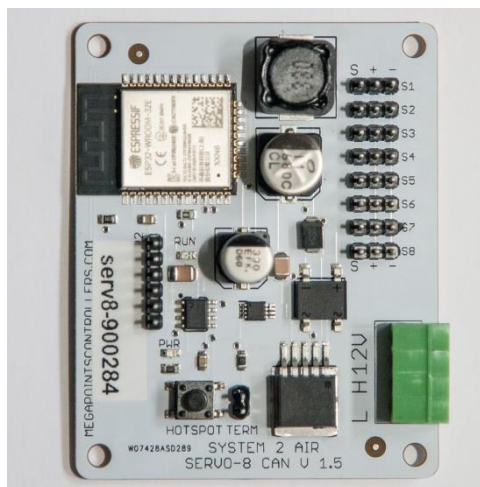


System-2 Starter Kit Quick Start Guide

by MegaPoints Controllers

The convenience of Wi-Fi for configuration and the reliability
of a wired network for operation.



User Guide

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System-2 Starter Kit quick start guide

Introduction

As a companion to this written guide see our range of System-2 videos on YouTube including the “System-2 Starter Kit - Quick Start Guide”. For a detailed description refer to the specific user guide for your board type.

Your starter kit comes pre-configured for 16 channels of operation and includes:

- 1 x 16 channel Panel Controller.
- 2 x Motor driver boards of choice.
- 16 x Pushbuttons with cables.
- 16 x LED cable pairs.
- 2 x Termination jumpers.

You will also need:

- 12 Volt DC regulated power supply.
 - 500mA per Panel Controller.
 - 1.5A per Servo Controller.
 - Approx. 200mA for other non-solenoid driver boards.
- A 16 Volt A/C transformer at 30VA minimum if using solenoid drivers
- Network cable such as CW1109B/Y supplied by CPC/Farnell (telephone jumper wire). See website for cable links. Non twisted pair cable is OK for testing purposes.

To use the Wi-Fi features of this board you will require:

- A DHCP equipped Wi-Fi network in the 2.4 GHz band.
- An active internet route (only required for software updates).

This is a 12 Volt device and should be connected to a minimum of 1.5 Amp regulated power supply.

MegaPoints Controllers use static sensitive components that must be handled with care.

Avoid touching any components or the circuit printed on the bottom of the board.

Avoid placing the board on any metallic surfaces including track.

DO NOT connect any part of this device directly to your track bus.

Getting your first board on your local Wi-Fi network

There's a dedicated YouTube video demonstrating this. Follow this link to view: <https://youtu.be/G3ajZazycP4>. It will probably be easier than going through the following text.

With your updated software the procedure here overrides that in the Starter Kit Quick Start Guide. It has changed slightly making it more intuitive and easier. The very first board on from your System-2 Air should be configured for your Wi-Fi. This will allow you to connect and adjust the board settings such as servo movement type, speed or range adjustment as well as download future software updates and change port addresses. We suggest using the Panel Controller for this example.

Broadly speaking, here's how to connect to your Wi-Fi:

- Apply 12 DC regulated power to the Panel Controller.
- Observe the RUN LED flashing about once per second (may take up to 30 seconds on first time boot..
- Hold the HOTSPOT button for 1 second; observe the RUN LED flash rate increase to double.
- From your phone, tablet or other Wi-Fi device scan for Wi-Fi networks and locate the hotspot network for the panel controller (it will be the device name/serial number on the sticker) such as "panel-xxxxxx" or "serv8-xxxxxx".
- Connect to this network hotspot network. You may receive a warning stating this network does not connect to the Internet. This is OK.
- If your device states "sign-in required", select this option and go to the sign-in page.
- If your device does not offer a sign-in page, navigate your browser to "4.3.2.1/admin".
- Enter the SSID and password for your local network. Note case sensitivity (screenshot below).
- Press the "Scan WiFi" button. After a few seconds the adjacent text box will populate with scanned networks. Select the appropriate network (strongest signals towards the top).
- Enter a password (case sensitive) and press the save button.
- Your devices IP address will now be displayed near the top (red band). Make a note of this.

12:16 4G 99%

Sign in to serv8-451b34
4.3.2.1

MegaPoints Controllers

System 2 AIR WiFi Configuration

Product: Servo-8
Hostname: serv8-451b34
IP Address: 192.168.0.121

Scan Wi-Fi networks automatically.

Scan WiFi Megapoints

Password

Save Reboot

Or enter Wi-Fi details manually.

SSID

Password

Save

Device Management

- Press the reboot button when ready and access the device via your usual network using the IP address obtained previously.

Figure 1 Example web control page

- From your browser (PC in my case) that's connected to your network, click the Reboot link and allow the board to restart. You will automatically reconnect when complete.

