



# MANUAL

## X2 Club

## Timing system

PRODUCTCODE  
00012345

CAN BE USED FOR



**EXPERIENCE PROGRESS**

Published by:  
MYLAPS B.V.  
Zuiderhoutlaan 4  
2012 PJ Haarlem  
The Netherlands

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#### Manual revision history

Version	Date	Amendments
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Version 2.0	May 2018	2.0
Version 2.0	November 2020	Changed the auxilliary scheme

## 1. How to use this manual



### Search for Keywords

Search for keywords such as “decoder or installation” to find a topic. Press Ctrl+F on Windows or Command+F on Mac.



### Navigate Topics

View a complete list of topics in the table of contents. Click on a topic to navigate to that section



### Printing this Document

This document supports high resolution printing.

## Legends



Hints and Tips



Important



Reference

## Download options

X2 utility

## About this Manual

This manual is intended for operating and supervisory personnel and provides information on installing and operating the X2 timing system.

This publication has been written with great care. However, the manufacturer cannot be held responsible, either for any errors occurring in this publication or for their consequences.

The sales of products, services of goods governed under this publication are covered by MYLAPS 's standard Terms and Conditions of Sales and this product manual is provided solely for informational purposes. This publication is to be used for the standard model of the product type given on the cover page.

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## 2. General

The X2 system is the next generation MYLAPS platform for Car, Motorbike and Kart racing. It offers extensive insights in race activity, track status and more.

The X2 Timing & Data System and X2 Link provides new features to everyone who's involved in racing. Race tracks, timekeepers and federations get a more stable system with detailed track information and racers get to access live race data, which can be published to racer's own on-board displays.

### Features and benefits of the X2 system.

#### **Automatic upload to MYLAPS.com**

The X2 system automatically uploads practice data of a transponder to a personal MYLAPS account on mylaps.com.

#### **Supports multi-loop setups**

A multi-loop set-up makes sector timing at the track possible. Race data can be segmented for each sector, allowing racers to focus and improve on specific parts of the track.

#### **One system for all sports**

With the X2 system it is possible to time all motorized sports, like car, motorbike, kart and MX racing\*.

\*One transponder type per session

#### **2-way communication**

X2 Link will bring 2-way communication to the race track: data is not only transmitted from the X2 Transponders to the System, but it will be possible to send vital race data back to the racer, which is displayed through their own on-board displays.

#### **Track analysis & remote control**

The system offers insight to system performance. Diagnostics can be accessed and controlled remotely when connected to the Internet. Timekeepers can set-up and monitor the system from everywhere; a perfect solution for checking in on free practice runs and race days.

#### **Live timing**

X2 enables live timing which makes it easier to broadcast real-time race data. Data can be published on displays on the track, on websites or via mobile apps and third-party applications.

#### **Develop custom apps**

A Software Development Kit (SDK) is available with the X2 System, which enables developers to build custom applications.

#### **Remote support**

The X2 System is characterized by the high build quality and ease of use. Still, issues may occasionally occur. When connected to the Internet, online support via the X2 Cloud is at hand.

With the full X2 set-up installed to the vehicles, racers get access to 2-way communication including live race data onto their current on-board display.

## What to do when you receive your X2 Timing System

<p><b>After receiving your X2 system:</b></p> <p>Install your X2 system at your track          Place the coax cable          Place the loop at the installation          Implement the network configuration          Install Orbits and connect to the X2 System          Configure Clock sync          Download X2 Utility</p>	<p><b>After receiving Orbits</b></p> <p>Install Orbits          License Key          Create or use MYLAPS Support Login          Connect to X2 Server          Test transponder passings          Login or create an organisation account to upload to Speedhive and Live Timing          Login to Speedhive Race Portal          Create your track          Select the rights sport (transponder type) otherwise no detection (either in X2 Utility or in Orbits)</p>
<p><b>A week before your event:</b></p> <p>Create your event          Create competitors list with transponder numbers          Check loop connection and noise          Check loop passings with the transponders          Check Orbits connection to X2 server          Create back up of Orbits</p>	<p><b>During your event:</b></p> <p>Check live timing</p> <p><b>After your event:</b>          Upload results to the MYLAPS Website          Create back up and save it on a flash drive</p>

## Sport settings

Make sure you select the right sport (transponder type) otherwise no detection (either in X2 Utility or in Orbits)  
 If you use a Kart transponder, your settings must be Kart as well.

## Track Sensor (optional)

This device is monitoring:

- 24/7 your system if it is working correctly
- Track temperature

## 2.1. X2 Timing system products

Product	Product code	What
X2 decoder and X2 server including cabling For the first-time line	15R091 (choose your sport)	
Detection loop - 10 meter Incl. coax cable - 20 meter incl. coax cable - 50 meter Incl. coax cable - 100 meter  Detection loop - 20 meter Incl. coax cable - 20 meter incl. coax cable - 50 meter Incl. coax cable - 100 meter	(Choose your sport) 30R001 30R002 30R003  30R004 30R005 30R006	
Detection loop end box 10 meter 20 meter	(Choose your sport) 30R010 30R011	
Connection box with Coax cables: 20 meter 50 meter 100 meter	30R020 30R021 30R022	
X2 Utility	Download	1-3 timelines
X2 Manager	Download	3 timelines and up
Orbits 5	25R035	Up to maximum of 5 timelines
Orbits 5 advanced	25R036	Up to maximum of 15 timelines
X2 decoder including cabling	15R092 (choose your sport)	
X2 Server including cabling	15R093 (choose your sport)	
X2 BaseLink	15R101	

USB Transponder Tester	40R117	
X2 track sensor	40R106	
Lemo adapter	40R045 (choose your sport)	
Loop Test set	40R234	
X2 RaceLink	19R001	
X2 transponder Car/Bike	Rechargeable: 1 year - 10R601 2 year - 10R602 5 year - 10R605 Direct Power 1 year - 10R611 2 year - 10R612 5 year - 10R615	
X2 transponder Kart	Rechargeable: 1 year – 10R641 2 year – 10R642 5 year – 10R645 Direct Power 1 year - 10R651 2 year - 10R652 5 year – 10R655	
X2 transponder MX	Rechargeable: 1 year – 10R661 2 year – 10R662 5 year – 10R665 Direct Power 1 year - 10R671 2 year - 10R672 5 year - 10R675	
Subscription cards	For every subscription we have subscription cards. These can be redeemed in your account.	
Subscription renewals	Can be renewed in your account	Account.mylaps.com



## 2.2. Specifications X2 Decoder

Dimensions	220 x 180 x 60 mm / 8.7 x 7 x 2.4 inch
Weight	1500 g / 3.3 lb
Decoder Clock stability	0.5 ppm
GPS Receiver	Quick fix, -160dB, 15nS
GPS antenna connection	SMA, active
Dual Decoding circuitry up to	-100dBm sensitivity, TranX3 and X2 transponder range
Decoder Timing Resolution	0.001 s
Loop Telemetry	32 kbps, 8 bytes per hit
Loop connection	1x BNC, max. 20 m loop
Operating temperature range	-20 to 50 C / -4 to 122 F
Humidity range	10 % to 90 % relative
Operating voltage range	10 to 14.4 V, typical 12V
Power consumption	Approx. 5W
Network Interfaces	10-100BT (RJ45)
Auxiliary connections	1x 5VDC, 100mA, output 1x Opto coupled closing contact Max. 50mA, output 3x Opto coupled, 5-12 VDC/5-15 mA, input
Auxiliary connector	DB15, female
Can Connection	Future use
Digital outputs	<ul style="list-style-type: none"> <li>• Number of connections 1</li> <li>• Opt1 DB15 pin 14(+) and pin 4(-)</li> <li>• Isolation Opto coupled photo-transistor</li> <li>• Signal type Closing contact</li> <li>• Max. switched current 50mA (DC)</li> <li>• Max. switched voltage 70V (DC)</li> </ul>
Digital inputs	<ul style="list-style-type: none"> <li>• Number of connections 3</li> <li>• PhotoCell DB15 pin 7(+) and pin 6(-)</li> <li>• ExtSt DB15 pin 13(+) and pin 12(-)</li> <li>• Sync DB15 pin 11(+) and pin 10(-)</li> <li>• Isolation Opto coupled photo-transistor</li> <li>• Timestamp accuracy 0.0001 second</li> <li>• Required drive current (high) 10mA</li> <li>• Switch voltage range 5-12VDC</li> </ul>
Power output	<ul style="list-style-type: none"> <li>• Voltage 5VDC</li> <li>• Max current 100mA</li> <li>• 5V DB15 pin 8, 15</li> <li>• Gnd DB15 pin 1, 5, 9</li> </ul>

### 2.3. Specification X2 Server

Material	Aluminium
Dimensions	220 x 180 x 60 mm / 8.7 x 7 x 2.4 inch
Weight	1800 g / 3.9 lb
AC Voltage (external power supply)	100 to 240 VAC at 50/60 Hz
DC Input voltage	10 to 14.4 VDC, typical 12 VDC
Power consumption	Max. 15 W per connection
Network Interfaces	10-100BT (RJ45)
GPS receiver	Quick fix, -160dB, 15 nS
Storage	120GB, solid state
Cooling	Passive
Internal battery	30-second soft power down after power loss
Communication	Network apparatus (for internet/local network)

### 2.4. Specifications Environmental




















Pollution degree	III
Protection class (rear lid closed)	IP54
Operating temperature	-20 to +50 °C (-4 to +122 °F)
Relative humidity	Max. 90%, non-condensing





### 2.5. Safety instructions

Clean only with a dry cloth. Do not use liquid cleansers or aerosol cleaners.
Do not install equipment near any heat sources such as radiators, heaters, stoves or other equipment that produce heat.
Never spill liquid of any kind on the equipment.
Take precautions to protect the equipment from power and lightning surges.
Adjust only those controls specified in the operating instructions.
Operate the equipment only from the type of power source indicated on the label.
Unless qualified, do not attempt to service damaged equipment yourself.
Install in accordance with the manufacturer's instructions in accordance with applicable local codes.
Use only accessories specified by the manufacturer.
The low voltage power supply unit must comply with EN/UL 60950. The power supply must be a SELV-LPS unit or a SELV-Class 2 unit (Safety Extra Low Voltage – Limited Power source).
Use only a +12VDC power supply or PoE as a power source. The power supply unit must be isolated from earth.

## 2.6. Compatibility

Specifications are subject to change without notice.

		
	TR2 Transponder	
	X2 Transponder	
	X2 Link	
	X2 Baselink	
	X2 Pro transponder	
	Flex Transponders	
	Classic transponders	
	Tranx transponders	
	Tranx 260 DP transponder	

	Tranx Pro	
	Rental kart fixed power	

### 3. Installation of the X2 Timing system

The X2 system consists of several high-quality parts.

#### Detection loops and coax cables

Detection loops are embedded in the track's surface at the start and finish line and at intermediate timing points along the track. A detection loop works as the system's antenna. It picks up signals from the transponders and passes them through to the decoder. The detection loops for X2 are similar to Tranx detection loops. When you switch to an X2 system you don't have to install new loops.

