



MICRO-DESIGN, INC.

StarPin-C Operator's Manual.











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Introduction

The StarPin solar tracker from LevelCon is the most advanced asset tracking product available on the market today. It communicates via the globally available and extremely efficient CatM1 / NB-IOT cellular network. It is designed with high precision GNSS systems to deliver precise GPS locations at all times. The StarPin operates from harnessing solar energy removing the burden of servicing batteries while in use. It can also be used as an live, powered up device via usb power supply system

Key Monitor Features

	Compatible with CatM1/NB-IoT networks
	BLE 5.0
	GPS enabled for mobile asset tracking
	24/7 access to data on LevelCon Cloud
	Solar powered / USB input power (Optional)
	Gyro detection and activation



Specifications

Product Name	StarPin	
Product Description	Solar powered Cellular enabled tracking device with BLE and shock/motion detection.	
Dimensions	Height	64 mm
	Width	44 mm
	Depth	27 mm
Power Requirements	Built in rugged capacitor to store solar power	
	Can also be charged using USB port, 5VDC	
Wireless Connectivity	Cellular	CAT M1, NB-IOT *
	BLE	4.0 and above compatible
Data Security	AES-128	
Data Packet	Proprietary Byte Packet	
Software updates	Over the air (OTA) firmware updates are provided as new features are introduced.	
Temperature range	Operating -40C to 65C, Storage -50C to 80C	
Certification	Environment	IP67 rated enclosure
Number of reports per full charge	Estimated 80 GPS reports on NB-IOT network under ideal conditions	

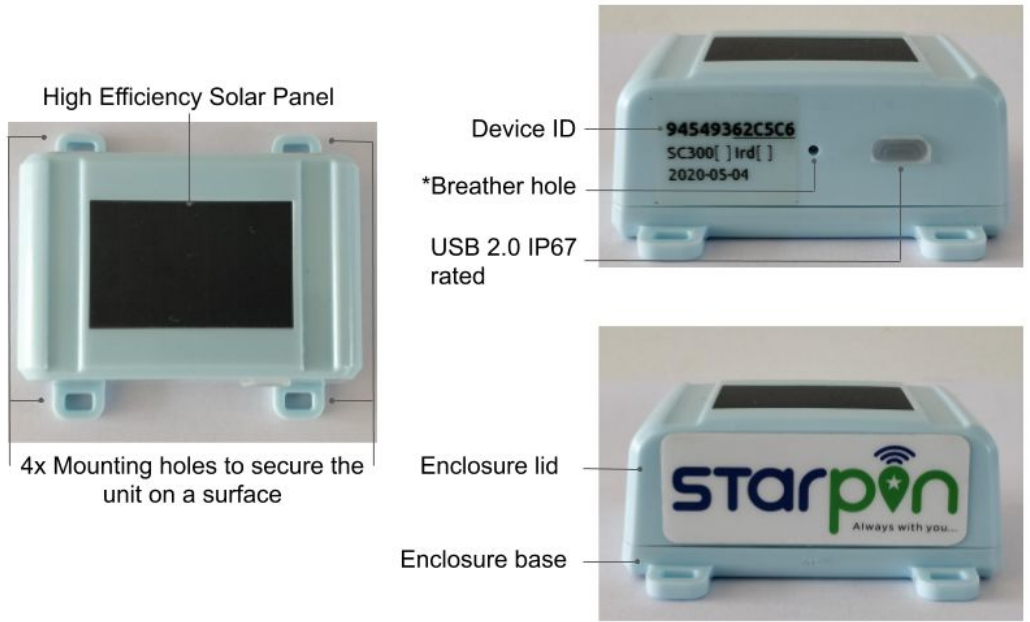
* Data access charges billed monthly

For detailed specifications please contact levelcon sales at Sales@levelcon.com



Understanding the exterior of the StarPin

StarPin devices are shipped in an IP67 rated enclosure. It has an ultra efficient solar panel on its lid. It has a Waterproof usb connector on one of it's longer edges.



***Do not insert anything into the breather hole. Punching the breather hole membrane will cause water intrusion problems and will void warranty.**

Locking Sensor Connection:





Unit Installation and commissioning

Basic Hardware

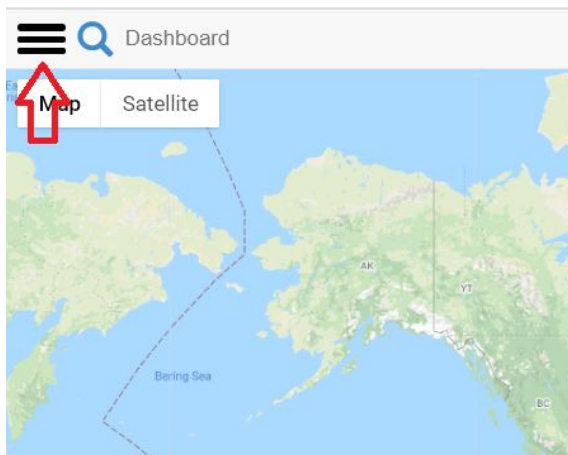
- Philips Head screwdriver
- Zip ties

Basic device configurations and generating first report

StarPin devices are BLE (Bluetooth low energy) enabled devices. They come pre configured from the factory and you can generate your first report by logging on to our web portal. Some devices do not ship with SIM populated on the device. Please visit installing SIM in this document for guidelines on inserting the SIM and then continue with below mentioned steps.

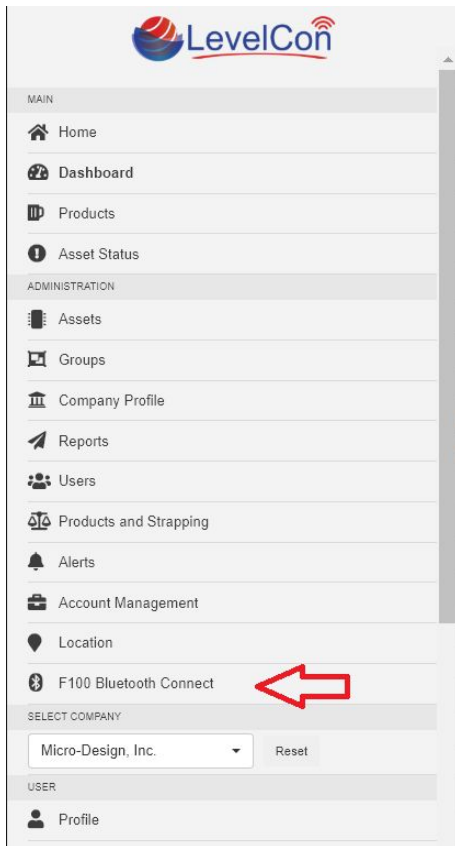
If the device comes pre populated with sim, please follow the below mentioned steps. Please perform these tasks on Google Chrome for windows or on Chrome for android only.

