

# ***Stagetrapper II***

BY TTA

User Manual

Hardware

*The information contained in this document is confidential, privileged and only for the information of the intended recipient and may not be used, published or redistributed without the prior written consent of TTA AS.*

## Table of Contents

<b>1</b>	<b>Introduction</b> .....	3
1.1	Stagetracker II.....	3
1.2	Products covered by this documentation.....	3
1.3	Technical support .....	3
1.4	About this manual .....	3
1.5	Permissions.....	3
1.6	Disclaimer .....	3
<b>2</b>	<b>System description</b> .....	3
2.1	Principles for tracking and use .....	3
<b>3</b>	<b>Terms and definitions</b> .....	5
3.1	Terms.....	5
3.2	Stagetracker II coordinates.....	5
3.3	Output coordinates .....	5
<b>4</b>	<b>Hardware</b> .....	6
4.1	Stagetracker II™ Core unit, front panel .....	6
4.2	Stagetracker II™ Core unit, rear panel.....	6
4.3	Stagetracker II™ Net unit, front panel .....	7
4.4	Stagetracker II™ Net unit, rear panel .....	7
4.5	Stagetracker II™ RadioEye .....	8
4.6	Stagetracker II™ Tag .....	9
4.7	Tag charger .....	9
4.8	Stagetracker II™ Hybrid cable.....	10
4.9	Link connections .....	10
	Figure 1 Stagetracker II Core unit, front panel .....	6
	Figure 2 Stagetracker II™ Core unit, rear panel.....	6
	Figure 3 Stagetracker II™ Net unit, front panel .....	7
	Figure 4 Stagetracker II™ Net unit, rear panel .....	7
	Figure 5 Stagetracker II™ RadioEye front cover .....	8
	Figure 6 RadioEye mounting bracket and cable connections.....	8
	Figure 7 RadioEye with drop arm accessories .....	8
	Figure 8 RadioEye, tilt adjustment handle .....	8
	Figure 9 Stagetracker II™ Tag, TTA-logo .....	9
	Figure 10 Stagetracker II™ Tag identification/mac address .....	9
	Figure 11 Stagetracker II™ charging led .....	9
	Figure 12 Hybrid cable connections .....	10
	Figure 13 Stagetracker Hybrid cable, standard lengths.....	10
	Figure 14 Stagetracker II™ link connections .....	10

---

## 1 Introduction

### 1.1 Stagetracker II

The TTA Stagetracker II™ is the world leading solution for tracking of actors and artists on stage – indoor and outdoor.

The Stagetracker II™ support the following spatial/immersive audio solutions:

- DS100 from d&b
- L-ISA from L-Acoustics
- SARA II from Astro Spatial Audio
- Holophonix from Amadeus
- AFC 4 from Yamaha

In addition, we have an ArtNet interface for direct control of lighting.

### 1.2 Products covered by this documentation

This documentation will cover the following products:

- 20000 Stagetracker II Core with display
- 21000 Stagetracker II Net
- 22000 Stagetracker II Tag
- 50000 Stagetracker Hybrid Cable

### 1.3 Technical support

For support questions not covered by this manual, we are happy to receive those by email to: [support@tta-sound.com](mailto:support@tta-sound.com)

Also, as the product and solutions are under constant development, there will be mismatch between this manual and the latest version of our SW and HW. If you find any such discrepancies, we are glad to receive feedback, preferably via email.

### 1.4 About this manual

This manual covers the following:

- Stagetracker II™ Hardware
- Link connections

### 1.5 Permissions

The Stagetracker II™ is a tracking system based on 4.9 to 5.9 GHz WiFi transmitters and receivers. The end customer is responsible to obtain the necessary permits to operate the equipment in the wanted area. TTA AS will assist in this process.

### 1.6 Disclaimer

The information contained in this document is subject to change without prior notice. TTA AS shall not be liable for errors contained herein or for incidental or consequential damages about the furnishing, performance, or use of this document. It is the customer's responsibility to verify that they have the latest revision available by checking with TTA AS.

## 2 System description

### 2.1 Principles for tracking and use

The Stagetracker II™ system uses active devices (tags) that are positioned on a tracking object. These tags periodically transmit WiFi packets containing identification data, as well as 9 DOF sensor data and status data. These packets are received by directional receivers, the RadioEyes (RE).

One RE will find the direction towards a tag with a given precision. Using two (or more) REs one can calculate intersections between the vectors.

