

Cara-S Tracker platform quick starter guide

ESMT Inc.

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I. Background:

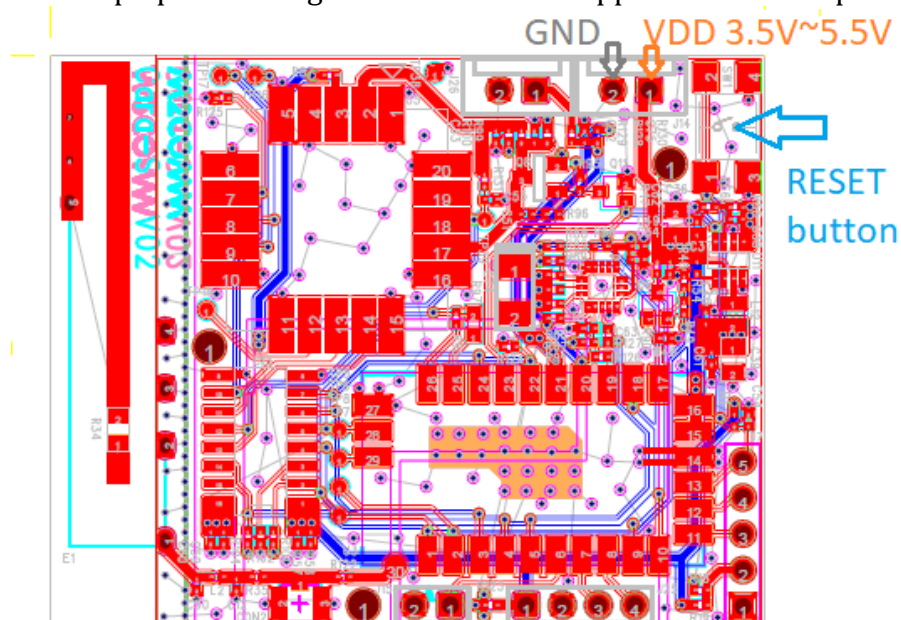
Cara-S is the most cost effective and ready-to-go platform for global asset tracking. It integrates GPS , thermistor and G-sensor with Sigfox uplink for RCZ12345(6) . It also carries preloaded firmware to send data to Sigfox network.

II. Features highlight of Cara-S

Category	Item	Description
Regular Monitoring (report to Sigfox network every 1 hour default, configurable)	Temperature	+/-1C accuracy
	G-shock stress level	0~2G max (absolute value only)
	Battery level	0~100% (16 levels)
	GPS location	Latitude , longitude
Event trigger (configurable threshold levels)	Over temperature	>50C
	Over Stress	>0.5G
Local recording (data is written into local flash memory)	Temperature and G-shock level	Every 15 minutes for 3 months

III. Initiate Cara-S

The Cara-S may come with a battery holder and a housing or a PCBA only. Cara-S starts up upon a voltage of 3.5V to 5.5V is applied across the power pins.



To ensure proper startup, press the RESET button after power is attached to the unit. Then the unit enters cold start for its first time operation, the unit must be put with access to the sky for the first time. Then a message will be sent to Sigfox backend. This indicates a successful startup.

IV. Sigfox network packet format

12 bytes of data is sent in every packet.

