

STAR UNIT

Operational Description



Version 1.0
May 2003

Prepared by:
Elmo-Tech Ltd.
Corporate Headquarters
2 Rehov HaBarzel
P.O. Box 13236
Ramat HaChayal
61132 Tel Aviv
Israel
Tel: +972-3 – 6478871
Fax: +972-3 – 6478872
Visit us at: www.elmotech.com

© 2001, Elmo Tech Ltd. All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, for purpose other than the user's manual, without prior permission of Elmo Tech Ltd.

NO WARRANTY

The technical documentation is being delivered AS-IS, and ElmoTech Ltd. makes no warranty as to its accuracy or use. Any use of the technical documentation or the information contained therein is at risk of the user. Documentation may include technical or other inaccuracies or typographical errors. ElmoTech Ltd. Reserves the right to make change without prior notice.

TABLE OF CONTENTS

<i>General</i>	<i>1</i>
<i>Software management modules</i>	<i>1</i>
<i>STAR modes</i>	<i>2</i>
Off mode	2
Setup mode	2
On mode	3
First time	3
Pre program	3
Live	3
Post program	3
Malfunction	4
Live sub-modes	4
Charge	4
Home	4
Save power (low battery)	4
First fix	5
Normal	5
Discovery	5
IDNT (Identification)	5
Relax (No motion with GPS)	6

TABLE OF FIGURES

FIGURE 1 - STAR MODES TREE	2
----------------------------------	---

TABLE OF TABLES

TABLE 1 - STAR MANAGEMENT MODULES	1
TABLE 2 - MANAGEMENT MODULES AVAILABILITY	ERROR! BOOKMARK NOT DEFINED.

GENERAL

The STAR will turn off in one of the following cases:

1. The STAR will shut itself down due to low battery detection.
2. The STAR can be manually shut off by pressing the reset button with external power disconnected (Can be done only by official support officer and can be exclusively blocked).

The moment that the STAR is turned on, its internal modes of operation are decided by the STAR according to its internal logic.

SOFTWARE MANAGEMENT MODULES

The following modules will selectively be active/not active according to the STAR mode of operation.

Later in this document it will be specified whether the module is active or not for each mode (or sub mode).

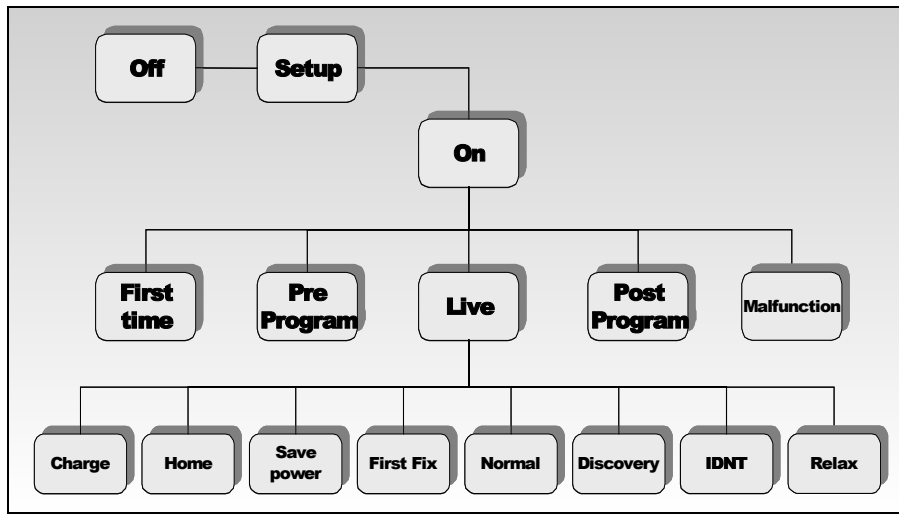
Table 1 - STAR management modules

Module name	Description
Power control	Control the STAR battery power, start and stop charging and external power control.
Monitoring	Control the GPS modes; decide when to log GPS points.
Schedule/Zones	Manage the zones in/out violations according to each zone schedule and type.
MMI	Control the LCD, Leds and buzzer. Response to user button's pressings.
Navigation	Averaging the received position and perform geographical calculations.

STAR MODES

The following figure describes the entire STAR modes of operations:

Figure 1 - STAR modes tree



Off mode

The STAR is turned off, the battery is not charging and the GPS is supplied with power from the backup battery to save last known GPS parameters (may be disabled by a jumper during storage).

Setup mode

The STAR is turned on, initialize parameters and load data from the non-volatile memory (flash and E2PROM) to its internal RAM. The STAR will check vital components usability (BIT) to detect component's malfunctions (GPS, GSM, RTC, Flash).

On mode

The On mode is initiated immediately after setup termination.
On mode is divided to five sub-modes as detailed below:

First time

First time sub mode is the initial activation mode where the STAR is actually blind and does not have any parameter to operate (there are no parameters to perform monitoring).

Pre program

The pre program sub-mode is generated upon STAR setting parameters availability and before the time of the start program.
The STAR will shut itself down upon external power disconnection.

Live

Live mode is generated if the parameters were downloaded successfully and the current time is between the start and the end program.
See later herein (Live sub-modes) a detailed description for each of the live sub-modes.

Post program

The post program sub-mode is generated upon STAR setting parameters availability and post the time of the end program.
The STAR will shut himself down upon external power disconnection.

The STAR is listening to incoming rings all the time attempting to establish a DCC connection.

Malfunction

In this mode one of the vital STAR components is out of order and the STAR can not functioning properly (GSM failure, RTC failure, Memory failure).

If this mode happens it needs a technical support interfering to fix it.

Live sub-modes

Charge

The STAR is in charge mode (external power is connected) without home detection.

Home

The STAR is in charge mode (external power is connected) with home detection.

Save power (low battery)

The battery power is detected below the normal operational power and thus the GPS will remain off.

In this mode only vital components operate, in order to save battery as long as possible.

First fix

This mode starts when the GPS position is required after a long time with GPS off (May starts immediately after power up or after any mode that does not require GPS).

Normal

Normal monitoring mode is valid only with valid GPS position, and the offender's schedule requires GPS monitoring.

Discovery

Discovery mode starts when the GPS position is required and after long time without valid position.

During discovery mode two states are toggled:

1. Discovery ON – The GPS is running in continues mode until acquisition.
2. Discovery OFF – The GPS is turned off to save the battery power.

If the discovery period expires the GPS switches its state to IDNT.

IDNT (Identification)

IDNT mode is generated after discovery mode failure.

IDNT mode requires the offender's cooperation.

During IDNT mode the offender is provided with an IDNT message (LCD) that instructs him/her to identify himself/herself as soon as possible.

The IDNT period is limited (download parameter) and the STAR shall return to discovery mode upon positioning failure.

Relax (No motion with GPS)

Relax mode is defined upon no-motion detection and with valid GPS point.

The STAR assumes that the unit remains in its last known position and turns the GPS off.

The time period that the last GPS point remains valid can be downloaded as STAR parameter.