

# Users' Guide Dots & Dot Driver

## Intended Use



Dots & Dot Drivers work together to emit an IR light signal that can be seen and followed by a Jigabot device or Auto Tracking Head. Your Dots can be driven with four distinct Signal Tracking Patterns, allowing differentiation of up to four subjects at a time. Dots & Dot Drivers are precision electronic & optical devices intended to be used by adult professionals. These devices are unique instruments, and all users should first learn how they are intended to be used, and then honor the principles of operation. Your Jigabot or Auto Tracking Heads device came with four Dots, and one Dot Driver.

**Dots** are intended to be easily attached to clothing, belts, or bands via the integrated magnet. They are also designed to be small, yet robust, and to be quickly attached to clothing—separate from a power supply. To be strong & dissipate heat, they are made of aluminum.

**Dot Drivers** are designed to provide power to the Dots, enabling them to run for extended periods of time. Hence they contain rechargeable batteries and extensive electronic & firmware logic. They are intended to be attached to the subject (or placed in a pocket) “out of the way,” controlling & powering Dots via connected micro USB cables.

Figure 1: Shows Dots (2) and a Dot Driver.



### Intended Use

Dots provide a strong directional signal, and are thus designed for long-range IR tracking (particularly indoors, and in low-light conditions). In proper conditions, tracking ranges of over 400 feet are possible.

Dot Drivers are designed for extended operating times. For example, Dot Drivers can last up to 3 hours or longer. And when

a battery is depleted in one IR Power Pack, a user can replace it with another fully charged Power Pack.

Intended subject-tracking movements are these: Left & right, up & down, near & far. Dots & Dot Drivers are not designed to track subjects who, while moving, are simultaneously spinning (like ballroom dancers).

An incomplete list of the kinds of subject-activities that are intended to be tracked using Dots & Auto Tracking Heads (Jigabot units) is here:

- Presenting, Teaching, Preaching
- Self-filming, News Broadcasting
- Stage Performances: Actors, Musicians
- Sports: Hockey, Fencing, Equestrian

### Definitions

At various times within this Users' Guide, we will use the terms **Dot** and **IR Emitter** (or simply **Emitter**) interchangeably.

We will also use the terms **Dot Driver** and **IR Power Pack** interchangeably.

We will also use the terms **Jigabot** and **Auto-Tracking Camera (or Auto Tracking Head)** interchangeably.

### Contents

This Users' Guide will cover the following additional topics related to IR Emit- ters & Power devices:

- **Attachment.** How to attach Dots & Dot Drivers onto a subject.
- **Coverage.** The pattern & range of an IR signal, and how that pattern is affected by using more than one Dot, or IR Emitter.
- **Placement.** Where to place your Jigabot 5 or other Auto Tracking Head so that they can see & track your subject.
- **Connecting.** How to connect Dots & Power, and cable options.
- **Operating.** Powering ON & OFF, Power Modes, and Charging.

# Users' Guide Dots & Dot Driver Attachment



**ATTACHMENT** (uh-tach-muh nt), noun:  
The act of attaching IR Emitters to a subject's clothing in such a manner that proper IR Coverage is achieved. IR Power Modules are also attached to a subject.

A Jigabot will track IR Emitters, or Dots, so attaching them properly to a subject is critical. This section discusses where and how to attach Emitters to subjects.

**Figure 2.** Front view of two subjects with attached Emitters. The Emitters can be attached underneath clothing, provided that the outer clothing is thin. (Test your particular clothing.)



Figure 2 shows oversized IR emitters attached to a man and woman.

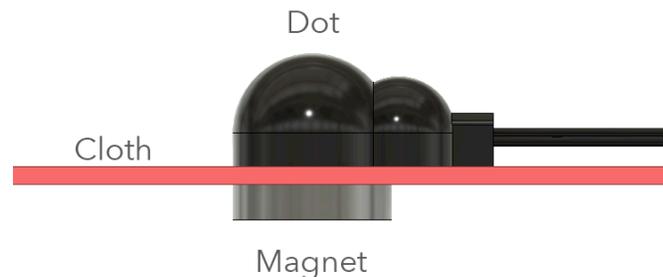
Emitters can be attached to a belt or to clothing worn near the subject's hips or waist. Alternatively they can be attached to the lapel of a jacket or sweater.