1. Go to settings on your PC, Laptop, tablet or phone and make sure bluetooth is enabled on your device.
2. Open chrome on your device and navigate to <https://one.levelcon.com>
3. Sign in with your username and password. If you do not have a username and password please contact us via email at support@levelcon.com
4. On the top left of the window there are three horizontal lines. Click on this and scroll down to and select F100 Bluetooth Connect.

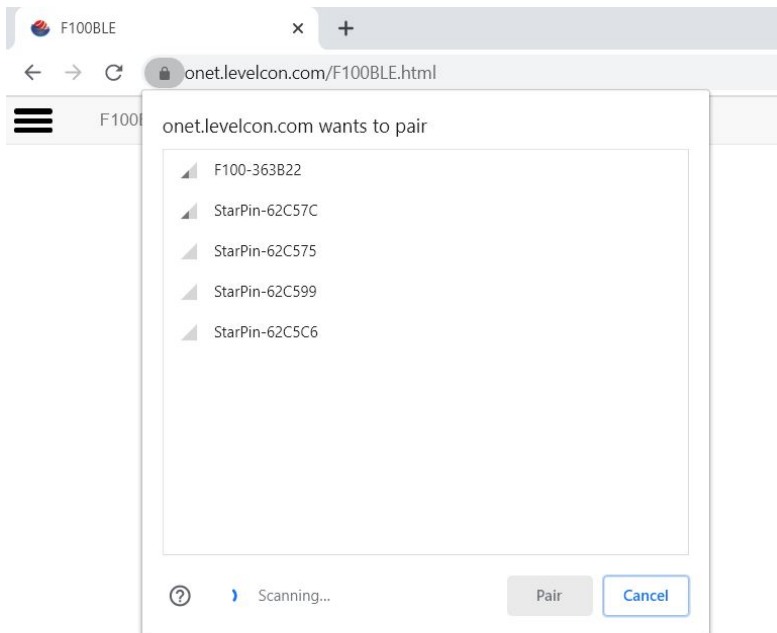




5. Click on F100 Bluetooth Connect



6. Click on connect F100 on the page and a new popup window will open, as shown below





7. Click on the StarPin that matches your device ID#. **StarPin-XXXXXX** (**XXXXXX** are the last six characters of the device ID) Your device number can be found on the USB side of the StarPin device
8. Once you have established a successful pairing, you will be able to set basic configurations of time zone, alarm times, set report rates and the device off and on for hours from the schedule tab. Click on the report button on the bottom of the screen to start the report sequence

Wake Alarm 9

Off Hrs Start

Off Hrs End

Save Report

9. After clicking on the report button, move to the Log tab at the top of the screen and you should be able to see the report sequence begin. You should see a “Report Success” at the end of a successful report. If you do not see anything populating on the Log screen, wait for 10 seconds. If you still do not see anything, simply hit the reboot button from the advanced tab and try connecting to the device again using **F100 Bluetooth Connect** and directly move to the Log Tab.
10. You should now be able to see the log and an updated device location on the Dashboard view after a successful report.

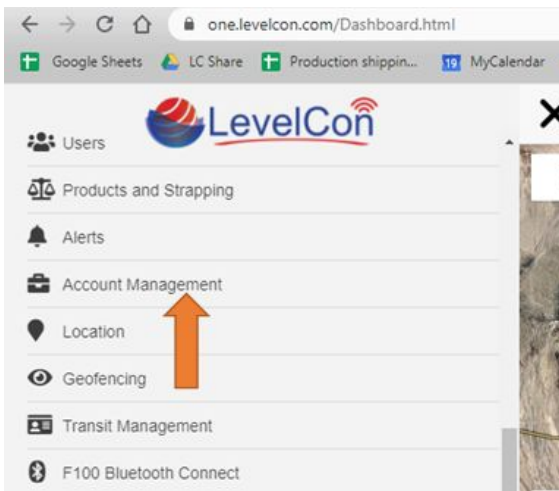
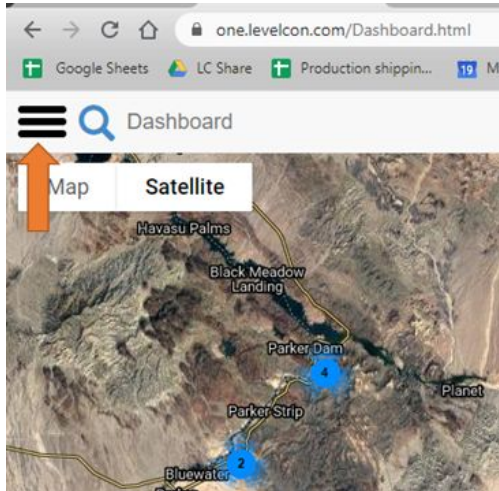
Note : The device should be able to see the sky for it to report it’s GPS coordinates.

Your device is now set up and is ready to be deployed.



Device configurations

These settings are available via BLE connection to the monitor from any BLE enabled device, or they can be set and queued via the LevelCon Web Portal under device management.



Bill Plan		
none		
F100 Cell		
F100 Cell		
F100 Cell		
F100 Cell		
F100 Cell		

Device Type: F100

Device ID(s): 3C71BF290A0D

Details | Configuration | Messages

Queue Message

Report Rate:

UTC Offset:

rtcAlm0:

rtcAlm1:

rtcAlm2:

rtcAlm3:

rtcAlm4:

rtcAlm5:

rtcAlm6:

rtcAlm7:

rtcAlm8:

rtcAlm9:

capThresh:

Queue Message



Schedule configurations

For StarPin devices you might be required to provide basic configurations such as alarm times, timezone details, device on and off schedules. These can be done from the schedule tab of F100 Bluetooth connect Page.

