



Phoenix Technologies

20 Years of Performance and Innovation

VisualeyezTM III

3D Motion Capture

Quick Start Guide



Welcome to the Visualeyez Experience!

Your VZ10K/VZ10K5 PTI 3D motion capture system is powerful and autonomous. It is also very simple to operate and use.

Please follow the instructions on these pages to set up your tracker(s), markers, and software. When you are ready to learn more on your system's advanced functions, we recommend that you read the full system manual.

If you meet any problem, please email support@ptiphoenix.com

1

PCIe card(s):

Install the 2-port PCIe card(s) in your computer.



2

When booting your PC, Windows will detect the card and request the drivers. Locate the PCIe card drivers on the W&T CD shipped with your system.

3

Install the dongle driver from the USB flash drive – do not plug in the dongle before the driver is installed. Then, plug in your dongle.



4

From the USB flash drive:

- 1/ Install **Microsoft DirectX 9.0c**
- 2/ Install **Microsoft Visual C++ 2010**
- 3/ Install **Microsoft .NET Framework 4.**

(Alternatively, you can download and install those from the Internet)

- 4/ Install VZSoft 3 (motion capture system operation software).
- 5/ Locate VZSoft executable in *c:\Program Files(x86)\Phoenix Technologies* and right click on it and then choose “Run as administrator”.

1

Your motion capture system comes with either steel tripod(s), or custom PTI tripod(s).



Steel Tripod



Custom PTI tripod with transportation case

2

Steel tripod:

Mount each tracker onto a tripod.

Attach the tracker to a tracker clamp first.

Attach each tracker clamp to a ball joint plate.

Adjust the length of each leg as necessary.



Tracker clamp and ball joint plate



Tracker clamp with two top hooks in reverse position to allow for tracker insertion



Tracker clamp with inserted tracker and two top hooks in secure grip position.

3

Custom PTI tripod:

Mount the tracker with its supporting bracket onto the tripod.

Make sure the **leg spreader** is properly attached to each tripod inner legs' Velcro.

The leg spreader is absolutely necessary to provide tripod stability.

Make sure the weight of the tracker is equally distributed over the 3 legs.

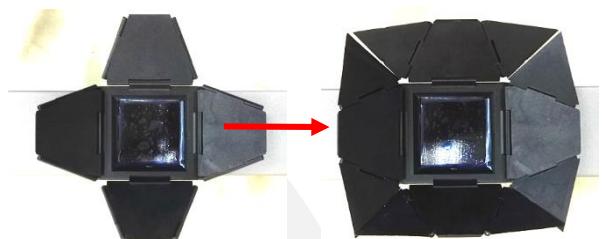


Quick Start Guide

2b – Tracker Installation

1

Unfold each tracker's eye cover and adjust it to form a square.



2

Prepare the following:

- 1 – white RS 422 cable for each tracker
- 1 – tracker power adapter for each tracker
- 1 – wireless transmitter
- 1 – wireless transmitter power cable

3

Connect the (white) RS422 **data cable**, with the Red ('Computer') end to the PCIe card port, and yellow ('Tracker') end to each tracker.



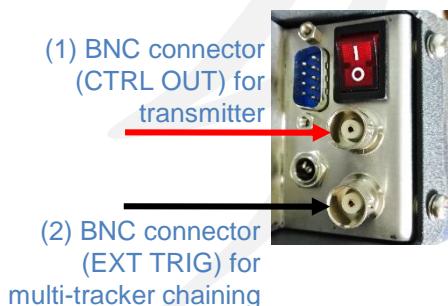
Then connect the (black) **power cable** to each tracker.

4

Transmitter: for tetherless operation, first connect the round BNC end of the transmitter power cable to the tracker's first BNC connector (CTRL OUT). See (1) on picture.



Then, connect the transmitter to its power cable and place it on top of the tracker (with Velcro). Finally, plug in the transmitter power adaptor (5V).