IDEALLY, however, you should try to place the Dots on the neck or collar of a shirt, dress, coat, or jacket.

Dots are magnetic, and are attracted to a second, included magnet. Figure 3 shows a Dot being attached to the outside of clothing using the included magnet.

Figure 4 shows the top view of a subject to which two Emitters are attached. Therefore Emitters are typically offset 45 degrees from center. This is done to maximize the visibility or "Coverage" of the subject, as explained more in the next section.

**Figure 3:** Attach a Dot to the outside of your clothing using the included magnet.



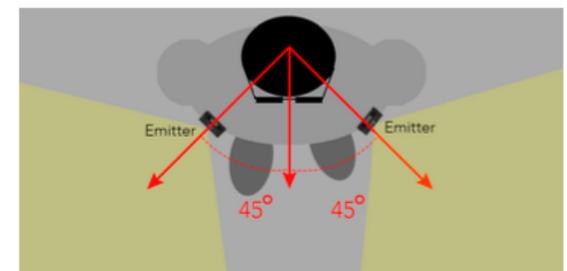
Emitters should be attached so that IR light is visible from the greatest number of locations within which a Jigabot might be placed.

Whereas Dots or IR Emitters are attached to clothing, belts, etc., an IR Power Pack is typically placed in a pocket. An IR Power Pack may be attached anywhere to a subject (typically underneath clothing and out of sight). Tape may be used to keep a Power Pack in position (such as electrical or gaffer tape).



Direct line of sight is required between an Emitter and a Jigabot; do not aim an Emitter away from a Jigabot, or obscure it.

**Figure 4.** Top view of subject with 2 attached Emitters.



# Users' Guide Dots & Dot Driver Coverage



## COVERAGE (*kuhv-er-ij*), noun:

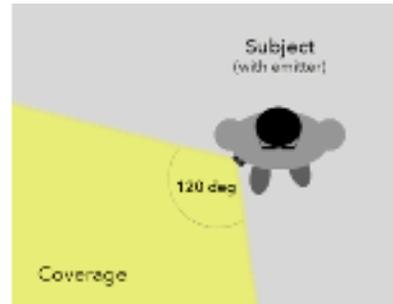
The area illuminated by one or more IR Emitters. IR light is not visible to humans, but is to Jigabot devices. In fact, it is only within Coverage, that a Jigabot can first see & then track the emitter and the subject upon which the emitter is attached.

An IR Emitter (Dot) shines Infra-red (IR) light at a 120 degree "angle of throw." The illuminated area is not visible to humans, but is illustrated in Figures 4 and 5 by colors of yellow, magenta, purple and blue. All IR light from all Emitters is collectively called "Coverage." Coverage is the only area within which a Jigabot device can see/track a subject.

Figure 5 shows a subject with one Emitter. Figure 6 shows the same subject wearing 4 Emitters in order to shine IR light in any direction. We call 360 degrees of coverage "Complete Coverage." Plenty of overlapping coverage (blue and yellow) is best.

Notice that only two Emitters (yellow and magenta) are sufficient to permit a subject to be seen from 3 sides (left, right, front.) Thus two Emitters may be enough to track a Presenter on a stage, provided that she never turns her back to the audience (which would be a 4th side).

What happens in Incomplete Coverage when a Jigabot cannot see an Emitter? The Jigabot device will remain stationary until it once again sees an Emitter, then it will resume tracking.