Remember to hit Save before you close the window for the changes to load to the memory.

Report Rate(s)

This option configures the device to report after a specified number of seconds. For example if you want the device to report every hour enter 3600. This is simply the number of seconds after which you want the device to report

Wake Alarm

These alarms enable the end user to set specific timings during the course of the day at which the unit should report its parameters. You can set upto 9 alarms using the basics menu. The time period needs to be set in the 24 hour format. As an example, if you want the device to report at **3:45 PM** please enter **1545** in the text space available next to Wake Alarm.

Off Hrs Start / Off Hrs End

This option allows you to set the time from when the device goes to sleep. As an example if you want the device to go to sleep at 8:00 PM and start reporting at 6:00 AM, please enter 2000 in Off Hrs Start and enter 600 in Off Hrs End.

Advanced configuration options

StarPin provides advanced configuration options such as apn, adc wait, gps enable etc. under the advanced tab of BLE configurations page. The following options available under Advanced tab are explained below.

Caution : Making uninformed changes in the “Advanced” tab might cause unrecoverable errors in the device configuration and void any warranty. Users take utmost care while modifying these parameters. Contact Levelcon in case you need assistance



Remember to hit Save before you close the window for the changes to load to the memory.

UTC offset

This option lets you select the appropriate time zone. This helps in maintaining time locally on the device and is used as a reference for setting time alarm. As an example if your time zone is +5:30, please enter the value **5.5** as an offset

Daylight Sav

This option lets you enable or disable daylight saving time settings. Please select the appropriate option from the drop down menu.

Mode

Mode should always be sim for a Starpin device. Any changes to this will render the device unusable

Sensor Type (F100M device only)

The device is capable of communicating with 0-5 V and 4-20 mA type analog sensors. If you are using an analog sensor with the device, please select the appropriate sensor type. By default, the device is configured for 0-5 V type sensors.

ADC Wait(s) (F100M device only)

This parameter enables you to set the number of seconds the device queues up the sensor for a reading before it collects the sensor level data from the sensor. The Default value is 0 seconds. This should only be increased if using a non-contact sensor such as a radar gauge, sonic sensor or laser sensor.

Shock Thresh

This parameter enables you to set the shock threshold. evel data from the sensor. The Default value is 40. Do not change this value without consulting the LevelCon team

Warning : Entering value greater than 0 will enable the shock sensor and may drain the batteries much sooner than expected. Use this option carefully. If you have questions about this option, please contact LevelCon.



Shock Delay

This parameter helps in setting the time delay between consecutive shock detection. Please set the number of seconds after which the consecutive shock to the device should be detected. The default value of this parameter is 3600

Digital Wake (F100M device only)

This feature is associated with digital input such as a high level float gauge for overflow protection or other types of normally open/normally closed contacts. If enabled, the input device will close its circuit and engage the no/nc on the digital input of the F100m forcing the monitor to turn on and report. The Digital Wake value is set in seconds and correlates to the number of seconds that NO/NC waits after triggered to force the F100 to report, i.e. if set to 3 seconds, when the DI is triggered for more than 3 seconds, the unit will force a report. The default value of this parameter is Off.

GPS Timeout(s)

This option enables device location reporting via GPS. This option should only be used for units that are deployed outdoors. Set the number of seconds the unit should wait before it obtains a GPS fix. The preferred value for this parameter is 60 seconds. A zero value means the unit will not attempt to obtain a GPS fix. By default the value of this parameter is zero.

Warning : Location reporting via GPS is a battery intensive operation and should only be enabled if the unit is outdoors. When installed, the StarPin's solar panel must be oriented towards the sky to enable faster GPS fix and solar charging.

Digital Output (for F100M device only)

This is a normally open, normally closed feature.

Off(Float)

On(low)

TCP Server

This parameter is used to modify the endpoint at which data is to be sent to and is set to the LevelCon Cloud by default. This parameter should not be modified without the assistance of a LevelCon representative. The default value for this parameter is f100.levelcon.com



Port

This parameter refers to the port on which the device communicates. This parameter should not be modified without the assistance of a LevelCon representative. The default value for this parameter is 8585



Servicing the SIM

Follow the procedure below to service the SIM on the StarPin Devices.

Warning : Do not use power tools to perform this service!!! Over tightening the screws might strip the threading for the screw. Please perform this service with utmost caution and away from any liquids. It is preferable to perform this service indoors in a dry place.

Use a soft cloth/mat to perform this service to avoid scratching the solar panel.

