure 3.1b Tron UNIDEC rear side

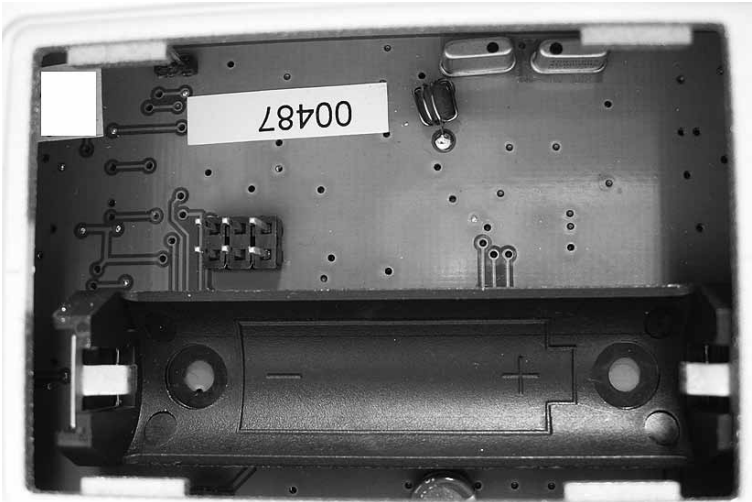


Figure 3.1c Inside the battery compartment

3.2 RS-232 connector

Nr.	Name	Function		In/Out
1	CD	Carrier Detect		-
2	PC_UART_Rx	PC serial port Receive Data	RS232	In
3	PC_UART_Tx	PC serial port Transmit Data	RS232	Out
4	DTR	Data Terminal Ready		-
5	GND	Ground		-
6	DSR	Data Set Ready		-
7	RTS	Ready To Send		-
8	CTS	Clear To Send		-
9	NC	Not Connected		-

Figure 3.2 RS-232 connector



3 INSTALLATION

3.1 PC SETUP

The PC software is distributed as a self-extracting program called Unidec-x.y-install.exe where x is major version number and y minor version. The first release will be “unidec-3.3-install.exe”. To install, just run this program and typically accept the default suggestions.

3.2 INSTALL TRON UNIDEC

Tron UNIDEC is supplied with serial cable to connect to a PC. If a serial port is not present at the PC, a USB serial port converter can be delivered. The USB serial port converter requires a separate installation.

- Install the 1.5 volt battery in the battery compartment of Tron UNIDEC.
- For PC: Connect the serial cable between Tron UNIDEC and your PC's COM port, or to the USB port using the USB serial port converter.





4 OPERATING INSTRUCTIONS

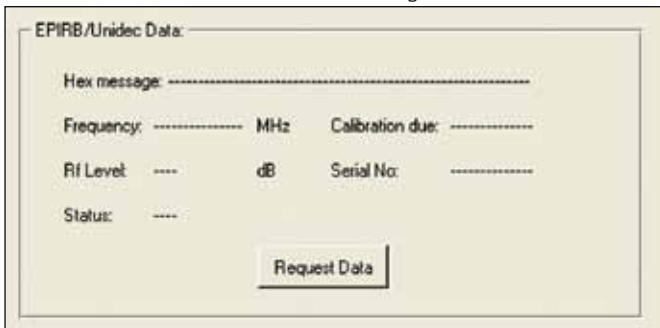
4.1 PROGRAM STARTUP

- From the program menu or desktop shortcut start the UNIDEC program.
- The UNIDEC program will search available com ports and search for a UNIDEC device. When detected, the LED indicator light at the Tron UNIDEC will light up for a few seconds.



4.1.1 EPIRB/UNIDEC DATA

The box called “EPIRB/Unidec Data” contains information retrieved from the 406 MHz Beacon after a test message is received.



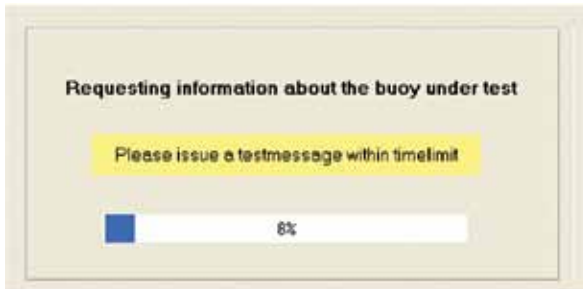
Pressing the “Request Data” button will initiate a new test of a Cospas-Sarsat 406 MHz Beacon.

Information will be shown in an over-laying window.



Request Data

- Select the actual frequency band in which the 406 MHz Beacon operates using the Frequency drop-down box.
- Press the "Request Data" button.
- Do a test of a 406 MHz Beacon within 120 seconds.
- Read the hexadecimal message, and the RF level.



Hex message

This field show the data received from the Cospas-Sarsat 406 MHz Beacon in hexadecimal. This message is either 112 bit (28 alpha/numerical) or 144 bit (36 alpha/numerical). If this field is filled in when opened, data from last 406 MHz Beacon readout is shown.