5

If you will use more than one tracker, connect the small male-male BNC **cable** to each tracker's multi-tracker chaining connector (EXT TRIG) as well . See (2) on above right-side picture.



Male-male BNC cable

Skip this page if you are using only one tracker

1

If you need to use more than one tracker, all trackers must be synchronized to work together by chaining them with **BNC trigger cables**. The first tracker on the trigger chain is the master, the others will be slave trackers.

2

Master tracker: Any tracker can serve as the master. The trigger cable chain normally starts forming from here, with the female end of a trigger cable first. The default Coordinate Reference Frame (CRF) of the master shall also become the default system CRF, unless changed by software.



Trigger cable to BNC extension cable (master tracker)

3

Slave tracker(s): Use a BNC T-splitter to connect the male end of a trigger cable to the next (slave) tracker. Repeat this until all slave trackers have been daisy-chained together with trigger cables.

Trigger cable connections
for each slave tracker



4

Last slave tracker: The T-splitter on the last tracker of the chain should have a male end left open. Connect the provided cable *terminator* to it to close the trigger cable chain. (This is needed to suppress the electronic signals from bouncing back and forth causing false triggers.)



Trigger cable connections
for the last slave tracker

5

For a 4~8 tracker system, a 75 ohm terminator should be used. When using more than 8 trackers together, a terminator may not be necessary. (Please consult with PTI should any tracker operation problem occurs.)



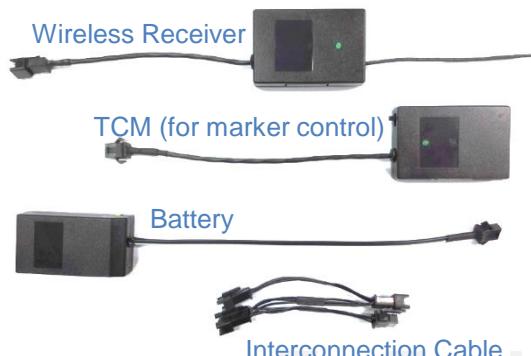
Terminator
(style may change)

Skip this page if you are using Octopus or SIK markers

1

A tetherless Standard marker system normally consists of:

- One receiver
- One target control module (TCM)
- One battery
- One interconnection cable
- A second TCM can be added if more markers need to be used



Connect all these together, with the interconnection cable.

2

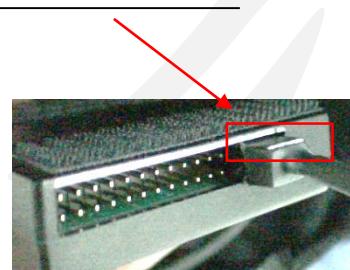
Each TCM has a TCM ID (1 to 8) indicated on a label when shipped. If you need to change this ID, please refer to page 12 of this manual.

3

Connect markers to the TCM. Make sure the white line on each marker matches the white line on the TCM.

If markers do not turn on, their connections on the TCM may be reversed.

When turning off a TCM, wait 30 seconds to let it reset properly before you turn it back on.



Each marker inherits a MarkerID made up by the TCMID followed by the LEDID associated with the location on the TCM to which the marker is inserted.

On the TCM, the white dot preceding the white line indicates location of the lowest LEDID associated with the TCM.

4

Each transmitter-receiver pair operates on one set frequency channel. If you need to change this channel, please refer to page 12 of this manual.

Skip this page if you are not using Octopus markers

1

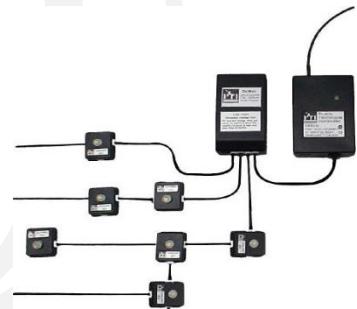
An Octopus marker ('OctKMarker') system consists of:

- One battery ('OctBatt')
- One receiver ('OctRx')



Each OctMarker has its own fixed ID and You can interconnect OctMarkers into any pattern.