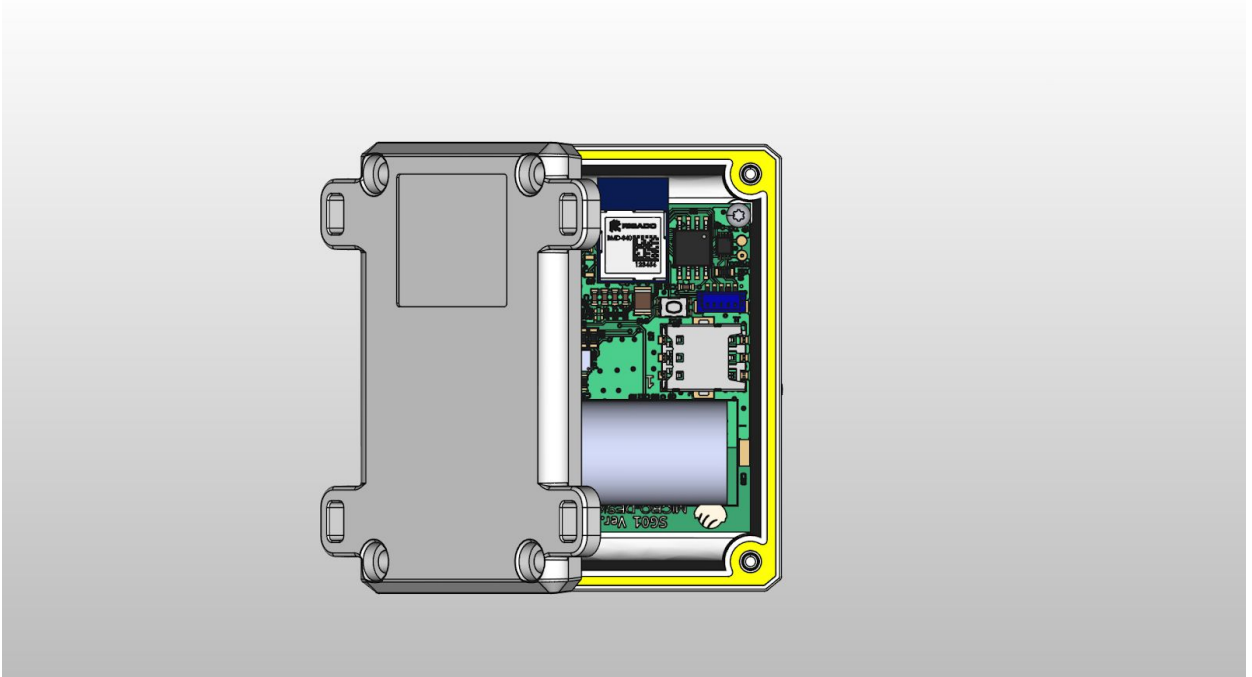
Inserting the SIM

1. Remove the 4 phillips head screws from the base of the enclosure using an appropriate screwdriver.

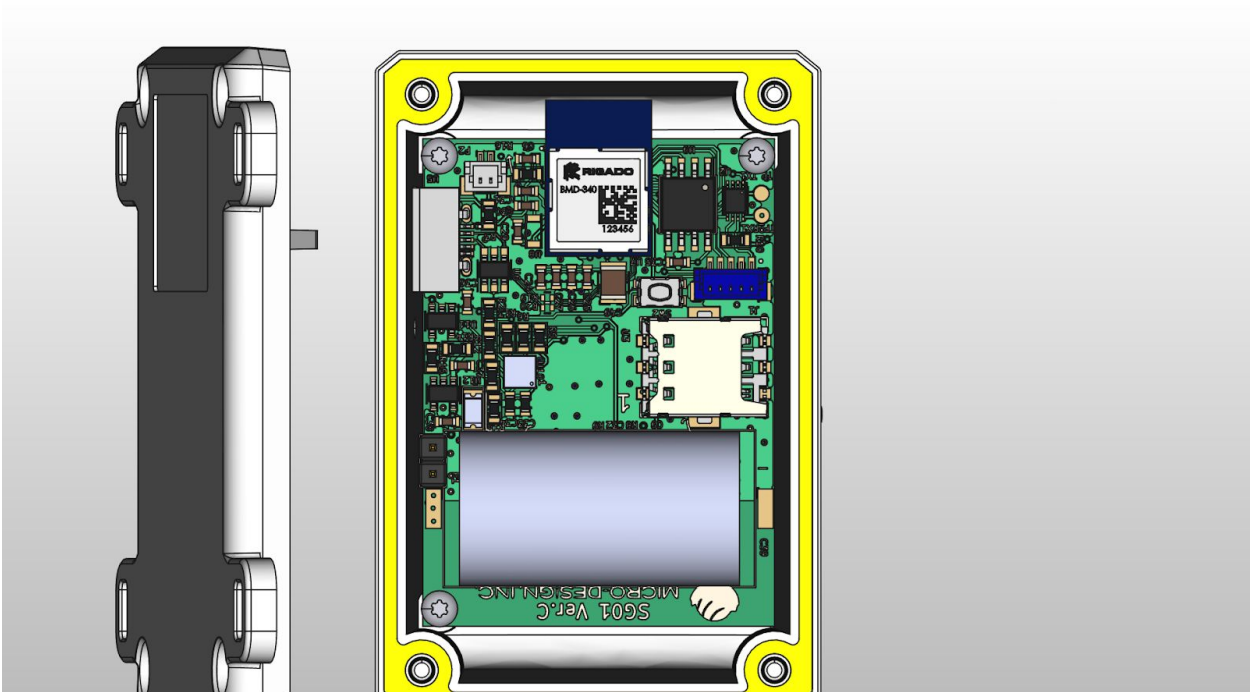




2. Open the base of the enclosure and put the lid on the table upside down such that you are able to see the circuit board

