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AWS IOT CUSTOM (MQTT) AND DEVICE CONFIGURATION GUIDE

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1. General information

Firmware version:	03.27.10.Rev.520
Hardware revision:	Any
Configurator:	1.7.30_E.AWS_R.5
Notes:	This guide does not contain any information how to store received MOTT packets in the AWS. Refer to this link.

2. AWS IoT core configuration

2.1. Setting up AWS IoT core

When logged in the AWS console, click on Services on the top left hand side screen, to access IoT core.



Figure 1. Accessing AWS IoT core from AWS console

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After accessing AWS IoT core, select *Manage* on the sidebar on the left side, then select *Things (Manage- >Things)*. And click on *Create things*.

aws Services Q Search for services	ces, features, blogs, docs, and more [Alt+S]	D.	\$ () Oregon	fmb920comp 🔻
AWS IOT ×	AWS IoT > Manage > Things				
Monitor Activity E Connect	Things (0) Info An IoT thing is a representation and record of your physical device in the doud. A physical device needs a thing record in order to work with AVS IoT.	Edit	Dele	te Cre	ate things
Overview	Name Thing type				
Types Thing groups Billing groups	No things No things to display in this Region Create things				
Jobs Job templates Tunnels Retained messages	4				
Fleet metrics					
► Greengrass					
Wireless connectivity					
▶ Secure					
▶ Defend					
▶ Act					
▶ Test					
Software Feedback English (US) 🔻	© 2022, Amazon Web Servic	es, Inc. or its af	filiates. P	rivacy Term:	Cookie preferences

Figure 2. Accessing Things

Afterwards for select Create single thing and click Next.

rea	te things up
hinar	rection register and the second state of a physical davies or legisal antity in AWS IsT. Your davies or antity peads a thing
ource	in the registry to use AWS IoT features such as Device Shadows, events, jobs, and device management features.
Num	nber of things to create
0	Create single thing
0	Create single thing Create a thing resource to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS
0	Create single thing Create a thing resource to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS IoT.
0	Create single thing Create a thing resource to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS IoT.
•	Create single thing Create a thing resource to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS IoT. Create many things
0	Create single thing Create a shing resource to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS IoT. Create many things Create a task that creates multiple thing resources to register devices and provision the resources those devices require to
•	Create single thing Create a thing resource to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS IoT. Create amany things Create a task that creates multiple thing resources to register devices and provision the resources those devices require to connect to AWS IoT.

Figure 3. Creating single thing

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After creating single thing, enter *Thing's name* and in the *Device Shadow tab* select *Unnamed shadow* (classic). Then click Next.

Step 1	Specify thing properties տ
specify thing properties	A thing resource is a digital representation of a physical device or logical entity in AWS IoT. Your device or entity needs a thing
Step 2 - optional	resource in the registry to use AWS IoT features such as Device Shadows, events, jobs, and device management features.
	Thing properties Info
Step 3 - optional	
Attach policies to certificate	Thing name
	FMB130
	Enter a unique name containing only: letters, numbers, hyphens, colons, or underscores. A thing name can't contain any spaces.
	Additional configurations
	You can use these configurations to add detail that can help you to organize, manage, and search your things.
	► Thing type - optional
	Searchable thing attributes - optional
	Ining groups - optional
	Billing group - optional
	Device Shadow Info
	Device Shadows allow connected devices to sync states with AWS. You can also get, update, or delete the state information of this thing's shadow using either HTTPs or MOTT topics.
	O No shadow
	Named shadow Create multiple shadows with different names to manage access to properties, and logically group your devices properties.
	Innamed shadow (classic)

Figure 4. Specifying thing properties

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Then when selecting Device certificate, select Auto-generate a new certificate and click Next.