#### X2 Server

The X server is the center piece of the X2 timing system and controls the entire system. The server is connected to all decoders collects all data of all decoders. The X2 server has a built-in practice mode that allows automatic uploads of practice results to MYLAPS.

#### X2 Decoder

The decoder determines the exact time at which each transponder passes the detection loops. The decoder sends this data to the server.

#### X2 utility

The X2 Utility can be used to perform maintenance operations on the X2 server. These operations include tasks like firmware upgrades and configuring the server.







#### Orbits





Orbits is software used for turning the timing information, generated by the X2, into scoring information.

#### Develop custom apps

A Software Development Kit (SDK) is available with the X2 System, which enables developers to build custom applications.

## 3.1 Installation X2 system – X2 decoder and X2 server

	<p>Use the coax cable to connect the (Start/Finish) track loop to the (S/F) decoder.</p>
	<p>Attach the GPS antenna to the decoder and position the antenna in a location where it can receive a satellite signal. Note: The real time clock (RTC) in the decoder is pre-set with the correct UTC time. This will be displayed on the main decoder display with a clock icon. The GPS signal helps synchronize the decoder clock to UTC time at power down.</p>
	<p>If required, use the auxiliary port to attach auxiliary equipment to the decoder:</p> <ul style="list-style-type: none"> <li>• Photocell</li> <li>• External Start pulse</li> <li>• Sync pulse</li> </ul>
	<p>Use the UTP cable to connect the red port on the server to the decoder:</p> <ul style="list-style-type: none"> <li>• If required, use the green UTP port to attach an additional decoder to the server (use an optional switch if more decoders are used)</li> </ul>
	<p>Attach the GPS antenna to the server:</p> <ul style="list-style-type: none"> <li>• Position the GPS antenna in a location where it can receive a satellite signal</li> <li>• When power is applied, the server clock will synchronize to the satellite UTC time*</li> </ul> <p>*when no GPS signal is available, the server will always sync to the main decoder</p>
	<p>Attach the 12 VDC power adapter to the decoder and to the AC mains power supply:</p> <ul style="list-style-type: none"> <li>• The decoder has no on/off button and will start working immediately</li> <li>• The display will show the date and time, plus a small clock icon Note: The real time clock (RTC) in the decoder is pre-set with the correct UTC time. This will be displayed on the decoder display together with a small clock icon. Any extra connected decoders and the server (with no GPS) will synchronize to this main (S/F) decoder time and display the same time together with the network time protocol (NTP) icon</li> </ul>

	<p>Attach the 12 VDC power adapter to the server and to the AC mains supply:</p> <ul style="list-style-type: none"> <li>• The server has no on/off button and will start working immediately</li> <li>• The display will eventually show a DC power supply icon and the time (synchronized initially from the main decoder and eventually from GPS)</li> <li>• When there is GPS reception, the display will additionally show a satellite icon with a signal strength indication</li> </ul>
	<p>Optionally, you can connect the server to a PoE switch for an alternative power supply. In this case, the display will show a PoE power supply icon. The PoE supply can also be used together with a DC power supply. In this case the PoE (+) supply is a secondary 'back-up' power supply. If the DC power supply is disconnected, the Server display will show a blinking DC icon.</p> <p>Note: When using a PoE (+) switch, the MYLAPS X2 Server can be powered over a single UTP port. In this case any port can be used, and the display will show a PoE or PoE+ icon.</p>
	<p>Use the UTP cable to connect the blue port on the Server to a local computer network, or to a laptop. The LEDs on the port will show if a physical network connection is available:</p> <ul style="list-style-type: none"> <li>• Make sure your computer is configured to obtain an IP address automatically.</li> <li>• Check the display to see if the Server obtained an IP address from a DHCP server.</li> <li>• If no DHCP server is available on the network, the MYLAPS X2 Server will obtain a 'local link' IP address itself and the display will show an IP address in the 169.254.x.x range. This will occur, for example, when the network port is connected directly to a laptop via a UTP cable.</li> </ul>
	<p>When the IP address is shown on the server, you have successfully completed installation</p>

## Uninstall X2 system – X2 decoder and X2 server

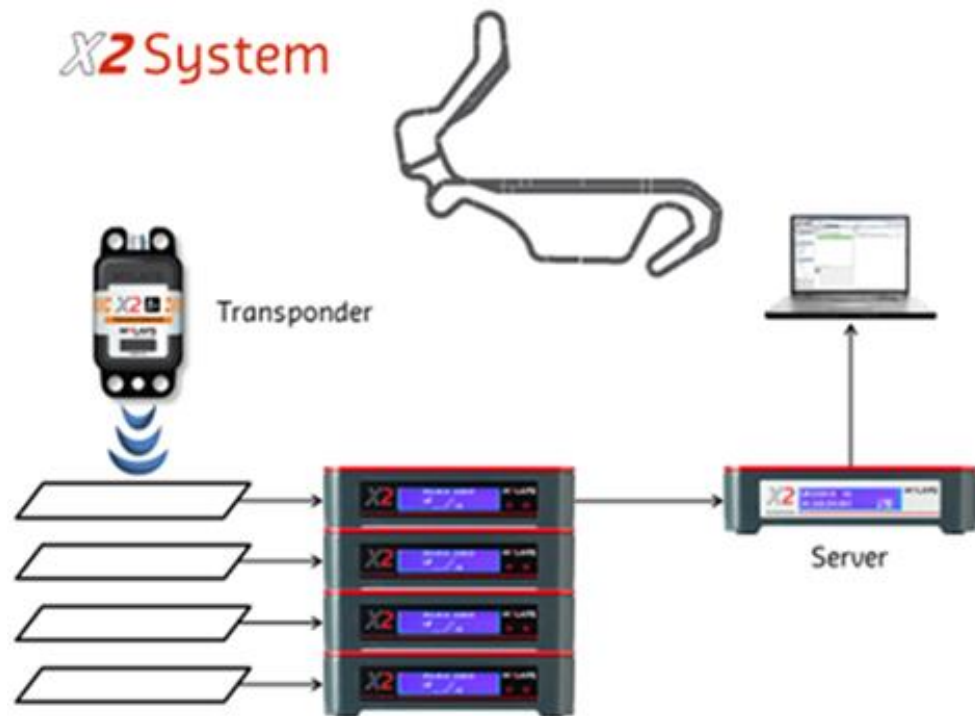
### Disconnect power to the server

- The Server will only shut down when both DC power supply and PoE power supplies are disconnected.
- Power down will take a few seconds as the Server will first close down the database using its internal 'close down' power source. The display will show 'powering down'

### Disconnect power to the decoder(s)

- Wait until power down is completed and server and decoder displays are empty.
- Disconnect all physical cables from server and decoder(s).

## 3.2. Installation X2 system



Sport	Loop width
Car/Bike/MX/Kart	60 cm (2ft)

Setting up and operating the MYLAPS X2 decoder may only be done by certified professionals.

To install the MYLAPS X2 Timing System, one needs to install a detection loop, connect the decoder, server and mount the MYLAPS X2 transponders to the cars/bikes or karts.

When you set up a track, make sure you have enough network cables on the right place. Contact a network administrator if you want to use more network cables.

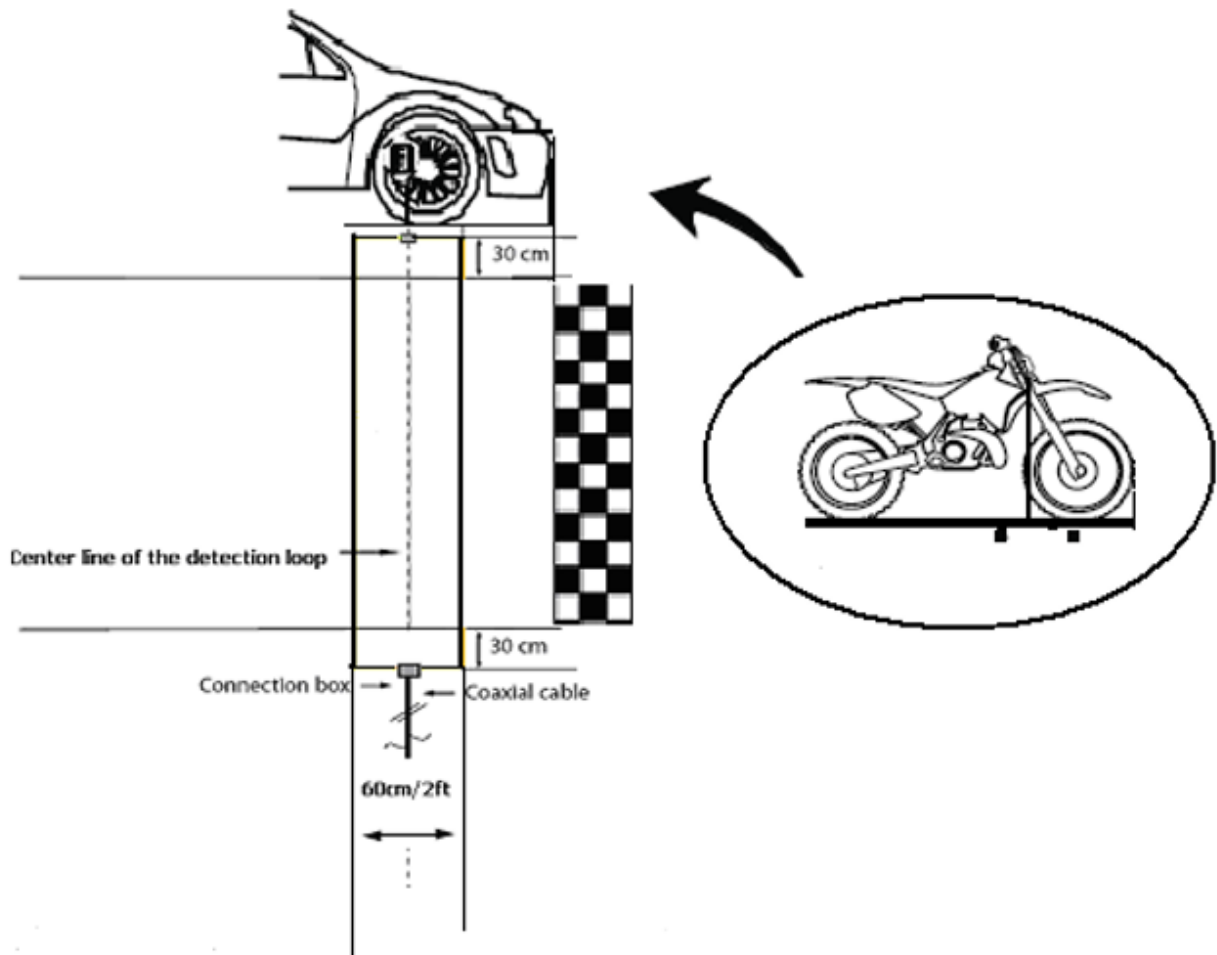
The MYLAPS X2 decoder is a precision instrument. Therefore, please handle it with care and keep the MYLAPS X2 decoder out of direct sunlight and avoid high humidity. Take special precautions in case of thunderstorms by disconnecting all cables (coax, Ethernet and mains) from the MYLAPS X2 decoder. Nearby lightning strikes can damage the decoder when these cables are connected.