Each battery ('OctBatt') can support up to 3 marker branches, with up to ~25 Octopus Markers in total.

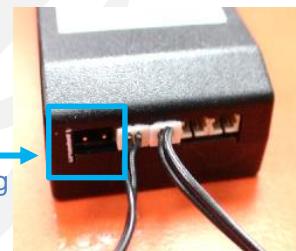


Connect no more than 12 Octopus Markers per branch. Octopus markers are hot-swappable.

2

The left connector, with a vertical white line, is for battery charging. The white line on the battery charger should match this white line when plugged in.

Left connector for battery charging



Octopus Battery

3

The interconnection cables for OctKMarkers should be handled with care. A damaged cable will cause all markers behind it to stop working properly.

When disconnecting a cable from an OctKMarker, do not tug at the wire.

Lightly lift up the bottom edge of the connector and pull it out, the connector will disengage easily.



Skip this page if you are not using SI3K markers

1

Each SI3K (“SIK” in brief) marker comes with 3 Marker IDs (on its label) and can control up to 3 LED targets.



Normally one of the LED targets is on the marker body itself, the other 2 are on short extension wires plugged into the two side connectors.



Each LED has its own Marker ID that cannot be changed.

Two types of SIK LEDs
on extension wires

2

The transmitter for operating the wireless SI3K markers is the same one as used for Standard markers. Please refer to page 5 of this guide for more information.



The SI3K markers do not require any external receiver. Each marker carries its own receiver internally.

The SI3K marker battery is hot-swappable and can be recharged with one SIK battery charger (up to 8 batteries can be charged at the same time).



SIK Marker and
its battery

1

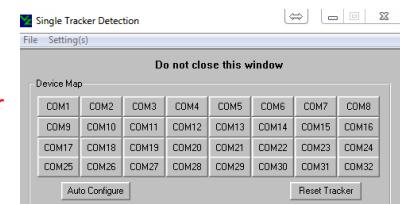
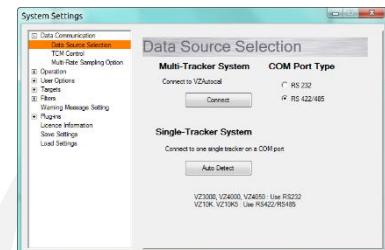
One-tracker system:

1. Power up your tracker, and start VZSoft.
2. Go to **Setup\Guided System Setup** and follow the instructions till the end. The complete process may take a few minutes, be patient.

OR:

Go to Settings\Data Source, click Auto Detect and wait for a short while. The Com port to which your tracker data cable is connected should turn white when the tracker is detected.

Do NOT close the tracker detection window or your tracker will no longer be detected.



2

Multiple-tracker system:

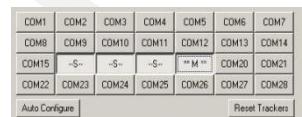
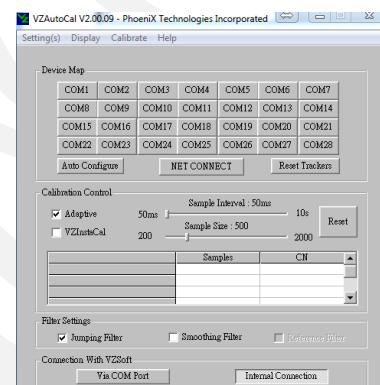
1. Power up all trackers after properly connecting the multi-tracker system
2. Go to **Setup\Guided System Setup** and follow the instructions till the end. The complete process may take a few minutes, be patient.

OR:

Power up only the ‘slave’ trackers, then go to **Settings\Data Source**, click Connect and wait for a short while for VZAutoCal window to come up. The COM ports to which your tracker data cables are connected should turn white when the (slave) trackers are detected. (In case VZAutoCal cannot find any tracker, click ‘Auto Configure’ to detect all the slave trackers; you may need to try twice).