Step 1 Specify thing properties	Configure device certificate - optional Info
Step 2 - optional Configure device certificate	A device requires a certificate to connect to AWS IoT. You can choose how you to register a certificate for your device no you can create and register a certificate for your device later. Your device won't be able to connect to AWS IoT until it h active certificate with an appropriate policy.
Step 3 - <i>optional</i> Attach policies to certificate	Device certificate
	• Auto-generate a new certificate (recommended) Generate a certificate, public key, and private key using AWS IoT's certificate authority.
	Use my certificate Use a certificate signed by your own certificate authority.
	O Upload CSR Register your CA and use your own certificates on one or many devices.
	 Skip creating a certificate at this time You can create a certificate for this thing and attach a policy to the certificate at a later time.
	Cancel Previous

Figure 5. Selecting Certificate

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After this select *Create policy* to create it and attach it to *Certificate*. In the Create Policy window, enter *Policy name*. In the *Policy document (1)* tab for *Policy Action (2)* select * and for Policy resource enter *.

Create policy Info AWS IOT Core policies allow you to manage access to the AWS IOT Core data plane operations.			
Policy properties AWS loT Core supports named policies so that many identities can reference the same policy document.			
Policy name FMB130Policy A policy name is an alphanumeric string that can also contain period (), comma (), hyphen(-), underscore (_), plus sign (+), equal sign (-), and at sign (@) characters, but no spaces.]		
▶ Tags - optional			
Policy document Info An AWS IoT policy contains one or more policy statements. Each policy statement contains actions, resources, and an effect that grants or denies the actions by the resources.		Builder	JSON
Policy effect Policy action Policy resource Allow · · Add new statement ·	Remove		
		Cancel	Create

Figure 6. Creating policy for certificate

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After creating policy, return to *Certificate* tab (Seperate tab after pressing *Create policy* should've popped out). Then select the created policy to attach it to the certificate and thing. After that click *Create thing*.

aws	Services Q Search for services, fee	atures, blogs, docs, and more [Alt+S]
=	AWS IoT > Manage > Things > C Step 1 Specify thing properties Step 2 - optional	reate things > Create single thing Attach policies to certificate - optional Info AWS IoT policies grant or deny access to AWS IoT resources. Attaching policies to the device certificate applies this access to the device.
	Configure device certificate Step 3 - optional Attach policies to certificate	Policies (1/1) C create policy I Select up to 10 policies to attach to this certificate. < 1 > ③ Q. Filter policies < 1 > ③
		Image: Name Image: FMB130Policy Cancel Previous Create thing

Figure 7. Attaching created certificate and creating thing

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Then window with Certificate files and key files download options should pop out. It's recommended to download all files, because later some of them will not be available for download. The files that are required for usage with FMX devices are: *Device certificate (1), private key(2), and Amazon Root CA 1 file(3)*, but it's recommended to download them all and store them in secured place.

AWS.	that it can connect to	
Device certificate You can activate the certificate now, or later. The certificate must be act AWS IoT.	live for a device to connect to	
Device certificate Deactivate certificate 5b969d6ec60te.pem.crt	e 🕑 Download	(
Key files The key files are unique to this certificate and can't be downloaded after Download them now and save them in a secure place.	r you leave this page.	
A This is the only time you can download the key files for	or this certificate.	
Public key file 5b969d6ec60b63c966b9e9fac0e9d9-public.pem.key	년 Download	
Private key file 5b969d6ec60b63c966b9e9fc0e9d9-private.pem.key	Key downloaded Download Key downloaded Key downloaded	(
Root CA certificates	ta endpoint and cipher suite	
you're using. You can also download the root CA certificates later. Amazon trust services endpoint RSA 2048 bit key: Amazon Root CA 1	🕑 Download	(
Amazon trust services endpoint ECC 256 bit key: Amazon Root CA 3	U Download	
If you don't see the root CA certificate that you need here, AW	VS IoT supports additional available in our developer	

Figure 8. Certificate files download window

2.2. Finding decive data endpoint (server domain)

To receive server domain (in AWS endpoint) click on the side bar on the left Settings.

Or click on the side bar on left side *Things*, select the created thing, after it click *Interact->View Settings*. Whole path - (*Things->*YourThingName*->Interact->ViewSettings*). Page containing endpoint will open. **Copy the whole endpoint address**.

Port for accessing this endpoint is 8883.

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Settings Info

Device data endpoint Info Your devices can use your account's device data endpoint to connect to AWS.

Each of your things has a REST API available at this endpoint. MQTT clients and AWS IoT Device SDKs 🔀 also use this endpoint.