## 3.3. Installation of a detection loop on an asphalt track

### Positioning the detection loop

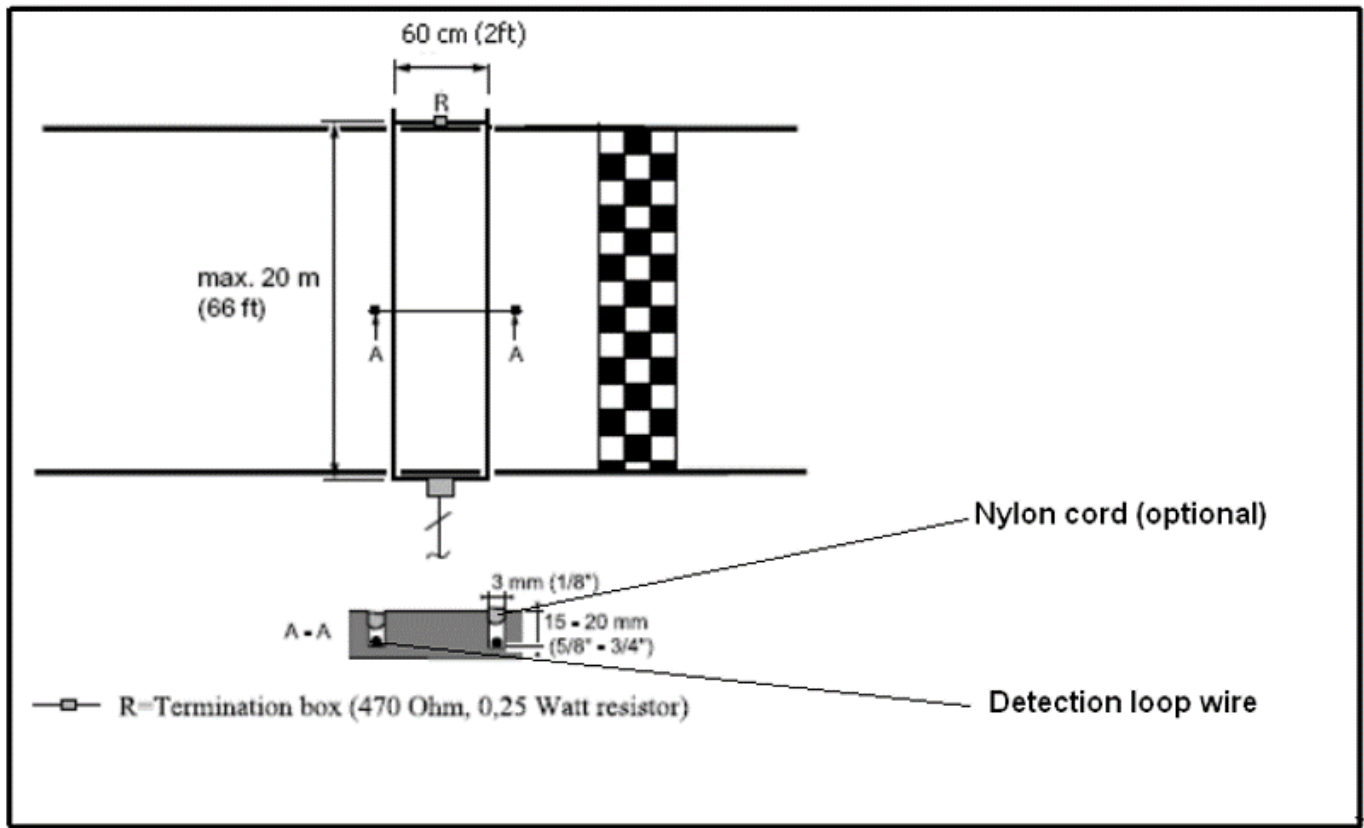
All wiring of the detection loop must be installed according to the drawing below to avoid a serious degradation in the performance of the system



### Pre-Installation considerations:

- The detection loop must be positioned in such a way that the transponder is above the centre of the detection loop when the front of the vehicle crosses the finish line.
- The width of the detection loop should exceed the width of the track by 60cm/2ft (30cm/1ft on each side, see overview above).
- The detection loop can be used for a track width of a maximum 12 m (66 ft).
- The detection loop is sensitive to interference, sometimes emitted by cables. If possible, keep other cables 5 m (15 ft) away from the detection loop.
- To avoid false inputs, make sure vehicles on other parts of the track will not get closer than 5 m (15 ft) to the detection loop.

## Installation of a permanent detection loop in asphalt



## Installation overview

1. Cut the slots in the track a maximum of 2 cm (3/4") deep and 60 cm (2 ft) apart. Make sure the slots are clean and dry. This will ensure a perfect seal when the silicon is applied after the installation of the wiring. Put the wires of the detection loop in the slots and cut the excess length of the detection loop wires.
2. Widen the slot with a chisel where the small connection box of the loop is to be installed. Place the connection box vertically. When all wires are installed, put the heat shrinkage sleeve over a detection loop wire end.
3. Solder the loop wire to the wire end of the connection box with activator. When soldering the wires together, the solder should flow through the entire connection and not only around it.
4. Put the shrinkage sleeve over the soldered connection and hold it over a heat source to shrink the sleeve.
5. Repeat c, d, and e for the second wire of the detection loop.
6. Test the loop as described in section 3.
7. Fill the slot with silicone.

Be sure not to overfill the slots and that the silicone is fully under the surface of the track, otherwise tires may pull out the silicone. If any silicone spills out of the slot, remove the excess silicone by scraping the top with a small piece of cardboard. This also ensures that the silicone is pressed into the slot for a perfect seal.

## Learned by experience

If you wish, you may pad the slots with a backing rod or nylon cord before sealing the slot with silicone. This helps to prevent the excessive use of silicone and is also useful when pulling out the silicone if the detection loop must be replaced.

**Silicone types** There is a wide variety of silicone types available in hardware stores; it is important that the right type is used. Silicone that can withstand different temperatures as well as both wet and dry conditions (since weather situations can vary) should be used. If you are unsure, check the specifications of the silicone.

The following types of silicone have been shown to yield lasting results and are recommended by MYLAPS:

- Dow Corning 890SL is a self-leveling silicone kit. It is applied as a liquid and fills the slot completely.
- Purflex is a polyurethane-based silicone that retains its elasticity under a wide range of temperatures.

## Testing the detection loop installation

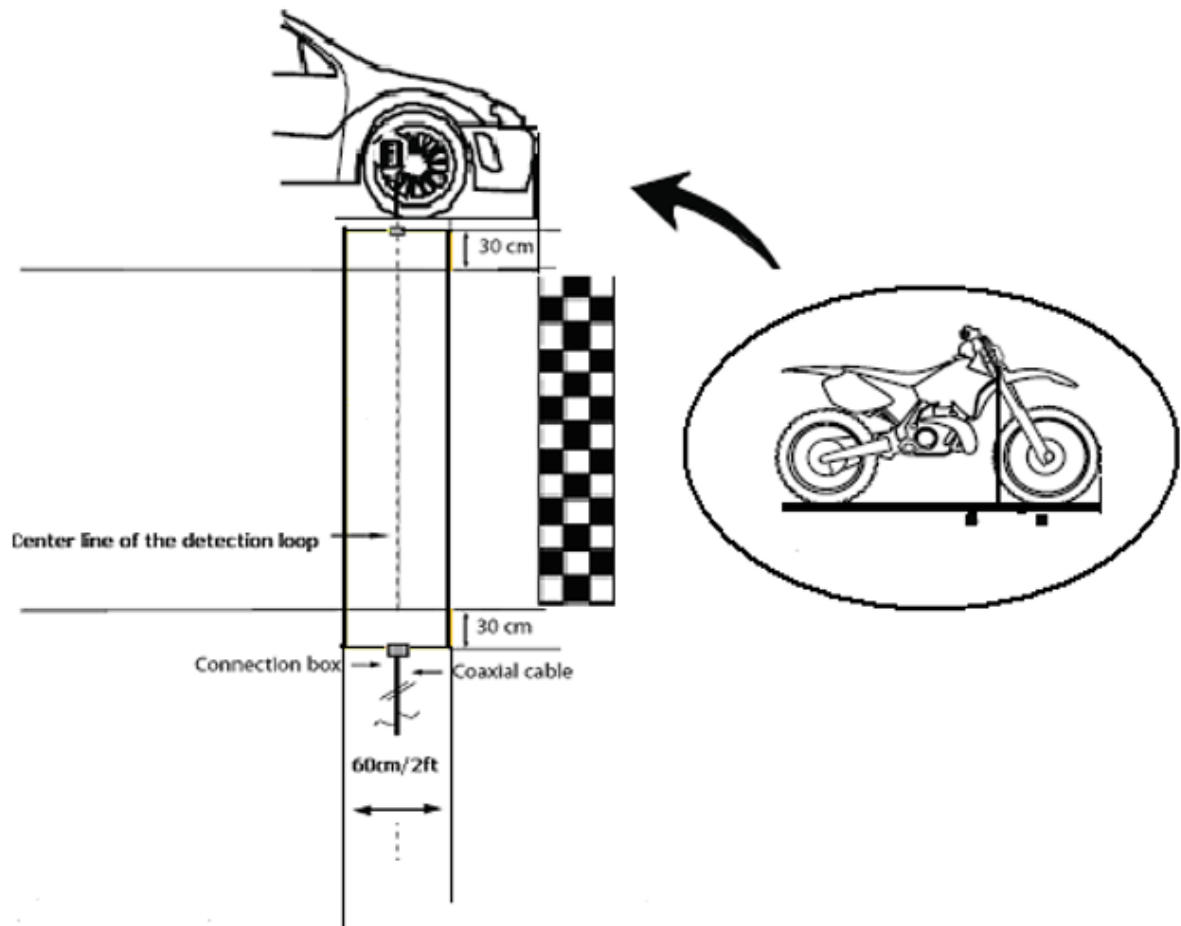
Once the loop has been installed, it should be tested to ensure that it is functioning correctly. We also recommend repeating the same procedure at the start of each race event.

1. You can determine if your loop is functioning correctly by doing the following tests.
2. Connect the detection loop to the decoder and computer running MYLAPS timing software.
3. Check the background noise, updated every five seconds in the MYLAPS timing software. The measured background noise level value should be between 0 and 40 points. A higher value may indicate interference by other electrical equipment in the area or a bad loop installation. Try switching off any suspected equipment or removing nearby objects and check for improvements. Especially at night, short-wave radio transmitters may cause an increased background noise.
4. On a correctly installed detection loop, a transponder signal should be picked up at the same distance along the entire detection loop. Consult the Periodic testing loop document.
5. Check the signal strengths of the transponders as they are picked up by the system during a test with karts:
  - A good loop will yield consistent transponder signal strengths of at least 100 points with a hit rate of at least 10 points.
  - The hit rate may vary depending on the speed of the transponder passings (slower passings yield higher hit counts), but the signal strength should be consistent (< 10 points variation).