The REs is connected (power and data) to the Stagetracker II™ Net interface rack unit. This unit is in turn connected to the Stagetracker II™ Core processing rack unit. The Stagetracker II™ Core is a high-performance computer running the Stagetracker II™ suite of programs.

It is the nature of narrowband RF tracking solutions that reflections will occur. It will also be susceptible to shadowing, from bodies or stage props that somehow are electrically conductive. Part of the Stagetracker II™ solution is to handle these

phenomena, and to do so we have defined objects and structures that aid in this. These will be covered in detail in a later chapter.

It is also important to be aware that the Stagetracker II™ is optimized for tracking of persons and objects - not tags. Small movements are filtered out, and the system should not respond to small, quick movements, e.g. a person turning around, and hold the position mostly steady during this.

Every audio or light output module has different requirements to the output signal parameters, and the Stagetracker II™ handles them different.

### 3 Terms and definitions

#### 3.1 Terms

In this document we use the following terms.

RE / RadioEye	This is the directional receiver. It contains 60 antennas that can be electrically tuned to function as a high gain directional antenna.
Tag	Small black rechargeable transmitter that is positioned using the REs. These tags are assigned to a Tracking Object, and typically worn hidden under the clothes.
Tracking Object	Person or object that are tracked. Each Tracking Object is assigned two Tags.

#### 3.2 Stagetracker II™ coordinates

In the world of lighting and sound systems there is a plethora of different coordinate systems and ways to specify a position and direction. Internally, Stagetracker II™ uses x, y and z / height:

- X is from stage right/house left to stage left/house right.
- Y is from downstage towards upstage.
- Height / Z is measured from the stage floor and upwards.

Thus, if you are seated in front of the stage:

- X is pointing to the right.
- Y is pointing away from you, towards the back of the stage.
- Height / Z is up.

#### 3.3 Output coordinates

The various output modules may (and will) have different coordinate systems. Stagetracker II™ is able to convert from internal coordinates to the output coordinates using a set of transformations. Those are described under each of the different output modules.

## 4 Hardware

### 4.1 Stagetracker II™ Core unit, front panel



Figure 1 Stagetracker II Core unit, front panel

The touchscreen on the front panel displays the following information:

- Stagetracker II™ Core status
- Current software version
- IP-address of the unit
- Temperature of the cpu
- Power on/off button

The beacon controlling the Tags on/off is located onboard the Stagetracker II™ Core unit.

The antenna found on the front panel is for beacon/Tag communication (this antenna is not for tracking data purposes).

### 4.2 Stagetracker II™ Core unit, rear panel



Figure 2 Stagetracker II™ Core unit, rear panel

On the rear panel there are two network connectors and one powerCON™ connector for mains power along with the serial number of the unit.

The left network connector is marked «Stagetracker Network». This connector connects to any of the connectors marked «Stagetracker Network» located on the rear panel of the Stagetracker II™ Net unit.

The right connector is marked «Tracking Data Interface / LAN ».

This connector connects to the Position Consumers, in most configurations a switch to which other customer hardware is connected. It can also be connected directly to a computer for setup and configuration of the Stagetracker II™ system. See figure 14 for detailed link connections.

**For all ethernet connections, use ethernet cables that meet the Cat5e standard or higher.**

#### Ventilation

The Stagetracker II™ Core uses fans for cooling. Adequate space must be left for air flow around fans and vents when in use.

### 4.3 Stagetracker II™ Net unit, front panel



Figure 3 Stagetracker II™ Net unit, front panel

The Stagetracker II™ Net unit has three groups of connectors on the front panel which deploys power and network connection to the RadioEyes.

Each group also contains a fuse for the output power circuit and a led indicating link between the Stagetracker II™ Net unit and the Stagetracker II™ RadioEye.

### 4.4 Stagetracker II™ Net unit, rear panel



Figure 4 Stagetracker II™ Net unit, rear panel

On the rear panel there are two network connectors and one powerCON™ connector for mains power along with the serial number of the unit.

One of the two network connectors connects to the left network connector on the Stagetracker II™ Core unit marked «Stagetracker Network» as described above.

The other network connector is used for daisy chaining multiple Stagetracker II™ Net units if more than three RadioEyes are used. See figure 14 for detailed link connections

**For all ethernet connections, use ethernet cables that meet the Cat5e standard or higher.**

#### Ventilation

The Stagetracker II™ Net uses fans for cooling. Adequate space must be left for air flow around fans and vents when in use.