Now,

1. Power up the ‘master’ tracker (see ‘Multi-Tracker Installation’ section).
2. Click ‘Auto Configure’ again to also detect the master tracker. Observe which new COM port turned white: this is the master tracker port.
3. Click on the master tracker’s COM port to make it show ‘M’
4. In Calibration Control (VZAutoCal window), make sure ‘Adaptive’ is on.
5. Make sure the ‘Internal Connection’ button is also on.



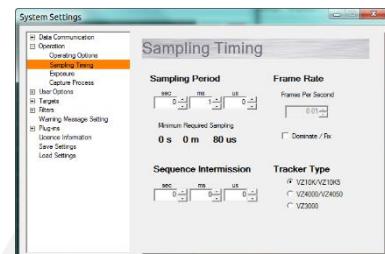
You can skip step #1 and #2 if you have used the Guided System Setup to successfully detect your tracker(s) and your markers.
If unsure, go to step #2 to detect your markers again.

1

In VZSoft:

[Settings\Sampling Timing](#)

- Adjust settings as required



Minimum Required Sampling

0 s 0 m 80 us

If in red, capture may fail

[Settings\TCM Control Mode](#)

- Select Tetherless for tetherless marker control

Minimum Required Sampling Period:

- If in **red** color, the combination of settings is too fast, the capture may not be successful.

Dominate:

- Check this for capturing at a set frequency (fps)

Ensure the LEDs never get too hot during a capture to prevent damage (< 120 fps is highly recommended).

2

In Setup :

- click *Launch Target Auto Detection*
- Press Start (wait for the progress bar to be full; this may take a while)
- Wait for a few seconds then press Stop (to detect markers)

Note: Each marker must be made visible to a tracker to be detected.

Note: If marker IDs are known, you can enable them manually without auto target detection.

3

Click through the TCM panels to verify that all connected markers have been detected.

Standard markers only:

- press Record to start capture.

Octopus/SIK markers only:

- click on **SI / OCT**
- click on **Pack Seq**
- click on Record to start capture

TCM1	TCM2	TCM3	TCM4	TCM5	TCM6	TCM7	TCM8
✓	□	□	□	□	□	□	□
1	9	17	25	33	41	49	57
2	10	18	26	34	42	50	58
3	11	19	27	35	43	51	59
4	12	20	28	36	44	52	60
5	13	21	29	37	45	53	61
6	14	22	30	38	46	54	62
7	15	23	31	39	47	55	63
8	16	24	32	40	48	56	64
			Clear Seq	Pack Seq			SI / OCT

Markers 101 to 108 are shown enabled

Skip this page if you are using only Standard markers

1

- All LED IDs ('LEDID') below each Octopus/SIK marker ID under the same TCM must be enabled. **There must be no gap.**

Ex. To capture SIK marker 305, you must enable markerIDs 301 to 304 too.
Also remember to activate **SI / OCT** when using SIK/Octopus markers.

TCM1	TCM2	TCM3	TCM4
TCM5	TCM6	TCM7	TCM8
1	9	17	25
2	10	18	26
3	11	19	27
4	12	20	28
5	13	21	29
6	14	22	30
7	15	23	31
8	16	24	32
9	17	25	33
10	18	26	34
11	19	27	35
12	20	28	36
13	21	29	37
14	22	30	38
15	23	31	39
16	24	32	40
17	25	33	41
18	26	34	42
19	27	35	43
20	28	36	44
21	29	37	45
22	30	38	46
23	31	39	47
24	32	40	48
25	33	41	49
26	34	42	50
27	35	43	51
28	36	44	52
29	37	45	53
30	38	46	54
31	39	47	55
32	40	48	56
33	33	41	57
34	34	42	58
35	35	43	59
36	36	44	60
37	37	45	61
38	38	46	62
39	39	47	63
40	40	48	64

Here, if 306 or 307 is an OctMarker/SIK marker, it won't be captured properly because of the gap in the marker ID sequence!