### 3.4. Installation of a detection loop on a dirt track.

#### Positioning the detection loop

All wiring of the detection loop must be installed according to the drawing below to avoid a serious degradation in the performance of the system.

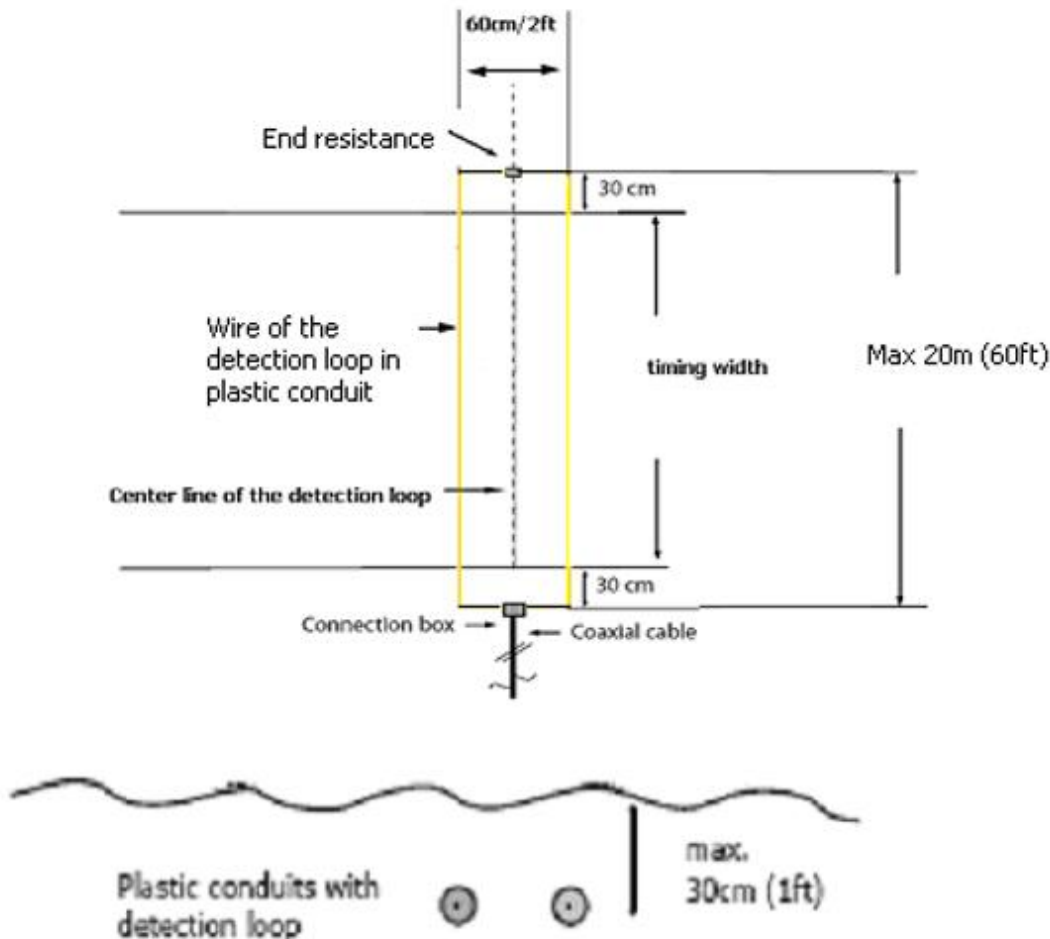


#### Pre-Installation considerations:

- The detection loop must be positioned in such a way that the transponder is above the center of the detection loop when the front of the vehicle crosses the finish line.
- The width of the detection loop should exceed the width of the track by 60cm/2ft (30cm/1ft on each side, see overview above).
- The detection loop can be used for a track width of a maximum 12 m (66 ft).
- The detection loop is sensitive to interference, sometimes emitted by cables. If possible, keep other cables 5 m (15 ft) away from the detection loop.
- To avoid false inputs, make sure vehicles on other parts of the track will not get closer than 5 m (15 ft) to the detection loop.

## Installation of the detection loop in dirt

For dirt tracks, the detection loop is best installed in plastic conduits at a maximum of 30cm (1ft) below the surface. The maximum depth should be chosen in a way that the cars/motorcycles cannot dig out the detection loop. However please respect the maximum distance between loop and transponder, which is 60cm (2ft) for cars and 120cm (4ft) for motorcycles.



1. When the position of the detection loop is defined (see chapter 1), dig 2 trenches about 60 cm (2 ft) from each other. The width of the detection loop should exceed the timing width by 60cm/2ft (30cm/1ft on each side, see Detection loop installation overview above)
2. Pull the wires of the detection loop through plastic conduits and cut the excess length of the detection loop wires. When pulling the detection loop wire through the plastic conduit, it is a good idea to pull another non-metal wire through. This wire then can be used to install a new loop wire in case it gets damaged.
3. When all wires are installed, place the heat shrinkage sleeve over a detection loop wire end.
4. Solder the loop wire end to the short wire end of the connection box. When soldering the wires together, the solder should flow through the entire connection and not only around it.
5. Put the shrinkage sleeve over the soldered connection and hold it over a heat source to shrink the sleeve.
6. Repeat 3, 4 and 5 for the second wire end of the detection loop.
7. Test the loop as described in section 3
8. Fill the trench with the plastic conduits with sand. Make sure that the vehicles cannot dig out the plastic conduits

## Testing the detection loop installation.

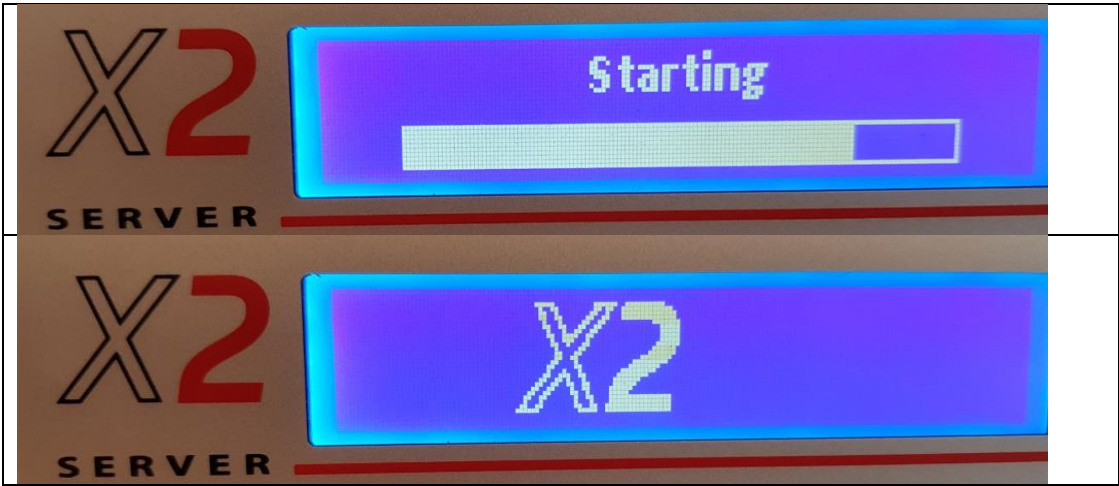
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4. Check the signal strengths of the transponders as they are picked up by the system during a test with karts:
  - A good loop will yield consistent transponder signal strengths of at least 100 points with a hit rate of at least 10 points.
  - The hit rate may vary depending on the speed of the transponder passings (slower passings yield higher hit counts), but the signal strength should be consistent (< 10 points variation).

4.Operating the MYLAPS X2 server

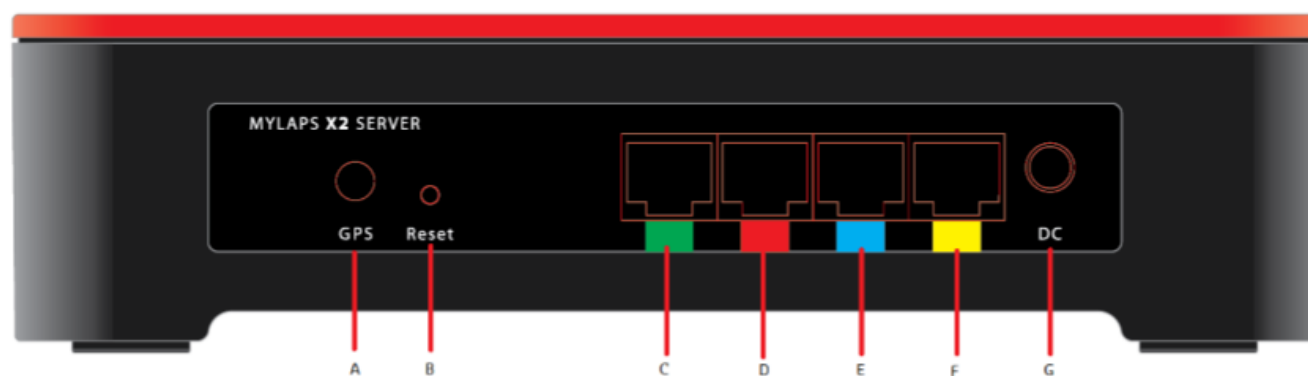
The X2 server is not equipped with an on/off switch, therefore connecting the server to the mains will automatically switch the system on.



Information display – status of the X2 Server



	Blinks when GPS receiver is attached; lit when decoder is receiving UTC time from satellite (signal strenght is shown next to it).
16:31:49	Time of day; local time when synchronized to GPS
x2-support	Server name
IP: 10.200.16.133	IP Address
#- DC	Display of the connected power source



A	Connection for GPS antenna cable
B	Reset button; to reset software to factory default; network settings will be set to DHCP and the admin login account will be set to "admin"
C	Network connection between server and decoder or timing network
D	Network connection between server and decoder or timing network
E	Network connection between server and decoder or timing network
F	Network connection between server and decoder or timing network
G	Power connection for 12 VDC power supply

Note: The LED's on the UTP ports will show if a physical network connection is available.

Note: A PoE (+) switch can be used to power the Server over a single UTP port. In this case, any of the four ports can be used to supply the power and the display will show a PoE or PoE+ icon.

Note: The four UTP ports are color-coded for examples on how the Server can be connected. There are no dedicated ports and all the ports have the same configuration.



## 5. Operating the MYLAPS decoder

The X2 decoder is not equipped with an on/off switch, therefore connecting the decoder to the mains will switch it on. This will enable timing of transponder passings after approximately 15 seconds. With each detection of a transponder the received transponder information is shown on the decoder display.