Frequency

This is the measurement of the frequency shown with 1 Hz resolution. By selecting the operating frequency band of the 406 MHz Beacon before the measurement takes place, the Tron UNIDEC will give an error message if the measured frequency is out of range. There is a general requirement for the measured frequency to be within +/- 5 kHz in 5 years For 406 MHz Beacon's with initial



frequency of 406.028 MHz the variation should be within $\pm 2/ - 5$ kHz. Please also note that the specification says that the frequency shall be within specs. in less than 15 minutes, so you may repeat the test of the 406 MHz Beacon until frequency is within specs. (In less than 15 minutes).

Calibration due

This is the month and year when Tron UNIDEC needs to be recalibrated. Calibration is done at JOTRON and this date is updated every time a calibration is done. It's on the format MMY, where MM is the month and Y is the Year.

Serial No

The version number of both software and hardware is shown together with the serial number. If the number is :

200BB00255, where the 3 first numbers are the SW revision, 200 means version 2.00 " " 2 next letters are the HW revision, here BB and the last 5 numbers are the serial number of the unit, here 00255.

RF level

Relative RF level is shown here.

Since it's difficult to measure an absolute RF level of 406 MHz Beacon's with different characteristics and antenna design, the measurement should be done following these guidelines:

In free Air:

If the UNIDEC is used in open air, the uncertainty is too big to use the results as absolute values. The result will vary with orientation of both UNIDEC and 406 MHz Beacon, distance, temperature and location of the testing person vs. 406 MHz Beacon/UNIDEC. The only thing we can say for sure is that the unit has output power or not. But if you have no choice, use these guidelines:

- There is no minimum distance between 406 MHz Beacon and Tron UNIDEC. (Units made before march 2002 have 4 meters because of higher sensitivity on these units).
- Measure an 406 MHz Beacon you know is OK at a certain distance. Check the result in the "RF level" field.

Measure the 406 MHz Beacon you want to check at the same location, distance and with same orientation of the beacon and compare the results with the first measurement. The result will give an indication of the RF level (Output power)



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In a Faraday cage:

Use an appropriate attenuator between the cage and the TRON UNIDEC. The attenuation must be determined by use of a known good beacon .The value shall not exceed 50 dB.

Test different 406 MHz Beacons, which you know is calibrated, and measure them in the Faraday cage. Write the number numbers down and fill them in a table, which could be like this:

Tron30SMKII:	45 dB
Tron45SX:	47 dB
Tron40S/GPS:	46 dB
McMurdo E3:	45 dB
etc..	

Then use these numbers as reference when you test other 406 MHz Beacons. The relation between dB and Watts is that if you have a value of 3dB below the reference for an 406 MHz Beacon, the output power is half of the reference output.

Example:

Tron40s reference power is 46 dB, which is 5 Watts

If another 406 MHz Beacon has a measured power of 43 dB, which is 2.5 Watt

This indicates that the tested 406 MHz Beacon has low output power and this must be checked. However, taking into account the relatively big uncertainty of this measurement, a difference of at least 4-5 dB should be allowed before taking any actions.

This means that the test conditions must have been identical as when the reference 406 MHz Beacon was tested (Temperature, distance, cage, environment, rotation of the 406 MHz Beacon).

NOTE:

If the Tron UNIDEC is changed with another one, new reference values for different 406 MHz Beacons must be obtained by measuring the reference 406 MHz Beacons with the new Tron UNIDEC!



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Status:

Field that display status messages. The following messages can appear:

- "406 MHz Beacon receive timeout" – Means that a timeout has occurred after the "Get new data" button was pressed. You have used too long time before the beacon was tested (more than 120 seconds) or the 406 MHz Beacon does not transmit on the 406 MHz frequency
- "Frequency outside limits" - This means that the frequency measured is outside range, or the selected frequency band is not correct.
- "Unidec corrupt message" – A message is received, but the validity check of the message fails. Try again.
- "406 MHz Beacon receive error" – Will be indicated if a bit-timeout occur or if the start of the message is wrong.
- "Replace Unidec battery" – Battery is below the limit of 1.0 volt
- "Message from 406 MHz Beacon received OK" – Received the message without faults.