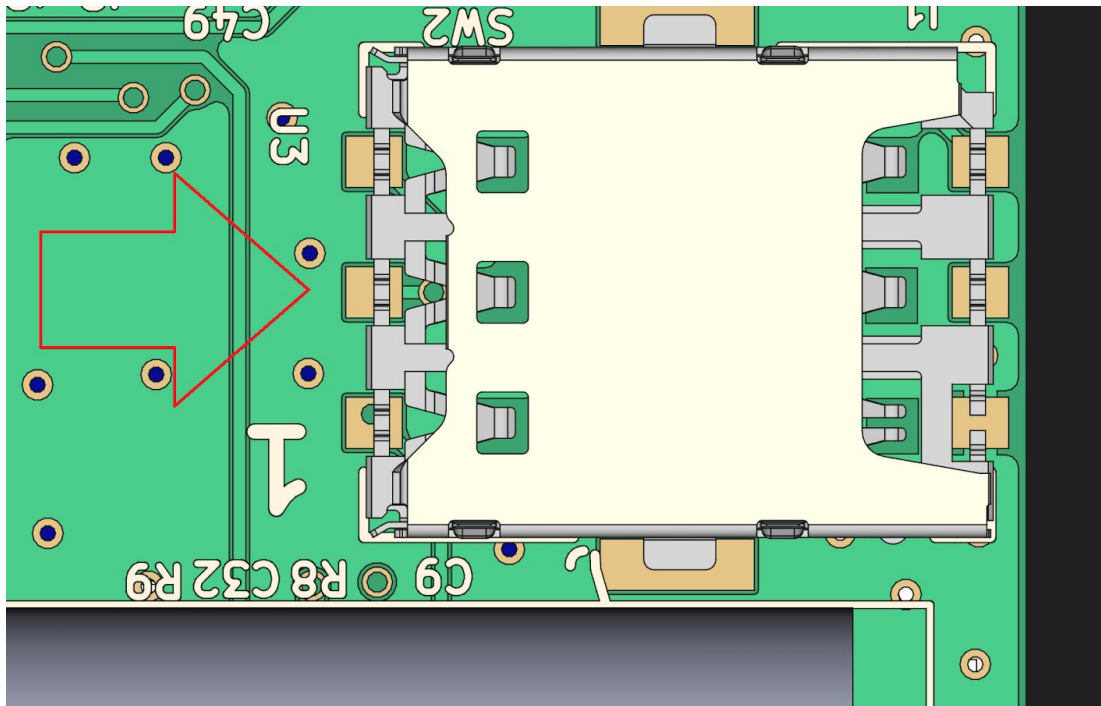


3. Locate the SIM holder. It's position is at the center of the board on the longer edge away from the USB.





4. The SIM holder is as shown in the image below



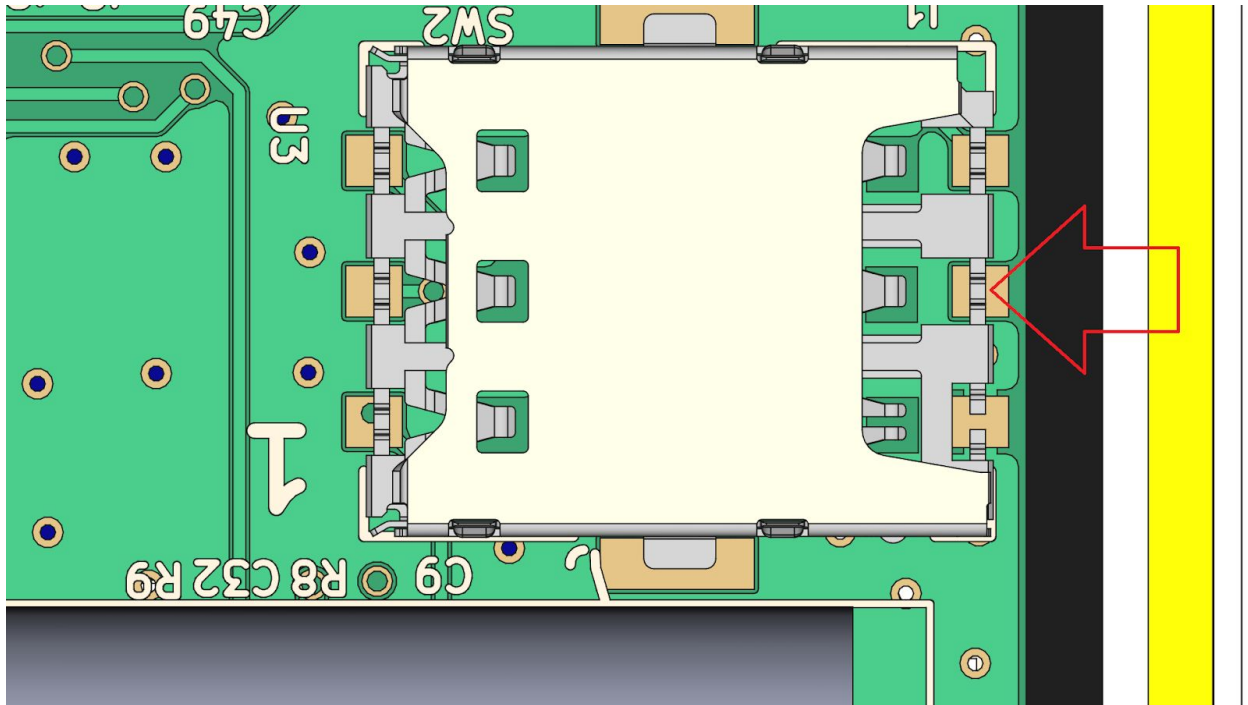
5. Insert the SIM with the **cut out going inside** the sim holder and the contacts facing the down, towards the circuit board. Push the sim all the way into the sim holder.
6. After inserting the SIM, please put the base back on to the lid and fasten the screws back on to the lid. Please make sure you tighten it snugly and do not over tighten the screw.



Removing the SIM

Follow the step 1 through step 3 in the inserting the sim section and then continue with the below mentioned steps.

1. Push the sim out from the slit provided in the sim holder using a flat head screwdriver and the sim should slide out $\frac{1}{4}$



2. Next use the index finger to side the sim all the way out. If you are facing any difficulties in removing the sim please feel free to contact us.
3. After removing the SIM, please secure the base back onto the lid and fasten the screws back on till snug.

Warning : Please take utmost care that the board does not come in contact with any metal or liquid during this process. The board may be rendered undeployable and will void any warranty. If you have any questions please contact Levelcon



Web interface.

Getting Started

The data from the StarPin is immediately displayed on the LevelCon secure cloud portal. You can access this data at <https://one.levelcon.com>. Follow the steps mentioned below to access your data. You can also view our online tutorial videos at:

<https://drive.google.com/drive/u/0/folders/0B7H0S78DpOhhdmE0cW1ZZzluYIk>

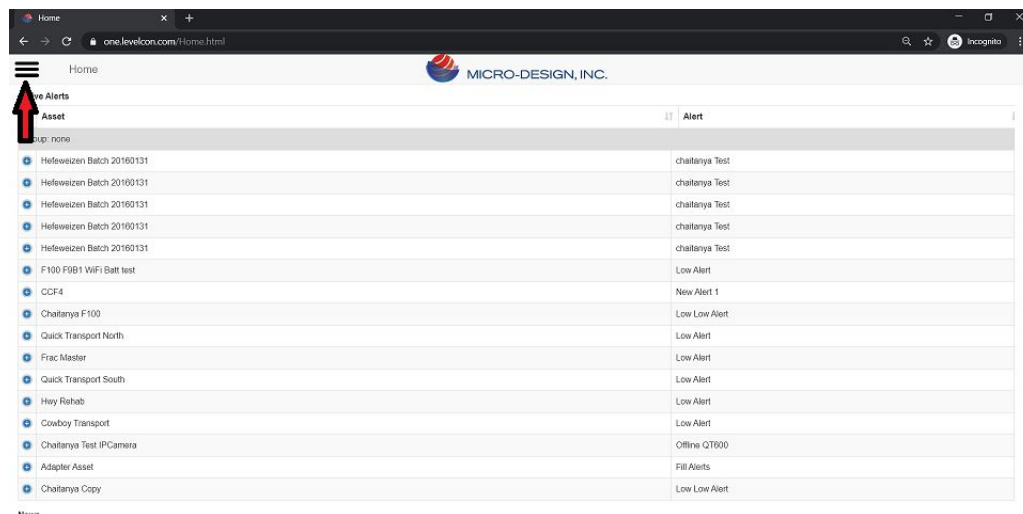
** If you do not have a username and password, please contact your company's account manager or send us a request for a new account at support@levelcon.com

1. Navigate to <https://one.levelcon.com> and input your username and password.



The image shows the LevelCon login interface. At the top is the LevelCon logo, which consists of a stylized globe icon and the text "LevelCon" with a Wi-Fi symbol above the 'n'. Below the logo are two input fields: "Email" with an envelope icon and "Password" with a lock icon. There is a "Remember me" checkbox below the password field. A large blue "Sign in" button is centered below the fields. At the bottom, there is a link that says "Forgot Password? Click Here".