#### 4.5 Stagetracker II™ RadioEye

The Stagetracker II™ RadioEye connects to the Stagetracker II™ Net units front panel connections, RadioEye 1-RadioEye 2-RadioEye 3.

There are two cable connections, one for power, 48v DC, and one for ethernet connection. The label with serial number and IP-address is found on the backplate of the RadioEye.



Figure 5 Stagetracker II™ RadioEye front cover



Figure 6 RadioEye mounting bracket and cable connections.

The RadioEye is supplied with two 48 mm half couplers attached to the bracket and one eye bracket for safety cable. Secure the RadioEye with a safety cable that is approved for the weight of the RadioEye so that the safety cable will hold the RadioEye if a primary attachment fails.



Figure 7 RadioEye, tilt adjustment handle



Figure 7 RadioEye with droparm accessories

To angle and position the RadioEye there are two spring loaded handles on the sides of the bracket. To loosen the bracket, pull the handle out and turn clockwise and then push the handle back in again and loosen the handle. Do the opposite to tighten the bracket.

TTA recommends using droparm when installing the RadioEye to ensure that the RadioEye will be positioned beneath other equipment such as light fixtures etc.



#### 4.6 Stagetracker II™ Tag



Figure 8 Stagetracker II™ Tag, TTA-logo



Figure 9 Stagetracker II™ Tag identification/mac address

The Stagetracker II™ Tag is to be used with the TTA-logo facing upwards. For identification of the device, the four last digits of the mac address found on the opposite side of the TTA-logo is used. For example, when assigning Tags to a Tracking Object the identification number of available Tags appears in the dropdown menu for selection.

The Stagetracker II™ Tag is equipped with a mini-usb B female connector for charging of the device. Use a mini USB-B Male > USB-A Male cable to connect the Stagetracker II™ Tag to a charger that meets the USB battery charging specification BC1.2.



Figure 10 Stagetracker II™ Tag charging

The led next to the USB socket will begin to flash red when charging, if the device is fully discharged it can take a while before the led begins to flash.

When the Tag is fully charged the led turns solid green.

When the Tag is connected to a running Stagetracker II™ Core unit and the Tags are turned on from the Stagetracker II™ Controller software the led is rapidly flashing green.

#### 4.7 Tag charger

TTA supplies third party USB battery chargers, currently two different models are available:

Model 1 - 13 x USB 3.0 Type-A interfaces + 1 USB fast-charge port, 5V/2.4A

Model 2 - 7 x USB 3.0 Type-A interfaces + 3 USB fast-charge ports, 5V/2.4A

#### 4.8 Stagetracker II™ Hybrid cable

The Stagetracker II™ Hybrid cable carries ethernet and power to the Stagetracker II™ RadioEyes from the Stagetracker II™ Net unit.

The cable end with the male Amphenol EcoMate connector (power) connects to the Stagetracker II™ Net unit. The other end is a female Amphenol EcoMate connector and connects to the Stagetracker II™ RadioEye.

Ethernet connectors are Neutrik etherCON.

It is possible to link several Stagetracker II™ Hybrid cables to extend the length of the cable with an ethernet coupler.

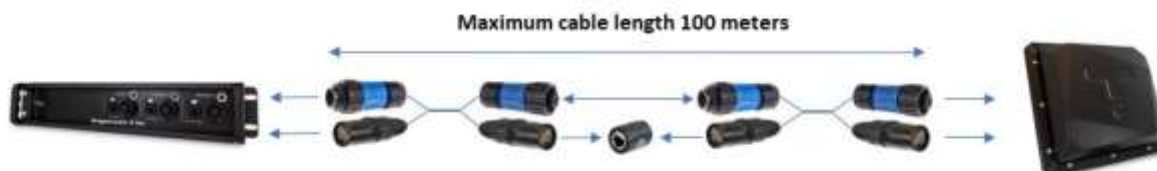


Figure 11 Hybrid cable connections

**Maximum total cable length is 100 meters, Cat5e standard.**

Standard cable lengths is shown in figure 13. For other lengths, please contact TTA on [sales@tta-sound.com](mailto:sales@tta-sound.com)



Figure 12 Stagetracker Hybrid cable, standard lengths

#### 4.9 Link connections

Illustration of link connections Stagetracker II™, configuration with customer hardware.



Figure 13 Stagetracker II™ link connections