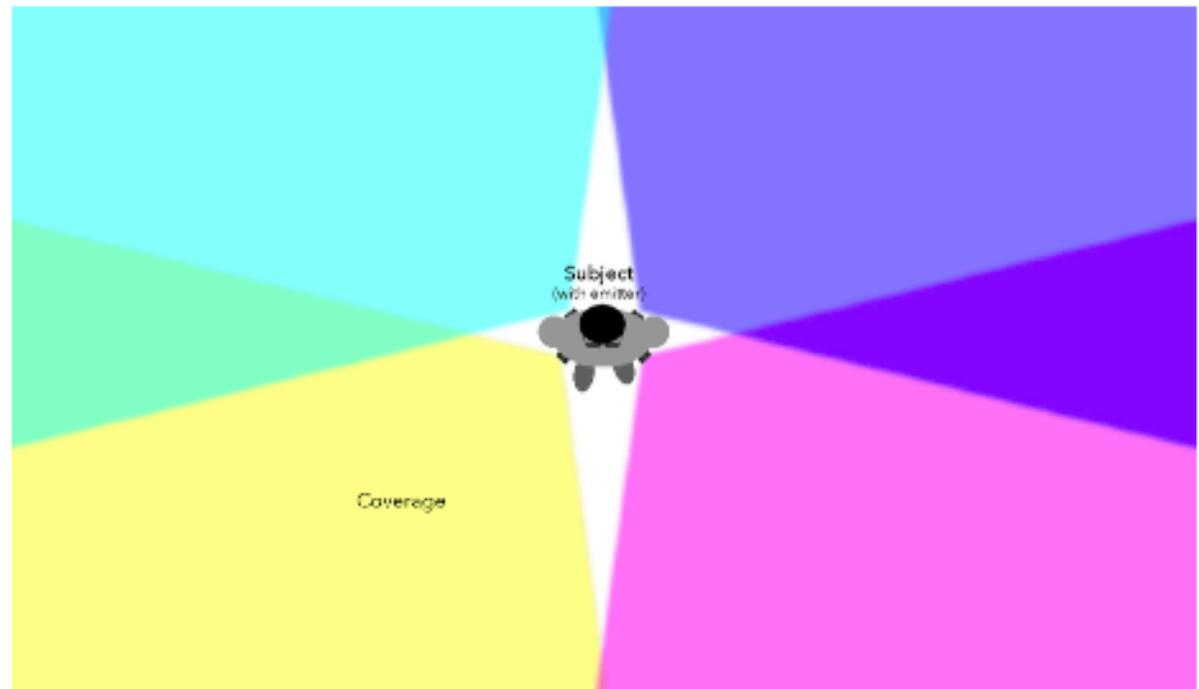


**Figure 5.** A top view of a subject with one attached IR Emitter. The Emitter is attached to a belt or other item of clothing and throws IR light 120 degrees in all directions (up, down, left, right). In this case, Coverage forms the shape of a cone, and is limited to 120 degrees from its source (the Emitter).



Whenever possible, light sources within the tracking environment that produce IR light should be turned off or dimmed. If a subject (or attached Emitters) are "blown out" by competing IR light, a Jigabot may not be able to sense an Emitter's IR signal.

**Figure 6.** A top view of a subject wearing 4 Emitters, where total coverage is 360 degrees. The coverage is 3D, and forms a spherical shape. This kind of coverage is called "Complete Coverage" because a subject can be seen from any direction.



# Users' Guide Dots & Dot Driver Placement

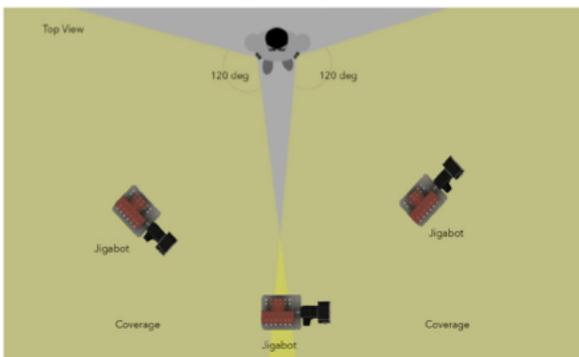
**PLACEMENT** (*pleys-muh nt*), noun:  
The position of a Jigabot or the placing of a Jigabot such that it can track an IR Emitter and subject. A Jigabot must be placed within Coverage to be able to track the Emitter.