TCM1	TCM2	TCM3	TCM4
TCM5	TCM6	TCM7	TCM8
1	9	17	25
2	10	18	26
3	11	19	27
4	12	20	28
5	13	21	29
6	14	22	30
7	15	23	31
8	16	24	32
9	17	25	33
10	18	26	34
11	19	27	35
12	20	28	36
13	21	29	37
14	22	30	38
15	23	31	39
16	24	32	40
17	25	33	41
18	26	34	42
19	27	35	43
20	28	36	44
21	29	37	45
22	30	38	46
23	31	39	47
24	32	40	48
25	33	41	49
26	34	42	50
27	35	43	51
28	36	44	52
29	37	45	53
30	38	46	54
31	39	47	55
32	40	48	56
33	33	41	57
34	34	42	58
35	35	43	59
36	36	44	60
37	37	45	61
38	38	46	62
39	39	47	63
40	40	48	64



303, 304, 305 must also be enabled to capture 306 or 307 properly!

2

For Octopus/SIK markers:

Make sure the 'LED' and 'COUNT' numbers are always the same in the Target Capture Sequence List for easy data identification.
(Captured data will always be associated with LEDID only)

SEQ	TCM	LED	COUNT	ChannelName	Flashes	Status
1	8	64	1	Channel864	1	Enabled
2	3	1	1	Channel301	1	Enabled
3	3	2	2	Channel302	1	Enabled
4	3	3	3	Channel303	1	Enabled
5	3	4	4	Channel304	1	Enabled
6	3	5	5	Channel305	1	Enabled
7	3	6	6	Channel306	1	Enabled
8	3	7	7	Channel307	1	Enabled

Target Capture Sequence list

3

Note:

- always activate **SI / OCT** when using SIK/Octopus markers.
- pack the sequence before you start the first capture, with the **Pack Seq** button.



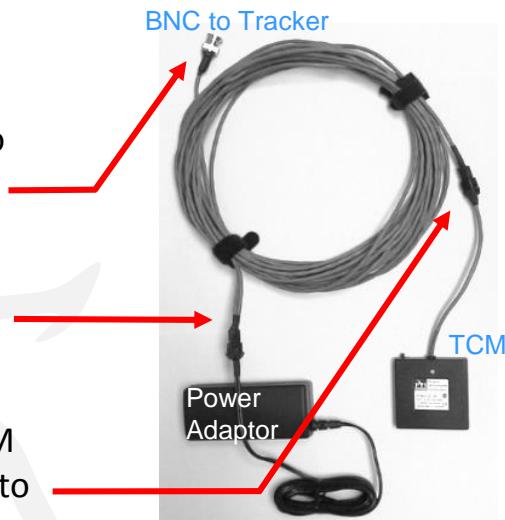
1

Tether Mode Cable with power adaptor:

- For Standard or Octopus markers
- For prolonged capture or troubleshooting (without battery)
- For avoiding radio interferences in tetherless operation

Usage:

- connect the BNC connector to the CTRL OUT plug on master tracker.
- connect the short end to the TCM power adaptor.
- connect the long end to a TCM or via interconnection cable(s) to more TCMs.
- change settings in **Settings\TCM Control Mode** (select tethered operation for tethered marker control mode)



The appearance of the products may slightly differ from the actual products.

TCM Control Mode

Tethered Operation

To control TCM(s) by a tether, connect the TCM power & control cable from the CTRL OUT jack on the master tracker back panel to the interconnection cable connecting the TCM(s).

[Tethered Operation](#)

Tetherless Operation

Connect a RF transmitter to the CTRL OUT jack on the master tracker. Connect a receiver, the TCM(s) with desired LED markers on the capture subject, and a battery belt, together with an interconnection cable. Before capturing, ensure the RF transmission is permissible to other equipment in the area, and vice versa.

[Tetherless Operation](#)

2

VZSuit (capture suit):

- normally comes equipped with markers.
- good for virtual reality/multimedia.
- markers can be moved to different locations.
- always leave enough slack on each marker wire to absorb the largest - possible motion stretch.
- gloves, socks, sole pads may be provided.
- use a laundry bag when cleaning, in cold water only.