MegaPoints Controllers **System 2 Air panel-a07c10**

Port Configuration

Input Ports										Output Ports			
Phys Port	V-Port	Latch (ms)	Input Type	Invert	RGB Red	LED Green	Colour Blue	Colour B/G	Phys Port	V-Port	Invert		
1	1	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	1	161	<input type="checkbox"/>		
2	2	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	2	162	<input type="checkbox"/>		
3	3	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	3	163	<input type="checkbox"/>		
4	4	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	4	164	<input type="checkbox"/>		
5	5	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	5	165	<input type="checkbox"/>		
6	6	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	6	166	<input type="checkbox"/>		
7	7	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	7	167	<input type="checkbox"/>		
8	8	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	8	168	<input type="checkbox"/>		
9	9	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	9	169	<input type="checkbox"/>		
10	10	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	10	170	<input type="checkbox"/>		
11	11	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	11	171	<input type="checkbox"/>		
12	12	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	12	172	<input type="checkbox"/>		
13	13	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	13	173	<input type="checkbox"/>		
14	14	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	14	174	<input type="checkbox"/>		
15	15	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	15	175	<input type="checkbox"/>		
16	16	1000	Push to make btn	<input type="checkbox"/>	0	0	0	<input type="checkbox"/>	16	176	<input type="checkbox"/>		

EasyConfig (V-Port address) Select board Num Locate Board ☐

Location/Description

Auto CAN ID ☒ CAN ID (Manual range 1000-1999.)

Share WiFi Credentials ☐ Revoke WiFi Credentials ☐

[Reset ports to defaults](#) | [Save Changes](#) | [Reload Values](#)
[Erase WiFi Credentials](#) | [Update Firmware](#) | [Reboot](#)
[Reload page](#) | [Documentation](#) | [Network Monitor](#)

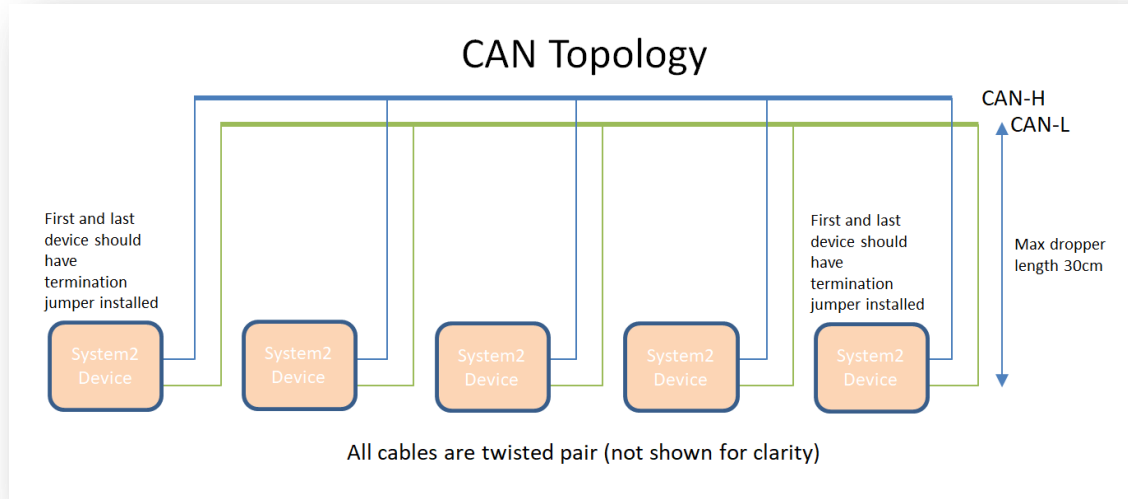
Panel Controller S/W Rev: 4 | Templates: 4 | IP Address: 192.168.0.80 | Name: panel-a07c10 | SSID: Megapoints

Firmware up to date. (27-OCT-2000)
Web client connected.

When you have all your boards connected to the CAN network you can automatically connect every board on your network to your Wi-Fi by pressing the “Share Wi-Fi credentials” button from the main configuration panel. YOU ONLY PERFORM THE ABOVE PROCESS ONCE ON YOUR FIRST BOARD. All subsequent boards will pick up the Wi-Fi credentials from your first board.

Every board that connects will report in on the main status page. From there you can see all boards IP addresses and installed software versions.

Network cabling



See the above diagram for network cabling. All cables should be a twisted pair signal cable.

You can use droppers to a main bus much like DCC or connect boards to each other in daisy chain fashion. Ensure the CAN-H and CAN-L connects to the same terminal in all cases.

Connect buttons and LEDs


Connect the buttons to the lower connectors of the Panel Controller. Ensure the black lead (ground) is to the lower outside edge.