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Byte Index	Item	Name	Description
0	State Register		
	-bit[7]	Device exposed to stress	If the device is exposed to 3 times over temperature event or 5 strong G-force event, this bit is set to 1 and will only be cleared by manual reset.
	-bit[6]	OverTemperature event	If 2 consecutive over temperature event is recorded (30 mins in total), a packet is sent with this field set to 1 and the over stressed temperature is carried in byte 2 if the device temperature changes from over temperatuere to normal for 2 consecutive interval, a packet is sent with this filed set to 0. It is a set and reset event logic .
	-bit[5]	Over Stress event	if the G-sensor event is triggered, a packet is sent with this field set to 1. The byte 3 will carry the value of G-force that triggers the event
	-bit[4]	GPS data valid	if a valid GPS data is acquired, a packet is sent with this field set to 1. byte 4 to 11 will carry the valid GPS data . If this field is 0, no GPS data is sent. (to keep the frame shorted to save power)
	-bit[3]	Battery[3]	4 bit battery level (1111 full, 0000 empty)
	-bit[2]	Battery[2]	
	-bit[1]	Battery[1]	
	-bit[0]	Battery[0]	
1		Current Temperature Data	Temperature in byte (UINT8 0x00 = -40C; 0x78 = 80C)
2		Reserved	
3		Overstressed G-sensor value	Average G-shock in milli-G. G-sensor is set to 3axis, HPF, trigger on impact, level is read from G-sensor and max is reported. This byte carries the value (abs(X)+abs(Y)+abs(Z))/24)
4		GPS Latitude	When GPS data is acquired successfully, data is carried in this field. The GPS coordinate can be calculated by equation {HEX2DEC([byte4; byte5; byte6; byte7;])/10000000, HEX2DEC([byte8; byte9; byte10; byte11;])/10000000]
5			
6			
7			
8		GPS longitutde	If not GPS data is acquired, 0x77,0x35,0x94,0x00,0x77,0x35,0x94,0x00 are sent which indicates GPS coordinate 200,200
9			
10			
11			

sample packet		134500010ec917fe4824d224	Bit value	Value
Byte Index	Item	Name		
0	State Register		13	
	-bit[7]	Device exposed to stress		0
	-bit[6]	OverTemperature event		0
	-bit[5]	Over Stress event		0
	-bit[4]	GPS data valid		1

	-bit[3]	Battery[3]	0	20%
	-bit[2]	Battery[2]	0	
	-bit[1]	Battery[1]	1	
	-bit[0]	Battery[0]	1	
1		Current Temperature Data	45	29C°
2		Reserved		
3		Overstressed G-sensor value	01	8mG
4		GPS Latitude	0e	24.8059902°
5			c9	
6			17	
7			fe	
8		GPS longitudde	48	121.0372644°
9			24	
10			d2	
11			24	

V. Sigfox Backend setup

Callback functions are available at the Sigfox backend portal (i.e. backend.sigfox.com). Device type -> Callbacks

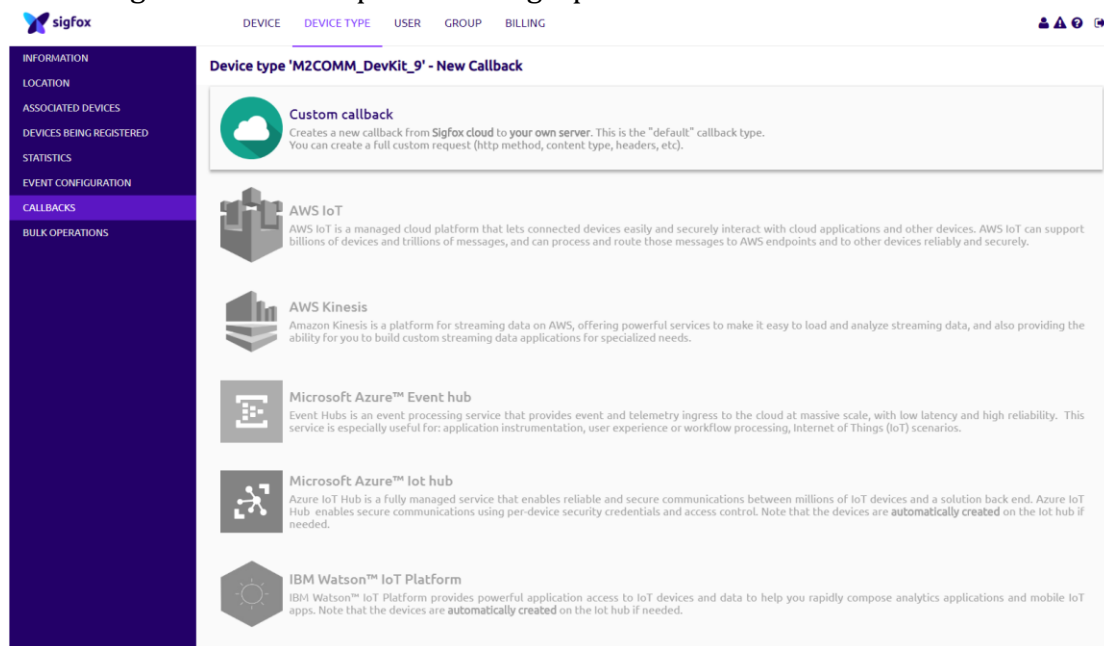
The screenshot shows the 'Device - List' page in the Sigfox backend. The 'Device type' column is highlighted with a red arrow, indicating the selection of 'ESMT Cara-S'. The page includes search filters for Id, State, Average SNR, and Last seen from date. The table shows one device with the following details:

Average Rssi	Average SNR	Communication status	Device type	Id	Last seen	Name	Token state
108.37	21.87		ESMT Cara-S		2018-11-20 11:32:35	ESMT Cara-S	

The screenshot shows the 'Device type 'ESMT Cara-S' - Information' page. The left sidebar has a red arrow pointing to the 'CALLBACKS' option. The main content area displays the following information:

- Id:** [Empty field]
- Name:** ESMT Cara-S
- Description:** Tracker Sample
- Keep alive:** N/A
- Subscription automatic renewal:** ☒
- Group:** Cara-S
- Payload display:** None
- Contract:** [Empty field]
- Alert Email:** [Empty field]
- Creation date:** [Empty field]
- Created by:** [Empty field]
- Last edition date:** [Empty field]
- Last edited by:** [Empty field]

Basically, when a packet is received by the Sigfox network regardless the country or SNO, the packet data will be decoded and be available at Sigfox backend. User can configure the active upon receiving a packet.



The screenshot shows the Sigfox console interface. On the left is a dark purple sidebar with navigation links: INFORMATION, LOCATION, ASSOCIATED DEVICES, DEVICES BEING REGISTERED, STATISTICS, EVENT CONFIGURATION, CALLBACKS (highlighted), and BULK OPERATIONS. The main content area is titled 'Device type 'M2COMM_DevKit_9' - New Callback'. It features a 'Custom callback' section with a cloud icon and text explaining that it creates a new callback from the Sigfox cloud to a user's own server. Below this are five cloud platform options, each with an icon and a brief description:

- AWS IoT**: AWS IoT is a managed cloud platform that lets connected devices easily and securely interact with cloud applications and other devices. AWS IoT can support billions of devices and trillions of messages, and can process and route those messages to AWS endpoints and to other devices reliably and securely.
- AWS Kinesis**: Amazon Kinesis is a platform for streaming data on AWS, offering powerful services to make it easy to load and analyze streaming data, and also providing the ability for you to build custom streaming data applications for specialized needs.
- Microsoft Azure™ Event hub**: Event Hubs is an event processing service that provides event and telemetry ingress to the cloud at massive scale, with low latency and high reliability. This service is especially useful for: application instrumentation, user experience or workflow processing, Internet of Things (IoT) scenarios.
- Microsoft Azure™ IoT hub**: Azure IoT Hub is a fully managed service that enables reliable and secure communications between millions of IoT devices and a solution back end. Azure IoT Hub enables secure communications using per-device security credentials and access control. Note that the devices are **automatically created** on the IoT hub if needed.
- IBM Watson™ IoT Platform**: IBM Watson™ IoT Platform provides powerful application access to IoT devices and data to help you rapidly compose analytics applications and mobile IoT apps. Note that the devices are **automatically created** on the IoT hub if needed.