The first rule of IR tracking is to always place your Auto Tracking Heads, or Jigabots, within Coverage (see Figure 7). In other words, always place your Jigabot where it can see IR light. Four Dots enable Auto Tracking Heads to be placed “anywhere.”

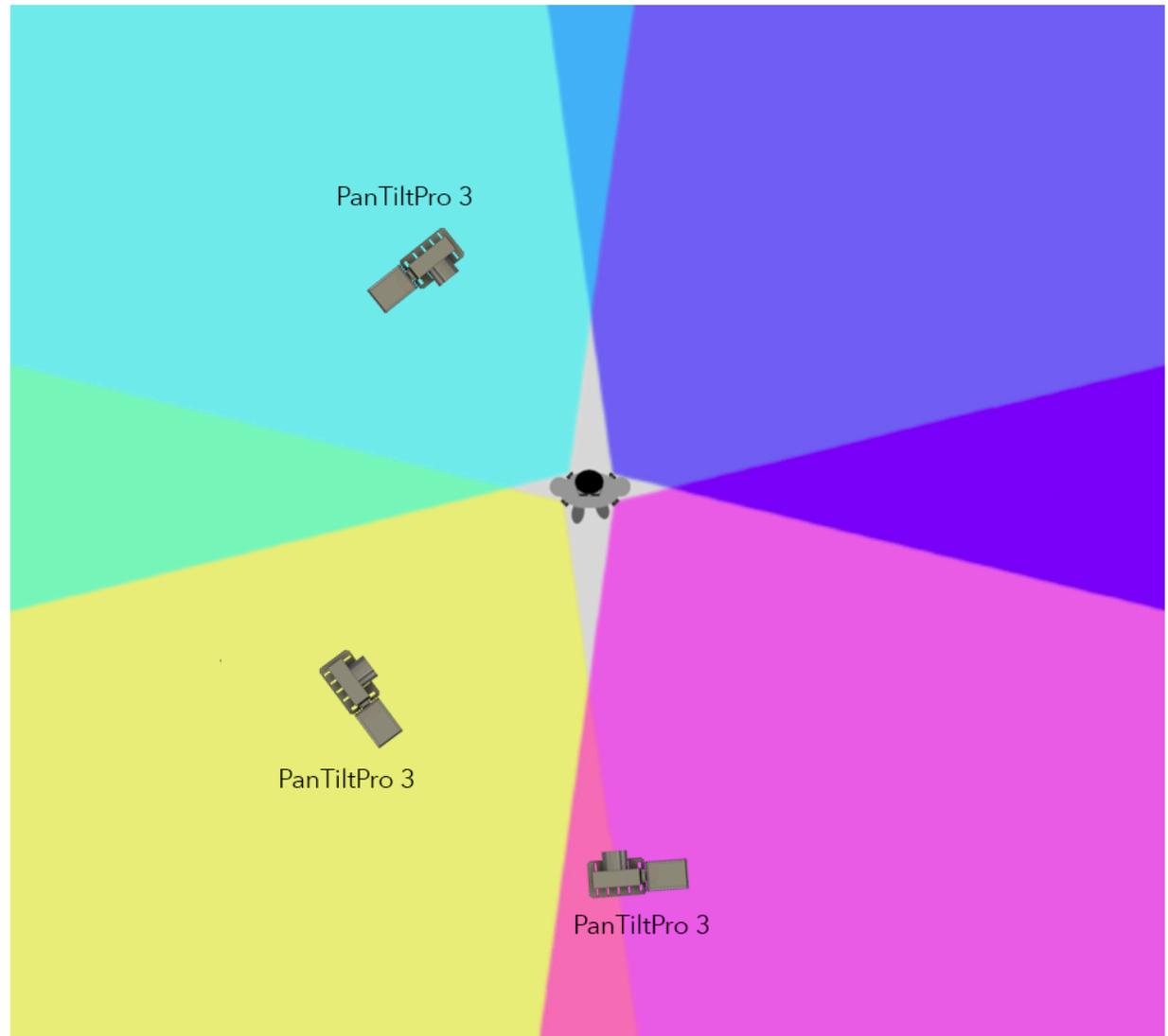
As discussed in the Coverage section above, only 2 Emitters allow Coverage from 3 sides: left, front, and right. Figure 8 shows a presenter on a stage, never turning his back to the audience, and wearing only 2 Emitters. This may be sufficient depending upon the motion of your subject.