Connect the LED cables to the top row of connectors. Ensure the black lead is to the outside edge.

With a servo (or other suitable motor type) connected to the motor driver board, pressing the corresponding button on the Panel Controller will result on the motor operating. The Panel Controller LEDs will change as the motor moves. Some types will optionally have the LEDs flash when the motor is moving (servo).

Admin Interface

The admin web page is shown on the page below. It is the place where you will change any settings for the Servo-8. Each board on the System-2 network has its own management web page.



System 2 Air

serv8-8ffd4c

Servo Port Configuration

Servo	V-Port	Range Low	Range High	Speed	Type	Reversed	Trigger V-Port	Feedback V-Port	Range Low	Range High	Speed
1	1	500	500	200	Points	<input type="checkbox"/>	321	161			
2	2	500	500	200	Points	<input type="checkbox"/>	322	162			
3	3	500	500	200	Points	<input type="checkbox"/>	323	163			
4	4	500	500	200	Points	<input type="checkbox"/>	324	164			
5	5	500	500	200	Points	<input type="checkbox"/>	325	165			
6	6	500	500	200	Points	<input type="checkbox"/>	326	166			
7	7	500	500	200	Points	<input type="checkbox"/>	327	167			
8	8	500	500	200	Points	<input type="checkbox"/>	328	168			

EasyConfig (Base address) ☐ Locate Board

Location/Description

Auto CAN ID ☒ CAN ID (Manual range 1000-1999.)

Share WiFi Credentials ☐ Revoke WiFi Credentials ☐

[Reset to defaults](#) |
 [Save Changes](#) |
 [Reload Values](#)
[Erase WiFi Credentials](#) |
 [Update Firmware](#) |
 [Reboot](#)
[Reload page](#) |
 [Documentation](#) |
 [Network Monitor](#)

Servo-8 S/W Rev: 1 | Templates: 1 | IP Address: 192.168.0.66 | Name: serv8-8ffd4c | SSID: Megapoints

Firmware update available, release date: 27-OCT-2022
Web client connected.

From the main page you can see the following information:

- Device name and serial number
- Servo configuration for each servo port (1-8) including
 - Movement range
 - Movement speed
 - Movement type (linear, logarithmic, semaphore bounce etc.)
 - Movement direction (reversed or normal)
 - V-Port assignment
 - Input and output V-Ports (yes even servos can generate events)
- EasyConfig (if selected)
- Locate Board: Will cause the LED on the selected board to flash fast helping you to locate the board if you have many.
- User definable text description or location
- Auto CAN ID. You can override the CAN ID if required.
- Share and revoke Wi-Fi credentials with all boards on the network

- Control buttons (shown in blue text) to:
 - Reset the board
 - Save changes you've made
 - Reload changes (resyncs the web page with board)
 - Erase this boards Wi-Fi credentials (will immediately leave the network)
 - Select the firmware update (requires internet connection)
 - Reboot the board (throws out any unsaved changes if you made a mess)
 - Reload the web page
 - Link to online documentation and support videos
 - A CAN network monitor (for those who prefer watching network packets to trains).
- The next line shows:
 - Product name (Servo-8)
 - Software version
 - Templates version (should always match the software version)
 - The local IP address
 - The device network name and serial number
 - The Wi-Fi name you are connected to
- The last item is a status box (light yellow background). This provides a real time status such as up to date software, or boards joining the network, whether you saved (or should) save your changes etc.

Easy Config

The Panel Controller and motor driver boards feature an easy config for port setup.

Panel Controller boards feature 16 channels and are numbered from boards 1 to 10 in the easy config menu. By default your starter kit should have the panel controller set to board 1 (V-Port addresses 1-16). Ensure your first motor driver board is set to 1A and the second to 1B. This will pre configure the V-Ports to the first sixteen. You are free to change any of the ports within the range 1 – 60,000 to suit your application.


Firmware Update

If you see a message in the status area, then a software update is available.

Servo-8 S/W Rev: 28 | Templates: 30 | IP Address: 192.168.0.90 | Name: serv8-a1c604 | SSID: Megapoints

Firmware update available, release date: 14-OCT-2022.
Web client connected.

Head over to the “Update Firmware” page to see what this update does.



Servo-8

System 2 Air

Software Update

14-OCT-2022

- o Added board location field for the user to enter meaningful data such as board location or purpose.

13-OCT-2022

- o Added hostname in large lettering to top right of config web page.

You can see the release dates and what's in each release. If you select to update you'll get all the changes right up to the latest version. The update is not mandatory. Installation is up to you.

In this example we're going to select the firmware update. It should complete within 10 minutes. During the update you'll see progress on the web page and the on board LED will flash erratically showing data transfer.