1

Synchronize your system with 3rd party equipment: (Force plates, EMG...)

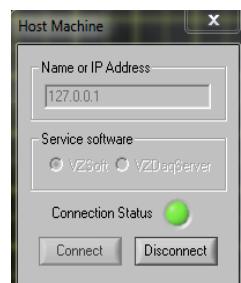
1. Connect the tether mode cable (see p.11) to master tracker
2. Use a PTI BNC adapter cable and a T-splitter to connect both the tether mode cable and a transmitter to master tracker
3. Connect a TCM with an End-of-Frame (EOF) output connector to the tether mode cable, and use a TCM power adaptor (see page 11)
4. Use an extension cable (normally not provided by PTI) to connect the EOF output to the **PF10** channel of your National Instruments DAQ board

Please contact PTI if you need to purchase any of these elements.
National Instruments DAQ boards based on DAQmx drivers are compatible with PTI software.

2

VZDaq Operation:

1. Install and launch **VZDaq** (and VZSoft) programs.
2. N/I DAQ device will appear in VZDaq top-left device window.
3. Go to **Server\Connection** to connect VZDaq to VZSoft.
4. Make sure the *Trigger* window shows “PTI Tracker”.
5. Check that the *Graphic* toggle is ON.
6. Click the green ON button on the upper right corner.
7. VZDaq is now ready.



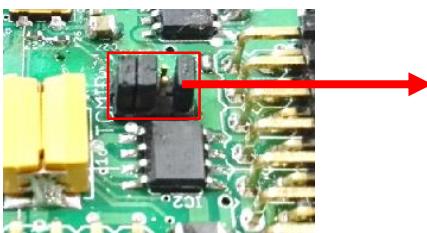
When you start a capture in VZSoft, VZDaq will collect the analog data from the ON channels corresponding to any working device connected to the N/I board. The analog data is bundled with the capture data in the VZSoft .vzp file when you stop recording.

In case of problems in getting VZDaq to connect to VZSoft, turn off all firewall programs.

The information provided below pertains to additional functions not required for standard operation

TCMID:

- Each TCM comes with a TCMID (1 to 8) indicated on a label when shipped.
- To change it, open the TCM case and change the binary jumper settings (8-4-2-1 codes).



TCMID
[] []

TCMID
[] []

TCMID
= 1

TCMID
[] []

TCMID
[] []

TCMID
= 2

TCMID
[] []

TCMID
[] []

TCMID
= 4

TCMID
[] []

TCMID
[] []

TCMID
= 8

Radio Channel for Tetherless Control Operation:

8 channels (0 to 7) are available for tetherless operation to avoid radio interference.
To change it:

- Place the transmitter and receiver pair on a table and open their top covers
- Locate the 4-gang mini-switch on the circuit board. You should see '8', '4', '2', '1' labels beside the switch pins, which are their binary weightings. You should also be able to see the 'ON' marking on the switch body.
- Set the switches according to the binary representation of the desired channel ('ON' = 0, the other side = 'OFF' = 1).
- Carefully close the top cover. Note: Do not over-tighten the screws!

NOTE: Both the transmitter and the receiver must be set on the same frequency.

Example:

Desired channel = 3 = 0011b (in binary)

Jumper Settings = Switch Settings = ON-ON-OFF-OFF

This is illustrated below, where a black rectangle represents a 'ON' (= 0) setting.

Frequency	Jumper Settings	Binary Code
1 (906.37Mhz)	[] [] []	0001
2 (907.87Mhz)	[] [] []	0010
3 (909.37Mhz)	[] [] []	0011
4 (912.37Mhz)	[] [] []	0100

Frequency	Jumper Settings	Binary Code
5 (915.37Mhz)	[] [] []	0101
6 (919.87Mhz)	[] [] []	0110
7 (921.37Mhz)	[] [] []	0111
0 (903.37Mhz)	[] [] []	0000

Quick Start Guide



Thank you for reading this quick start guide!
Any question or need assistance? support@ptiphoenix.com