Test the placement of your Jigabots in advance.

**Figure 8.** This illustrates a basic configuration for tracking a presenter on a stage using 2 Emitters.



**Figure 7.** Placement is simple in Complete Coverage: simply place one or more Jigabots wherever you get preferred angles.



# Users' Guide Dots & Dot Driver

## Connecting

**CONNECT** (*kuh-nekt*), verb:  
To join together, and establish a communications & power link between, IR Emitters & Power module.

Dots, or IR Emitters, are powered and controlled via the Dot Driver, or IR Power Pack.

As shown in Figure 9, two Dots are connected to a single 3.5mm audio jack, via a small black wires.

As shown in Figure 10, two jacks can connect to a single driver, allowing four Dots to be powered by a single driver.

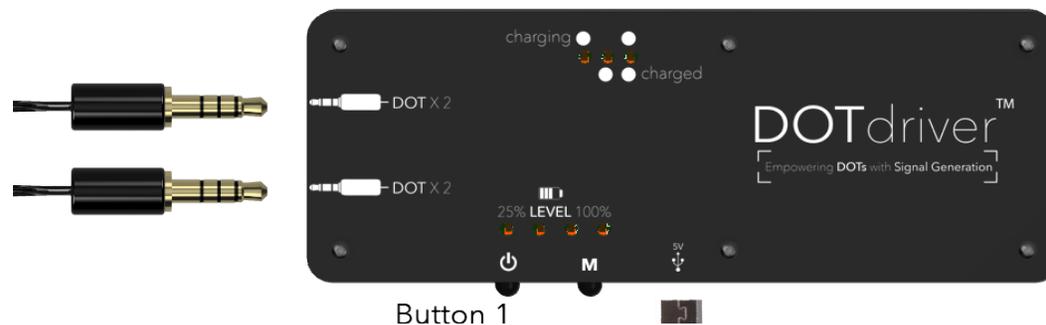
After attaching the Dots to your clothing, connect them to the Dot Driver.

The Dot wires are over 3 feet in length, allowing you to place the Dot Driver in your pocket or otherwise out of sight.

**Figure 9:** Four Dots can connect to a single Dot Driver which powers them.



**Figure 10:** Two jacks (each powering 4 Dots) can connect to a single Dot Driver which powers them.



# Users' Guide Dots & Dot Driver

## Operating



**OPERATING** (*op-uh-rey-ting*), verb:  
To manage or use an IR Power device, in order to power and control IR Emitters.

As mentioned previously, Dots or IR Emitters, are controlled & powered via an IR Power device that we call a Dot Driver, and which is illustrated in Figure 11.

### Power ON/OFF

To power ON the Dots that have been connected to the Dot Driver: press Button 1 for about one second. You will see LEDs on the Dot Driver illuminate momentarily indicating that you have powered ON.

To power OFF the Dots that have been connected to the Dot Driver: press Button 1 for about one second. You will see LEDs on the Dot Driver power OFF indicating that you have powered OFF.

### Checking Battery Level

To check the battery level: when the Power ON, click (briefly) the ON/OFF button to activate the Indicator LEDs. The Indicator LEDs will illuminate briefly to show your Battery level, where 1=25%, 2=50%, 3=75%, and 4=100%.