☐ [View full update history.](#)

Examine the release notes above to see what's changed from your installed software. Only the changes will be listed.

To upgrade to the latest software release [Click Here](#).

Once the upgrade has started you must not power off your device until the upgrade is complete. This will take between 4-8 minutes to complete. If successful the device will reboot automatically.

[Click Here](#) to return to the main page.

Below is the log file created during the software update:

```
Update initiated.
Beginning firmware update. Two downloads will be processed.
Onboard LED will flash erratically indicating data transfer.
The update will take between 4-8 minutes to complete.
An active internet connection is required for success.
Please wait, do not reboot! Update in progress...
Download (1/2). Connecting to update server.
Received 926816 bytes from the update server.
Written only: 0/926816. Please Retry.
Received 926816 bytes from the update server.
Wrote: 926816 bytes successfully.
File (1/2) has been updated.
File (1/2) download complete.
Download (2/2). Connecting to update server.
Received 1507328 bytes from the update server.
Wrote: 1507328 bytes successfully.
File (2/2) has been updated.
Rebooting. Please return to the main web page.
```

When complete the board will automatically reboot and re-join the network.

All your configuration data remains unchanged and is preserved across updates.

The update will fail safe. This means that if you interrupt the connection or power off during an update you can return to the update screen and begin the process again.

V-Ports

System-2 is an event driven system. This means when a button is pressed an event is generated on the network. This event is visible to all connected nodes and will be acted on by those nodes listening for that event.

At the heart of the system is the "V-Port" or virtual port. The system will allow V-Ports in the range 1 – 60,000, which should be big enough for the largest and most sophisticated layouts.

When you set a V-Port address under the “V-Port” column you are saying that the servo is to listen for events on this V-Port and take commanded action if appropriate.

A corresponding V-Port should be configured on an output channel such as a Panel Controller, PC or DCC interface.

Feedback V-Port

Servo Port Configuration												
Servo	V-Port	Range Low	Range High	Speed	Type	Reversed	Trigger V-Port	Feedback V-Port	Range Low	Range Hi	Speed	
1	1	500	500	200	Points Linear ▼	<input type="checkbox"/>	321	161				
2	2	500	500	200	Points Linear ▼	<input type="checkbox"/>	322	162				

The Feedback V-Port will generate an event from the servo controller:

- When the servo begins to move
- When the servo has arrived

This is useful in multiple ways:

After a button is pressed on a Panel Controller the servo will indicate that it has begun to move. The panel controller can be configured to have its position LEDs flash to indicate movement is in progress.

After a servo has arrived at its destination indicating to the Panel Controller movement has completed and the servo is at its commanded position.

This gives a closed loop operation proving the communication from the button to the servo and back was completed.

Trigger V-Port

The Trigger V-Port will fire when the servo is at the half way mark. This is particularly useful to trigger a relay for frog polarity (works with analogue DC and DCC) when the blades are halfway. On some N gauge points this is desirable to prevent short circuits.

What is System-2 Air?

System-2 is our new generation of products that feature our V-Port protocol addressing up to 60,000 devices. You can scale an installation from a single Servo-8 Controller right up to a huge layout as your needs grow. Flexibility is baked in and as we announce new modules that will work right alongside other System-2 modules.

The “Air” in System-2 refers to how you configure the system. It’s done wirelessly using Wi-Fi. This means you can configure a device using your PC, tablet or phone and replaces the need for buttons, flashing lights and extension cables to reach under baseboard locations.

We use Wi-Fi for configuration and a CAN network for data. This offers high speed, low latency and above all else reliability. You can even shut down the Wi-Fi network when your configuration is complete making your system secure and robust. It’s not required for operation at all.

Software for all System-2 Air modules can be updated over the air. A single button push is all that’s needed to download and install the latest version. This means as new ideas and features are introduced everyone gets to benefit from them. You can even see the changes that have been introduced since your last update and choose whether to install or not. You won’t get nagging reminders to update. It’s flexible and entirely up to you when or if you decide to do it.

System-2 has been real world tested on some of the largest exhibition model railway layouts in the UK for over 1 year before launching, so you can be confident it’s fit for your needs.

Each of our System-2 boards has the administrative core baked in. You can connect to any board’s admin web page and from there manage your entire network. There’s no central point of control (or failure) as they are all peers in their own right.

System-2 Air, for the smallest to the largest layouts and everything in between.

Designed and manufactured in England.

Document revision history

Rev 3	Updated hotspot changes. Admin page now on 4.3.2.1/admin.
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Contacting us

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If you have any product improvement suggestions we'd be very pleased to hear from you.

NOTE: We operate on a policy of continuous improvement. Colours, specifications and even the placement of components may vary from time to time.