### 5.1. Noise level

The decoder will show the average background noise. Noise level should not exceed -84 dBm. If the noise level is higher, the received transponder signal strength should be at least 20 dBm above noise level to ensure proper functioning of the system. So, if the transponder received signal strength is -55 dBm, the noise should not exceed -75 dBm.

The average background noise is sent to the computer by the decoder every five seconds.

Noise values in AMb points:

0	The loop is not detected
1-30	noise level is ok
30-50	noise level is medium
50+	noise level is high, not reliable detection

Formula to calculate ambpoints:  $(100/35 \times \text{dBm value}) + 289$

e/g -84 dBm in AMb points =  $(100/35 \times -84) + 289 = 46 \text{ AMb}$

Formula to calculate dBm points:  $\text{aMb} - 289/100 - 35$

e/g 46 AMb points in dBm =  $46 - 289/100 - 35 = -84 \text{ dBm}$

### 5.2. Signal strength

Transponder signal strength should preferably be above -65 dBm and should at least be 20 dBm higher than the indicated background noise. The closer the transponder is to the track, the higher the received signal strength will be. A higher transponder signal strength should allow for greater immunity against outside interference.

### 5.3. Number of hits

The number of hits, as shown by the software, is an indication of the number of repeated transponder signal receipts during a passing. Hit-rates vary with the speed of a passing transponder. Slower passings yield higher hit counts. Usually the number of hits is greater than 10.

### 5.4. Firmware update

We constantly strive to improve all our products. For new functionalities, firmware update and minor changes, you can check MYLAPS utility

## 5.5. The decoder

Reverse side



1.	Detection loop	Connect the supplied 75 Ohm double-shielded coax cable to the X2 decoder.
2.	Auxiliary port	The auxiliary port has 3 inputs, photo cell 1, external start or a sync pulse and. For more information on how to connect these devices, see appendix about Auxiliary.
3.	GPS	Connect the GPS antenna cable and place the antenna where it has a clear view of the sky overhead to be able to make connections to satellites.
4.	Can connector	For future use.
5.	The network	This port can be used to connect the network cable between decoder and the network connection port of the computer.
5.	Power	Connect the supplied VDC adapter to the decoder and mains. It is recommended to connect the VDC adapter to mains through an Uninterruptable Power Supply (UPS) to avoid any interruption of power supply to the decoder.

## 5.6. Information display – status of the decoder

Front side



1.	Decoder date/time, UTC when synchronized to GPS or NTP.
2.	Message line – you will see errors e/g DNS error – no message on this picture
3.	Background noise indication in dBm
4.	Indication that hits are received, remains black when a transponder is being received by the loop.
5.	Last received signal strength of the transponder
6.	Strength of last received transponder in dBm.
7.	Timeline name SF (Start/Finish) M – can be any name – This can be changed via Orbits XML track set up.
8.	Local time in the decoder
9.	GPS lock and how many satellites which are connected – 1 stripe = 2 satellites



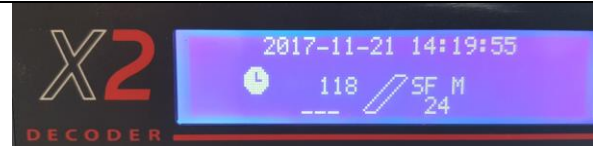

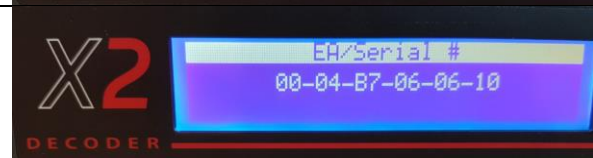
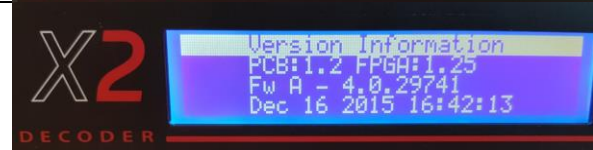
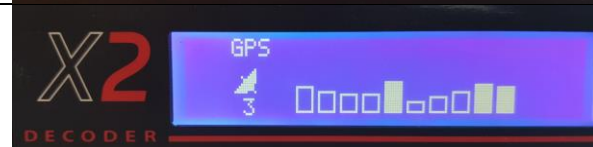


synched with an NTP server (Network Time Protocol)

## 5.7. X2 decoder menu



The decoder is not equipped with an on/off switch, therefore connecting the decoder to the mains will switch it on.

You can navigate between the menu items with the Select button and you can choose an option with the Acknowledge button. Please note that you can go one step back by selecting << and clicking the Acknowledge button.

By clicking on the Acknowledge  button you will see the following screens:

	Information display - status of the decoder
	Network information: IP address:  Mask
	EA/Serial:  This is your MAC Address/serial number
	Version information: PCB: FW A: Firmware version Date and time
	Status of GPS Signal
	Noise history on receivers with actual, minimum and maximum detected values
	Remote connections: Connected server




## 5.8. Main menu

By clicking on the Select  and Acknowledge  buttons you can choose which information you want to see on the display. Here you find all detailed information and the menu options.

Click on the select button to see the main menu.  
With the select button you go from top to bottom.

Beacon Id
Network
Switch Firmware
Factory Defaults
<<

## 5.9. Sub menu

Click on the select button  to go to Menu and click on the acknowledge button  to go to the submenu. Click on the select button to go to down in the menu. When you got the right submenu, click on the acknowledge button  again to set the information.

### Beacon id

Choose your beacon id	Used for racing with Pro transponders – 2-way communication id. Click on cancel and accept by using the select button. You don't need this with X2 club transponders.
-----------------------	---

### Network

DHCP	You can select here either On or Off. If your decoder is placed in a network the decoder will try via the DHCP server (DHCP = Dynamic Host Configuration Protocol) to get an IP address which is in the range of the network. Please note that it can take about 60 sec. to obtain the settings via DHCP.
IP Address	IP address of your decoder. An identifier for a computer or device on a TCP/IP network.
Network mask	A mask used to determine what subnet an IP address belongs to.
Gateway	A node on a network that serves as an entrance to another network.
DNS Server	Short for Domain Name System (or Service or Server), an Internet service that translates domain names into IP addresses.
<<	Return to main menu.

### Switch firmware

Accept or Cancel if you want to switch	Within the Switch Firmware menu, you can switch the firmware. Firmware is software running inside the decoder - When you update the firmware in your decoder, the decoder will retain the current version of the firmware. With the switch firmware option you are able to revert back to the previous installed version.
--	---

### Factory defaults

Accept or cancel if you want to reset your decoder to defaults.	Within the Factory defaults menu, you can reset to the factory defaults. This means that you can reset the settings of the decoder to the initial settings.
---	---

## 6. MYLAPS X2 Utility Software

### General

X2 Utility Software Tool is developed to allow for intuitive configuration of the X2 sports timing network. It offers assistance for professional and club organizations in configuring, expanding and upgrading their X2 system installations.

### Main functions:

- The utility incorporates the following functions:
- Network discovery of compatible X2 hardware
- Firmware upgrade assistance
- Configuration of individual components
- Component diagnostics and network status overview

### Requirements

#### Hardware:

The minimum hardware specifications to run the X2 Utility program are:

- 1 GHz 32-bit (x86) or 64-bit (x64) processor
- 1024 MB Memory
- 100 MB of free hard disk space
- Network adapter

#### Software:

The supported operating systems are:

- Windows 7 SP1
- Windows 8
- Windows 8.1
- Windows 10.0

## Download the software MYLAPS X2 Utility

The X2 Utility software is provided by the X2 server's built-in web server. To download the software, you must make sure that your X2 server;

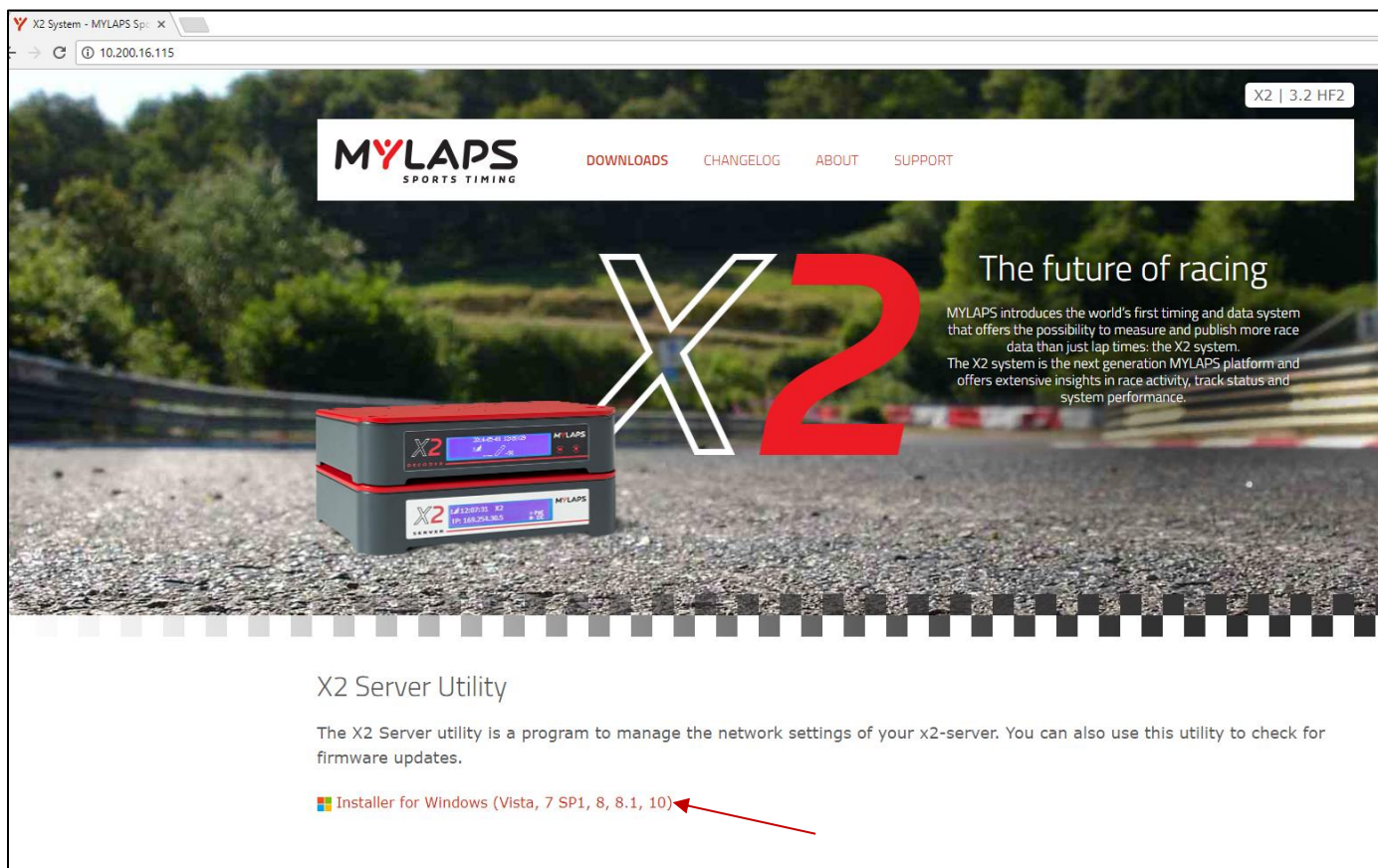
- connects to the same network as your computer
- is powered on and fully started



Then navigate your browser to the IP address of your X2 server. You can find this address on the server's display.