### Charging the Battery

To charge the Dot Driver: connect one end of a Micro USB cable to the Dot Driver where shown in Figure 11. Then plug in the other end of the USB cable to the 5V DC

adapter that was supplied with the Dot Driver. This adapter is then plugged into an A/C wall outlet, and will charge the IR Power unit at a rate of 1A. Charging LEDs 1 and 3 will illuminate when the Dot Driver is charging.

Charging LEDs 2 and 3 will illuminate when the Dot Driver is finished charging.

Charging time takes approximately 2 hours.

### Changing Signal Tracking Patterns

Dots can be switched between one of 4 differentiated signal patterns. Your Jigabot or Auto Tracking Head can follow one specific pattern at a time.

To change a single pattern, press Button 2 for about one second. You will see LEDs on the Dot Driver blink to indicate which pattern they are set to: 1, 2, 3, or 4. Press Button 2 again to advance to the next pattern (or toggle to pattern 1 again).

Blinks correspond with patterns, so you will see a single blink representing pattern 1, two blinks representing pattern 2, and so on.

**IMPORTANT:** Your Jigabot or Auto Tracking Head ships with Signal Pattern 1 set by default. If you

change this pattern on your Dot Driver without also changing the pattern that your Jigabot is following, your Jigabot will not follow your Dots.

**NOTE:** Always set your Dot Driver to Pattern #1 by default.

Content of all Users' Guides may be subject to change at any time without notice.

**Figure 11:** Dot Driver (IR Power Pack) showing locations of Button 1, Button 2, and the USB jack.



# Users' Guide Dots & Dot Driver

## Warnings, Warranty & Support



NOTE: Standard Jigabot Dots are magnetic. Do not use if you have a pacemaker; rather, request a non-magnetic Dot.



### WARNINGS

IR Emitters and IR Power Packs are precision electronic / emitting devices. They are intended to be used only in defined ways, by professionals. They should not be by those who have not read & understood this Users' Guide.

There are dangers to you and to these devices if not used properly:



**Liquids.** Neither IR Emitters nor IR Power Packs are intended to get wet. Water or other liquids will short-circuit the electronics, and cause failure.



**Looking.** Do not look into an IR Emitter when it is powered on. IR light cannot be seen by humans, but can damage eyes.



**Clothing.** Attachment of the IR Emitter by its spring clip to more fragile cloth or clothing can damage the clothing.



**Falling & Bumping.** An Emitter & Power device are both made of aluminum and very hard. Do not attach where your body could be injured in the event of falling or bumping into another object.



**Heat.** IR Emitters can get very hot. Please do not attach them where you or your clothing could be burned.



**Cables.** Never hold a Jigabot device by a cable!. Also, do not leave cables unattended, or use cables in ways that can cause choking or other physical injury.



**Filters.** IR Emitters use glass filters which are fragile and if broken could cause bodily injury.



**Batteries.** The IR Power Pack contains Li-Ion batteries. Do not expose them to extremes of heat (120 F) or cold (32 F).



**Charging.** IR Power Packs are intended to be charged only with the 5V, 1A, 110/220AC wall chargers supplied with the units--and should not be charged by other means. IR Emitters should never be charged!



**Pinching.** All Jigabot devices are motor-powered robots which can pinch or even crush fingers or hands. Do not put hands near Jigabot devices while in operation!

### Avoid Overheating

Do not power on when Dots are touching or are magnetically attached to each other.

### LIMITED WARRANTY

Jigabot warranties its IR Emitters & IR Power devices against faulty parts and workmanship for a period of 18 months. Judgment of original quality of parts and workmanship, and of cause of failure, is solely Jigabot's. Improper use of Emitters or Power Packs, including uses not specifically mentioned herein, will void your warranty.

### SUPPORT & HELP

Please find additional User Documentation at [www.Jigabot.com/docs/](http://www.Jigabot.com/docs/).

Email questions to: [support@Jigabot.com](mailto:support@Jigabot.com)