2. After a successful login, you will be directed to the Home Page. Here you see any alerts associated with your assets. Click on the navigation menu to access the options associated with your security level.

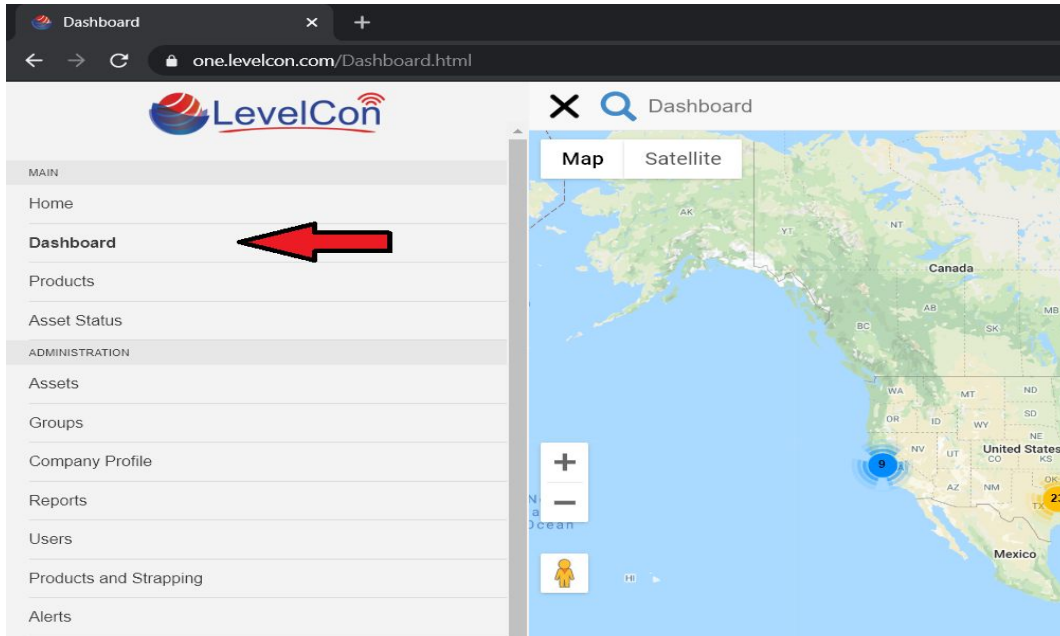


The screenshot shows the LevelCon Home Page in a web browser. The page has a navigation menu on the left with a red arrow pointing to the "Alerts" option. The main content area displays a table of alerts. The table has two columns: "Asset" and "Alert".

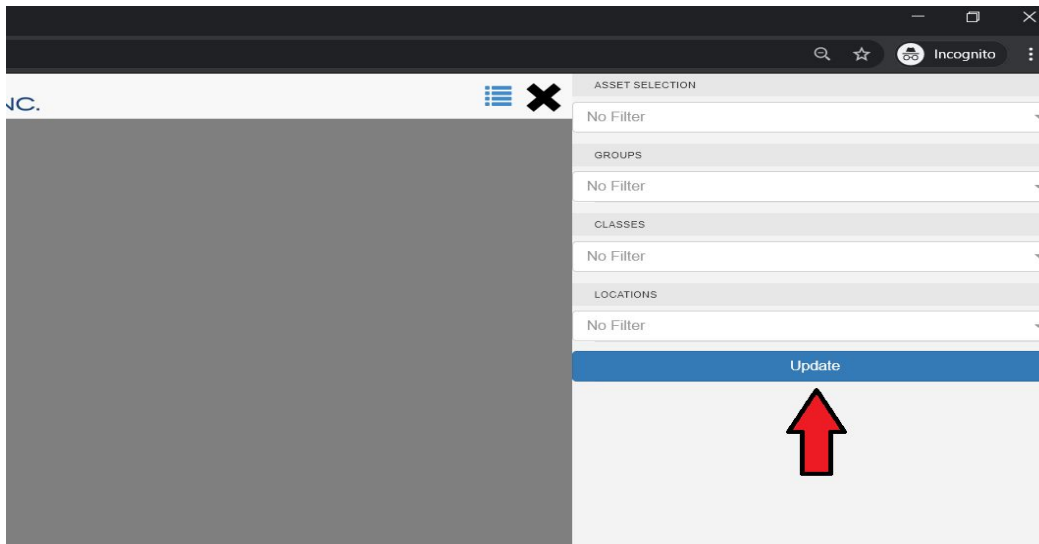
Asset	Alert
Hefeweizen Batch 20160131	chaitanya Test
Hefeweizen Batch 20160131	chaitanya Test
Hefeweizen Batch 20160131	chaitanya Test
Hefeweizen Batch 20160131	chaitanya Test
Hefeweizen Batch 20160131	chaitanya Test
F100 F0B1 WiFi Batt test	Low Alert
CCF4	New Alert 1
Chaitanya F100	Low Low Alert
Quick Transport North	Low Alert
Frac Master	Low Alert
Quick Transport South	Low Alert
Hoy Rehab	Low Alert
Cowboy Transport	Low Alert
Chaitanya Test IPCamera	Offline QT000
Adapter Asset	Fill Alerts
Chaitanya Copy	Low Low Alert