Endpoint

iot.us-west-2.amazonaws.com

Figure 9. Device data endpoint

3. Configuring the device

3.1. Security and certificates

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Find *Certificate file* ending with extension pem.crt *Private key file* and *AmazoonRootCA1 file* (no need to change filenames). These file should have been downloaded when creating *Thing* in AWS IoT Core.

Name	Date modified	Туре	Size
□ 5b969d6ec60b63c966b9e9f9bf79ae916b03448d6c7711617e85026d8ac0e9d9-certificate.pem.crt	2022-02-07 11:34	Security Certificate	2 KB
5b969d6ec60b63c966b9e9f9bf79ae916b03448d6c7711617e85026d8ac0e9d9-private.pem.key	2022-02-07 11:34	KEY File	2 KB
AmazonRootCA1.pem 3	2022-02-07 11:34	PEM File	2 KB
ABTELTONIKA TELEMATICS altoniskiu st. 9B-1. LT-08105			
Inius, Lithuania			
	SYSTEM	SYSTEM	SYSTEM
egistration code 305578349	Shelly Charles	John Chille	UNEN.
	CATIO	DANA(MANAC
wedbank AB	² DNV·GL ²	DNV.GL 2	DNV·G
I71 7300 0101 6274 0043	ISO 9001	ISO 14001	ISO 45001
W.I.F.I. HABAL122			



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Upload the mentioned files in the Security tab in the Teltonika Configurator.

Status Security GPRS	Load from device Load from file SIM 1 [Active] SIM Status: Ready Atte	Save to device	Update firmware	Reset configuration
Status Security System GPRS	SIM 1 [Active] SIM Status: Ready Atte	Bave to file	Read records	Reboot device
Status Security System GPRS	SIM 1 [Active] SIM Status: Ready Atte	mpts Left: 3		
Security System GPRS	SIM Status: Ready Atte	mpts Left: 3		
System GPRS				
GPRS				
	Enable PIN			
ata Acquisition	Current RIN			
S \ Call Settings				
SM Operators	Enable			
Features				
erometer Features	Keyword Settings			
uto Geofence	Set keyword			
anual Geofence				
ip \ Odometer	New Keyword			
Bluetooth				
Bluetooth 4.0	Repeat Keyword			
Beacon List	6-4			
norization ID List	Set			
I/O				
OBD II	Certificates			
CAN Adapter	Certificate files in device			
	root.pem (Root certif	icate)		
	private.pem.kev (Priv	ate kev)		
		and may,		
	Upload	Download		
	Delete	Open directory		

Figure 10. Uploading certificates

After uploading certificates, go to System tab and in Data protocol section select - Codec JSON.

Data Protocol	
Codec 8	Codec 8 Extended
Codec JSON	

Figure 11. Selecting Data protocol

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3.2. Device GPRS configuration for AWS IoT Custom MQTT settings

In the GPRS tab, under Server Settings select:

- 1. Domain *Endpoint* from the AWS, Port: 8883
- 2. Protocol MQTT
- 3. TLS Encryption TLS/DTLS

In the MQTT Settings section select:

- 1. MQTT Client Type AWS IoT Custom
- 2. Device ID enter device IMEI (optional)
- 3. Leave Data and Command Topics unchanged.

Save the configuration to the device.

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GPRS Settings		Second Server Settings		MQTT Settings	
GPRS Context		Backup Server Mode		MQTT Client Type	
Disable	Enable	Disable	Backup	AWS IoT Shadow	AWS IoT Custom
APN	banga	Duplicate	EGTS	Azure IoT	
APN Username		Backup Server Domain		Device ID (2) 35	8480085331785
APN Password		Backup Server Port	0 🗢	Data Topic %i	mei%/data
GPRS Authentication		Backup Server Protocol		Commands Topic %i	mei%/commands
Normal(PAP)	Secured(CHAP)	тср	UDP		
		MQTT			
Auto APN Search		TLS Encryption			
Auto APN Search		None	TLS/DTLS		
Disable	Enable				
Transfer APN File		Records Settings			
APN File Unload / Downloa	ad	Open Link Timeout (s)	300 🗘		
		Response Timeout (s)	30 🗘		
Upload		Network Ping Timeout (s)	0 🗘		
с. с. <i>и</i> .		Sort By			
Server Settings	1	Newest	Oldest		
Domain (АСК Туре			
Port	8883 •	TCP/IP	AVL		
	חסוו	FOTA WEB Settings			
	UDP	Status			
MQIT	3	Disable	Fnable		
ILS Encryption		Domain fm.te	eltonika.lt		
None	ILS/DILS	Port	5000 ^		
		Period (min)	720		
		r choa (miny	120 🗸		