A connected and working server returns a page containing a download link that is in the bottom left corner of the screen.


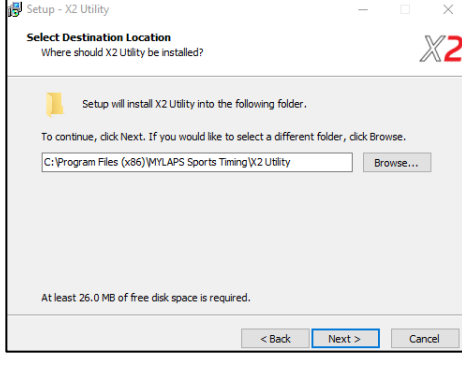
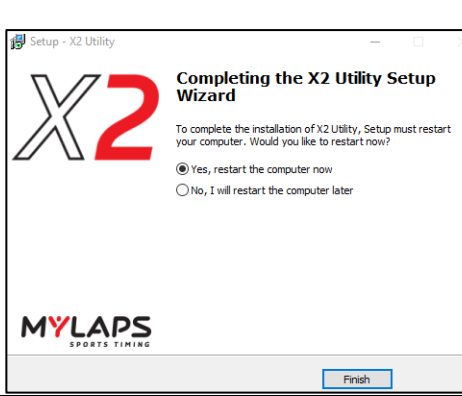
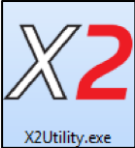
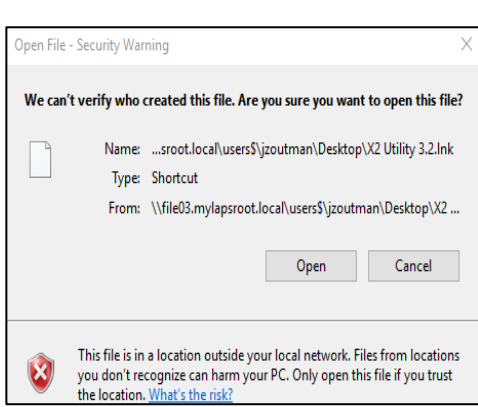


Use the link in the screen above that is named "Installer for Windows" to start the download of the X2 Utility setup program.



## Installing the software

Click on the link "installer for Windows" to install the X2 Utility, locate and start the downloaded set up file on your computer. In your downloads, you find the file "X2 utilitySetup.exe". Choose your language and follow the next steps.

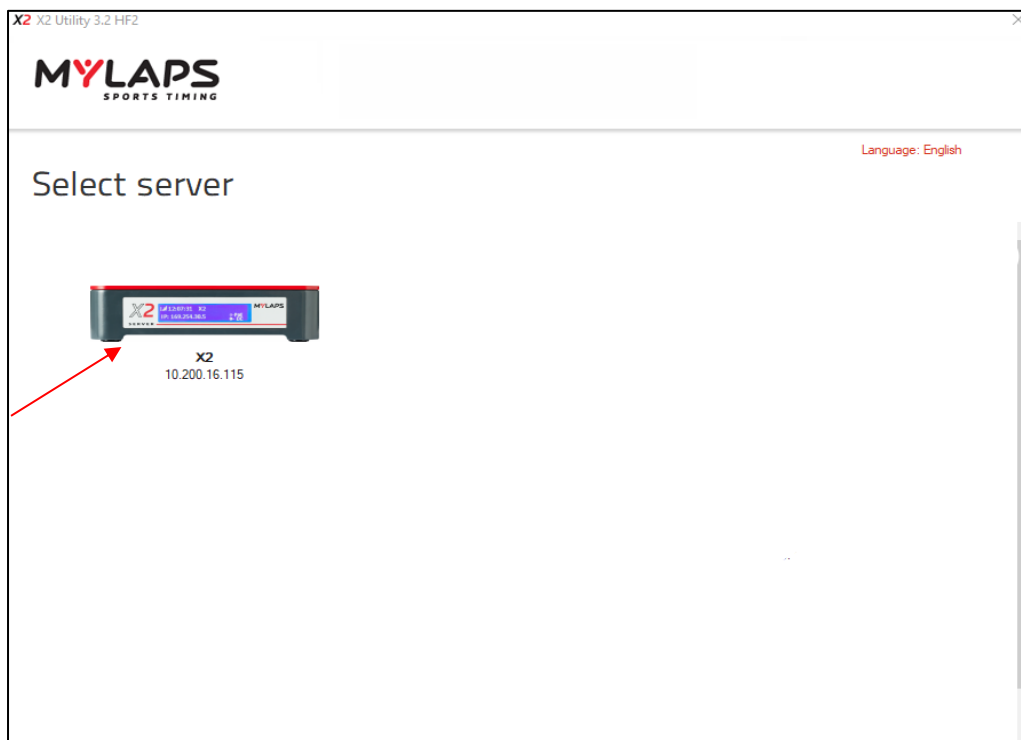
<p>Click on &lt;next&gt; and accept the agreement and click on &lt;next&gt;</p>	 <p>The screenshot shows the 'Welcome to the X2 Utility Setup Wizard' window. It includes the X2 logo, the MYLAPS Sports Timing logo, and text stating it will install X2 Utility 3.2 HF2. It recommends closing other applications and provides 'Next &gt;' and 'Cancel' buttons.</p>
<p>The installation will start.</p> <p>Here you can choose the place where you want to put your file.</p> <p>Both components (X2 utility and bonjour) must be marked on the next page.</p> <p>A file has been created and you can choose in the following pages if you want a desktop icon or a quick launch icon.</p>	 <p>The screenshot shows the 'Select Destination Location' window. It asks 'Where should X2 Utility be installed?' and shows the default path: 'C:\Program Files (x86)\MYLAPS Sports Timing\X2 Utility'. It includes a 'Browse...' button and 'Back', 'Next &gt;', and 'Cancel' buttons. A note at the bottom states 'At least 26.0 MB of free disk space is required.'</p>
<p>To finish the installation, you must restart your computer.</p>	 <p>The screenshot shows the 'Completing the X2 Utility Setup Wizard' window. It asks 'To complete the installation of X2 Utility, Setup must restart your computer. Would you like to restart now?' with two radio button options: 'Yes, restart the computer now' (selected) and 'No, I will restart the computer later'. It includes a 'Finish' button.</p>
<p>After you restarted the computer open X2 Utility</p> 	 <p>The screenshot shows a 'Security Warning' dialog box. It asks 'We can't verify who created this file. Are you sure you want to open this file?' and displays file details: Name: '...sroot.local\users\$\jzoutman\Desktop\X2 Utility 3.2.Ink', Type: 'Shortcut', and From: '\\file03.mylapsroot.local\users\$\jzoutman\Desktop\X2 ...'. It has 'Open' and 'Cancel' buttons. A warning icon and text at the bottom state: 'This file is in a location outside your local network. Files from locations you don't recognize can harm your PC. Only open this file if you trust the location. What's the risk?'.</p>



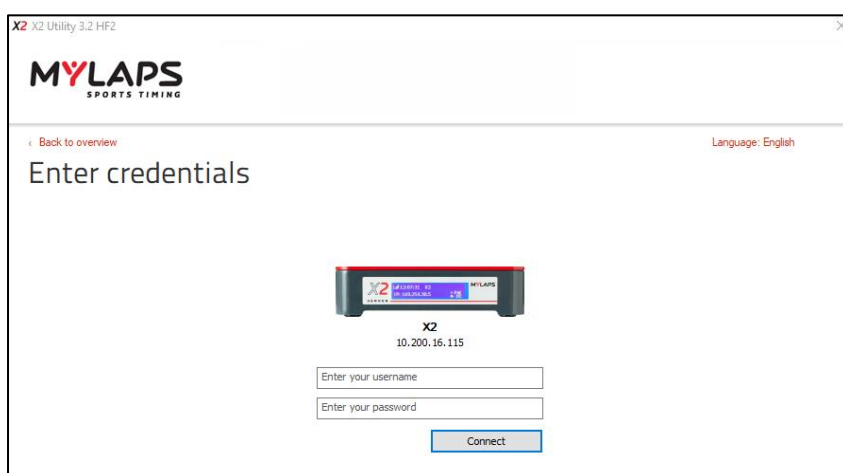
## Select your X2 server

When you opened the X2 Utility, the first screen shows an overview of discovered servers on the networks that your computer is connected to.

When there are no known servers, you should verify that X2 server is up and running and connected to the same network as your computer. If you are still having trouble connecting to your server the network might be blocking attempts of the utility to discover the server(s). You can choose to connect to the server(s) manually instead.



Check on your X2 server the IP address and select on the server with this address by clicking on the server.

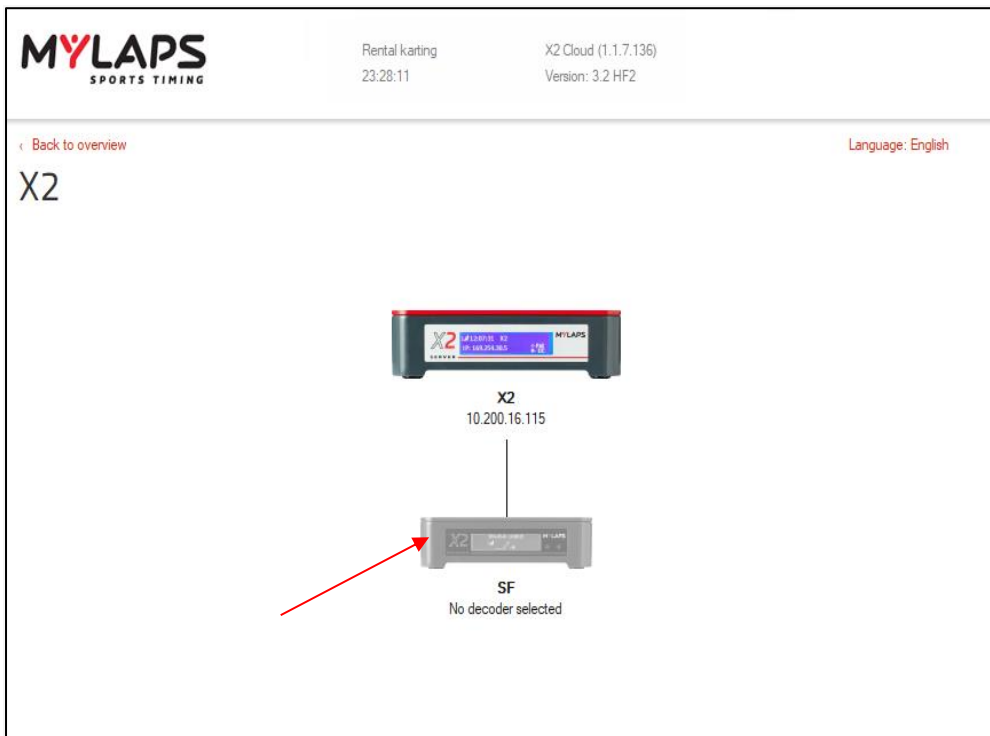


When you selected your server, enter your credentials.