3. Click on the **Dashboard** option to go to the dashboard from the main menu.

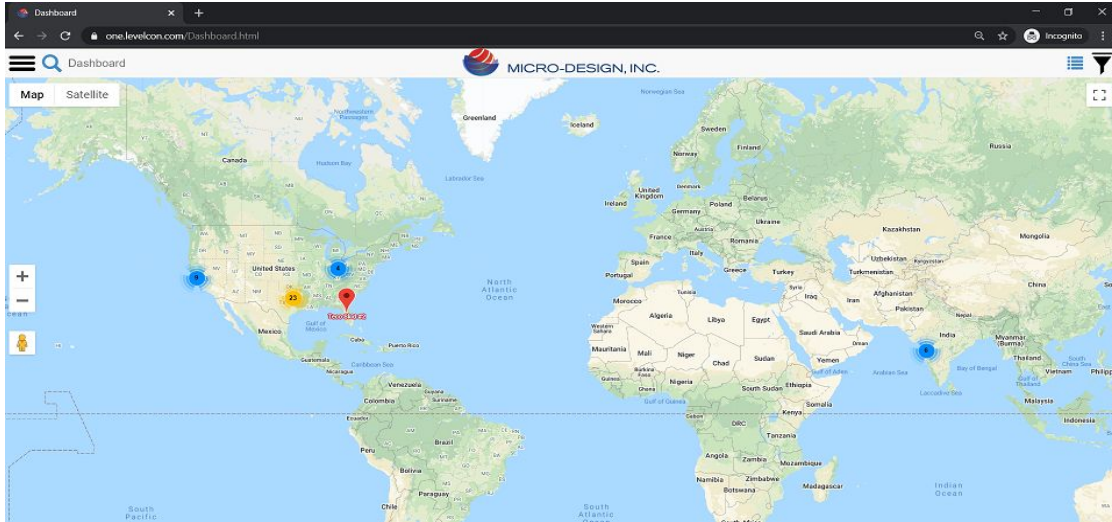




4. If you are logging in for the first time click on update from the filter menu to see all your assets.

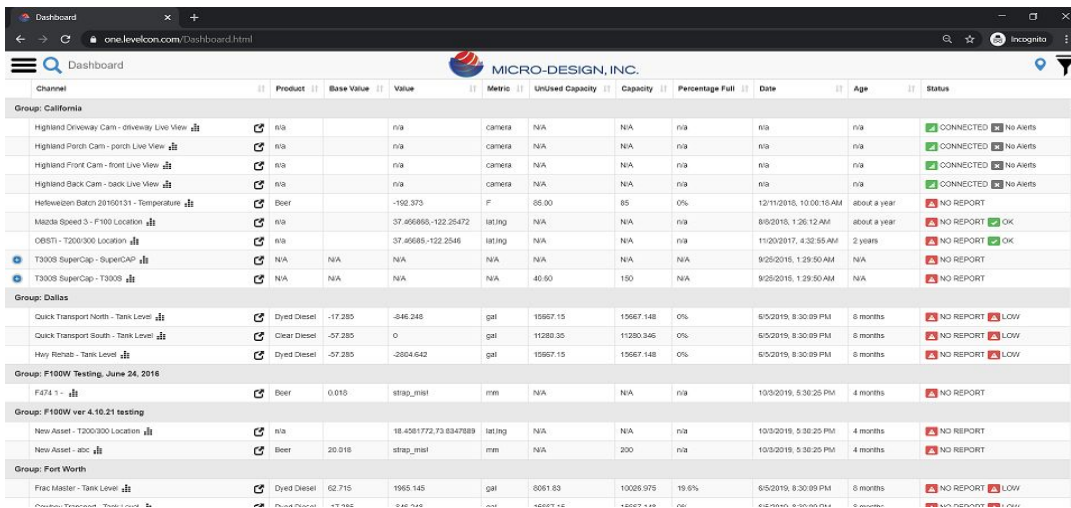




- 5. Once your view has been updated, you should be able to see all your assets on the single map view of the dashboard.



- 6. To view the assets on the gridview, click on the grid icon  on the top right of the window. You can switch back to the map view by clicking on the map icon  on the same dashboard view.



Channel	Product	Base Value	Value	Metric	Unused Capacity	Capacity	Percentage Full	Date	Age	Status
Group: California										
Highland Onramp Cam - onramp Live View	cam	n/a	n/a	camera	N/A	N/A	n/a	n/a	n/a	CONNECTED No Alerts
Highland Porch Cam - porch Live View	cam	n/a	n/a	camera	N/A	N/A	n/a	n/a	n/a	CONNECTED No Alerts
Highland Front Cam - front Live View	cam	n/a	n/a	camera	N/A	N/A	n/a	n/a	n/a	CONNECTED No Alerts
Highland Back Cam - back Live View	cam	n/a	n/a	camera	N/A	N/A	n/a	n/a	n/a	CONNECTED No Alerts
Helixwellen Baton 20160131 - Temperature	Beer	-192.375	F	95.00	85	0%	12/11/2016, 10:00:18 AM	about a year	NO REPORT	NO REPORT
Mazda Speed 3 - F100 Location	car	37.495685,-122.25472	lat/long	N/A	N/A	n/a	8/8/2015, 1:26:12 AM	about a year	NO REPORT	OK
OBSTI - T200/300 Location	car	37.495685,-122.2546	lat/long	N/A	N/A	n/a	11/20/2017, 4:32:55 AM	2 years	NO REPORT	OK
T3000 SuperCap - SuperCAP	car	N/A	N/A	N/A	N/A	N/A	9/25/2016, 1:29:50 AM	N/A	NO REPORT	NO REPORT
T3000 SuperCap - T3000	car	N/A	N/A	N/A	40.50	150	N/A	9/25/2016, 1:29:50 AM	N/A	NO REPORT
Group: Dallas										
Quick Transport North - Tank Level	Dyed Diesel	-17.285	-846.246	gal	15667.15	15667.148	0%	6/5/2019, 8:30:09 PM	6 months	NO REPORT LOW
Quick Transport South - Tank Level	Clear Diesel	-57.285	0	gal	11280.35	11280.346	0%	6/5/2019, 8:30:09 PM	6 months	NO REPORT LOW
Hay Rehab - Tank Level	Dyed Diesel	-57.285	-3304.642	gal	15667.15	15667.148	0%	6/5/2019, 8:30:09 PM	6 months	NO REPORT LOW
Group: F100W Testing, June 24, 2016										
F474 1	Beer	0.016	strap_msl	mm	N/A	N/A	n/a	10/3/2019, 5:30:25 PM	4 months	NO REPORT
Group: F100W ver 4.10.21 testing										
New Asset - T200/300 Location	car	n/a	18.4561772,73.6347689	lat/long	N/A	N/A	n/a	10/3/2019, 5:30:25 PM	4 months	NO REPORT
New Asset - abc	Beer	20.916	strap_msl	mm	N/A	200	n/a	10/3/2019, 5:30:25 PM	4 months	NO REPORT
Group: Fort Worth										
Flac Master - Tank Level	Dyed Diesel	62.715	1965.145	gal	6061.63	10025.975	19.6%	6/5/2019, 8:30:09 PM	6 months	NO REPORT LOW