Figure 12. GPRS settings for MQTT AWS IoT Custom

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4. Checking received data and sending commands in the AWS IoT core

The data received from the device can be found in the *MQTT test client*, which can be found in the bottom of sidebar on the left.

To see incoming data, subscribe to topic - ***DeviceImei*/data**. Or subscribe to # to see all incoming outgoing data in the Topics.

WS IoT > MQTT test client			
MQTT test client Info			
ou can use the MQTT test client to monitor o inform devices and apps of changes and e	the MQTT messages being passed in your AWS account. Devices publish MQTT message vents. You can subscribe to MQTT message topics and publish MQTT messages to topic	es that are identified by topics to communicate the state of the state	heir state to AWS IoT. AWS IoT also publishes MQTT messages
Subscribe to a topic Publis	h to a topic		
Topic filter Info The topic filter describes the topic(s) to which yo	u want to subscribe. The topic filter can include MQTT wildcard characters.		
#			
 Additional configuration 			
Subscribe			
Subscriptions	358480085331785/data		Pause Clear Export Edit
Favorites	▼ 358480085331785/data	Ū,	February 07, 2022, 12:41:46 (UTC+0200)
358480085331785/commands 🛇 🗙	, { { "state": {		
{ "CMD": "setdigout 111" } 🛛 💙 🗙	"reported": {		
	"16": 0,		
All subscriptions	"16": 0, "21": 4, "66": 14804,		
All subscriptions # $\heartsuit \times$	"16": 0, "21": 4, "66": 14804, "67": 3082, "66": 0, "69": 1, "170": 0, "130": 0,		

Figure 13. Subscribing to data topic

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{
"format": "ison".
"topic": "358480085331785/data".
"timestamp": 1644227812734.
"payload": {
"state": {
"reported": {
"16": 0.
"21": 4.
"66": 14547.
"67": 4019.
"68": 144.
"69": 1.
"179": 0,
"180": 0,
"181": 9,
"182": 6,
"200": 0,
"239": 1,
"240": 0,
"241": 24602,
"380": 0,
"ts": 1644227810000,
"pr": 1,
"latlng": "54.700450,25.259818",
"alt": 128,
"ang": 0,
"sat": 15,
"sp": 0,
"evt": 0
}

Incoming data is received in JSON format, for e.g.:

Figure 14. Received data format

To send SMS/GPRS commands to the device, in the same MQTT test client window select *Publish to a topic*. Enter topic name - ***DeviceIMEI*/commands**. In the Message payload enter wanted GPRS/SMS command in following format and press *Publish*:

{"CMD": "<Command>"}

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Subscribe to a topic	Publish	to a topic	
Topic name The topic name identifies the messar Q 358480085331785/comm Message payload { "CMD": "setdigout 111" } • Additional configuration Publish	ge. The messa	age payload will be published to this topic with a Quality of Service (QoS) of 0.	
Subscriptions		358480085331785/commands	Pause Clear Export Edit
Favorites	~~~	▼ 358480085331785/commands	February 07, 2022, 12:43:37 (UTC+0200)
358480085331785/comman { "CMD": "setdigout 111" }	ds 🗸 X	{ "CMD": "setdigout 111" }	
All subscriptions			
] #	Ø×	La	



The response to the command will be shown in the **Data topic**:

Subscriptions	358480085331785/data	Pause Clear Export Edit
Favorites 358480085331785/data $\heartsuit imes$	▼ 358480085331785/data	February 07, 2022, 12:43:41 (UTC+0200)
358480085331785/commands ♡ 🗙	{ "RSP": "DOUT1:1 Timeout:INFINITY DOUT2:1 Timeout:INFINITY DOUT3:1 Timeout:INFINITY "	
{ "CMD": "setdigout 111" }	}	
All subscriptions		



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