The LED on Tron UNIDEC will be GREEN when the unit is ready to receive, and flash YELLOW when transmission is received correct from Beacon under test



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Tron UNIDEC EPIRB decoder(Ver.3.3.7)



Jotron AS
Fax: +47 22 12 47 80
beacon@jotron.com

Beacon information:

Vessel Name: Stina
Beacon Manufacturer: Jotron
Model: Tron40S mkII
Beacon serial number: 01035
Bracket type: FB4
Bracket serial number:
Battery expiry: 02-2017
Hydrostatic release expiry date: 02-2014

Measurements:

Frequency: (MHz (406.040 +/-0.0050): 406.036650
RF level: (dB): 36
Status: Message from EPIRB received OK

Message Decoding:

Hex message: FFFD050152490E1A4268C38A510
Message format: short format
Protocol: User
Country code: 267
User Type: Maritim user
Maritime MMSI (6 digits): TEST
Specific beacon number: 0
Aux radio device: 121.5 MHz
Emergency code flag: Emergency Code Data Not Entered
Activation type: Automatic and Manual Activation
Emergency code: No information or National Assigned
15 HexID: A02A4921C3484D1

Reference: IMO MSC/Circ. 1040 and SOLAS IV/15.9 (Annual)
IMO MSC/Circ. 1039 (Shore-based maintenance)

Company: _____ Tested by: John R.

Tron Unidec:

Serial no: 2005B00038
Calibration due: 0912

Wed Jan 25 2012 11:19:23

Close

Print

Load Report

Save Report

Email



The box called “Input information data” contains data that can be modified by the user. Note the “Frequency” field. It is important to select the correct frequency band for the 406 MHz Beacon under test. The UNIDEC program will then be able to check that the measured frequency is within the limits. Otherwise an error message is most likely to occur during measurement.

- Fill in the additional information about the 406 MHz Beacon in additional fields
- Decode the message by pressing the “Decode Data” button, and to generate the report

A screenshot of a software interface titled "Input information data". The form contains several input fields for user data: "Vessel", "Beacon Manufacturer", "Beacon Serialno", "Bracket Serialno", "Hydrostatic release expiry", "Company Name", "Model", "Bracket type", "Battery expiry", "Frequency" (a dropdown menu currently showing "406.025 MHz"), and "Tested by". Below the form is a button labeled "Decode Data".

From the report view it is possible to e-mail the report, print the report, or save it for printing later. Typically a catalogue in “My documents” is created, (can be done inside the “Save Report” dialog) and the reports are saved in this catalogue. Default name when saving is taken from the “Beacon Manufacturer”, “Model” and “Beacon Serialno” to form a unique filename. The report is saved in HTML format, and can be loaded in most text processing tools and Web-browsers. By pressing “Load Report”, previous saved reports may be loaded for inspection and printout. It is possible to do this without a Unidec box attached.

E-mailing a report will bring up the standard E-mail client with the report as an attachment. Select the required receiver and send the mail. In order to display the Jotron logo in the report, the “jotron.png” file must be downloaded in the same catalogue as the report. This is only required once, but overwriting the current file is no problem.



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5 MAINTENANCE AND TROUBLESHOOTING

5.1 NO COMMUNICATION WITH TRON UNIDEC

If there is a problem autodetecting the Tron UNIDEC device, please be aware of that the serialport port must be mapped in the range from COM1 to COM15. The mapping of the com ports may be checked using the control panel of the computer . Please consult information relevant for the computers operatingsystem for further information.

6 SERVICE AGENTS

Please look at www.jotron.com for Marine Service Agents.

Jotron Group subsidiary companies:

Jotron UK Ltd.

Crosland Park
Cramlington
Northumberland NE23 1LA
United Kingdom
Tel +44 1670 712000
Fax +44 1670 590265
E-mail: sales@jotron.com

Jotron Asia Pte. Ltd.

Changi Logistics Center
19 Loyang Way #04-26
Singapore 508724
Tel +65 65426350
Fax +65 65429415
E-mail: sales@jotron.com

Jotron USA, Inc.

10645 Richmond Avenue, Suite 170
Houston, TX 77042
USA
Tel +1 713 268 1061
Fax +1 713 268 1062
E-mail: sales@jotron.com



CONTACT INFORMATION

Jotron AS

P.O.Box 54
3281 Tjodalyng
Norway
Tel: +47 33 13 97 00
Fax: +47 33 12 67 80
sales@jotron.com

Jotron Phontech AS

P.O.Box 274
3192 Horten
Norway
Tel: +47 33 08 35 00
Fax: +47 33 08 35 01
sales@jotron.com

Jotron Consultas AS

P.O.Box 743
3196 Horten
Norway
Tel: +47 33 03 07 00
Fax: +47 33 03 07 10
sales@jotron.com

Jotron Satcom AS

Dølasletta 7
3408 Tranby
Norway
Tel: +47 32 84 53 87
Fax: +47 32 84 55 30
sales@jotron.com

Jotron UK Ltd.

Crosland Park
Cramlington
NE23 1LA
United Kingdom
Tel: +44 (0) 1670 712000
Fax: +44 (0) 1670 590265
sales@jotron.com

Jotron Asia Pte. Ltd.

19 Loyang Way
Changi Logistics Centre
Rear Office Block 04-26
Singapore 508724
Tel: +65 65426350
Fax: +65 65429415
sales@jotron.com

Jotron USA, Inc.

10645 Richmond Avenue
Suite 170
Houston, TX 77042
USA
Tel: +1 713 268 1061
Fax: +1 713 268 1062
sales@jotron.com