The factory default for the administrator role is **admin** (for the username) and **admin** (for the password).

This can be changed and can only be used in your own network.

When successfully connected to the server you will be presented with an overview of all configured loops and connected decoders. Click on the decoder to choose your decoder.



Your X2 server is now connected with your X2 decoder.

## X2 Server settings

### Server and decoder overview

The connected server overview shows the type of sport selected, server time, remote support status and X2 Utility version. Connected decoders show up as enabled (not greyed out). Basic component information is displayed when you hove over enabled components. Configured loops show up as disabled decoders.



Rental karting  
23:33:37

X2 Cloud (1.1.7.136)  
Version: 3.2 HF2

[Back to overview](#)
Language: English

# X2



**X2**  
10.200.16.115

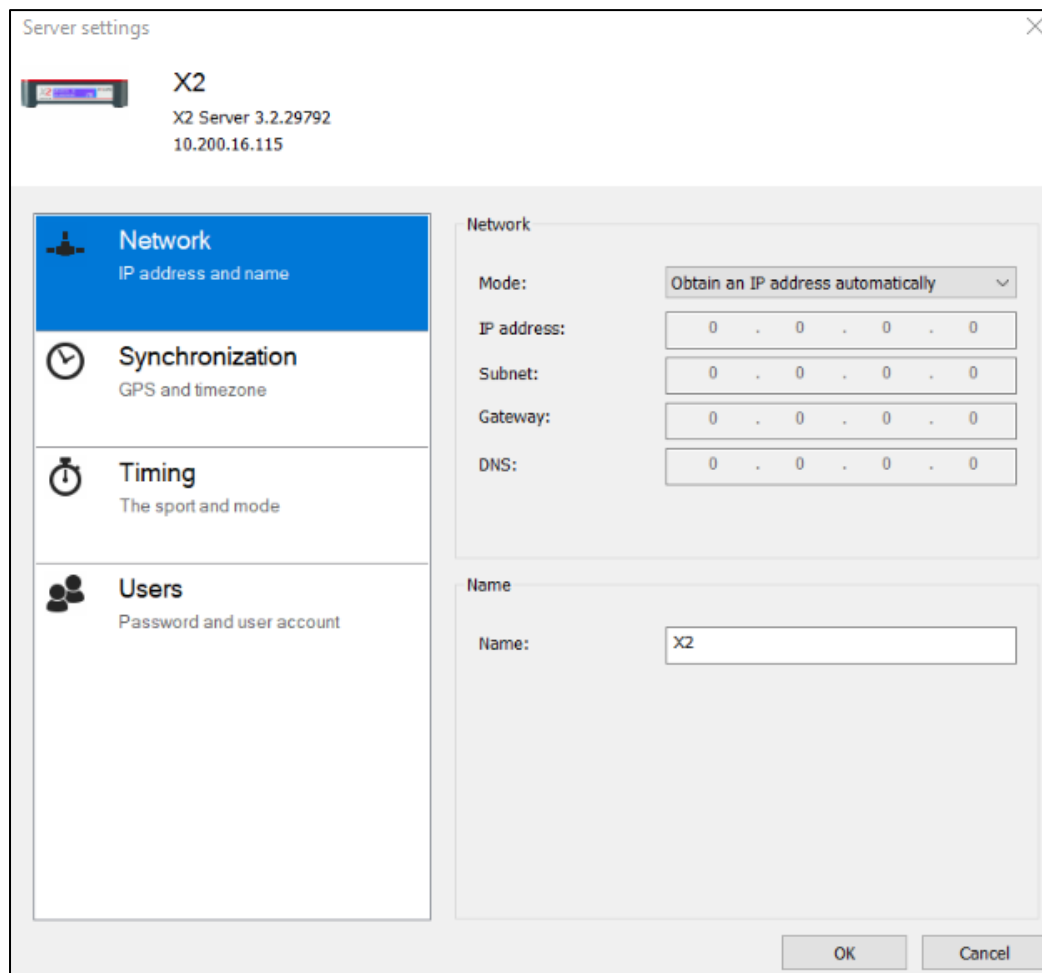


**SF**  
10.200.16.122

## X2 Server configuration

Clicking on the server shows the server configuration dialog where you can set Network, Synchronization, Sport, Authentication and Remote support settings.

### Network



The screenshot shows the 'Server settings' dialog box for 'X2'. The title bar says 'Server settings' with a close button. Below the title bar, there's a server icon and the text 'X2', 'X2 Server 3.2.29792', and '10.200.16.115'. The main area is divided into two panes. The left pane has a sidebar with four tabs: 'Network' (selected, blue background), 'Synchronization' (GPS and timezone), 'Timing' (The sport and mode), and 'Users' (Password and user account). The right pane shows the 'Network' configuration. It has a 'Mode' dropdown set to 'Obtain an IP address automatically'. Below it are four input fields for 'IP address:', 'Subnet:', 'Gateway:', and 'DNS:', each containing '0 . 0 . 0 . 0'. At the bottom of the right pane is a 'Name' section with a text box containing 'X2'. At the very bottom of the dialog are 'OK' and 'Cancel' buttons.

### Mode


With the default setting the IP address and network settings will be obtained automatically using the network's DHCP server. If no IP address can be obtained it will be necessary to configure a static IP address, subnet and gateway and DNS server. Please consult your network provider or administrator when configuring a static IP address for your server as the IP address has to be unique to your server. Otherwise IP address conflicts might arise that can cause X2 server disconnections.

### Name


Choose or alter the hostname for your server. Hostname labels may contain only the ASCII letters 'a' through 'z' (in a case-insensitive manner), the digits '0' through '9', and the hyphen ('-').


## Synchronization


Server settings




**X2**  
X2 Server 3.2.29792  
10.200.16.115

**Network**  
IP address and name

**Synchronization**  
GPS and timezone

**Timing**  
The sport and mode

**Users**  
Password and user account

**Synchronization**

Use GPS to  
synchronize the clocks:

Yes

The server and decoders are synchronized by  
GPS. Make sure the GPS antenna is attached  
to the server and decoders.

Timezone:

PRC

OK

Cancel


### GPS

Select "Yes" if the X2 server and decoders are synchronized using GPS. If this option is selected both the server and all decoders need a connected GPS antenna.


### Time zone


Select the appropriate time zone for your location.


## Timing




**X2**  
X2 Server 3.2.29792  
10.200.16.115


**Network**  
IP address and name


**Synchronization**  
GPS and timezone


**Timing**  
The sport and mode


**Users**  
Password and user account

**Sport**  
Sport: Bike racing

**Mode**  
Mode: Main mode

OK

Cancel

### Sport

Select the sport that is being timed. The selected sport will be transmitted to all connected decoders.


### WARNING:

A configured sport can be overridden by timing software connected to the server. When no data is recorded you should double check that the sport shown in the X2 Utility server's overview screen header is correct. Also check the sport setting in your timing software (when available).


### Mode


Set the server in main or in backup mode. In main mode the server is able to write settings to the decoders and read from the decoders. In backup mode the server can only read data from the server. The backup setting will only be used when you have 2 servers that are using the same decoders. In backup mode you avoid overriding settings done by the man server.


## Users




**X2**  
X2 Server 3.2.29792  
10.200.16.115


**Network**  
IP address and name


**Synchronization**  
GPS and timezone


**Timing**  
The sport and mode


**Users**  
Password and user account

**Administrator**

Username:   
New password:   
Confirm:   

The administrator can change the settings of the server and decoders.

**User**

User account:   
Username:   
New password:   
Confirm:   

The user can't change the settings of the server and decoders.

OK

Cancel

On this screen you can set the credentials for the X2 administrator and user accounts.

### Administrator


The administrator can change the settings of the X2 server and decoders.

### User

The user cannot change the appliance settings but will be able to read timing data.

X2 Decoder configuration

Network



SF

X2 Motorized decoder 4.0.40070

10.200.16.122


Network

IP address and name

☐


Loop

Track sensors and 2-way ID



Timing

Squelch



Input

Input hold off and trigger

Network

Mode:

Obtain an IP address automatically

IP address:

10 . 200 . 17 . 122

Subnet:

0 . 0 . 0 . 0

Gateway:

0 . 0 . 0 . 0

DNS:

0 . 0 . 0 . 0

Disconnect decoder

OK


Cancel

Mode


With the default setting the IP address and network settings will be obtained automatically using the network's DHCP server. If no IP address can be obtained, it will be necessary to configure a static IP address, subnet and gateway and DNS server. Please consult your network provider or administrator when configuring a static IP address for your decoder as the IP address must be unique to your decoder. Otherwise IP address conflicts might arise that can cause disconnections.





## Loop





**SF**  
X2 Motorized decoder 4.0.40070  
10.200.16.122


**Network**  
IP address and name


**Loop**  
Track sensors and 2-way ID


**Activation**  
Enable or disable activation


**Timing**  
Squelch


**Input**  
Input hold off and trigger

Disconnect decoder

Loop

Track sensors: 0

2-way ID: 1

OK

Cancel


### Track sensors

Select the number of installed track sensors (up to 3).


### 2-way identification

If used, select the ID for outgoing messages from the loop to the transponders. (1 through 64)


## Timing




**SF**  
X2 Motorized decoder 4.0.40070  
10.200.16.122




**Network**  
IP address and name



**Loop**  
Track sensors and 2-way ID



**Timing**  
Squelch



**Input**  
Input hold off and trigger

**Timing**  
Squelch:  dBm (46)

With the squelch setting you can suppress weak transponder signals. This is sometimes useful if participants are walking near the loop or the coaxial cable and are picked up accidentally. E.g. if the squelch setting is set to -60 dBm, all transponders with received strength below -60 dBm will be ignored.


Disconnect decoder
OK
Cancel

## Squelch


Here you can tune the sensitivity of the loop when detecting a passing transponder. A higher number has a limiting effect on transponder detection. This is typically used when loops are installed in proximity of each other and weak transponder signals are erroneously received.


## Input


Decoder settings




SF
X2 Motorized decoder 4.0, 40070
10.200.16.122


**Network**  
IP address and name


**Loop**  
Track sensors and 2-way ID


**Timing**  
Squelch


**Input**  
Input hold off and trigger

Input

	Holdoff (ms)	Trigger on
Input 1:	20	Rising edge
Input 2:	20	Rising edge
Input 3:	20	Rising edge

Disconnect decoder
OK
Cancel

The decoder has three inputs. In most cases these are used to connect photo cell equipment or triggering start events.