Enabling Battery levels in Grid View

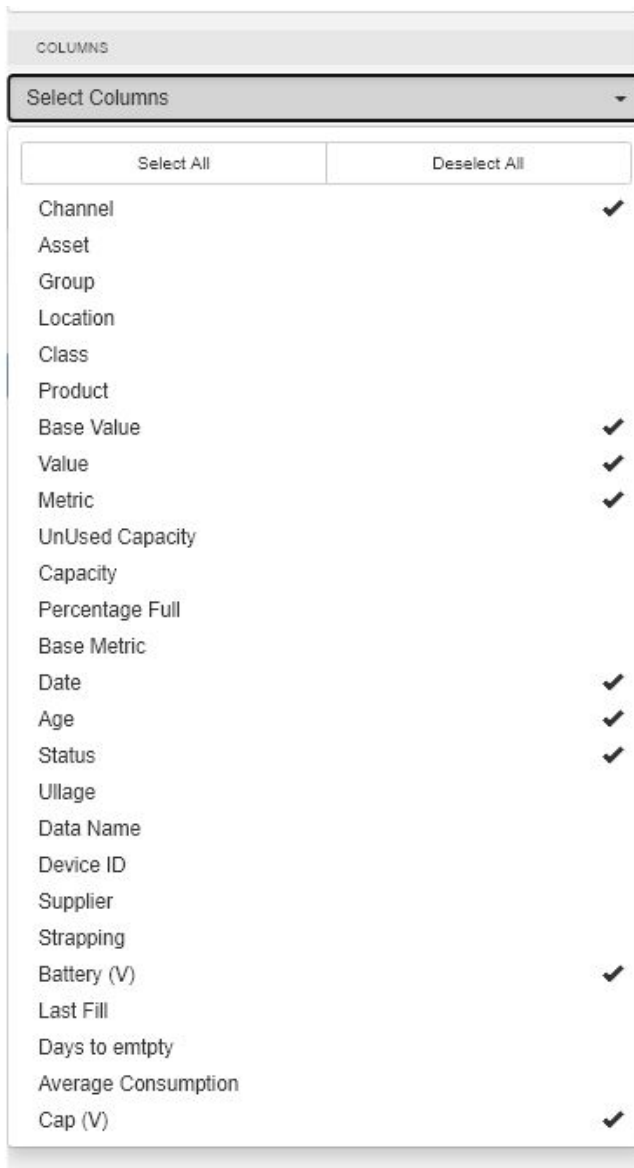
Login to <https://one.levelcon.com> . Battery levels can be enabled in the grid view on the Dashboard page by selecting appropriate columns from the filter menu. Follow the steps below to enable the battery level in the grid view



1. From the dashboard view, first switch to the Grid view by clicking on the grid view icon available in the top right corner.

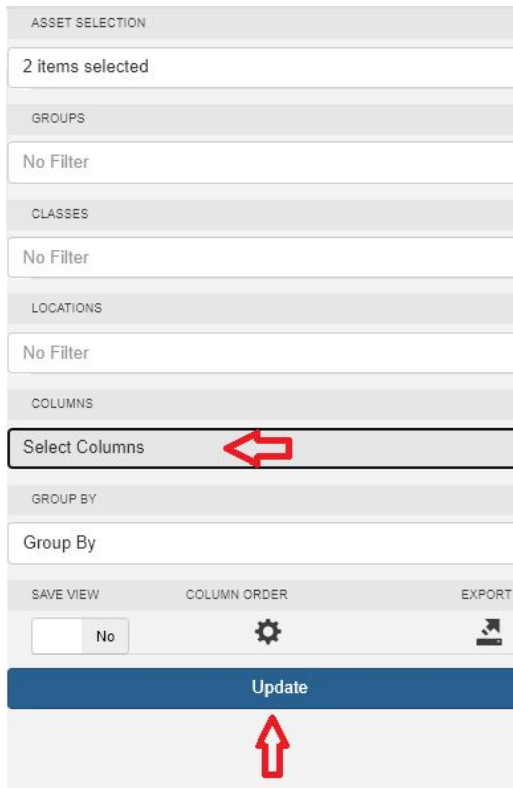


2. Click on the Filter menu by clicking on the filter icon on the top right corner and the menu as shown below will appear. Click on **Select Columns** and from the drop down, start enabling (clicking) only following column names Channel, Base Value, Value, Metric, Capacity, Date, Age, Status, Battery(V) and Cap(V) as shown below.





- Now, simply click on **Select Columns** to close the dropdown and click on **Update**



- Cap (V) column should now be visible as shown below. The column shows the last reported Cap level of the device. For StarPin Devices Cap(mV) is the actual battery level.



- To check the Cap(mV) history, simply click on the number reported in the Cap (V) column value and a new popup window will appear where you will be able to see the complete reported history of the Cap(mV). Select the date range from the date picker at the location pointed to by the arrow as shown below and refer to the Cap(mV) value in



the table.

Local Time	Bat(mV)	Cap(mV)	Sen13(mV)
2020-06-23 13:59:19	3779	4037	
2020-06-23 11:56:57	3849	4040	
2020-06-23 11:53:57	3678	4039	
2020-06-23 11:50:59	4025	4042	
2020-06-23 11:49:12	4370	4052	
2020-06-23 11:47:09	4480	4053	
2020-06-23 11:43:18	4427	4049	
2020-06-23 11:41:42	4448	4051	
2020-06-23 11:40:06	4488	4056	
2020-06-23 08:01:24	4495	4056	

6. You can also view the Values as Graph by simply clicking on the Graph tab as shown by the arrow below. You can turn off Battery Level and Temperature Graphs by simply clicking on their legends located just above the graph as pointed to by the arrows