### Hold-off

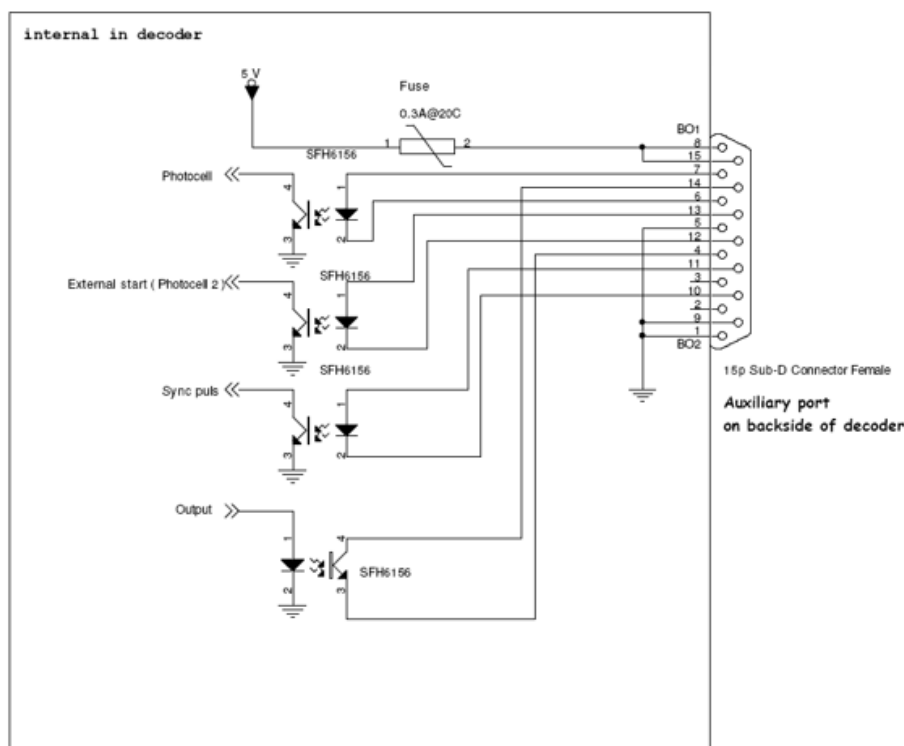
The hold-off in milliseconds tells the detector to ignore subsequent signal changes after the triggering edge is detected for the specified number of milliseconds. This is typically used to ignore switching artifacts of the connected electronic circuits.

### Trigger

This tells the input to disable or trigger detection on the rising, falling or both edges of the input signal.

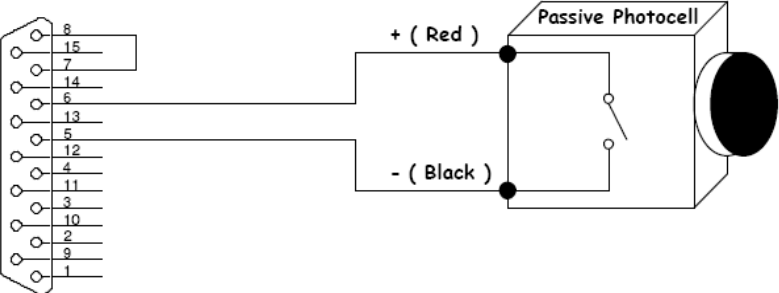
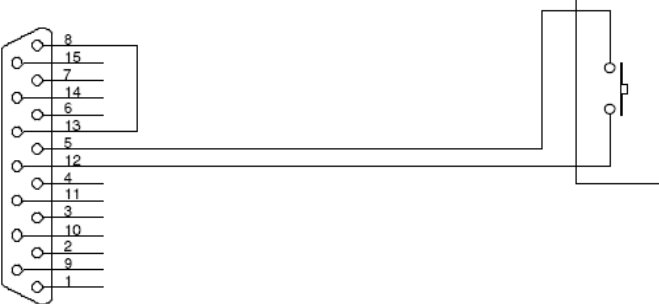
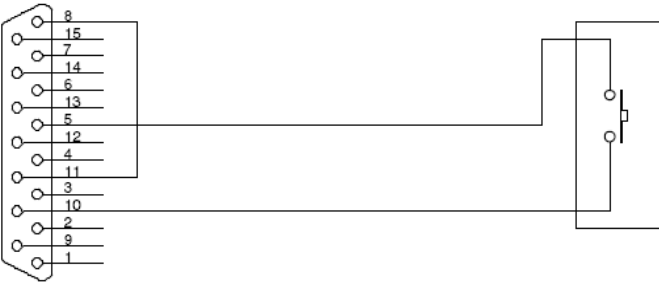
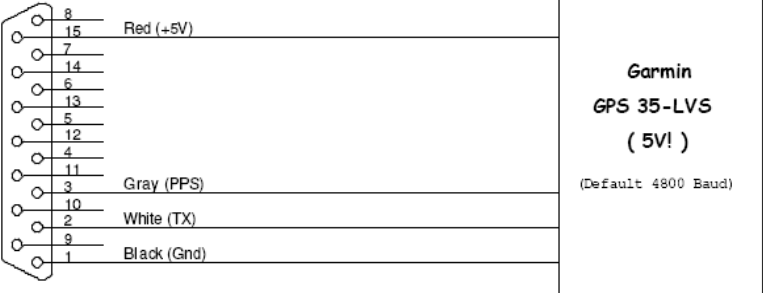
## 7. Appendix Auxiliary Connections

The MYLAPS decoder is equipped with an auxiliary port (15 pin sub D-connector). The auxiliary port has 3 inputs, photo cell 1, photo cell 2, sync pulse and a control port for a GPS receiver. All inputs can be triggered by a 5 VDC (5-15 mA) pulse. Figure 1 explains the connection setup. To use a photocell, connect it using the MYLAPS photocell cable or make an appropriate cable using figure 1 below. Two types of photocells are available, passive and active photocells. They both operate as a switch; to connect the passive photocells please follow the connection setup in figure 1a and scheme 1b. Active photocell can be connected directly to the photocell/sync – and + input pins.



**Auxiliary port  
on backside of decoder**

+5 V (Max 300mA)	8, 15
Ground	1, 5, 9
Photocell +	7
Photocell -	6
External start +	13
External start -	12
Sync. puls +	11
Sync. puls -	10
Output +	14
Output -	4

 <p>15p Sub-D Connector Male</p>	<ul style="list-style-type: none"> <li>- Connect pin 7 to pin 8 ( or 15 )</li> <li>- Connect pin 6 to + terminal of photocell</li> <li>- Connect pin 5 to - terminal of photocell</li> </ul>
 <p>15p Sub-D Connector Male</p>	<ul style="list-style-type: none"> <li>- Connect pin 13 to pin 8 ( or 15 )</li> <li>- Connect pin 12 to terminal of start button</li> <li>- Connect pin 5 to - terminal of start button</li> </ul>
 <p>15p Sub-D Connector Male</p>	<ul style="list-style-type: none"> <li>- Connect pin 11 to pin 8 ( or 15 )</li> <li>- Connect pin 10 to + terminal of sync. contact</li> <li>- Connect pin 5 to - terminal of sync. contact</li> </ul>
 <p>15p Sub-D Connector Male</p>	<ul style="list-style-type: none"> <li>- Connect Red wire to pin 15 ( or 8 )</li> <li>- Connect Black wire to pin 1 ( or 9 )</li> <li>- Connect White wire to pin 2</li> <li>- Connect Gray wire to pin 3</li> </ul>

## 8. Support

In case you encounter any issues, please contact your sales offices:

MYLAPS EMEA Office  
Haarlem, The Netherlands  
Tel: +31 23 7600200  
Email: [info@mylaps.com](mailto:info@mylaps.com)

MYLAPS Americas Office  
Atlanta, USA  
Tel: +1 678 816 4000  
Email: [info.americas@mylaps.com](mailto:info.americas@mylaps.com)

MYLAPS Japan Office  
Tokyo, Japan  
Tel: +81 3 6418 8209  
Email: [info.japan@mylaps.com](mailto:info.japan@mylaps.com)

MYLAPS APAC Office  
Sydney, Australia  
Tel: +61 2 9533 1100  
Email: [info.asia.pacific@mylaps.com](mailto:info.asia.pacific@mylaps.com)

MYLAPS Asia Office  
Selangor, Malaysia  
Tel: +60 3 5613 1235  
Email: [info.asia@mylaps.com](mailto:info.asia@mylaps.com)

MYLAPS 24/7  
Only in cases of direct needed support for event  
organizers and companies.  
Tel: +31 23 7600200

Our Frequently Asked Questions (FAQ) can be found on [help.mylaps.com](http://help.mylaps.com)

## CE Declaration of Conformity MYLAPS X2 Club Decoder

We,

MYLAPS  
Zuiderhoutlaan 4  
2012 PJ Haarlem  
The Netherlands

Declare that the UHF system

MYLAPS X2 Decoder

In accordance with the following directives:

2006/95/EC	The Low Voltage Directive
2004/108/EC	The Electromagnetic Compatibility Directive
1999/5/EC	Radio & Telecommunications Terminal Equipment Directive

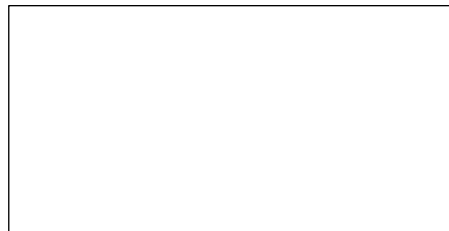
Has been designed and manufactured to the following specifications:

EN 301-489-1 (2005-09)  
EN 301-489-3 (2002-08)  
EN 302-208-2 (2008-04)  
EN 61000-3-2 (2006)  
EN 61000-3-3 (2008)

I hereby declare that the product named above is designed to comply with the relevant sections of the above referenced specifications, and all essential requirements of the Directives.

Name of authorized person: John Verwoerd  
Function of authorized person: R & D Director  
Place and Date: Haarlem, November 2018

Signature of authorized person:



## CE Declaration of Conformity MYLAPS X2 Club Server

We,

MYLAPS  
Zuiderhoutlaan 4  
2012 PJ Haarlem  
The Netherlands

Declare that the UHF system

MYLAPS X2 Server

In accordance with the following directives:

2006/95/EC	The Low Voltage Directive
2004/108/EC	The Electromagnetic Compatibility Directive
1999/5/EC	Radio & Telecommunications Terminal Equipment Directive

Has been designed and manufactured to the following specifications:

EN 301-489-1 (2005-09)  
EN 301-489-3 (2002-08)  
EN 302-208-2 (2008-04)  
EN 61000-3-2 (2006)  
EN 61000-3-3 (2008)

I hereby declare that the product named above is designed to comply with the relevant sections of the above referenced specifications, and all essential requirements of the Directives.

Name of authorized person: John Verwoerd  
Function of authorized person: R & D Director  
Place and Date: Haarlem, November 2018

Signature of authorized person:

