Using Avantec HVAC devices with ThingsBoard

Release 2.3.4

Avantec Manufacturing Limited

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FIRST STEPS

1	l First steps							
	1.1	Why Avantec + Thi	ngsBoard?	. 3				
		1.1.1 Why Avant	tec?	. 3				
		1.1.2 Why Thing	gsBoard?	. 4				
		1.1.3 What is Av	vantec + ThingsBoard?	. 5				
	1.2	Get Started		. 7				
		1.2.1 Introductio	m	. 7				
		1.2.2 Prerequisite	es	. 7				
		1.2.3 Step 1. Ten	1ant Login	. 8				
		1.2.4 Step 2. Imp	port Avantec Widgets	. 9				
		1.2.5 Step 3. Imp	port device profile	. 9				
		1.2.6 Step 4. Imp	port Dashboards	. 9				
		1.2.7 Step 5. Pro	vision device	. 9				
		1.2.8 Step 6. Con	nnect device	. 10				
		1.2.9 Step 7. Ass	sign Device and Dashboards to Customer	. 10				
		1.2.10 Step 8. Op	en Dashboards	. 17				
		1.2.11 Next Steps		. 17				
		1.2.12 See also .		. 17				
		1.2.13 Your feedb	ack	. 17				
2	Thin	gsBoard		19				
	2.1	Overview		. 19				
		2.1.1 Introductio	n	. 19				
		2.1.2 Features .		. 19				
		2.1.3 Getting Sta	arted Guides	. 20				
	2.2	Over-the-air firmwa	re updates	. 21				
		2.2.1 Overview		. 21				
		2.2.2 Firmware u	update monitoring dashboard	. 22				
		2.2.3 Provision C	OTA package to ThingsBoard repository	. 24				
		2.2.4 Assign OT	A package to device profile	. 28				
		2.2.5 Assign OT	A package to device	. 30				
		2.2.6 Update pro	cess	. 31				
		2.2.7 Configurati	ion	. 33				
	2.3	Working with IoT D	Dashboards	. 33				
		2.3.1 How to cus	stomize	. 34				
		2.3.2 Next steps		. 34				
	2.4	Getting Started with	a Rule Engine	. 35				
		2.4.1 What is Th	iingsBoard Rule Engine?	. 35				
		2.4.2 Typical Use	e Cases	. 35				
	25	White-labeling		35				

		2.5.1	Feature	. 36
		2.5.2	Next steps	. 36
	2.6	Installa	ation options	. 36
	2.7	Mobile	e application	. 36
		2.7.1	ThingsBoard mobile application	. 36
		2.7.2	ThingsBoard PE mobile application	. 37
	2.8	Things	Board MOTT Device API	. 37
	2.0	2.8.1	Introduction	. 37
		2.0.1	Getting started	. 37
		2.0.2	Key-value format	. 38
		2.0.5 2.8.4		. 30
		2.0.4		. 59
		2.0.5		. 41
		2.0.0		. 44
		2.8.7		. 40
		2.8.8		. 4/
		2.8.9		. 47
2	Avor	atoo Exte	onsion	40
3	Avai 2 1	Avento	ension per widgete	49
	5.1		Widget list	. 49
		5.1.1 2.1.2		. 49
		3.1.2 2.1.2		. 33
	2.0	3.1.3 D		. 57
	3.2	Demo		. 57
		3.2.1	ТА652FC-W	. 57
		3.2.2	TA652FH-W	. 58
		3.2.3	TA692FC-L-5	. 58
		3.2.4	Other Dashboards	. 58
4	TAC	STEC W	A WE ESThermostet	50
4	TA6	52FC-W	V Wi-Fi Thermostat	59
4	TA6 4.1	52FC-W TA652	V Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 . 59
4	TA6 4.1	52FC-W TA652 4.1.1	W Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat Introduction East on List	59 . 59 . 59
4	TA6 4.1	52FC-W TA652 4.1.1 4.1.2	Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat Introduction Feature List	59 . 59 . 59 . 60
4	TA6 : 4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3	Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat Introduction Feature List Wiring	59 . 59 . 59 . 60 . 60
4	TA6 : 4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4	Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat Introduction Feature List Wiring Mounting	59 . 59 . 59 . 60 . 60 . 61
4	TA6 :4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5	Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat . Introduction . Feature List . Wiring . Mounting . Dimension in mm:	59 59 59 60 60 61 61
4	TA6 :4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6	Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat . Introduction . Feature List . Wiring . Mounting . Dimension in mm: LCD Interface .	59 59 59 60 60 61 61 62 63
4	TA6 :4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA	W Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 60 60 60 61 62 63 63 68
4	TA6 :4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1	Wi-Fi Thermostat PFC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 60 60 61 62 63 63 68 68 68
4	TA6 :4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2	Wi-Fi Thermostat PFC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 60 60 61 62 63 63 68 68 68 68 68
4	TA6 :4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3	Wi-Fi Thermostat PFC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 600 600 61 62 63 63 68 68 68 68 68 68 68 68
4	TA6 : 4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4	Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 600 600 611 62 633 633 634 635 638 638 639 699 699
4	TA6 : 4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5	W Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 600 600 611 62 633 633 634 635 635 645 645 645 645 645 645 645 645 645 64
4	TA6 : 4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6	Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 60 60 61 62 63 63 68 68 68 68 68 68 69 50 69 72 73
4	TA6 : 4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7	W Wi-Fi Thermostat 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 60 60 61 62 63 63 68 68 68 68 68 68 69 5 69 5 72 73 73 76
4	TA6 : 4.1	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8	W Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 60 60 61 62 63 63 68 68 68 68 68 68 68 50 69 72 73 73 77 6 77
4	TA6 : 4.1 4.2	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connect	Wi-Fi Thermostat2FC-W - 2 pipe Fan Coil Wi-Fi Thermostat .Introduction .Feature List .Wiring .Mounting .Dimension in mm:LCD Interface .A652FC-W to ThingsBoard .Step 1. Tenant Login .Step 2. Import Detail Dashboard of TA652FC-WStep 3. Import List Dashboard of TA652FC-WStep 4. Provision TA652FC-W device .Step 5. Connect TA652FC-W device .Step 6. Assign Device and Dashboards to Customer .Step 7. Open Dashboards of TA652FC-W .Yur feedback .Ct TA652FC-W to ThingsBoard .	59 59 59 60 60 60 61 62 63 63 68 68 68 68 68 68 69 72 73 73 77 77
4	TA6 : 4.1 4.2	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1	Wi-Fi Thermostat2FC-W - 2 pipe Fan Coil Wi-Fi Thermostat .Introduction .Feature List .Wiring .Mounting .Dimension in mm:LCD Interface .A652FC-W to ThingsBoard .Step 1. Tenant Login .Step 2. Import Detail Dashboard of TA652FC-WStep 3. Import List Dashboard of TA652FC-WStep 4. Provision TA652FC-W device .Step 5. Connect TA652FC-W device .Step 6. Assign Device and Dashboards to Customer .Step 7. Open Dashboards of TA652FC-W .Yen Feedback .Ct TA652FC-W to ThingsBoard .Prerequisites. Clear Wi-Fi Configuration .	59 59 59 60 60 60 61 62 63 68 68 68 68 68 68 68 69 72 77 77 77 77 77 77
4	TA6 : 4.1 4.2 4.3	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1 4.3.2	Wi-Fi Thermostat2FC-W - 2 pipe Fan Coil Wi-Fi Thermostat .Introduction .Feature List .Wiring .Mounting .Dimension in mm:LCD Interface .A652FC-W to ThingsBoard .Step 1. Tenant Login .Step 2. Import Detail Dashboard of TA652FC-WStep 3. Import List Dashboard of TA652FC-WStep 4. Provision TA652FC-W device .Step 5. Connect TA652FC-W device .Step 6. Assign Device and Dashboards to Customer .Step 7. Open Dashboards of TA652FC-W .Your feedback .ct TA652FC-W to ThingsBoard .Prerequisites. Clear Wi-Fi Configuration .Step 1. Get Access-Token .	59 59 59 60 60 60 61 62 63 68 68 68 68 68 68 68 69 72 73 77 77 77 77 77 77 77 77
4	TA6 : 4.1 4.2 4.3	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1 4.3.2 4.3.3	Wi-Fi Thermostat2FC-W - 2 pipe Fan Coil Wi-Fi Thermostat .Introduction .Feature List .Wiring .Mounting .Dimension in mm:LCD Interface .A652FC-W to ThingsBoard .Step 1. Tenant Login .Step 2. Import Detail Dashboard of TA652FC-WStep 3. Import List Dashboard of TA652FC-WStep 4. Provision TA652FC-W device .Step 5. Connect TA652FC-W device .Step 6. Assign Device and Dashboards to Customer .Step 7. Open Dashboards of TA652FC-W .Your feedback .ct TA652FC-W to ThingsBoard .Prerequisites. Clear Wi-Fi Configuration .Step 1. Get Access-Token .Step 2. Power On .	59 59 59 600 600 611 62 633 688 688 688 688 688 689 722 733 766 777 777 777 777 778 779 799
4	TA6 : 4.1 4.2	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1 4.3.2 4.3.3 4.3.4	Wi-Fi Thermostat 2FC-W - 2 pipe Fan Coil Wi-Fi Thermostat . Introduction . Feature List . Wiring . Mounting . Dimension in mm: LCD Interface . A652FC-W to ThingsBoard . Step 1. Tenant Login . Step 2. Import Detail Dashboard of TA652FC-W Step 3. Import List Dashboard of TA652FC-W Step 4. Provision TA652FC-W device . Step 5. Connect TA652FC-W device . Step 7. Open Dashboards of TA652FC-W. Your feedback . ct TA652FC-W to ThingsBoard . Prerequisites. Clear Wi-Fi Configuration . Step 1. Get Access-Token . Step 2. Power On . Step 3. Configure	59 59 59 600 600 611 62 63 63 68 68 68 68 68 68 69 72 73 73 77 77 77 77 77 77 77 77 79 79 79 79
4	TA6 : 4.1 4.2	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5	V Wi-Fi Thermostat 2FC-W – 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 60 60 61 62 63 63 68 68 68 68 68 68 68 69 72 73 73 77 77 77 77 77 77 77 77 79 79 82
4	TA6 : 4.1 4.2	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5 4.3.6	Wi-Fi Thermostat2FC-W - 2 pipe Fan Coil Wi-Fi ThermostatIntroductionFeature ListWiringMountingDimension in mm:LCD InterfaceA652FC-W to ThingsBoardStep 1. Tenant LoginStep 2. Import Detail Dashboard of TA652FC-WStep 3. Import List Dashboard of TA652FC-WStep 4. Provision TA652FC-W deviceStep 5. Connect TA652FC-W deviceStep 6. Assign Device and Dashboards to CustomerStep 7. Open Dashboards of TA652FC-WYour feedbackct TA652FC-W to ThingsBoardPrerequisites. Clear Wi-Fi ConfigurationStep 1. Get Access-TokenStep 3. ConfigureStep 4. CheckTroubleshooting	59 59 59 60 60 61 62 63 68 68 68 68 68 68 69 69 72 73 73 77 77 77 77 77 77 77 8 79 79 82 83
4	TA6 : 4.1 4.2 4.3	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5 4.3.6 TA652	Wi-Fi Thermostat PFC-W - 2 pipe Fan Coil Wi-Fi Thermostat . Introduction . Feature List . Wiring . Mounting . Dimension in mm: LCD Interface . A652FC-W to ThingsBoard . Step 1. Tenant Login . Step 2. Import Detail Dashboard of TA652FC-W Step 3. Import List Dashboard of TA652FC-W Step 4. Provision TA652FC-W device . Step 5. Connect TA652FC-W device . Step 6. Assign Device and Dashboards to Customer . Step 7. Open Dashboards of TA652FC-W . Your feedback . ct TA652FC-W to ThingsBoard . prerequisites. Clear Wi-Fi Configuration . Step 1. Get Access-Token . Step 2. Power On . Step 3. Configure . Step 4. Check . Troubleshooting .	59 59 59 60 60 61 62 63 68 68 68 68 68 68 68 69 72 73 73 76 77 77 77 77 77 77 79 82 79 82 83 83
4	TA6 : 4.1 4.2 4.3	52FC-W TA652 4.1.1 4.1.2 4.1.3 4.1.4 4.1.5 4.1.6 Add TA 4.2.1 4.2.2 4.2.3 4.2.4 4.2.5 4.2.6 4.2.7 4.2.8 Connec 4.3.1 4.3.2 4.3.3 4.3.4 4.3.5 4.3.6 TA652 4.4.1	Wi-Fi Thermostat 2FC-W - 2 pipe Fan Coil Wi-Fi Thermostat	59 59 59 600 600 611 622 633 688 688 688 689 699 722 733 766 777 777 778 779 799 799 799 822 833 833 833

		4.4.2	Modify device profile's mobile dashboard 84
		4.4.3	Clear device profile's mobile dashboard 86
	4.5	TA6521	FC-W Demo Dashboards Usage
		4.5.1	Overview
		4.5.2	TA652FC-W Thermostat List
		4.5.3	TA652FC-W Thermostat (For Mobile App)93
	4.6	TA6521	FC-W MQTT API
		4.6.1	Overview
		4.6.2	Features
		4.6.3	MQTT Special
		4.6.4	Flow Chart
		4.6.5	Telemetry (Time-series data)
		4.6.6	Shared attributes
		4.6.7	Client-side attributes
		4.6.8	Server-side RPC
5	TA65	52FH-W	Wi-Fi Thermostat 131
	5.1	TA6521	FH-W — Floor Heating Wi-Fi Thermostat
		5.1.1	Introduction
		5.1.2	Feature List
		5.1.3	Wiring
		5.1.4	Mounting
		5.1.5	Dimension in mm:
		5.1.6	LCD Interface
	5.2	Add TA	140 A652FH-W to ThingsBoard
		5.2.1	Step 1. Tenant Login
		5.2.2	Step 2. Import Detail Dashboard of TA652FH-W
		5.2.3	Step 3. Import List Dashboard of TA652FH-W
		5.2.4	Step 4. Provision TA652FH-W device
		5.2.5	Step 5. Connect TA652FH-W device
		5.2.6	Step 6. Assign Device and Dashboards to Customer
		5.2.7	Step 7. Open Dashboards of TA652FH-W
		5.2.8	Your feedback
	5.3	Connec	t TA652FH-W to ThingsBoard
	5.4	TA6521	FH-W Thermostat – Demo Device Profile Usage
		5.4.1	Import device profile
		5.4.2	Modify device profile's mobile dashboard
		5.4.3	Clear device profile's mobile dashboard
	5.5	TA6521	FH-W Demo Dashboards Usage
		5.5.1	Overview
		5.5.2	TA652FH-W Thermostat List
		5.5.3	TA652FH-W Thermostat (For Mobile App)
		5.5.4	Office center - TA652FH-W Thermostats
	5.6	TA6521	FH-W MQTT API
6	TA69	92FC-L-	5 LoRaWAN Thermostat 173
	6.1	TA6921	FC-L – FCU Thermostat Series
		6.1.1	Features
		6.1.2	Technical Specification
		6.1.3	Order Code
		6.1.4	Dimensions / Outline
		6.1.5	Product pictures
		6.1.6	Wiring Example for TA692FC-L-1 177
		6.1.7	Terminal Labels on TA692FC-L-1

		6.1.8	Wiring Example for TA692FC-L-2	178
		6.1.9	Terminal Labels on TA692FC-L-2	179
		6.1.10	Wiring Example for TA692FC-L-3	180
		6.1.11	Terminal Labels on TA692FC-L-3	181
		6.1.12	Wiring Example for TA692FC-L-4	181
		6.1.13	Terminal Labels on TA692FC-L-4	182
		6.1.14	Wiring Example for TA692FC-L-5	183
		6.1.15	Terminal Labels on TA692FC-L-5	184
		6.1.16	Output diagrams	184
		6.1.17	LCD Display Content	186
		6 1 18	Internal Parameter Menu in TA692FC-L-5	188
		6 1 19	Advanced Parameter Menu in TA692FC-L-5	188
	62		692FC-L -5 to ThingsBoard	189
	0.2	621		180
		6.2.1		107
		6.2.2	Stop 1 MTCAD configuration	109
		0.2.3	Step 1. MTCAP configuration	190
		0.2.4		190
	()	6.2.5	Step 3. Integrating ChirpStack with ThingsBoard PE	190
	6.3	Multile	ch Conduit® MTCAP-868-041A	211
		6.3.1	MTCAP Series	211
	<i>.</i> .	6.3.2	MTCAP-868-041A	211
	6.4	ChirpSt	ack v3	220
		6.4.1	Quick start Amazon AWS	220
		6.4.2	Connecting a gateway	227
		6.4.3	Connecting a device	235
	6.5	TA692I	FC-L-5-868 Thermostat – Demo device profile usage	246
		6.5.1	Import device profile	246
		6.5.2	Modify device profile's mobile dashboard	247
		6.5.3	Clear device profile's mobile dashboard	248
	6.6	TA692I	FC-L-5 Demo Dashboards Usage	249
		6.6.1	Overview	249
		6.6.2	TA692FC-L-5 Thermostat List	250
		6.6.3	TA692FC-L-5 Thermostat (For Mobile App)	255
	6.7	TA692I	FC-L-5 LoRaWAN API	259
		6.7.1	Overview	259
		6.7.2	Payload format in LoRA packet used by TA692FC-L-5	259
7	Relea	ase Notes	6	263
	7.1	Release	Notes	263
		7.1.1	v2.3.4 (Nov 8, 2023)	263
		7.1.2	v2.3.3 (Sep 25, 2023)	263
		7.1.3	v2.3.2 (July 5, 2023)	263
		7.1.4	v2.3.1 (July 5, 2023)	264
		7.1.5	v2.3 (June 20, 2023)	264
		7.1.6	v2.2 (June 1, 2023)	264
		7.1.7	v2.1 (Apr 18, 2023)	265
		7.1.8	v1.0 (Jul 24, 2020 / Dec 20, 2022)	265
	7.2	Upgrad	e instructions	265
		- 10-44		
8	Avan	tec and	the project	267
	8.1	About u	 IS	267
	8.2	Copyrig	ts and Licenses	267
		8.2.1	Copyrights	267
		8.2.2	ThingsBoard License	268

Avantec provides some networking HVAC solutions. A series of networked HVAC devices in these solutions are connected to ThingsBoard IoT platform through MQTT protocol.

CHAPTER

FIRST STEPS

Are you new to Avantec Thermostats or ThingsBoard IoT platform? Learn about them to help you create fantastic project.

- Why Avantec + ThingsBoard?
- Get Started

1.1 Why Avantec + ThingsBoard?

Avantec provides some networking HVAC solutions. A series of networked HVAC devices in these solutions are connected to ThingsBoard IoT platform through MQTT protocol.

1.1.1 Why Avantec?

Avantec Manufacturing Limited was founded in 1983. Avantec has been a trusted name in the original equipment and design manufacturing (OEM/ODM) industry. In early years, products manufactured and exported by Avantec were highly diversified, ranging from gaming, electronics dictionary, handheld timers, to corded and cordless telephones.

Over the past decade, we have evolved into product design and serve customers around the world with our branded products. Three major product lines are (1) Telecommunication, (2) Education and (3) HVAC (Heating, Ventilating, Air Conditioning and refrigeration).

Avantec's strength lies in delivering high-quality engineering solutions. We provide one-stop-shop service from product design, structural/mechanical engineering design, tooling maintenance, electronics circuit design, firmware and software coding, to quality control and optimization.

HVAC

- Device Type:
 - Thermostat
 - Humidistat
 - Sensor for smart city
 - DDC (Direct Digital Controller)
 - VAV (Variable Air Volume) Controller
 - ...
- Networking:

- Classic
- Modbus
- BACnet
- RF 433/868/915
- Wi-Fi
- LoRaWAN

- ...

1.1.2 Why ThingsBoard?

ThingsBoard IoT platform

ThingsBoard is an open-source IoT platform that enables rapid development, management and scaling of IoT projects. Their goal is to provide the out-of-the-box IoT cloud or on-premises solution that will enable server-side infrastructure for your IoT applications.

• 100% Open-source

ThingsBoard is licensed under Apache License 2.0, so you can use any it in your commercial products for free. You can even host it as a SaaS or PaaS solution.

• Telemetry Data Collection

Collect and store telemetry data in reliable way, surviving network and hardware failures. Access collected data using customizable web dashboards or server-side APIs.

• IoT Rule Engine

ThingsBoard allows you to create complex Rule Chains to process data from your devices and match your application specific use cases.

• Data Visualization

Provides 30+ configurable widgets out-of-the-box and ability to create your own widgets using built-in editor. Built-in line-charts, digital and analog gauges, maps and much more.

• Multi-tenancy

Support multi-tenant installations out-of-the-box. Single tenant may have multiple tenant administrators and millions of devices and customers.

ThingsBoard Community Edition and ThingsBoard Professional Edition

ThingsBoard includes ThingsBoard CE (Community Edition) and ThingsBoard PE (Professional Edition).

Note: When we developed TA652FC-W and TA652FH-W Thermostats, we used ThingsBoard CE.

ThingsBoard IoT Gateway

The ThingsBoard IoT Gateway is an open-source solution that allows you to integrate devices connected to legacy and third-party systems with ThingsBoard.

ThingsBoard Mobile Application

The ThingsBoard Mobile Application is an open-source project based on Flutter. It allows you to build your own IoT mobile application with minimum coding efforts. It is powered by ThingsBoard CE IoT platform.

The ThingsBoard PE Mobile Application is an open-source project based on Flutter. It allows you to build your own advanced IoT mobile application with minimum coding efforts. It is powered by ThingsBoard PE IoT platform.

1.1.3 What is Avantec + ThingsBoard?

Avantec Extension

We provide Avantec widgets and Demo Dashboards based on ThingsBoard IoT platform for demonstration.

Of course, you can also customize your own Web UI and Mobile Application based on them.

Avantec Devices

TA652FC-W

- 2 pipe Fan Coil Wi-Fi Thermostat.
- Firmware ID: TA652FC-W-TB.



TA652FH-W

- Floor Heating Wi-Fi Thermostat.
- Firmware ID: TA652FH-W-TB.



TA692FC-L-5

• LoRaWAN thermostat for fan coil units.



HA652-W

Coming soon...

TA640FC-W

Coming soon...

TA670-W

Coming soon...

DL10-W

Coming soon...

CDT022-W

Coming soon...

Tip: Firmware ID - a hardware device may have several firmwares, which are respectively connected to different software platforms. Firmware ID are used to distinguish these firmwares.

1.2 Get Started

Tip:

- This section applies when no Avantec HVAC device is added to the ThingBoard server.
- If you add some Avantec HVAC devices to ThingsBoard Server again, please refer to the instructions of each device.
 - Add TA652FC-W to ThingsBoard
 - Add TA652FH-W to ThingsBoard

Reprinted this article from Getting Started with ThingsBoard, slightly modified.

1.2.1 Introduction

The goal of this tutorial is to demonstrate the basic usage of the most popular Avantec HVAC device and ThingsBoard features. You will learn how to:

- Connect devices to ThingsBoard;
- Import real-time end-user dashboards.

We will connect and visualize data from a Avantec HVAC device to keep it simple.

Refer to Getting Started with ThingsBoard to get support for the following features:

- Define thresholds and trigger alarms;
- Push notifications about new alarms over email, SMS or other systems.

1.2.2 Prerequisites

You will need to have ThingsBoard server up and running.

- The easiest way is to use Live Demo server.
- Or ThingsBoard Cloud.
- The alternative option is to install ThingsBoard using Installation options.
 - Windows users should follow this guide.
 - Linux users that have docker installed should execute the following commands:

mkdir -p ~/.mytb-data && sudo chown -R 799:799 ~/.mytb-data
mkdir -p ~/.mytb-logs && sudo chown -R 799:799 ~/.mytb-logs
docker run -it -p 9090:9090 -p 7070:7070 -p 1883:1883 -p 5683-5688:5683-5688/
_udp -v ~/.mytb-data:/data \
-v ~/.mytb-logs:/var/log/thingsboard --name mytb --restart always thingsboard/
_tb-postgres

These commands install ThingsBoard and load demo data and accounts. ThingsBoard UI will be available using the URL: http://localhost:8080 . You may use username **tenant@thingsboard.org** and password **tenant**. More info about demo accounts is available.

Some important parameters

Please remember the following important parameters, which will be used frequently in the following work:

ThingsBoard server	Web URI		Default Te	nant Account	MQTT URI / Cloud Host			
Live Demo server ThingsBoard Cloud (Subscription plans)	https://demo https://things	.thingsboard.io sboard.cloud			mqtt://demo.thin mqtt://mqtt.thing	gsboard.io sboard.clou		
Installation	local: h remote: htt 8080	attp://localhost:8080 tp://your_server_ip:	username: password: 1	tenant@thingsboard.org enant See demo accounts	mqtt://your_serve	er_ip		

Table 1: Some important parameters

1.2.3 Step 1. Tenant Login

- Open ThingsBoard Web UI in browser, e.g. http://localhost:8080
- Tenant Administrator login ThingsBoard.

۲ ThingsBo	oard
e (email) * @thingsboard.org	
	<u>م</u>
	Forgot Password?
Login	
Login	

Tenant default username and password, refer to Some important parameters.

1.2.4 Step 2. Import Avantec Widgets

• See Import Avantec Widgets.

1.2.5 Step 3. Import device profile

- See Import Device Profile of TA652FC-W Thermostat, or
- See Import Device Profile of TA652FH-W Thermostat.

1.2.6 Step 4. Import Dashboards

- See Import TA652FC-W Detail Dashboard and Import TA652FC-W List Dashboard, or
- See Import TA652FH-W Detail Dashboard and Import TA652FH-W List Dashboard.

1.2.7 Step 5. Provision device

- See Step 4. Provision TA652FC-W device, or
- See Step 4. Provision TA652FH-W device.

1.2.8 Step 6. Connect device

- See Step 5. Connect TA652FC-W device, or
- See Step 5. Connect TA652FH-W device.

1.2.9 Step 7. Assign Device and Dashboards to Customer

One of the most important ThingsBoard features is the ability to assign Dashboards to Customers. You may assign different devices to different customers. Then, you may create a Dashboard(s) and assign it to multiple customers. Each customer user will see his own devices and will not be able to see devices or any other data that belongs to a different customer.

Step 7.1 Create customers

Let's create a customer with title "My New Customer". Please see instruction below:

• Navigate to the Customers page.

🕵 ThingsBoard	🚦 Dashboards 🗧 👫 My New Dashboard		1 S Andrew Shvayka Tenant administrator
✿ Home	My New Dashboard		My New Dashboard 🕶 🗔 My New Device 🚫 Realtime - last hour 👱 🚼
✓··> Rule chains	Entition	0	
💒 Customers		~ • •	Realtime - last day
Assets	Entity name T Entity type temperature		Created time 🧄 Originator Type Severity Status
[₀] Devices	My New Device Device 30		Critical Active
D Device profiles	Navigate to "Customers" page		L 2020-1-27 13.27.10 Device Temperature Unacknowledged ···· V X
Entity Views	Navigate to Customers page		
📸 Widgets Library	Items per page: 10 💌 1 – 1 of 1	< >	
Dashboards			
Audit Logs	New Timeseries - Flot		
		16:15 16:20 2020	s Items per page: 10 ▼ 1 - 1 of 1 < >
	- temperature	30	
			Powerd by Thingsbard v.3.2.0

• Click the "+" sign to add a customer.

🕵 ThingsBoard	😤 Customers	C: C Andrew Shvayka Tenant administrator
✿ Home		
✓··> Rule chains	Customers	+ C Q
🚑 Customers	Created time Title Email Country City Click	"+" to add a Customer
📰 Assets	□ 2020-11-26 11:10:17 Customer C	A 🖩 🖬 🖬 🕯
LoD Devices		
D Device profiles	2020-11-26 11:10:17 Customer B	🕒 🖿 🖬
Entity Views	2029-11-26 11:10:17 Customer A	8 🖩 🖬 🕯
🐈 Widgets Library		
- Dashboards		
🕲 Audit Logs		
	llems per page:	10 ▼ 1-3 of 3 < >

• Add customer title and click "Add".

ر ThingsBoard	半 Customers		C 🕑 Andrew Shvayka Tenant administrator
🔒 Home			
↔ Rule chains	Customers	Add Customer ? X	+ C Q
2 Customers	Created time 🕹 🛛 Title		City
E Assets	2020.11.26 11:10:17 Customer	My New Customer Add title	
LoD Devices			
D Device profiles	2020-11-26 11:10:17 Customer	Description	🗎 🖬 🗔 🖽 🖯
Entity Views	2020-11-26 11:10:17 Customer		e 🖩 🖬 🖬
Widgets Library		Country	
Dashboards		City State / Province Zip / Postal Code	
🕑 Audit Logs			
		Address	
		Address 2	
		Phone	
		Email Click "Add" Cancel Add	
			Items per page: 10 ▼ 1 − 3 of 3 <

Step 7.2 Assign dashboards to Customer

Let's share our dashboard with the Customer. The Customer users will have read-only access to the Dashboard.

- See Step 6.1 Assign dashboards of TA652FC-W to Customer, or
- See Step 6.1 Assign dashboards of TA652FH-W to Customer.

Step 7.3 Assign device to Customer

Let's assign device to the Customer. The Customer users will have ability to read and write telemetry and send commands to devices.

- See Step 6.2 Assign TA652FC-W device to Customer, or
- See Step 6.2 Assign TA652FH-W device to Customer

Step 7.4 Create customer user

Finally, let's create a user that will belong to the customer and will have read-only access to the dashboard and the device. You may optionally configure the dashboard to appear just after user login to the platform web UI.

• Navigate back to the "Customers" page and click the "manage customer users" icon.

thingsBoard	2 Customers				: C Andrew Shvayka Tenant administrator
☆ Home					
<> Rule chains	Customers				Click "Manage customer users" icon $+ C \circ$
💒 Customers	□ Created time ↓	Title	Email	Country	City Manage customer users
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[₀] Devices					
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🖬 Entity Views	2020-11-26 11:10:17	Customer B			🕯 🔡 🗔 🏢 \varTheta
👫 Widgets Library	2020-11-26 11:10:17	Customer A			e 🖩 🖬 🖬
Dashboards					
🕑 Audit Logs					
					Items per page: 10 💌 1 - 4 of 4 < >

• Click the "Add user" icon.

thingsBoard	😕 Customers 👌 😂 Customer Users			업 ② Andrew Shvayka Tenant administrator 북
☆ Home				
⟨··⟩ Rule chains	My New Customer: Customer Users			+ 6 4
2 Customers	Created time 🕹 First Name	Last Name	Email	Click "Add user" icon
E Assets				Chek Add User Feor
Devices				
Device profiles				
📅 Entity Views				
👬 Widgets Library				
- Dashboards				
🕑 Audit Logs				
		No users found		
				Items per page: 10 💌 0 of 0 < >

• Specify email that you will use to login as a customer user and click "Add".

🎉 ThingsBoard	🚜 Customers 🗧 😫 Customer Users			CI C Andrew Shvayka
	My New Customer: Customer Users Created time ↓ First Name	Last Name Add User 2 × Specify email. first and last name	Email	+ C Q
Entity Views Widgets Library Usabboards Audit Logs		Email Opecary Entroy Entroy and the Net Market Second Second Sec	tens per	page: 10 → 0 of 0 < >

• Copy the activation link and save it to a safe place. You will use it later to set the password.

🕵 ThingsBoard	🗱 Customers 🗧 😝 Customer Users	13 😫 Andrew Shvayka Tenant administrator
A Home ⟨··⟩ Rule chains	My New Customer: Customer Users	+ C Q
Lustomers	Created time & First Name Email	
Lon Devices	Email*	
Device profiles Entity Views	User activation link ×	
Widgets Library	In order to activate user use the following activation link :	
🕘 Audit Logs	https://demo.thingsboard.io/api/noauth/activate?activateToken=cKHZzGqSbHLDqatIaV690PHB1nhfij	
	User activation link has been copied to clipboard Close OK	
	tems per p	ge: 10 🔻 0 of 0 < >

• Open user details.

thingsBoard	😕 Customers 👌 😂 Customer Users		::	Andrew Shvayka Tenant administrator
🔒 Home				
∢·· ≽ Rule chains	My New Customer: Customer Users	Click to open user details		+ C Q
² Customers	□ Created time ↓ First Name	Last Name	Email	
E Assets	- 2020 11 27 17:20:20 John	Dee	uer@uutemer.company.com	
Devices	2020-11-2717:20:30 John	Doe	user@customer-company.com	신 🔳
Device profiles				
🔚 Entity Views				
Widgets Library				
- Dashboards				
🕲 Audit Logs				
			Items per page: 10 💌	1 - 1 of 1 < >

• (Option) Toggle edit mode.

🕵 ThingsBoard	🚨 Customers 🗧 🕄 Customer Users	C1 S Andrew Shvayka Ternant administrator
A Home ⟨··> Rule chains	My New Customer: Customer Users	user@customer-company.com
2 Customers	Created time 🦆 First Name	Details Attributes Latest telemetry Audit Logs Toggle edit mode
Assets	2020-11-27 16:27:39	Disakla Harr Areaunt Disaku astimitar link Dasand astimitar Lasis on Austamou lass. Dalata was
Devices	-	Disable Oser Account Display activation mix resent activation Login as customer Oser Delete user
Device profiles		Email * user@customer-company.com
Entity Views		
🖶 Widgets Library		First Name
- Dashboards		Last Nama
🕲 Audit Logs		Description

• (Option) Select default dashboard and check "Always fullscreen". Apply changes.

لَّنْهَجَ ThingsBoard	😕 Customers 🕞 Customer Users	1 🕒 Andrew Strvayka Tenant administrator
A Home ⟨··⟩ Rule chains	My New Customer: Customer Users	user@customer-company.com
🚬 Customers	Created time First Name	Email*
Assets	2020-11-27 16:27:39	user@customer-company.com
LoD Devices		First Name Apply changes
D Device profiles		
Entity Views		Last Name
Widgets Library		
Dashboards		
(b) Audit Logs		Default dashboard My New Dashboard Select "My New Dashboard" and optionally check "Always fullscreen".

Step 7.5 Activate customer user

• Use the activation link to set the password. Click "Create Password". You will automatically login as a customer user.

$\leftarrow \ \ \rightarrow \ \ \mathbb{C} \ \ \mathbb{O} \text{demo.thingsboard.io/api/noauth/activate?activateToken=cKH2zGqSbHLDqatIaV690PHB}$	inhfij 🏠 🖈 🖲
	Insert the saved activation link and press "Enter"
Create Page	ssword
Input p	assword and click "Create Password" button.

• You have logged in as a Customer User. You may browse the data and acknowledge/clear alarms.

My New Dashboard				My New Dashboard - 🚮 My New Device 🛇 Realtime - last hour 🛨 😂 down Dee E
Entities		٥	ຈ 🗰 🛙	Alarms Vou can hide this items in the dashboard settings. $q = 1$
Entity name 1	Entity type	temperature		using tenant admin account □ Created time ↓ Originator Type Severity Status
My New Device	Device	30		2020-11-27 15 27:10 My New Device High Temperature Critical Active Upacknowledged
	Items p	erpage: 10 ▼ 1 - 1 of 1	< >	
New Timeseries - Flot			0	
1				
1				
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0				
-1 16:30 16:35 16:40 16:45	16:50 16:55 17:00 17:05	17:10 17:15 17:20	17:25	
- temperature			avg	Items per page: 10 💌 1 - 1 of 1 < > Powered by Thingsboard v.3.2.0

1.2.10 Step 8. Open Dashboards

- See Step 7. Open Dashboards of TA652FC-W, or
- See Step 7. Open Dashboards of TA652FH-W.

1.2.11 Next Steps

- Working with IoT Dashboards Customize your Dashboard & Widget.
- Getting Started with Rule Engine Customize your event processing with Rule engine.
- White-labeling Customize your company or product logo with ThingsBoard PE.
- Platform Integrations Connect existing NB IoT, LoRaWAN, SigFox and other devices with specific payload formats directly to ThingsBoard platform.
- Trendz Analytics Converts the IoT dataset into insights and simplifies the decision-making process.
- *Mobile application* learn how to customize the mobile application.
- *ThingsBoard MQTT Device API* | *TA652FC-W MQTT API* | *TA652FH-W MQTT API* Connect Avantec HVAC device to your existing IoT platform.

1.2.12 See also

- Installation guides Learn how to setup ThingsBoard on various available operating systems.
- · Connect your device Learn how to connect devices based on your connectivity technology or solution.
- Data visualization These guides contain instructions how to configure complex ThingsBoard dashboards.
- Data processing & actions Learn how to use ThingsBoard Rule Engine.
- IoT Data analytics Learn how to use rule engine to perform basic analytics tasks.
- Hardware samples Learn how to connect various hardware platforms to ThingsBoard.
- Advanced features Learn about advanced ThingsBoard features.

1.2.13 Your feedback

Don't hesitate to star Avantec on github to help us spread the word.

CHAPTER

TWO

THINGSBOARD

Here is an overview about ThingsBoard.

- Key concepts
- Installation options
- Dashboards | Rule engine | White labeling
- MQTT Device API

2.1 Overview

Reprinted articles: https://thingsboard.io/docs/

2.1.1 Introduction

See What is ThingsBoard?

2.1.2 Features

Entities and relations

See Entities and relations .

Working with telemetry data

See Working with telemetry data.

Working with IoT device attributes

See Working with IoT device attributes.

Attributes are treated key-value pairs. Flexibility and simplicity of the key-value format allow easy and seamless integration with almost any IoT device on the market.

Device specific attributes are separated into two main groups:

• **client-side attributes** - attributes are reported and managed by the device application. For example current software/firmware version, hardware specification, etc.

• **shared attributes** - attributes are reported and managed by the server-side application. Visible to the device application. For example customer subscription plan, target software/firmware version.

Using RPC capabilities

See Using RPC capabilities.

Thinsboard RPC feature can be divided into two types based on originator: device-originated and server-originated RPC calls. In order to use more familiar names, we will name device-originated RPC calls as a **client-side RPC** calls and server-originated RPC calls as **server-side RPC** calls.

Client-side RPC

Server-side RPC

Server-side RPC calls can be divided into one-way and two-way:

- **One-way server-side RPC** request is sent to the device without delivery confirmation and obviously, does not provide any response from the device. RPC call may fail only if there is no active connection with the target device within a configurable timeout period.
- **Two-way server-side RPC** request is sent to the device and expects to receive a response from the device within the certain timeout. The Server-side request is blocked until the target device replies to the request.

Claiming devices

Refer to Claiming devices. *TODO*...

Over-the-air firmware and software updates

See OTA Updates.

2.1.3 Getting Started Guides

These guides provide quick overview of main ThingsBoard features. Designed to be completed in 15-30 minutes.

- Hello world : Learn how to collect IoT device data using MQTT, HTTP or CoAP and visualize it on a simple dashboard. Provides variety of sample scripts that you can run on your PC or laptop to simulate the device.
- End user IoT dashboards : Learn how to perform basic operations over Devices, Customers, and Dashboards.
- Device data management : Learn how to perform basic operations over device attributes to implement practical device management use cases.

2.2 Over-the-air firmware updates

Refer to here.

2.2.1 Overview

Since ThingsBoard 3.3, ThingsBoard allows you to upload and distribute over-the-air(OTA) updates to devices. As a tenant administrator, you may upload firmware packages to the OTA repository. Once uploaded, you may assign them to Device Profile or Device. ThingsBoard will notify devices about the available update and provide a protocol-specific API to download the firmware. The platform tracks status of the update and stores history of the updates. As a platform user, you may monitor the update process using the dashboard.



2.2.2 Firmware update monitoring dashboard

ThingsBoard provides the summary of the firmware update to monitor and track the firmware update status of your device, such as which devices are updating right now, any boot issues, and which ones have already been updated.

Check firmware dashboard

The dashboard is created automatically for each new tenant that you add to ThingsBoard in ThingsBoard CE. But this is not the case in ThingsBoard PE and ThingsBoard Demo. Check if you have a firmware dashboard in your dashboard list:

👸 ThingsBoard	- Dashboards	C3 (2) tenant@thingsboard.org Tenant administrator
	• • • • • • • • • • • • • • • • • • •	
OTA updates	Dashboards	+ C Q
🔚 Entity Views		
式 Edge instances	Created time ↓ Title Assigned to customers Public	
👚 Edge management 🛛 🗸	2022-04-06 10:21:03 Firmware	8 ± < < 8 1
Widgets Library		11 ± < < 自主
Dashboards		
🕑 Audit Logs		
۱۱، Api Usage		11 ± < < 自 ī ,
🔹 System Settings 🛛 🗸	Items per page: 10	

Import firmware dashboard

If there is not firmware dashboard, you can also download the dashboard JSON firmware.json and import it for existing tenants.

• Dashboards -> + -> Import a dashboard -> Drag and drop firmware.json -> Import.

🎉 ThingsBoard	- Dashboards		: 8 Tenant administrator
	Insert dash and		
	Dashboards Import dashboard X		+ C Q
		Public	2 import a dashboard
🙊 Edge management 🛛 🗸	Dashboard Tile *		
Widgets Library	2022-11-08 1: Drag and drop a JSON file or Browse file		± < < 🖻 🖊 🖬
Dashboards	2022-11-08 1		+ 2 6 0 2 1
Version control	firmware.json		
🕑 Audit Logs	2022-11-08 11 3 drag and drop firmware.json		土 < < 白 / 言
11. Api Usage	Cancel 4 import		土 く 木 白 / 言 ・
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Firmware dashboard details

My ThingsBoard	📲 Dashboards 🔸 🕂 Firmware		C C tenant@thingsboard.org Frenant administrator
↑ Home	Device list	후 Fil	ters 🔇 Realtime - last minute 🚦
		o	
22 Customers	Devices	Q []	۵ ک
Assets	Device ↑ Current FW title Current FW version Target FW title Target FW version Target FW set time Progress Status		0
LoD Devices	Beijing ranch 4	3 🖍 ± 🗖	Device Walting
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OTA updates			1
Entity Views	· · · · · · · · · · · · · · · · · · ·	9 / ± 1	Darden Hardetten
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👚 Edge management 🛛 🗸	Plant Floor TA652FC-W-TB 1.6.8 TA652FH-W-TB 1.6.8 2022-12-15 👥 🗹 Updated 4	9 🖍 ± 🗖	A
Widgets Library	and the second s	10.00	0
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O Audit Logs	Monitor the status of	of devices.	\checkmark
II. Api Usage	Clicking on these tabs open the	he details.	-
🗘 System Settings 🗸 🗸	Items per page: 10	I< < > >I	2 Device Updated Powered by
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			Tenant administrator
☆ Home	Device list	च Fil	Tenant administrator
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A Home ←> Rule chains ∴ Customers Image: Assets [si] Devices ① Device profiles	Device list Devices Device ↑ Current FW title Current FW version Target FW title Target FW version Target FW set time Progress Status verv.e Landrouters 2023-01-10	= ⊓ 1 2 Q :: 3 4 5 6 ⊙ ⁄ ± ⊡	C C Realtime - last minute C C C Realtime - last minute C C C Realtime - last minute C C C R R R R R R R R R R R R R R R R R
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There you can see a list of all devices with full information about their firmware.

Click the "History of the firmware updates" button next to the device name to learn about the firmware update status of specific device.

4. Change firmware;

6. Copy checksum.

5. Download firmware;

Items per page: 10 👻 1 - 10 of 14

(m.

Dashboards

() Audit Logs

II. Api Usage

💼 System Settings

Device Failed

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Device Up

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🎉 ThingsBoard	🚦 Dashboards 🔸 👪 Firmware 🖸	tenant@thingsboard.org Tenant administrator
🔒 Home	Device list Ξ Filters () Realtime - last minute
		D
22 Customers	Devices Q ::	
ssets	Device ↑ Current FW title Current FW version Target FW title Target FW version Target FW set time Progress Status	0
Lon Devices		Device Waiting
D Device profiles		୯
OTA updates	Fan Coll TA652FC-W-TB 1.6.12 TA652FC-W-TB 1.6.12 15:11:12 Updated (3) ✓ ± I	4
Entity Views	Plant Floor TA652FC-W-TB 1.6.8 TA652FH-W-TB 1.6.8 2022-12-15 - Vlpdated 🕢 🎤 🛓 🗋	1
Edge instances	-0 ≠ ± □	Device Updating
😤 Edge management 🗸 🗸 🗸		A
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II. Api Usage	· · · · · · · · · · · · · · · · · · ·	<u>×</u>
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fraction Home	Device list >	Firmware history: H	leadquaters Fan Coil		\Xi Filters 🕓 Realtin	ne - last minute 🚦
∢·· > Rule chains	-					
💒 Customers	Realtime - I	ast 30 days	0	Toront Common Male	Terrat Germanian	Q
E Assets	2023-01-10	TAGENEC WITH	1.6.12	larget firmware title	larget firmware version	Status
Devices	15:42:14 2023-01-10	TA652EC-W-TB	1.6.12			Undated
D Device profiles	15:42:06 2023-01-10	TA652FC-W-TB	1.6.10			Updating
OTA updates	2023-01-10	TA652FC-W-TB	1.6.10			Verified
Entity Views	2023-01-10 15:42:06	TA652FC-W-TB	1.6.10			Downloaded
Edge instances	2023-01-10 15:41:34	TA652FC-W-TB	1.6.10			Downloading
👚 Edge management 🗸 🗸	2023-01-10 15:41:33	TA652FC-W-TB	1.6.10			
Widgets Library	2022.01.10				. 10 1 10 401	
Dashboards				items per page	e. 10 • 1 - 10 of 21	

2.2.3 Provision OTA package to ThingsBoard repository

• OTA updates -> + -> Input *title & version* -> Select device profile -> select Firmware -> Enable Upload binary file -> Drag and drop a package file -> Disable Audo-generate checksum -> Select MD5 checksum algorithm, Checksum is blank -> add.

🎉 ThingsBoard	OTA updates	C 😮 Tenant administrator
🔒 Home		
	Packa Add package 2 X	2 + C Q
😤 Customers		File size Checksum
E Assets	Title * Version *	3 Enter the package name and its new version
Devices	1.0012/C-W-1D 1.0012	
🛃 Profiles 🗸 🗸	TA652FC-W-TB 1.6.12	
🜐 OTA updates 1	Custom tag should match the package version reported by your device. Device profile *	4 Select the device profile.
🔚 Entity Views	TA652FC-W Thermostat ×	Package will be distribute to all devices with the same profile
🚽 Edge instances	The uploaded package will be available only for devices with the chosen profile. Package type *	
죾 Edge management 🗸 🗸	Firmware 👻	5 Choose preferred OTA package
Widgets Library	Once the package is uploaded, you will not be able to modify title, version, device profile and package type.	6. Upload a binary file
Dashboards		
Version control		7 Drag and drop OTA package file
🕑 Audit Logs	Drag and drop a package file or Browse file	
11. Api Usage	TASSEC WITH 14 10 WIELing him	
🔅 System Settings 🗸 🗸		8 NOT auto-generate checksum
	Checksum aborithm	9. Select "MDE" checksum algorithm
	If charkerin is annotative in the nanarataria summatically	Checksum is blank
	Cancel 10 Add	
	<	,

Table 1: OTA package parameters

Model	Title	Version	Device profile	Туре	Checksum algorithm
TA652FC-W	TA652FC-W-TB	e.g. 1.6.10	TA652FC-W Thermostat	Firmware	MD5
TA652FH-W	TA652FH-W-TB	e.g. 1.6.10	TA652FH-W Thermostat	Firmware	MD5

- Navigate to the "OTA Updates" menu item to list and upload OTA update packages. Each package consist of:
 - Title the name of your package. You can use different names for production and debug firmware.
 - Version the version of your package. Combination of the title and version must be unique in scope of a tenant.
 - Device Profile each package is compatible with one device profile. We track compatibility to prevent accidental updates of devices with incompatible firmware. Link to a device profile means that device that use this profile may be updated to the current package. However, the update is not triggered, until the user or script *assigns* the package to the device profile or device.
 - Type can be either Firmware or Software.
 - Checksum algorithm optional parameter, it is a short name of the checksum algorithm to use. Please select MD5 checksum algorithm.
 - Checksum optional parameter, it's a value of the file checksum. If no checksum provided by the user, server will use SHA-256 algorithm automatically.
 - Description optional text description of the firmware.
- You can browse the provisioned packages as well as search them by title. Also, you are able to download and delete packages.

🍇 ThingsBoa	ard	OTA updates							: Carant administrator
🔒 Home	Â								1 2 3
↔ Rule chains		Packages repositor	ry						+ C Q
2. Customers		Created time 🕹	Title Version	Version Tag	Package type	Direct URL	File name	File size	Checksum
Assets			TA652FC-	TA652FC-W-			TA652FC-W-TB-		4 5 6
		2023-01-09 15:09:05	W-TB 1.6.12	TB 1.6.12	Firmware		v1.6.12_WiFi.ino.bin	1.3 MB	MD5: e10696e814e1c02
Profiles	~							1. Add	OTA package:
OTA updates								2. Refre	esh page;
Entity Views								3. Sear	ch OTA package by title; (the checksum:
Edge instances								5. Dow	nload OTA package;
	~							6. Dele	te OTA package.
Widgets Library									
Dashboards									
• Version control		4					Itome r	or page: 10	
() Audit Logs							items p	erpage. 10	

• To open package details, click the table row. Package details allow you to copy package ID and checksum.

🕵 ThingsBoard	😄 OTA updates			🖸 😩 Tenant administrator 🕴
☆ Home	Declaration		TA652FC-W-TB	
	Packages reposito	iry	OTA update details	? ×
2 Customers	Created time 🕹	Title Version	Dataile	
Assets	2022.01.09.15:00:05	TA652FC- 16.12		In edit mode, you
Devices	2023-01-09 10.09.00	W-TB 1.0.12	Open details page Download package Delete pack	can modify the
Profiles 🗸			Copy package Id	description
📋 OTA updates			Title Version	- 1
📊 Entity Views			1A032FC-W-1D 1.0.12	
Edge instances			TA652FC-W-TB 1.6.12	
🕤 Edge management 🗸 🗸			Device profile	
Widgets Library			TA652FC-W Thermostat	
Dashboards			Package type	
Version control				· · · · · · · · · · · · · · · · · · ·
🕑 Audit Logs			Checksum algorithm Checksum MD5 ➡ e10696e814e1c02ea624	464114196c81a
ılı Api Usage			File name File size in bytes	Content type
🔹 System Settings 🗸 🗸			TA652FC-W-TB-v1.6.12_WiFi.ino 1314480	application/octet-stream
	4		Description	

لَّهُ ThingsBoard		٥	OTA updates					C C Tenant administrator
🔒 Home	Â					TA652EC-W-TB		
↔ Rule chains	L	P	ackages repositor	у		OTA update details		? ×
2 Customers			Created time 🕹	Title	Version	Tala	Vacian *	(<)_(<)_
Assets		_		TA652FC-		TA652FC-W-TB	1.6.12	2 save changes
LoD Devices			2023-01-09 15:09:05	W-TB	1.6.12	Version Tag		
🔓 Profiles 🗸 🗸	L					TA652FC-W-TB 1.6.12		
OTA updates	L					Device profile		
Entity Views						Paskasa hus		
🚅 Edge instances	L					Firmware		•
	L					Checksum algorithm	Checksum	
📑 Widgets Library	L					MD5 -	e10696e814e1c02ea624	464114196c81a
Dashboards	L					File name TA652FC-W-TB-v1.6.12_WiFi.ino.	File size in bytes . 1314480	Content type application/octet-stream
• Version control	L					Description		
🕑 Audit Logs	H	•				Fw update 1 edit descrip	otion	
ılı Api Usage	•							/

• Also, Audit logs track information about users who provisioned the firmware.

👸 ThingsBoard	🕲 Audit Logs				::	E Tenant adminis	strator
☆ Home							
∢·· > Rule chains	() last day				Observe O	C TA package s	3 Q tatus
P Customers	Timestamp 🕹	Entity Type	Entity Name	User	Туре	Status	Details
Assets	2023-01-09 15:09:05	OTA package	TA652EC-W-TB	lian 1. hk	Added	Success	
[₀] Devices		e tri paenege					
🖆 Profiles 🛛 🗸							
@ OTA updates							
Entity Views							
Edge instances							
👚 Edge management 🛛 🗸							
Widgets Library							
Dashboards							
Version control							
🕑 Audit Logs				1	tems per page: 10 📼 1 – 2 of 2		
II. Ani Usage					terns per page. 10 V 1=2012		/ //

All actions listed are also available via REST API.

2.2.4 Assign OTA package to device profile

You may assign firmware to the device profile to automatically distribute the package to all devices that share the same profile. See screenshots below.

🎉 ThingsBoard	😫 Profiles 🔸 🛛 Device profiles	13 😮 Tenant administrator
🔒 Home		
 ✓→ Rule chains 	Device profiles	Device profile details
🐏 Customers	Created time 🞍 🛛 Name	f DataileTransport configuration Alarm rules (0) Device provide the
Assets	2 Click	
Devices	2023-01-03 17:30:02 Thermostat	Copy device profile Id
Profiles 1 A	2022-11-08 13:37:20 Charging port	C Name TA652FC-W Thermostat
D Device profiles	2022-11-08 13:37:20 Air Quality Sensor	C
R Asset profiles	2022-11-08 13:37:20 Temperature	Rule chain
OTA updates	Jensor	- Mahila daabhaard
Entity Views	2022-10-13 13:39:06 default	Used by mobile application as a device details dashboard
🚽 Edge instances		Queue
👚 Edge management 🗸 🗸		
😭 Widgets Library		Assigned firmware
Dashboards		Applement applying
Version control		
		Device exectly increase
م الآلامي ThingsBoard	🖆 Profiles 👌 🛛 Device profiles	: 8 Tenant administrator
ିଞ୍ଜୁ ThingsBoard त Home ऀ	💼 Profiles 🔸 🛛 Device profiles	C 8 Tenant administrator
ff ThingsBoard ♠ Home ← Rule chains	Profiles > Device profiles	TA652FC-W Thermostat ? × Device profile details ? ×
Markowski Markowski ♠ Home ▲ ←> Rule chains ▲ Customers ▲	Profiles > Device profiles Device profiles Created time Name	TA652FC-W Thermostat ? × Device profile details ? × Details
Image: Figure 1 Image: Figure 1 Image: Home Image: Figure 1 Image: Home Image: Figure 1 Image: Home Image: Figure 1 Image: Customers Image: Figure 1 Image: Assets Image: Figure 1	Profiles > Device profiles Device profiles Created time Name TA652FC-W	TA652FC-W Thermostat Image: Comparison of the second s
Image: Control of the second of the seco	Profiles □ Device profiles Device profiles Name Created time ↓ Name 2023-01-03 17:30.02 TA652FC-W Thermostat	TA652FC-W Thermostat ? × Device profile details ? × Details Transport configuration Alarm rules (0) Device profile Name* 5 Save changes ^
Image: Filler Stress Image: Filler Stress Image: Filler Stress Image: Filler Stress Image: Filler Stress Image: Filler Stress	Profiles □ Device profiles Device profiles ○ Created time ↓ Name ○ 2023-01-03 17:30:02 TA652FC-W Thermostat ○ 2022-11-08 13:37:20 Charging port	Contract administrator Image: Contract administrator TA652FC-W Thermostat Image: Contract administrator Device profile details Image: Contract administrator Image: Contract administrator Image: Contract administrator Image: Contract adminiter Image: Contract administrator
Image: Device profiles	Profiles □ Device profiles □ Created time ↓ Name □ 2023-01-03 17:30:02 TA652FC-W Thermostat □ 2022-11-08 13:37:20 Charging port □ 2022-11-08 13:37:20 Air Quality Sensor	C O Terant administrator Image: Constraint administrator TA652FC-W Thermostat
Image: Second secon	Profiles □ Device profiles □ Created time ↓ Name □ 2023-01-03 17:30:02 TA652FC-W Thermostat □ 2022-01-08 13:37:20 Charging port □ 2022-11-08 13:37:20 Air Quality Sensor □ 2022-11-08 13:37:20 Temperature Sensor	Image: Second state of the
Image: Second	Profiles □ Device profiles □ Created time ↓ Name □ 2023-01-03 17:30:02 TA652FC-W Thermostat □ 2022-01-03 17:30:02 TA652FC-W Thermostat □ 2022-11-08 13:37:20 Charging port □ 2022-11-08 13:37:20 Air Quality Sensor □ 2022-11-08 13:37:20 Temperature Sensor	C Portice profile details TA652FC-W Thermostat Device profile details Details Transport configuration Alarm rules (0) Device provide of the second seco
Image: Second	Profiles □ Device profiles □ Created time ↓ Name □ 2023-01-03 17:30:02 TA652FC-W Thermostat □ 2022-11-08 13:37:20 Charging port □ 2022-11-08 13:37:20 Air Quality Sensor □ 2022-11-08 13:37:20 Temperature Sensor □ 2022-11-08 13:37:20 Temperature Sensor □ 2022-11-03 13:39:06 default	C Period A Construction as a device details dashboard Queue
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Home Home Customers Customers Assets Devices Profiles Oraupdates OTA updates Edge instances Edge management	Profiles □ Device profiles □ Created time ↓ Name □ 2023-01-03 17:30:02 TA652FC-W □ 2023-01-03 17:30:02 TA652FC-W □ 2022-11-08 13:37:20 Charging port □ 2022-11-08 13:37:20 Air Quality Sensor □ 2022-11-08 13:37:20 Air Quality Sensor □ 2022-11-08 13:37:20 Temperature Sensor □ 2022-11-108 13:37:20 default ↓ Select compatible OTA Update package Charging port	C Details Transport configuration Alarm rules (0) Device provide a contract of the format of the for
Home Home Customers Customers Assets Porfiles Porfiles Oraupdates Customers Edge management Widgets Library	Profiles Device profiles □ Created time ↓ □ 2023-01-03 17:30:02 □ 2022-11-08 13:37:20 □ 2022-11-08 13:37:20 □ 2022-11-08 13:37:20 □ 2022-11-08 13:37:20 □ 2022-11-08 13:37:20 □ 2022-11-08 13:37:20 □ 2022-10-13 13:39:06 □ 2022-10-13 13:39:06 □ 4 Select compatible OTA Update package	C Details Transport configuration Alarm rules (0) Device provide the second sec
Image: Second	Profiles Device profiles Created time ↓ 2023-01-03 17:30:02 TA652FC-W Thermostat 2023-01-03 17:30:02 TA652FC-W Thermostat 2022-11-08 13:37:20 Charging port 2022-11-08 13:37:20 Air Quality 2022-11-08 13:37:20 Temperature 2022-10-13 13:39:06 A Select compatible OTA Update package	C Choose software that will be distributed to the devices

۳ ThingsBoard	🖆 Profiles ゝ 🛛 Device profiles	🕄 😫 Tenant administrator
🔒 Home		TA652EC-W Thermostat
⟨··⟩ Rule chains	Device profiles	Device profile details
🚑 Customers	Created time 🕹 🛛 Name 🛛 F	
E Assets		Details Transport configuration Alarm rules (0) Device province and g
Devices	2023-01-03 17:30:02 Thermostat	Name * TA652FC-W Thermostat
Profiles 🔨	2022-11-08 13:37:	
D Device profiles	2022-11-08 13:37: Change of the firmware	e may cause update of 1 device.
A Asset profiles	2022-11-08 13:37	Cancel Proceed
OTA updates		Used by mobile application as a device details dashboard
Entity Views	2022-10-13 13:39:06 default I	Queue
Edge instances		Assigned firmware
🕤 Edge management 🗸 🗸		TA652FC-W-TB (1.6.12) × Choose firmware that will be distributed to the devices
Widgets Library		Assigned software
Dashboards		Choose software that will be distributed to the devices
Version control		Device profile image
م السی ThingsBoard	🖆 Profiles 🔸 🛛 Device profiles	: 8 Tenant administrator
☆ Home		TA652FC-W Thermostat
A Home ⟨··⟩ Rule chains	Device profiles	TA652FC-W Thermostat ? ×
☆ Home ←> Rule chains 2 Customers	Device profiles □ Created time ↓ Name F	TA652FC-W Thermostat Device profile details Q × Details Transport configuration Alarm rules (0) Device provisioning
 Home ←> Rule chains ∴ Customers ⊞ Assets 	Device profiles Created time ↓ Name F 2023-01-03 17:30:02 TA652FC-W	TA652FC-W Thermostat ? × Device profile details ? < Details ? Details Device provisioning
 ↔ Home ↔ Rule chains ≵ Customers ➡ Assets ➡ Devices 	Device profiles □ Created time ↓ Name F □ 2023-01-03 17:30:02 TA652FC-W Thermostat T	TA652FC-W Thermostat ? × Device profile details ? × < Details ? × Rule chain Rule chain ? ×
 ↔ Home ↔ Rule chains ∴ Customers ⊞ Assets ⊡ Devices ♪ Profiles 	Device profiles Created time ↓ Name F 2023-01-03 17:30:02 TA652FC-W Thermostat C	TA652FC-W Thermostat ? × Device profile details ? × < Details ? × Rule chain Rule chain ? ×
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 Home ↔ Rule chains ∴ Customers ∴ Customers ∴ Assets Continue C	Device profiles Created time ↓ Name 2023-01-03 17:30:02 TA652FC-W Thermostat 1 2023-01-03 17:30:02 1 202 2023-01-03 202 2023-01 202 2023-01 202 2023-01 202 2023-01 202 2023-01 202 2023-01 202 202 202 202 202 202 202	TA652FC-W Thermostat ? × Device profile details ? × < Details ? × Rule chain Mobile dashboard > ×
 Home ← Home ← Rule chains ← Customers ← Assets ← Devices ← Profiles ← Asset profiles ← Asset profiles ← Asset profiles ← OTA updates 	Device profiles □ Created time ↓ Name F □ 2023-01-03 17:30:02 TA652FC-W C □ 2023-01-03 17:30:02 TA652FC-W C □ 1 1 1 □ 1 1 1 □ 2 0 0 □ 1 0 0 □ 2 0 0 □ 2 0 0	TA652FC-W Thermostat ? × Device profile details ? × Details ? × Rule chain
 Home ↔ Rule chains ↓ Customers ↓ Assets ↓ Devices ↓ Profiles ↓ Profiles ↓ Asset profiles 	Device profiles □ Created time ↓ Name F □ 2023-01-03 17:30:02 TA652FC-W C □ 1 Thermostat C □ 1 1 C □ 1 1 C □ 2 Gensor C 2022-10-13 13:39:06 default C	TA652FC-W Thermostat ? × Device profile details ? × < Details Transport configuration Alarm rules (0) Device provisioning > Rule chain Mobile dashboard Used by mobile application as a device details dashboard Queue
 Home ←> Rule chains ↓ Customers ↓ Assets ↓ Assets ↓ Profiles ↓ Profiles ↓ Asset profiles ↓ Asset profiles ↓ Asset profiles ↓ Asset profiles ↓ Edge instances 	Device profiles □ Created time ↓ Name F □ 2023-01-03 17:30:02 TA652FC-W C □ 2023-01-03 17:30:02 TA652FC-W C □ 1 1 1 □ 1 1 1 □ 2 0 1 □ 1 1 1 □ 2 0 0 2022-10-13 13:39:06 default 1	TA652FC-W Thermostat 2 × Device profile details 2 × Details 2 × Details Transport configuration Alarm rules (0) Device provisioning Rule chain Mobile dashboard Vertex of the device details dashboard Vertex of the device details dashboard Vertex of the device profile Assigned firmware TA652FC-W-TB (1.6.12) Firmware has been assigned to the device profile
	Device profiles □ Created time ↓ Name F □ 2023-01-03 17:30:02 TA652FC-W T □ 1 Thermostat T □ 1 1 1 □ 2 0 1 □ 2 0 0 2022-10-13 13:39:06 default 1	TA652FC-W Thermostat Device profile details

The device profile details will let you choose only compatible OTA update packages (see provisioning for more info). Device profile may be used by thousands of devices. Assignment of the firmware triggers the *Update process*.

2.2.5 Assign OTA package to device



You may also assign firmware to specific device. See screenshots below.
🎉 ThingsBoard	Con Devices	: Carant administrator
fr Home	Device profile TA652FC-W-TB	
✓··> Rule chains	Devices All × Device details	? ×
👱 Customers	Created time ↓ Name Device t Dataile Attributes Latest tolematry	Alarme Evente
E Assets	2022 01 02 17:57:01 TA652FC- TA652F Name	
Devices	W-TB Thermo TA652FC-W-TB	
🗜 Profiles 🗸 🗸	2022-11-08 13:37:21 Charging Port 2 Chargin Device profile	
OTA updates	2022-11-08 13:37:21 Charging Port 1 Chargina	
Entity Views	Air Label Quality Air Qual AVANTEC Headquaters	
Edge instances	Sensor Sensor	
👚 Edge management 🗸 🗸	Quality Air Qual Sensor Sensor TA652FC-W-TB (1.6.12) Firmware has been	assigned to the device
Widgets Library		
Dashboards	Assigned software	

The firmware version assigned to the device will automatically overwrite firmware version that is assigned to the device profile.

For example, let's assume you have Devices D1 and D2 that has Profile P1:

- If you assign package F1 to Profile P1 (via *profile details UI* or REST API), Devices D1 and D2 will be updated to F1.
- If you assign package F2 to Device D1 (via device details UI or REST API), Device D1 will be updated to F2.
- Subsequent assignment of the package F3 to the Profile P1 will affect only D2, since it has no specific firmware version assigned on the device level. So, D2 will be updated to F3, while D1 will continue to use F2.

Customers may choose available firmware and assign it to the devices that belong to them. However, customers can't provision or manage firmware packages.

2.2.6 Update process

Assignment of the firmware to the device or device profile triggers the update process. ThingsBoard tracks the progress of the update and persists it to the device attributes.

Update progress may have one of the following states. The state of the update is stored as an attribute of the device and is used to visualize the update process on the *dashboard*.

QUEUED state

The very first state of the firmware update. Means that the notification about new firmware is queued but not yet pushed to the device. ThingsBoard queues the update notifications to avoid peak loads. The queue is processed with the constant pace. By default, it is configured to notify up to 100 device per minute. See *configuration properties* for more details.

INITIATED state

Means that the notification about firmware is fetched from queue and pushed to device. Under the hood, ThingsBoard converts notification to the update of the following *shared attributes*:

- fw_title name of the firmware.
- fw_version version of the firmware.
- fw_size size of the firmware file in bytes.
- fw_checksum attribute that is used to verify integrity of the received file.
- fw_checksum_algorithm the algorithm used to calculate file checksum.

🎉 ThingsBoard	OTA updates
✿ Home	
	Packages repository + C Q 1 2 3 4
📇 Customers	Created time 🕹 Title Version Version Tag Package type Direct URL File name File size Checksum
Assets	2022-01-00 15-00-05 TA652FC- 1.6.12 TA652FC-W- Eirminare TA652FC-W-TB- 1.9 MB MDS-e10606-e014e1-02 N
[₀] Devices	V1.6.12_WFLino.bin 1.3 MB MU3. Pr0590614PT02
🔮 Profiles 🛛 🗸	1. "fw_title"
OTA updates	2. "fw_version"
🔚 Entity Views	4. "fw_checksum"
Edge instances	
Edge management 🗸 🗸	
😭 Widgets Library	ttems per page: 10
Dashboards	

Device is able to subscribe to shared attribute update using MQTT API.

Update states reported by the device

The remaining states are reported by the device firmware that is currently processing the update. We have prepared description of those states and sample applications for the most popular protocols written in python. Sample applications simulate behavior of the device firmware and may used as a reference for the implementation.

- DOWNLOADING notification about new firmware update was received and device started downloading the update package.
- DOWNLOADED device completed downloading of the update package.
- VERIFIED device verified the checksum of the downloaded package.
- UPDATING device started the firmware update. Typically is sent before reboot of the device or restart of the service.
- UPDATED the firmware was successfully updated to the next version.
- FAILED checksum wasn't verified, or the device failed to update. See "Device failed" tab on the Firmware dashboard for more details.
- Once the firmware is updated, ThingsBoard expect the device to send the following telemetry:

for firmware:

If the firmware update failed, ThingsBoard expect the device to send the following telemetry:

for firmware:

```
{"fw_state": "FAILED", "fw_error": "the human readable message about the cause of the.

→error"}
```

Firmware of the device is updated. To see its status, you should go to the firmware dashboard as it shows in the following paragraph.

To find out about the firmware update, you need to make a request and subscribe to attributes.

2.2.7 Configuration

Queue processing pace

To set the max number of devices that will be notified in the chosen time period using the following configuration properties:

```
export TB_QUEUE_CORE_FW_PACK_INTERVAL_MS=60000
export TB_QUEUE_CORE_FW_PACK_SIZE=100
```

Max size setting

By default, the maximum size of firmware that we can save in database is 2 gb. It can not be configured.

2.3 Working with IoT Dashboards

Reprinted articles: https://thingsboard.io/docs/user-guide/dashboards/

ThingsBoard allows you to configure customizable IoT dashboards. Each IoT Dashboard may contain multiple dashboard widgets that visualize data from multiple IoT devices. Once IoT Dashboard is created, you may assign it to one of the customers of you IoT project.

IoT Dashboards are light-weight and you may have millions of dashboards. For example, you may automatically create a dashboard for each new customer based on data from registered customer IoT devices. Or you may modify dashboard via script when a new device is assigned to a customer. All these actions may be done manually or automated via REST API.

You can find useful links to get started below:

Dashboards

ThingsBoard provides the ability to create and manage dashboards. Each dashboard can contain plenty of widgets. Dashboards display data from many entities: devices, assets, etc. Dashboards can be assigned to Customers.

• Widgets Library

All IoT Dashboards are constructed using ThingsBoard widgets defined in the Widget Library. Each widget provides end-user functionality such as data visualization, remote device control, alarm management and display of static custom HTML content.

- Digital and analog gauges for latest real-time values visualization
- Highly customizable Bar and Line charts for visualization of historical and sliding-window data points

- Map widgets for tracking movement and latest positions of IoT devices on Google or OpenStreet maps.
- GPIO control widgets that allow sending GPIO toggle commands to devices.
- **Card** widgets to enhance your dashboards with flexible HTML labels based on static content or latest telemetry values from IoT devices.

2.3.1 How to customize

- In Avantec Widgets & Avantec Dashboards:
 - Change widget title, background, colors, fonts, shadows, etc
 - Add or remove widget
 - Modify dashboard states, aliases and widget actions
 - Visualizing assets data using Maps and Tables
- · Create new Widgets
- Create your Dashboards

2.3.2 Next steps

ThingsBoard Data visualization

- Visualizing assets data using Maps and Tables : Learn how to: create assets and devices and define their relationships; add the server attributes and create a new dashboard; visualize data from the asset attributes using "Entities Table" and "Map" widgets.
- Dashboard states, aliases and widget actions : Learn how to: add and configure new dashboard states; create various aliases; visualize the attributes data using the Image Map widget; create actions in different widgets in order to navigate between states; visualize the telemetry data using Analogue and Digital gauges and the Time-series widget.
- Remote device control and alarm management : Learn how to: add and use the Knob Control widget; create alarm rules; handle alarms using the Alarms widget; make a dashboard public.
- Basic widget settings : Learn how to: change widget title, background, colors, fonts, shadows, etc.
- Latest Values Map widget : Learn how to create Map widget, based on latitude and longitude, and customize the Map widget layout and properties.
- Time Series Map widget : Learn how to display your devices with the latest telemetry data on the Time Series Map widget and modify the widget properties.
- Trip Animation widget : Learn how to display your devices with the latest telemetry data on the Trip Animation widget and modify the widget properties.

• ThingsBoard Contribution and Development

- Widgets Development Guide : Learn how to customize and create custom widgets.

2.4 Getting Started with Rule Engine

2.4.1 What is ThingsBoard Rule Engine?

Rule Engine is an easy to use framework for building event-based workflows. There are 3 main components:

- **Message** any incoming event. It can be an incoming data from devices, device life-cycle event, REST API event, RPC request, etc.
- **Rule Node** a function that is executed on an incoming message. There are many different Node types that can filter, transform or execute some action on incoming Message.
- **Rule Chain** nodes are connected with each other with relations, so the outbound message from rule node is sent to next connected rule nodes.

2.4.2 Typical Use Cases

ThingsBoard Rule Engine is a highly customizable framework for complex event processing. Here are some common use cases that one can configure via ThingsBoard Rule Chains:

- Data validation and modification for incoming telemetry or attributes before saving to the database.
- Copy telemetry or attributes from devices to related assets so you can aggregate telemetry. For example data from multiple devices can be aggregated in related Asset.
- Create/Update/Clear alarms based on defined conditions.
- Trigger actions based on device life-cycle events. For example, create alerts if Device is Online/Offline.
- Load additional data required for processing. For example, load temperature threshold value for a device that is defined in Device's Customer or Tenant attribute.
- Trigger REST API calls to external systems.
- Send emails when complex event occurs and use attributes of other entities inside Email Template.
- Take into account User preferences during event processing.
- Make RPC calls based on defined condition.
- Integrate with external pipelines like Kafka, Spark, AWS services, etc.

See Getting Started with Rule Engine.

2.5 White-labeling

Tip: ThingsBoard PE Feature

Only Professional Edition supports White-labeling feature. Use ThingsBoard Cloud or install your own platform instance.

2.5.1 Feature

ThingsBoard web interface allows you to configure your company or product logo and color scheme in 2 minutes with zero coding efforts and no service restart required. The following configuration options are available:

- Configure color scheme, icon and favicon on System Administrator level;
- Tenant and Customer Administrator UI inherits configuration changes by default;
- Tenant and Customer Administrators are able to set up their own white-labeling configuration;
- System and Tenant Administrator are able to set up custom email server settings and customer email templates to interact with the users;
- Allow System administrator to enable/disable white-labeling for each tenant;
- Allow Tenant administrator to enable/disable white-labeling for each customer;
- Allow Tenant administrator to configure custom translation of system components and end-user dashboard elements.

See White-labeling.

2.5.2 Next steps

- Self-registration allows tenant to configure sign-up page for its customers to be able to simply sign-up and login to the ThingsBoard with predefined permission configurations.
- Custom Translation allows you to upload alternative to existing language translations and extend the translation to specific GUI elements on the dashboards.
- Custom Menu allows you to extend ThingsBoard UI with custom menu items and show/hide existing menu items.

2.6 Installation options

ThingsBoard is designed to run and utilize on majority of hardware, from local Raspberry PI to powerful servers in the cloud

- The alternative option is to install ThingsBoard using Installation Guide.
- Windows users should follow this guide.

2.7 Mobile application

2.7.1 ThingsBoard mobile application

The ThingsBoard Mobile Application is an open-source mobile application project based on Flutter. It allows you to build your own IoT mobile application with minimum coding efforts.

This documentation can help you set up and run your first IoT mobile app, learn how to customize the app and publish it to Google Play or App Store.

- Getting started with mobile application Learn how to setup and run your first IoT mobile app.
- Customize your app with mobile application Learn how to customize your app without code changes.

• Publish your app with mobile application - Learn how to publish your app to Google Play or App Store.

2.7.2 ThingsBoard PE mobile application

The ThingsBoard **PE** Mobile Application is an open-source PE mobile application project based on Flutter. It allows you to build your own IoT mobile application with minimum coding efforts.

This documentation can help you set up and run your first IoT mobile app, learn how to customize the app and publish it to Google Play or App Store.

- Getting started with PE mobile application Learn how to setup and run your first IoT mobile app.
- Customize your app with PE mobile application Learn how to customize your app without code changes.
- Publish your app with PE mobile application Learn how to publish your app to Google Play or App Store.

2.8 ThingsBoard MQTT Device API

2.8.1 Introduction

See ThingsBoard API reference.

ThingsBoard API consists of two main parts: Device API and Server-side API.

- Server-side API is available as REST API and Websocket API:
 - REST API:
 - * Administration REST API The server-side core APIs.
 - * Attributes query API The server-side APIs provided by Telemetry Service.
 - * Time-series query API The server-side APIs provided by Telemetry Service.
 - * RPC API The server-side APIs provided by RPC Service.
 - * REST Client
 - Websocket API:
 - * Websocket API duplicates REST API functionality and provides the ability to subscribe to device data changes.
- Device API is grouped by supported communication protocols:
 - MQTT Device API
 - CoAP Device API (Not supported!)
 - HTTP Device API (Not supported!)

2.8.2 Getting started

See MQTT Device API Reference.

MQTT basics

MQTT is a lightweight publish-subscribe messaging protocol which probably makes it the most suitable for various IoT devices. You can find more information about MQTT here.

ThingsBoard server nodes act as an MQTT Broker that supports QoS levels 0 (at most once) and 1 (at least once) and a set of predefined topics.

Client libraries setup

You can find a large number of MQTT client libraries on the web. Examples in this article will be based on Mosquitto and MQTT.js. In order to setup one of those tools, you can use instructions in our Hello World guide.

MQTT Connect

We will use access token device credentials in this article and they will be referred to later as **\$ACCESS_TOKEN**. The application needs to send MQTT CONNECT message with username that contains **\$ACCESS_TOKEN**. Possible return codes and their reasons during connect sequence:

- 0x00 Connected Successfully connected to ThingsBoard MQTT server.
- 0x04 Connection Refused, bad user name or password Username is empty.
- 0x05 Connection Refused, not authorized Username contains invalid \$ACCESS_TOKEN.

2.8.3 Key-value format

By default, ThingsBoard supports key-value content in **JSON**. Key is always a string, while value can be either string, boolean, double, long or JSON. For example:

```
{
    "stringKey":"value1",
    "booleanKey":true,
    "doubleKey":42.0,
    "longKey":73,
    "jsonKey": {
        "someNumber": 42,
        "someArray": [1,2,3],
        "someNestedObject": {"key": "value"}
    }
}
```

2.8.4 Telemetry upload API

In order to publish telemetry data to ThingsBoard server node, send PUBLISH message to the following topic:

v1/devices/me/telemetry

The simplest supported data formats are:

{"key1":"value1", "key2":"value2"}

or

[{**"key1"**:"value1"}, {**"key2"**:"value2"}]

Please note that in this case, the server-side timestamp will be assigned to uploaded data!

In case your device is able to get the client-side timestamp, you can use following format:

{"ts":1451649600512, "values":{"key1":"value1", "key2":"value2"}}

In the example above, we assume that "1451649600512" is a unix timestamp with milliseconds precision. For example, the value "1451649600512" corresponds to "Fri, 01 Jan 2016 12:00:00.512 GMT"

Example

Client library Shell file		JSON file		
Mosquitto	mosquitto-telemetry.sh	telemetry-data-as-object.jsontelemetry-data-as-array.json		
MQTT.js	mqtt-js-telemetry.sh	• telemetry-data-with-ts.json		

mosquitto-telemetry.sh

mqtt-js-telemetry.sh

telemetry-data-as-object.json

```
{
    "stringKey": "value1",
    "booleanKey": true,
    "doubleKey": 42.0,
    "longKey": 73,
    "jsonKey": {
        "someNumber": 42,
        "someArray": [1,2,3],
        "someNestedObject": {"key": "value"}
    }
}
```

telemetry-data-as-array.json

[{"key1":"value1"}, {"key2":true}]

telemetry-data-with-ts.json

```
{
    "ts": 1451649600512,
    "values": {
        "stringKey": "value1",
        "booleanKey": true,
        "doubleKey": 42.0,
        "longKey": 73,
        "jsonKey": {
            "someNumber": 42,
            "someArray": [1, 2, 3],
            "someNestedObject": {
            "key": "value"
            }
      }
}
```

(continues on next page)

(continued from previous page)

2.8.5 Attributes API

} }

ThingsBoard attributes API allows devices to

- Request client-side and shared device attributes from the server.
- Upload client-side device attributes to the server.
- Subscribe to shared device attributes from the server.

Request attribute values from the server

Before sending PUBLISH message with the attributes request, client need to subscribe to:

v1/devices/me/attributes/response/+

Once subscribed, the client may request client-side or shared device attributes to ThingsBoard server node, send **PUB-LISH** message to the following topic:

v1/devices/me/attributes/request/\$request_id

where **\$request_id** is your integer request identifier.

The client should receive the response to the following topic:

```
v1/devices/me/attributes/response/$request_id
```

Example

The following example is written in javascript and is based on mqtt.js. Pure command-line examples are not available because subscribe and publish need to happen in the same mqtt session.

Client library Shell file		JavaScript file	Result (JSON file)	
MQTT.js	mqtt-js-attributes-request.sh	mqtt-js-attributes-request.js	attributes-response.json	

mqtt-js-attributes-request.sh

```
export TOKEN=$ACCESS_TOKEN
node mqtt-js-attributes-request.js
```

mqtt-js-attributes-request.js

attributes-response.json

{**"key1"**:"value1"}

Please note, the intersection of client-side and shared device attribute keys is a **bad** practice! However, it is still possible to have same keys for client, shared or even server-side attributes.

Publish attribute update to the server

In order to publish client-side device attributes to ThingsBoard server node, send **PUBLISH** message to the following topic:

v1/devices/me/attributes

Example

Client library	Shell file	JSON file
Mosquitto	mosquitto-attributes-publish.sh	new-attributes-values.json
MQTT.js	mqtt-js-attributes-publish.sh	

mosquitto-attributes-publish.sh

```
# Publish client-side attributes update
mosquitto_pub -d -h "127.0.0.1" -t "v1/devices/me/attributes" -u "$ACCESS_TOKEN" -f "new-
→attributes-values.json"
```

mqtt-js-attributes-publish.sh

new-attributes-values.json

```
{
    "stringKey": "value1",
    "booleanKey": true,
    "doubleKey": 42.0,
    "longKey": 73,
    "jsonKey": {
        "someNumber": 42,
        "someArray": [1,2,3],
        "someNestedObject": {"key": "value"}
    }
}
```

Subscribe to attribute updates from the server

In order to subscribe to shared device attribute changes, send SUBSCRIBE message to the following topic:

v1/devices/me/attributes

When a shared attribute is changed by one of the server-side components (such as the REST API or the Rule Chain), the client will **receive** the following update:

{**"key1":**"value1"}

Example

Client library	Shell file	
Mosquitto	mosquitto-attributes-subscribe.sh	
MQTT.js	mqtt- js - $attributes$ - $subscribe.sh$	

mosquitto-attributes-subscribe.sh

```
# Subscribes to attribute updates
mosquitto_sub -d -h "127.0.0.1" -t "v1/devices/me/attributes" -u "$ACCESS_TOKEN"
```

mqtt-js-attributes-subscribe.sh

```
# Subscribes to attribute updates
mqtt sub -v "127.0.0.1" -t "v1/devices/me/attributes" -u '$ACCESS_TOKEN'
```

2.8.6 PRC API

Server-side RPC

In order to subscribe to RPC commands from the server, send SUBSCRIBE message to the following topic:

```
v1/devices/me/rpc/request/+
```

Once subscribed, the client will receive individual commands as a **PUBLISH** message to the corresponding topic:

v1/devices/me/rpc/request/\$request_id

where **\$request_id** is an integer request identifier.

The client should publish the response to the following topic:

```
v1/devices/me/rpc/response/$request_id
```

Example

The following example is written in javascript and is based on mqtt.js. Pure command-line examples are not available because subscribe and publish need to happen in the same mqtt session.

Client library Shell file		JavaScript file		
MQTT.js	mqtt-js-rpc-from-server.sh	mqtt-js-rpc-from-server.js		

mqtt-js-rpc-from-server.sh

```
export TOKEN=$ACCESS_TOKEN
node mqtt-js-rpc-from-server.js
```

mqtt-js-rpc-from-server.js

```
var mqtt = require('mqtt');
var client = mqtt.connect('mqtt://127.0.0.1',{
    username: process.env.TOKEN
});
client.on('connect', function () {
    console.log('connected');
    client.subscribe('v1/devices/me/rpc/request/+')
});
client.on('message', function (topic, message) {
    console.log('request.topic: ' + topic);
    console.log('request.topic: ' + topic);
    console.log('request.body: ' + message.toString());
    var requestId = topic.slice('v1/devices/me/rpc/request/'.length);
    //client acts as an echo service
    client.publish('v1/devices/me/rpc/response/' + requestId, message);
});
```

Client-side RPC

In order to subscribe to client-side RPC response from the server, send SUBSCRIBE message to the following topic:

v1/devices/me/rpc/response/+

Once subscribed, the client may send **PUBLISH** message to the following topic:

v1/devices/me/rpc/request/\$request_id

where **\$request_id** is an integer request identifier. The response from server will be published to the following topic:

```
v1/devices/me/rpc/response/$request_id
```

Example

The following example is written in javascript and is based on mqtt.js. Pure command-line examples are not available because subscribe and publish need to happen in the same mqtt session.

Client library	Shell file	JavaScript file
MQTT.js	mqtt-js-rpc-from-client.sh	mqtt-js-rpc-from-client.js

mqtt-js-rpc-from-client.sh

```
export TOKEN=$ACCESS_TOKEN
node mqtt-js-rpc-from-client.js
```

mqtt-js-rpc-from-client.js

```
var mqtt = require('mqtt');
var client = mqtt.connect('mqtt://127.0.0.1', {
   username: process.env.TOKEN
});
client.on('connect', function () {
   console.log('connected');
   client.subscribe('v1/devices/me/rpc/response/+');
  var requestId = 1;
  var request = {
      "method": "getTime",
      "params": {}
  };
  client.publish('v1/devices/me/rpc/request/' + requestId, JSON.stringify(request));
});
client.on('message', function (topic, message) {
   console.log('response.topic: ' + topic);
   console.log('response.body: ' + message.toString());
});
```

2.8.7 Claiming API

Please see the corresponding article to get more information about the Claiming devices feature.

In order to initiate claiming device, send PUBLISH message to the following topic:

v1/devices/me/claim

The supported data format is:

{"secretKey":"value", "durationMs":60000}

Please note that the above fields are optional. In case the **secretKey** is not specified, the empty string as a default value is used. In case the **durationMs** is not specified, the system parameter **device.claim.duration** is used (in the file **/etc/thingsboard/conf/thingsboard.yml**).

2.8.8 Firmware API

Replace 8192 with your chunk size.

When ThingsBoard initiates an MQTT device firmware update, it sets the fw_title, fw_version, fw_checksum, fw_checksum_algorithm shared attributes. To receive the shared attribute updates, the device has to subscribe to:

v1/devices/me/attributes/response/+

Where

+ is the Wildcard character.

When the MQTT device receives updates for fw_title and fw_version shared attributes, it has to send PUBLISH message to:

v2/fw/request/\${requestId}/chunk/\${chunkIndex}

Where

\${requestId} - number corresponding to the number of firmware updates. The **\$**{requestId} has to be different for each firmware update.

\${chunkIndex} - number corresponding to the index of firmware chunks. The **\${chunkID}** are counted from 0. The device must increment the chunk index for each request until the received chunk size is zero. And the MQTT payload should be the size of the firmware chunk in bytes.

For each new firmware update, you need to change the request ID and subscribe to:

v2/fw/response/+/chunk/+

Where

+ is the Wildcard character.

2.8.9 Device MQTT Topic

Function To	opic	Subscribe	Тх	Rx
Telemetry			v1/devices/me/telemetry	
Request tributes	at-	v1/devices/me/attributes	v1/devices/me/attributes/request/	v1/devices/me/attributes/response/
Publish tributes	at-		v1/devices/me/attributes	
Subscribe tributes upd	at- ate	v1/devices/me/attributes		v1/devices/me/attributes
Server-Side	RPC	v1/devices/me/rpc/reque	v1/devices/me/rpc/response/\${re	v1/devices/me/rpc/request/\${reque
Client-Side	RPC	v1/devices/me/rpc/respo	v1/devices/me/rpc/request/\${requ	v1/devices/me/rpc/response/\${req
Claiming de	evice		v1/devices/me/claim	
Firmware dates*	up-	v2/fw/response/+/chunk	v2/fw/request/\${requestId}/chun	v2/fw/response/\${requestId}/chun

Table 2: Device MQTT Topic

Note:

- The order in which topics are performed.
- Firmware updates needs the support of *Telemetry*, *Request attributes* and *Subscribe attributes update*.

CHAPTER

THREE

AVANTEC EXTENSION

Here is an overview about Avantec Customization.

- Demo Dashboards
- Avantec Widgets

3.1 Avantec widgets

3.1.1 Widget list

Entities cards

Latest values widget.

Entities Cards	🗆 🌶 🛨 🗙
function1! This is	function2
a testing of title!	Sin
Sin: 581.0	581.0
Random: -740.94	Cos. This a a testing of
Duplicate random:	data label!
-740.94	-814, false •c

Configuration:

- 1. Add all datasources and data keys in Data page.
- 2. Add some card templates in Advanced page. A card template per entity alias used in the datasources.
 - Alias Name: Entity alias name.
 - Card HTML pattern: HTML template. You can use \${dsName}, \${entityName}, \${entityLabel}, \${aliasName}, \${entityDescription}, or \${your_datakey_label} in it.

- Card style function: f(datasource, ctx): CSS.
- 3. Optionally, configure some data keys used in **Card HTML pattern**: Data page -> Pen icon -> Advanced page.
 - Cell content function: f(value, datasource, ctx): text or HTML
 - Cell style function: f(value, datasource, ctx): CSS.
- 4. Add some action in Action page. A action of element click per entity alias used in the datasources.
 - Action source: On HTML element click
 - Name: Entity alias name.
- 5. Optionally, if you want to hide the border of the widget, you should do this in Settings page:
 - Disable Display widget title.
 - Background color of the widget should be the same as background color of Dashboard.

RPC button with params & response

Control widget.

For Server-side RPC.

RTC button with params & response	::	/	ŧ	×
RPC param label *				_
Send RPC Command				
RPC command response				7

Segmented switch of boolean value

Segment switch of boolean value	✓ ± ×
Target device is not set! True label	
False label	

Segmented switch of string value

Control widget.

Segmented switch of string value	✓ ± ×
Target device is not set! Option1 Label	
Option2 Label	

Select double value from flexible options

Control widget.

Deprecated!

Select double value from flexiable options	✓ ± ×
Target device is not set!	
~	

Select double value from flexible options (New)

Select double value from flexiable option (New)	:3	/	ŧ	×
Target device is not set!				

Select double value from flexible options with pattern key

Control widget.

Some parameters of this widget can be appended with a suffix for programming time.

Select double value from flexiable option with pattern	::	/	ŧ	×
кеу				
Target device is not set!				
~				

Select time zone value

Control widget.

Select timezone value		1	ŧ	×
	Target device is not set!			
	~			

Setting list

Setting list		□ 🖌 ± ×
📅 Date	Target device is not set!	>
Ō Time		>

Simple Attributes Card

Latest values widget.

This widget can display the attributes of devices.

ample Attribute	s card	53	±	>
Random	-93.09			
Cos	243.00			
Sin	970.00			

Simple state params card

Control widget.

This widget can display the state parameters of the Dashboard.

Simple state params card		::	/	Ŧ	×
	State param				
	-				

Styled button of string value

Styled button of string value	1	ŧ	×
Target device is not set!			
Off state label			

Styled button of string value with pattern key

Control widget.

Styled button of string value with pattern key	✓ ± ×
Off state label	

Buttons navigation bar

Control widget.

Buttons navigatio	n bar	
	BBBB	CCCC
		•

Tabs navigation bar

Control widget.

Tabs navigation bar		0 🖌 🛨 🗡
₩ First	Second	🎝 Third

Update shared string attribute with segmented switch

Latest values widget.



Update time value

Control widget.

Update time value	✓ ± ×
]	<u>o</u> X</td

Update time value with pattern key

Control widget.

Some parameters of this widget can be appended with a suffix for programming time.

	Update time value with pattern key
	:- <u>o</u> ~ ×
l	

3.1.2 Import Avantec Widgets

Tip: Avantec_widgets.json can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step or Update Avantec Widgets.

- Download avantec_widgets.json.
- Widgets Library -> + -> Import widgets bundle -> Popup dialog: Import widgets bundle -> Drag and drop avantec_widgets.json -> Import.

🎉 ThingsBoard		😭 Widgets Bundles				B	, Tenant a	idminis	trator
E Assets	^	Widgets Bundles					2		
[₀] Devices		Thageto Bullaleo			_		- L		
🖆 Profiles 🛛 🗸		Created time	Import widgets bundle	×		System			
OTA updates		2022-11-18 00:02:40	3				±		
Entity Views			Widgets bundle file *]		_		-	
🛁 Edge instances		2022-11-18 00:02:40					*		
👚 Edge management 🛛 🗸		2022-11-18 00:02:40	Drag and drop a JSON file or Browse file	×			<u>+</u>	1	
Widgets Library 1		2022-11-18 00:02:40	avantec_widgets.json				Ŧ	/	1
Dashboards		2022-11-18 00:02:42			1		+		
Version control			Cancel 4	Import			<u> </u>	-	
🕘 Audit Logs		2022-11-18 00:02:42	Date				±	/	Î
ıl. Api Usage		2022-11-18 00:02:41	Digital gauges				Ŧ	1	T
🔅 System Settings 🗸 🗸					Items per page: 10 👻	1 - 10 of 14	1<	< :	>>

• Widgets Library -> click Avantec widgets

🎉 ThingsBoard		🚼 Widgets Bundles	B	Tenant ac	Iministi	rator
Lustomers	*					
Assets		Widgets Bundles		+	С	Q
Devices		☐ Created time Title ↑	System			^
Profiles 🗸						- 8
🔅 OTA updates			\checkmark	<u>+</u>		Î
🔚 Entity Views		6 aliak	\checkmark	<u>+</u>		
Edge instances		2023-01-04 16:48:00 Avantec widgets		ŧ		
🙊 Edge management 🛛 🗸			-			-
🕂 Widgets Library 5				*		- 8
Dashboards			\checkmark	<u>+</u>		
Version control		dell'estate internationale	\checkmark	<u>+</u>		Î
🕑 Audit Logs		2	~	Ŧ		
ılı Api Usage			_		-	-
🔅 System Settings 🗸 🗸		Items per page: 10 👻 1 -	• 10 of 15	< <	>	>

• All Avantec widgets

🎉 ThingsBoard	😫 Widgets Bundles ゝ 📑 Avantec widg	ets	: C Tenant administrator
Customers	Update time value with pattern key 🖍 🛓 🗙	Update time value	Segment switch of boolean value 🖌 🛓 🗙 Target dévice îs not set!
🛱 Profiles 🗸 🗸	Select double value from :: > ± × flexiable option with pattern key Target device is not set!	Tabs navigation bar ∷ ✓ ± × ∰ First Second	Segmented switch of string value 🖌 🛨 🗙
📑 Entity Views	Setting list Target device is not set! Date	Simple state params card :: 🖍 生 × State param	Styled button of string value
Edge management Widgets Library Dashboards	Ō Time Select double value from flexiable option (New) :: ✓ ± ×	RTC button with params & 🛛 🖍 🛨 🗙 response	Simple Attributes Card :: / ± × Random -49.40
Version control Audit Logs	Target device is not set! Select timezone value	RPC param label * Send RPC Command	
ıl. Api Usage ✿ System Settings ✔	Target device is not set!	Select double value from flexiable 💉 🛨 🗙 options Target device is not set!	•

3.1.3 Update Avantec Widgets

• First, Delete Avantec Widgets: Widgets Library -> Click in the row of *Avantec widgets* -> Popup dialog: Are you sure you want to delete ...? -> Yes.

🎉 ThingsBoard	Solution Widgets Bundles	다. e Tena dministrator :
Device profiles	Widgets Bundles	+ C Q
Entity Views Edge instances Edge management Vidgets Library	Are you sure you want to delete the widgets bundle 'Avantec widgets'? Be careful, after the confirmation the widgets bundle and all related data will become unrecoverable. No 3 Yes	System
 Dashboards Audit Logs Api Usage 	2022-04-06 11:01:42 Avantec widgets 2022-04-06 10:21:00 Carde Items per page: 10	□ # ² ■ • • • = • 1-10of15 < < > >

• Next, Import Avantec Widgets.

3.2 Demo Dashboards

3.2.1 TA652FC-W

- TA652FC-W Thermostat List device list.
- TA652FC-W Thermostat (For Mobile App) device detail.

3.2.2 TA652FH-W

- TA652FH-W Thermostat List device list.
- TA652FH-W Thermostat (For Mobile App) device detail.
- Office center TA652FH-W Thermostats multiple TA652FH-W thermostats in an office center.

3.2.3 TA692FC-L-5

- TA692FC-L-5 Thermostat List device list.
- TA692FC-L-5 Thermostat (For Mobile App) device detail.

3.2.4 Other Dashboards

- Thermostats All Avantec Thermostas.
 - After import it, Entit aliases must be updated!
 - After import it, some action's targe dashboard must be update in Thermostats Cards a widget of Entities Cards!

TODO:...

• Firmware - firmware update.

Some versions of ThingsBoard have already installed this Dashboard, which can be used without importing. See here.

• Manage device claiming - ...

TODO:...

• Claiming - ...

TODO:...

CHAPTER

TA652FC-W WI-FI THERMOSTAT

These references will help you learn more about TA652FC-W Wi-Fi Thermostat, operate it, and even realize your personalized Dashboard.

- Specification
- Add to ThingsBoard | Connect to ThingsBoard | Demo Dashboards
- MQTT Device API

4.1 TA652FC-W – 2 pipe Fan Coil Wi-Fi Thermostat

Caution:

- 1. Turn off all electrical devices (e.g. heater, cooler) that are connected to the unit before installation and maintenance.
- 2. The installer must be a trained service personnel.
- 3. Disconnect the power supply before maintenance.
- 4. It must be mounted on a dry clean indoor place.
- 5. Do not expose this unit to moisture.
- 6. Do not expose this unit to dipping or splashing.

4.1.1 Introduction

TA652FC-W is a controller that controls fan coil system to maintain room temperature at a desired level.

Changeover sensor is required to install when auto changeover is used.

4.1.2 Feature List

- Voltage supply: 230Vac
- Temperature display in $^\circ C$ or $^\circ F$
- Temperature measurable range : 0 50 °C
- 2-pipe system
- Manual changeover or Auto changeover can be selected
- Selection of Heat/Cool
- 7days/5+1+1days, 1day program, no program.
- EEPROM stores all settings
- Adjustable control span

4.1.3 Wiring

NOTE: Power supply of TA652FC-W is 230Vac.

Terminals	Device
L	230Vac Live
Ν	230Vac Neutral
Qv	Changeover valve
Q1	Fan Low
Q2	Fan Med
Q3	Fan High
T1	Floor Sensor
T2	Floor Sensor

Pull all cables back into the wall beforehand to avoid trapping of wires. Do not use any metal conduits or cables provided with metal sheaths.

Recommend adding fuse or protective device in the live circuit.





4.1.4 Mounting





- 1. Wiring the terminals.
- 2. Put into junction box.
- 3. Mount the bottom plate of LCD board into junction box.
- 4. Connect the wire to the LCD board.
- 5. Assemble the Top and bottom plate of LCD Board.

4.1.5 Dimension in mm:





4.1.6 LCD Interface

LCD Indication



sn item

- 1 Time
- 2 Room Temperature
- 3 Current Set Point
- 4 Temperature Unit
- 5 Current Program
- 6 Heat / Cool Mode
- 7 Auto Changeover
- 8 Output is On (when appear)
- 9 Fan Low/Med/High/Auto
- 10 Wi-Fi (appear when connected to router)
- 11 Mode Key: Press to **internal setting 1**. Long hold to **internal setting 2**.
- 12 Clock Key: Press to set clock. Hold to Program the Schedule
- 13 Short Press: Fan Key, Long Hold: On/Off Key
- 14 Up/Down key: Adjust Set point or Value of setting.
- 15 Blank: the area outside of the previous five keys

Turn On/Off the thermostat

Hold **I** to turn On / Off the thermostat. When the thermostat is Off. No Output will be activated.

Clock setting

Normally the clock is automatically set once Wi-Fi is connected and synchronize for each day. So manual set is not necessary when it is online.

- Press to start the setting
 Press / I to change the day of week
 Press again to confirm day of week setting and start to adjust hour
 Press / I to change the hour
- Press 🕒 again to confirm hour setting and start to adjust minutes
- Press / / to change the minutes
- Press again to confirm minutes setting and start to adjust day of week
- Press [blank] to confirm or leave the clock setting. Or return after no key pressed for 20 seconds.

Clock synchronization

When Wi-Fi is connected and time synchronization is need. Please use the App for time synchronization.

Schedule Programming

When 1 day / 5+1+1 day / 7day program is selected in internal setting.

- Hold to start the setting.
- Press / / to adjust the day of week
- Press 🕑 to confirm.
- Press / / V to adjust the time of schedule
- Press 🕑 to confirm.
- Press / V to adjust the setpoint
- Press 🕒 to confirm.

• Press [blank] to confirm return.

Override Temperature

The Set point can be adjusted by \mathbf{D} / \mathbf{D} .

When it is in program mode, the set point will be overwritten until the next time slot.

can be pressed to release the override status.

Internal parameter setting 1

• Operation:

- Press key to start the setting



- Press [blank] to confirm and move to next setting

ID	Items	Value	Default Value
P00	User Interface Screen Saver	0-3	0
P01	Screen Saver Count down	0-120	20
P02	Display unit	°C / °F	°C
P03	Time Display unit	12/24	12
P04	Temperature Offset	-5°C - 5°C, -10°F-10°F	0°C
P05	Switching Differential Heat	2 - 4°C, 4 - 8°F	2°C
P06	Switching Differential Cool	2 - 4°C, 4 - 8°F	2°C
P07	Program mode	No program (0) / 1day program (1) / 5+1+1 program (2) / 7day program (3)	3
P12	Force Ventilation	Disable, Enable	Disable
P13	Changeover Mode	Heat, Cool, Auto	Heat
P14	Changeover temperature Heat	27 - 40°C	27°C
P15	Changeover temperature Cool	10-25°C	10°C

• User Interface Screen Saver:

The thermostat will go to screen saver mode after no key for certain period.

- Mode 0: Nothing will be displayed in screen saver mode.
- Mode 1: Only room temperature will be displayed in screen saver mode.

- Mode 2: Room temperature and Time will be displayed in screen saver mode.
- Mode 3: Display all in screen saver mode.
- Screen Saver Count Down:

The count down time (in seconds) to screen saver mode.

• Display Unit:

Temperature unit in Celsius or Fahrenheit.

• Time Display Unit:

12/24.

• Temperature offset:

The temperature of internal sensor can be calibrated from $-5^{\circ}C - +5^{\circ}C$ in case there is temperature difference between actual value and thermostat.

• Switching Differential:

The difference between switching the heating or controller on and off



- Program Mode:
 - 0: No Program Mode, the thermostat control the temperature simply according to single setpoint.
 - 1: 1 day program, the thermostat control the temperature according to single schedule.
 - 2: **5+1+1 day** program, the thermostat control the temperature according to 5 +1+1 schedule (Mon to Fri, Sat, Sun).
 - 3: 7 days program, the thermostat control the temperature according to 7day program (individual program for each day).
- Forced Ventilation:
 - **Disable**: Fan will turn on only when heat/cool is on.
 - Enable: Fan keeps on (low) even heat / cool is off.
- Changeover mode:
 - 0: Heat mode
- 1: Cool mode
- 2: Auto Changeover: When changeover sensor detect the temperature above changeover heat set point. Heat mode will be activated.

When changeover sensor detect the temperature below changeover cool set point. Cool mode will be activated.

- Changeover heating setpoint: Parameter for Auto Changeover mode.
- Changeover cooling setpoint: Parameter for Auto Changeover mode.

Internal parameter setting 2

• Operation:

– Hold wey to start the setting

- Press / To adjust the value
- Press [blank] to confirm and move to next setting

ID	Items	Value	Default Value
P19	Clear Wi-Fi Configuration	Yes or No	No
P20	Clear Parameter setting (restore default)	Yes or No	No

• Clear Wi-Fi Configuration:

When set to yes, the SSID and Password stored in the thermostat will be cleared so another SSID and Password can be set again.

• Clear Parameter setting:

When set to yes, all internal parameter setting will be restored to default value in next power on (reset)

Technical Data

Power supply:	195-250 Vac
Relay Contact Voltage:	230Vac Max. 50/60 Hz
Relay Contact Current:	2A Max. for each
Sensing Element:	103AT
Terminals:	2 sq. mm Cable
Operating Temperature:	32 - 122 °F / 0 - 50 °C
Storage Temperature:	23 - 122 °F / -5 - 50 °C
Operating Humidity:	5-95%RHnon-condensing

4.2 Add TA652FC-W to ThingsBoard

Tip:

- This section applies to the situation where you add TA652FC-W to ThingsBoard Server.
- If you are adding the first Avantec HVAC device to ThingsBoard Server, please refer to Get Started.

4.2.1 Step 1. Tenant Login

- Open ThingsBoard Web UI in browser, e.g. http://localhost:8080
- Tenant Administrator login ThingsBoard.

ThingsBoard 🖉	
Username (email) *	
tenant@thingsboard.org	
Password	\$
,	Forgot Password?
Login	

Tenant default username and password, refer to Some important parameters.

4.2.2 Step 2. Import Detail Dashboard of TA652FC-W

See Import TA652FC-W Detail Dashboard.

4.2.3 Step 3. Import List Dashboard of TA652FC-W

See Import TA652FC-W List Dashboard.

4.2.4 Step 4. Provision TA652FC-W device

Step 4.1 Add device

 Devices -> + -> Add new device -> Popup Dialog -> Input Name, Label & Description, select device profile -> Add.

🎉 ThingsBoar			<u> </u>	Tenant admi	
🔒 Home	Add new device		? ×	_	
	1 Device details	2 Credentials	Customer		device –
2 Customers	Name *	- optional			
Assets	TA652FC-W-TB		12		
[₀□ Devices 1	AVANTEC Headquaters 3				
Profiles	Device profile *				2
OTA updates	Select existing device profile TA652FC-W The	rmost × 4	12		, .
Entity Views					
Edge instances	C create new device profile				
🙊 Edge management	Is gateway		C		, 🔳
Widgets Library	A Thermostat for fan-coil		10) 💼
Dashboards					
Version control			Next: Credentials		
🕑 Audit Logs			Cancel 5 Add	IK K	> >
1. Api Usage					

Field	Value
Name*	My device name, e.g. TA652FC-W-TB, A8:48:FA:57:60:A4
Device profile*	TA652FC-W Thermostat
Label	My device label, e.g. AVANTEC Headquarters
Description	My device description, e.g. A Thermostat for fan-coil

Note: The field with * must be filled in.

• Now my device should be listed first, since the table sort devices using the time of the creation by default.

thingsBoard	Devices							8	9	enant ac	dministr	rator
🔒 Home	Device profile											
⟨··⟩ Rule chains	Devices All		×							+	· C	Q
Lustomers	Created time 🕹	Name	Device profile	Label	Customer	Public	ls ga					^
E Assets	2023-01-03 17:57:01	TA652FC-	TA652FC-W	AVANTEC	٦			• 6	P	4		
Devices		W-TB	Thermostat	Headquaters				•			V	- H
Profiles 🗸	2022-11-08 13:37:21	Charging Port 2	Charging port		Demo Customer		 <	. 0	Ê	•	•	î i
道: OTA updates	2022-11-08 13:37:21	Charging Port 1	Charging port		Demo Customer		 <	: 8	ê	•	•	÷
Entity Views	2022-11-08 13:37:20	Air Quality Sensor T1	Air Quality Sensor				 <	: 🖻	Ċ	*	•	1
	2022-11-08 13:37:20	Air Quality Sensor C1	Air Quality Sensor		Demo Customer		 <	: e	Ê	*	•	î
Widgets Library	2022-11-08 13:37:20	Sensor C1	Temperature Sensor		Demo Customer		 <	: 8	Ê	•	•	
Dashboards	2022-11-08 13:37:20	Sensor	Temperature					• 🖻	B			
Version control		T1	Sensor					•			V	
🕑 Audit Logs	4				Items per	nade: 10 -	, 1-	10 of 18		, ,		
ılı Api Usage					nems per	page. 10 •	-	10 01 10			. /	<u></u>

Step 4.2 Add shared attributes of new device

• **Devices** -> Click *my device* -> **Attributes** -> **Shared attributes** -> + -> **Popup Dialog** -> Input Key, Value type & value -> **Add**

لَّهُوَ ThingsBoard	GO Devices	다 😝 Tenant administrator ᠄
A Home		
⟨··⟩ Rule chains	Devices All X Device details	0 ×
Lustomers	Created time ↓ Name Device p Details 2 Attributes Latest telemetry	Alarma Events
Assets 2	click 4 select "shared	attributes"
Devices 1	Add attribute Y attributes	, <u>5</u> + ट ५
Profiles 🗸 🗸		ī –
OTA updates	□ 2022-11-08 13:37:2 6 Key *	Value
Entity Views	uploadFreq	
Edge instances	Value type Integer value * 123 Integer - 120	
👚 Edge management 🛛 🗸	2022-11-08 13:37:2	
Widgets Library	Cancel 7 Add	
Dashboards	No attributes found	
Version control	2022-11-08 13:37:20 T1 Sensor	

Please add the following Shared attributes of TA652FC-W:

Key*	Value Type*	Value*	Memo			
uploadFreq	Integer	300	5*60. Telemetry per uploadFreq seconds			
uploadThresh- old	Double	1.5	1.5°C. If the temprature (Telemetry data) change exceeds it, up- load immediately!			
syncTimeFreq	Integer	86400	24*3600. Sync time per syncTimeFreq seconds			
timezone	Integer	480	Please replace with your value . The time offset from UTC, minutes. For example Hongkong is UTC+8:00 time zone, this offset is 480 minutes (8*60)			
timeNTPServer	String	pool.ntp.org	SNTP Server URL, e.g. pool.ntp.org, 0.pool.ntp.org, 1.pool.ntp.org, uk.pool.ntp.org, hk.pool.ntp.org, time.nist.gov,			

Table 1:	Add	shared	attributes	of	TA652FC-W
10010 11	1 1000	0110100		~	11100 -1 0 11

Note: The field with * must be filled in.

• Now the shared attributes of my device is like:

👸 ThingsBoard	Let Devices	C C Tenant administrator
☆ Home	Device profile TA652EC-W-TB	
	Devices All × Device details	? ×
📇 Customers	Created time 🦊 Name Device p	
Assets	C Details Attributes Latest telemetry	Alarms Events Receivor >
Devices	2023-01-03 17:57:01 W-TB Therms Entity attributes scope	+ C Q
🖆 Profiles 🗸 🗸	2022-11-08 13:37-21 Charging Port 2 Chargin Port 2 Chargin Port 2	<u> </u>
OTA updates	□ 2022-11-08 13:37:21 Charging Port 1 Last update time Key ↑	Value
🔚 Entity Views	Air Quality Air Qual 2022-01-03 18:07:10 cloudHost	mqtt://demo.thingsboard.io
Edge instances	Air 2022 01 02 19:0 /21 arran Time Frag	1000
😤 Edge management 🛛 🗸	Quality Air Qual 2022-11-08 13:37:20 Quality Air Qual Sensor Sensor	
Widgets Library	C1 2023-01-03 18:06:03 timeNTPServer	pool.ntp.org
Dashboards	C1 Sensor 2023-01-03 18:04:47 timezone	480
Version control	2022-11-08 13:37:20 Sensor T1 Sensor 2023_01_03 19:03:59 unloadErea	120
🕑 Audit Logs	Test Zo22-11-08 13:37:14 Device default C1	120

You may also use:

- Bulk provisioning to provision multiple devices from a CSV file using UI.
- Device provisioning to allow device firmware to automatically provision the device, so you don't need to configure each device manually.
- REST API to provision devices and other entities programmatically.

4.2.5 Step 5. Connect TA652FC-W device

Step 5.1 Copy credentials of new device

To connect the device you need to get the device credentials first. ThingsBoard supports various device credentials. We recommend using default auto-generated credentials which is access token for this guide.

• Devices -> Manage credentials (icon) -> Popup Dialog -> Select Access Token, Ctrl + C.

🎉 ThingsBoard	[₀□ Devices					:: (B Tena		
A Home	Device profile								
↔ Rule chains	Devices _{All}	×						+ C	Q
🔔 Customers	Created time 🔶 Nar	me Device profile	Label (Customer	Public	ls gi			Ê.
E Assets	D 2023-01-03 17:57:01 TA	652FC- TA652FC-W	AVANTEC				PL .	2	-
Devices		TR Thermostat	Headquaters						
🔓 Profiles 🗸 🗸	2022-11-08 13:37:21	evice Credentials	×	o omer			Ê	• •	Î
OTA updates	2022-11-08 13:37:21 Cr	redentials type		o omer		$\Box < \dot{\Box}$	8	• •	î 📗
Entity Views	A	ccess token	*	-			Ph. 4		
Edge instances	A	ccess token * 3 COPY							
🕤 Edge management 🗸 🗸 🗸	2022-11-08 13:37:20	JAWI IIIIA ZEIWa JWII		o omer			8	• •	Î
Widgets Library	2022-11-08 13:37:20		Cancel Save	o omer			Ê	K 😲	1
Dashboards	2022-11-08 13:37:20 Ser	nsor Temperature Sensor	_				6	K 😯	
Version control		Genadi							

Tip: The Credentials (Access Token), which you need to use when you're configuring your hardware, for example, *j9JiCkID9E7uE1WhKxnc*, *lMTQLZ7VSRQSD7ls*.

Step 5.2 Connect device to ThingsBoard

See Connect TA652FC-W to ThingsBoard.

Step 5.3 Publish data to ThingsBoard

Now your device has already published telemetry data to ThingsBoard. You should immediately see them in the Device Telemetry Tab:

م الشیخ ThingsBoard	Lo Devices		C 8 Tenant administrator
☆ Home	Device profile	TA652EC-W-TB	
⟨··⟩ Rule chains	Devices All ×	Device details	? ×
2 Customers	Created time 🦊 Name Devi	ep	Alarms Events
Assets	2 click	2F	Aldinio Evento Interno
Devices 1	W-TB The	Latest telemetry	Q
🔓 Profiles 🛛 🗸	2022-11-08 13:37:21 Charging Cha Port 2 Cha	gin	•
④ OTA updates	2022-11-08 13:37:21 Charging Char Port 1 Charging Chargin	gin Last update time Key 个	Value
🔚 Entity Views	Air Quality Air 0 2022-11-08 13:37:20	ua 2023-01-03 18:21:04 current_fw_title	та652FC-W-ТВ <mark>4</mark>
Edge instances	T1 Air	2023-01-03 18:21:04 current_fw_version	1.6.8
😤 Edge management 🛛 🗸	2022-11-08 13:37:20 Quality Air 0 Sensor Sen	ual or	140616
Widgets Library	2022-11-08 13:37:20 Sensor Ten	2023-01-03 18.23.00 Irain	148010
Dashboards	Sensor Terr	2023-01-03 18:23:06 roomTemp	18.3
Version control	2022-11-08 13:37:20 T1 Sen	or 2023-01-03 18:23:06 spiram	4192139
Audit Logs	2022-11-08 13:37:14 Device defa	JIt 2023-01-03 18:23:06 wifiResi	-39

4.2.6 Step 6. Assign Device and Dashboards to Customer

One of the most important ThingsBoard features is the ability to assign Dashboards to Customers. You may assign different devices to different customers. Then, you may create a Dashboard(s) and assign it to multiple customers. Each customer user will see his own devices and will not be able to see devices or any other data that belongs to a different customer.

Refer to Step 7.1 Create customers, Step 7.4 Create customer user & Step 7.5 Activate customer user.

Step 6.1 Assign dashboards of TA652FC-W to Customer

• Assign *Detail dashboard* to Customer: **Dashboards** -> Click **Manage assigned customers** (icon) in *Detail dashboard* line -> **Popup Dialog** -> Select *My New Customer* -> **Update**.

🎉 ThingsBoard	E Dashboards	13 😮 Tenant administrator
🔒 Home		
⟨··⟩ Rule chains	Dashboards	+ C Q
2 Customers	Created time 🕹 Title Assigned to customers Public	
E Assets	2022 01 02 17:45:42 TA552EC W Thermoster List NovNew Customer	1 2 4 ft 2 1
Devices	2 Click "man	age assiged customers"
🔓 Profiles 🗸 🗸	2023-01-03 17:16:01 TA652FC-W Thermostat (For Mobile App)	± < < 🖻 🗡 🗊
OTA updates	2021 Device Claiming Customer Demo	± < < 🖻 🖊 🗊
Entity Views	Manage assigned customers X	主くを自える
📕 Edge instances		
🙊 Edge management 🛛 🗸		
Widgets Library	202: Entity list	土 く 糸 自 / 正
Dashboards		± < < 🖻 / 🗊
• Version control	Cancel Update	+ < 6 0 2 1
🕑 Audit Logs		
11. Api Usage	2022-11-08 13:37:15 Temperature Sensor (For Device Claiming Customer, Demo Mobile App) Customer	± < < 🖻 🖊 🗊
🔅 System Settings 🛛 🗸	2022-11-08 13:37:15 Environmental monitoring Demo Customer	土 く 糸 白 / 前

• Assign *List dashboard* to Customer: **Dashboards** -> Click **Manage assigned customers** (icon) in *List dashboard* line -> **Popup Dialog** -> Select *My New Customer* -> **Update**.

م ThingsBoard	- Dashboards	C O Tenant administrator
A Home		
⟨··⟩ Rule chains	Dashboards	+ C Q
2 Customers	Created time 🗸 Title Assigned to customers Public	
Assets		2 =
Con Devices	2023-01-03 17.45.42 TA652FC-W Thermostat List	
🛱 Profiles 🗸 🗸	2023-01-03 17:16:01 TA652FC-W Thermostat (For Mobile App)	生く ヘ 自 / 盲
道: OTA updates	2021 Device Claiming Customer, Demo	± < < ≜ ≥ ≣
Entity Views	Manage assigned customers X	土くち自之言
Edge instances		
👚 Edge management 🛛 🗸		* < < 8 / 1
Widgets Library	202: My New Customer × Entity list	生く ヘ 自 / 盲
Dashboards		± < < 🖻 / 🗊
Version control	Cancel 4 Update	十七五日之王
🕑 Audit Logs		
11. Api Usage	2022-11-08 13:37:15 Hemperature Sensor (For Device Claiming Customer, Demo	± < < 🖻 🖊 🗊

• It's like this now.

🕵 ThingsBoard	🕂 Dashboards				E Enant administrator
🔒 Home					
	Dashboards				+ C Q
2 Customers	Created time 🕹	Title	Assigned to customers	Public	
E Assets	2023-01-03 17:45:42	TA652EC-W Thermostat List	My New Customer		+ < + 0 < =
Devices					
🗜 Profiles 🗸 🗸	2023-01-03 17:16:01	TA652FC-W Thermostat (For Mobile App)	My New Customer		± < < 🖻 🗡 🗊
i OTA updates	2022-11-08 13:37:17	1-mil-1-1-mil-1-mi	10		土 く 木 白 / 主
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Edge instances	_		the second s	_	
兖 Edge management 🛛 🗸	2022-11-08 13:37:16	-			* < • 8 / •
📑 Widgets Library	2022-11-08 13:37:16		and selected		± < < 🖻 🖊 🗊
Dashboards	2022-11-08 13:37:16	c			± < < 🖻 🖊 🗊
Version control	2022-11-08 13:37:16	C			+ < 6 8 2 1
🕑 Audit Logs				-	
ılı Api Usage	2022-11-08 13:37:15	ino Sons.			± < < 🖻 🖊 🗊
🔹 System Settings 🛛 🗸	2022-11-08 13:37:15				± < < 🖻 🗡 🗊

Step 6.2 Assign TA652FC-W device to Customer

• Devices -> Click Assign to customers (icon) in *My New Device* line -> Popup Dialog -> Select *My New Customer* -> Assign.

🕵 ThingsBoard	Con Devices	: B Tenant administrator
🔒 Home	Device profile	
∢··Rule chains	Devices All ×	+ C Q
2 Customers	□ Created time ↓ Name Device profile Label Customer	Public Isgat
E Assets	2023-01-03 17:57:01 TA652FC- TA652FC-W EC	
[₀] Devices 1	W-TB Thermostatquaters	
🔓 Profiles 🛛 🗸	Assign Device(s) To Customer X	
OTA updates	2022-11-08 13:37:21	
Entity Views	Please select the customer to assign the device(s)	
Edge instances	My New Customer 3 ×	
🕤 Edge management 🗸 🗸	2022-11-08 13:37:20	
Widgets Library	Cancel 4 Assign	
Dashboards	Sensor Temperature	
Version control	T1 Sensor	

• It's like this now.

🕵 ThingsBoard	🗔 Devices	S							:	: (9 Te	enant a	idminist	rator	
☆ Home		Device profile													
⟨··⟩ Rule chains	Devices	All		×								+	- C	; Q	
👱 Customers	Created t	time 🔸	Name	Device profile	Label	Customer	Public	ls gat							Î
Assets		00 17:57:01	TA652FC-	TA652FC-W	A	My New			_0	in the second se	F B	4		=	U
LoD Devices	2023-01	-03 17.57.01	W-TB	Thermostat	i _{juut} ers	Customer			~		¢.	5	V		U
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OTA updates				1.000		D Guu.			<	Ê	Ê	•	•	Î	L
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📲 Edge instances			T1	001001									V	-	U
Edge management 🗸 🗸	202		C1	Gensor		ousionier			<	Ż	Ê	•	•	Î	

4.2.7 Step 7. Open Dashboards of TA652FC-W

- You are logged in as a Customer User or a Tenant user.
- **Dashboards** -> click my list dashboard

🍇 ThingsBoard	🕂 Dashboards	E 🕃 Tenant administrator
Assets	Daabhaarda	
Devices	Dasinoarus	+ C 4
Profiles 🗸 🗸	Created time J Title Assigned to customers Put	plic
 OTA updates 	2 CIICK 2023-01-03 17:45:42 TA652FC-W Thermostat List	1 ± < < 8 / 1
Entity Views	TAGE2EC W Thermostat (Ear	
Edge instances	2023-01-03 17:16:01 (Ado2rCeV Herniostat (For Mobile App)	
🛣 Edge management 🗸	Ch , Demo	±<≤≤₿≥≣
Widgets Library	2022-11-08 13:37:16 ner	± < ≤ ≜ ≥ ∎
Dashboards 1	2022-11-08 13:37:16	+ < 6 0 4 =
Version control		
🕑 Audit Logs	2022-11-08 13:37:16 In pmer	± < < ₿ ≠ ≣
ılı Api Usage	2022-11-08 13:37:16 Sei tomer, Demo	±<<₿∠∎-
🔹 System Settings 🛛 🗸	Items per page: 10	▼ 1 - 10 of 18 < < > >

• Select my device -> **Settings** (icon)

م ThingsBoard	📲 Dashboards 🗧 📕 TA652FC-W Thermostat List	C C Tenant administrator
Assets	TA652FC-W Thermostat List TA652FC-W Thermostat List - 🗔 Entities	🔇 Realtime - last 5 minutes 🛓 🔝
Devices	TA652EC-W Thermostats Q III ::	
Profiles 🗸 🗸		
: OTA updates	Entity name Tr Entity type Type active koom temp Change Over Sensor temp	
📊 Entity Views	TA652FC-W- Device W true 17.5 0 3	
Edge instances		
👚 Edge management 🗸 🗸	4	
Widgets Library	Items per page: 10 ▼ 1 - 1 of 1 < < > >	
Dashboards		
• Version control		

• Switch page -> Operation

🎉 ThingsBoard	🔚 Dashboards ゝ 🕂 TA652FC-W Thermostat (For Mobile App)	E 🕃 Tenant administrator
Lustomers	MONITOR > CONTROL > PROGRAM > SETTINGS > ADMIN > 4	
E Assets		
Devices	Room temperature Change over sensor temperature 5	
🗜 Profiles 🗸 🗸	0.0°C	
OTA updates	17.0 Setpoint Fan status	
Entity Views	■ 17.8 18.0°C High	
Edge instances	Temperature history	
Edge management 🗸 🗸	🔇 Realtime - last 7 days	
Widgets Library		
Dashboards	-1 Apr 12 Apr 13 Apr 14 Apr 15 Apr 16 Apr 17 Apr 18	
Version control	Room temperatue Change over sensor temperatue	
🕑 Audit Logs		

See TA652FC-W Demo Dashboards Usage.

4.2.8 Your feedback

Don't hesitate to star Avantec on github to help us spread the word.

4.3 Connect TA652FC-W to ThingsBoard

Tip:

- This section applies to both TA652FC-W and TA652FH-W.
- Unless otherwise specified, all specifications applicable to TA652FC-W are also applicable to TA652FH-W.

This section describes the process of connecting TA652FC-W to ThingsBoard via Wi-Fi. This process applies to all models of thermostats in this series.

4.3.1 Prerequisites. Clear Wi-Fi Configuration

Tip: If your TA652FC-W is used for the first time, or your TA652FC-W has never been connected to any Wi-Fi router, you can skip this step.

If your TA652FC-W has been connected to a Wi-Fi router before, when you need to connect to a new Wi-Fi router, you need to clear the Wi-Fi configuration of the TA652FC-W first.

• Press and hold and simultaneously for 10 seconds on the TA652FC-W.



• Enter Wi-Fi parameter clearing mode P19.





• Press to return to the normal interface, and the Wi-Fi parameters are cleared.

4.3.2 Step 1. Get Access-Token

Get a access-token of TA652FC-W from ThingsBoard. See Step 5.1 Copy credentials of new device.

4.3.3 Step 2. Power On

When you first power up, TA652FC-W will enter Wi-Fi AP mode without any Wi-Fi parameters. At this point, you can configure the parameters through the web page.

Tip: TA652FC-W has a different Wi-Fi Hotspot name every time it's powered on.

4.3.4 Step 3. Configure

• Connect to TA652FC-W's Wi-Fi hotspot on your computer or smart phone. It's like Avan-Stats-CEBD8.



- Open your browser, type http://192.168.4.1.
- Input your configuration, then Apply.

🕙 WiFi setup	1 × +	•	
\leftarrow \rightarrow G \blacktriangle	不安全 192.168.4.1	\$ \$ \$	1 🔒 📃
-			
² WiFi SSID:	W!4G		
Password:	2789 630203		
Auth token:	C9sPsT-10 MASgx5		
Host:	mqtt://192.100.21.206		
	Claim device		
	3 Apply		

Field	Description
Wi-Fi SSID	SSID of your Wi-Fi router
Password	password of your Wi-Fi router
Auth Token	Access Token of your TA652FC-W. See <i>Step 1</i> . <i>Get Access-Token</i>
Host	
	This ThingsBoard Server's MQTT URL.
	It must begin with "mqtt://", such as "mqtt://192.168.21.206"
	Please replace 192.168.21.206 with your ThingsBoard IP Address.
	See Step 4.2 Add shared attributes of new device



• If the configuration is successful, the following screen *may be* displayed.



4.3.5 Step 4. Check

Check if TA652FC-W is connected to ThingsBoard correctly. If connected correctly, there will be a Wi-Fi icon in the upper right corner of the Thermostat, and the time will no longer be **12:00**. If you do not set the tone zone relationship on ThingsBoard correctly, the time displayed by TA652FC-W may be slightly off.



4.3.6 Troubleshooting

Thermostat TA652FC-W can't connect to Wi-Fi:

- If the Thermostat has never been connected to any Wi-Fi router since leaving the factory, it will enter Soft-AP mode. You can search for Wi-Fi SSID similar to "Avan-Stats-CEBD8" through your mobile phone or computer.
- Make sure the Wi-Fi router supports and turns on the 2.4G signal. Currently, some dual-band (2.4G & 5G) Wi-Fi routers can turn off the 2.4G signal. Please turn it on in your router settings.
- Make sure your Wi-Fi SSID and Password are correct, and they are related parameters of 2.4G Wi-Fi signal.
- Confirm that the Token is normal.
 - Confirm that the Token corresponds to the actual model (the Token of TA652FH-W-TB can only be connected to the Thermostat of TA652FH-W-TB. The same is true for TA652FC-W-TB).
 - Confirm that the Token did not fail during the copying process.
 - Confirm that the Token has no special characters. Token can only contain A-Z, a~z, 0~9. Illegal characters such as "-" will appear in the case of product end. You can edit and get a new Token in *Step 1. Get Access-Token*.
- Confirm that the *Host* parameter is correct. Host must start with "mqtt://", followed by IP address or domain name of ThingsBoard.
- If the above parameters are confirmed to be correct, you can start from *Step 2*. *Power On* and try several times.

4.4 TA652FC-W Thermostat – Demo device profile usage

4.4.1 Import device profile

Tip: A Device Profile file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

- Download ta652fc_w_thermostat.json.
- **Profiles** -> **Device profiles** -> + -> **Popup dialog: Import device profile** -> Drag and drop *my device profile File* -> **Import**.

🎉 ThingsBoard	🖆 Profiles 🗧 🛛 Device profiles	C 8 Tenant administrator	
Assets	Device profiles 2 import d	levice profile 井 C	Q
Profiles 🔨	Created time Import device profile X ****************************	Default	
D Device profiles	D 2022-11-08 1: 3	□ ± №	î
Asset profiles	Device profile file *	□ ± ►	î
Entity Views	Drag and drop a JSON file or Browse file X		-
- Educional Educional Educional		_ <u> </u>	-
Edge management	2022-10-13 1: ta652fc_w_thermostat.json efault device profile		
Widgets Library	Cancel 4 Import		
Dashboards			
Version control			
🕑 Audit Logs	items per page: 10 👻	1 – 4 of 4 < < >	>
Api Usage			
الله المراجع ا سالم المراجع الم	💼 Profiles 🗧 🛛 Device profiles	C O Tenant administrator	, !
 Massets 	Profiles > Device profiles	Tenant administrator	, :
 Massets Devices 	Profiles > Device profiles Device profiles	C B Tenant administrator	, : Q
ThingsBoard	Profiles > Device profiles Created time Name Profile type Transport type Description	C O Tenant administrator + C Default	ς :
ThingsBoard Assets Devices Profiles Device profiles	Profiles □ Device profiles □ Created time ↓ Name Profile type Transport type Description □ 2023-01-03 17:30:02 TA652FC-W Thermostat Default Avantec Thermostat File	C C Default	ς : α
Image: Constraint of the sector of the s	Profiles □ Device profiles □ Created time ↓ Name Profile type Transport type Description □ Created time ↓ Name Profile type Transport type Description □ 2023-01-03 17:30:02 TA652FC-W Thermostat Default Default Avantec Thermostat File Coil □ 2022-11-08 13:37:20 Charging port Default MQTT	C C Default	ς : α : :
ThingsBoard Assets Devices Profiles Device profiles Asset profiles Asset profiles TA updates Entity Views	Profiles Device profiles □ Created time ↓ Name Profile type Transport type Description □ Created time ↓ Name Profile type Transport type Description □ 2023-01-03 17:30:02 TA652FC-W Thermostat Default Default Avantec Thermostat Friction □ 2022-01-03 17:30:02 TA652FC-W Thermostat Default MQTT □ 2022-11-08 13:37:20 Charging port Default MQTT □ 2022-11-08 13:37:20 Air Quality Sensor Default MQTT	Cefault	
Image: Constraint of the sector of	Device profiles Device profiles □ Created time ↓ Name Profile type Transport type Description □ 2023-01-03 17:30:02 TA652FC-W Thermostat Default Avantec Thermostat File □ 2022-01-08 13:37:20 Charging port Default MQTT □ 2022-11-08 13:37:20 Charging port Default MQTT □ 2022-11-08 13:37:20 Temperature Sensor Default MQTT	Cefault	
Image: Constraint of the sector o	Image: Profiles Image: Profiles Image: Device profiles Image: Profile type Transport type Description Image: Device profiles Image: Profile type Transport type Description Image: Device profiles Image: Profile type Transport type Description Image: Device profiles Image: Device profile type Transport type Description Image: Device profile 2023-01-03 17:30:02 TA652FC-W Thermostat Default Default Avantec Thermostat Free Coil Image: Device profile 2022-11-08 13:37:20 Charging port Default MQTT Image: Device profile type Temperature Default MQTT Default Default Image: Device profile type Temperature Default Default Default Default Image: Device type type Temperature Default Default Default Default	C C Tenant administrator + C Default 1 1 2 1 1	
Assets Devices Profiles O Device profiles O Device profiles Asset profiles Asset profiles Asset profiles Asset profiles Edge instances Edge management Widgets Library	Profiles > Device profiles □ Created time ↓ Name Profile type Transport type Description □ 2023-01-03 17:30:02 TA652FC-W Thermostat Default Default Avantec Thermostat F Coll □ 2022-11-08 13:37:20 Charging port Default MQTT □ 2022-11-08 13:37:20 Air Quality Sensor Default MQTT □ 2022-11-08 13:37:20 Temperature Sensor Default MQTT □ 2022-11-08 13:37:20 Temperature Sensor Default MQTT □ 2022-10-13 13:39:06 default Default Default Default	Certault	 ♀ ■ ■ ■ ■ ■ ■
Image: Constraint of the sector o	Image: Profiles Device profiles □ Created time ↓ Name Profile type Transport type Description □ 2023-01-03 17:30:02 TA652FC-W Thermostat Default Default Avantec Thermostat F Coll □ 2022-11-08 13:37:20 Charging port Default MQTT □ 2022-11-08 13:37:20 Air Quality Sensor Default MQTT □ 2022-11-08 13:37:20 Temperature Sensor Default Default Default	C C Ceant administration C C Ceant Default C C C C C C C C C C C C C C C C C C C	 ♀ ♀
Assets Image: Assets Image: Composition of the sector of the se	Image: Profiles Device profiles □ Created time ↓ Name Profile type Transport type Description □ 2023-01-03 17:30:02 TA652FC-W Thermostat Default Default Avantec Thermostat F. Coll □ 2022-11-08 13:37:20 Charging port Default MQTT □ 2022-11-08 13:37:20 Air Quality Sensor Default MQTT □ 2022-11-08 13:37:20 Temperature Sensor Default MQTT □ 2022-10-13 13:39:06 default Default Default Default	Cefault	ς : Q 1 1 1 1 1 1 1 1 1 1 1 1 1

4.4.2 Modify device profile's mobile dashboard

Device profile's mobile dashboard is for ThingsBoard Mobile Application or ThingsBoard PE Mobile Application.

• **Profiles** -> **Device profiles** -> click *my device profile* -> **Toggle edit mode** (red icon)

🕵 ThingsBoard	🖆 Profiles 🔸 🛛 Device profiles	12 😮 Tenant administrator
🔒 Home	×	TA652EC-W Thermostat
	Device profiles	Device profile details
🚑 Customers	Created time 🕹 Name	3
Assets	2 click	Details Transport configuration Alarm rules (0) Device provisio (11.6.2.2.5)
Devices	2023-01-03 17:30:02 Thermostat	Pula shate
Profiles	2022-11-08 13:37:20 Charging port	Rule chain
D Device profiles	2022-11-08 13:37:20 Air Quality Sensor	Mobile dashboard
A Asset profiles	2022-11-08 13:37:20 Temperature	Used by mobile application as a device details dashboard
OTA updates	Sensor	Queue
Η Entity Views	2022-10-13 13:39:06 default	Assigned firmware
🗐 Edge instances		
👚 Edge management 🛛 🗸		Assigned software
Widgets Library		Device profile image
- Dashboards	*	· · · · ·

• Modify *Mobile dashboard* -> Apply changes (red icon)

🦓 ThingsBoard	Profiles > D Device profiles	C C Tenant administrator
Assets	Davias medilas	TA652FC-W Thermostat
Devices	Device profiles	Device profile details
Profiles	Created time 🦊 Name	P Details Transport configuration Alarm rules (0) Device povering
D Device profiles	2023-01-03 17:30:02 TA652FC-W Thermostat	c Name* 2 ^
R Asset profiles	2022-11-08 13:37:20 Charging port	TA652FC-W Thermostat
📊 Entity Views	2022-11-08 13:37:20 Air Quality Sensor	c Rule chain
Edge instances	2022-11-08 13:37:20 Temperature Sensor	Mobile dashboard TA652FC-W Thermostat (For Mobile App) 1 ×
Edge management 🗸 🗸	2022-10-13 13:39:06 default	Used by mobile application as a device details dashooard
😫 Widgets Library	2022 10 10 10:05:00 default	Queue
Dashboards		
Version control		Assigned firmware Choose firmware that will be distributed to the devices
🕑 Audit Logs		Assigned software
II. Api Usage		Choose software that will be distributed to the devices

These values are shown in the following table:

Field	Value
Mobile dashboard	TA652FC-W Thermostat (For Mobile App)

4.4.3 Clear device profile's mobile dashboard

Sometimes if TA652FC-W Thermostat device profile's mobile dashboard is cleared, TA652FC-W Thermostat (For Mobile App) can only be deleted.

• **Profiles** -> **Device profiles** -> click *my device profile* -> **Toggle edit mode** (red icon)

🕵 ThingsBoard	🖆 Profiles 👌 🛛 Device profiles	🕄 😮 Tenant administrator								
☆ Home	A	TA652EC-W Thermostat								
	Device profiles	Device profile details								
🔑 Customers	Created time 🦊 Name F									
E Assets	2 click	Details Transport conliguration Alarm rules (0) Device provisionals								
Devices	2023-01-03 17:30:02 Thermostat	Pula chain								
🛃 Profiles 🔨 🔨	2022-11-08 13:37:20 Charging port	Rule Ciali								
D Device profiles	2022-11-08 13:37:20 Air Quality Sensor	Mobile dashboard								
A Asset profiles	2022-11-08 13:37:20 Temperature	Used by mobile application as a device details dashboard								
OTA updates	Sensor	Queue								
🔚 Entity Views	2022-10-13 13:39:06 default [Assigned firmware								
Edge instances										
🕤 Edge management 🛛 🗸		Assigned software								
Widgets Library		Device profile image								
Dashboards	•	· ·								

• Clear *Mobile dashboard* -> **Apply changes** (red icon)

ThingsBoard	🛱 Profiles 🔸 🛛 Device profiles	🖸 🌲 🕃 _{Tenant administrator} 🕴
♠ Home		TA652EC-W Thermostat
\land Alarms	Device profiles	Device profile details
Dashboards	☐ Created time ↓ Name	Pr
🛦 Entities 🔥	TA652FH-W	
🗔 Devices	Thermostat	Name* TA652FC-W Thermostat
= Assets	2023-01-03 17:30:02 TA652FC-W Thermostat	De
Entity Views	2022-11-08 13:37:20 Charging port	De Default rule chain
🖆 Profiles 🔥	2022-11-08 13:37:20 Air Quality	De
Device profiles	Temperature	TA652FC-W Thermostat (For Mobile App)
R Asset profiles	2022-11-08 13:37:20 Sensor	De Used by mobile application as a device details dashboard
📇 Customers		Queue

4.5 TA652FC-W Demo Dashboards Usage

4.5.1 Overview

There are two dashboards related to TA652FC-W, namely TA652FC-W Thermostat List and TA652FC-W Thermostat (For Mobile App). We open the former to start operating TA652FC-W.

🍇 ThingsBoard	- Dashboards	C C tenant@thingsboard.org Tenant administrator
🔒 Home		
∢·· ≯ Rule chains	Dashboards	+ C Q
P. Customers	Created time 🦊 Title Assigned to customers Public	
E Assets	D 2022-12-28 18:07:38 TA652FC-W Thermostat (For	
Lon Devices	Mobile App)	
D Device profiles	2022-12-28 17:58:03 TA652FC-W Thermostat List	# ± < < ₿ ∎
道: OTA updates	2022-11-16 14:48:39 Thermostat	# ± < ≤ ≜ ≆
📊 Entity Views	2022-11-10 09:39:48 Thermostat (Deprecated)	11 ± < < 8 1
Edge instances	Avantee Deckhoard	
죾 Edge management 🗸 🗸	2022-04-06 11:06:41 Available DashDaard (Deprecated)	
Widgets Library	2022-04-06 10:21:03 ThingsBoard Thermostats	11 ± < < 自 ī
Dashboards	2022-04-06 10:21:03 Firmware	
🕑 Audit Logs	Items per page: 10 💌	1 - 10 of 10 < < > >
II. Api Usage		

Table 2: TA652FC-W Demo Dashboards

Dashboard	Description	For Web UI	For Mobile App	Entry*
TA652FC-W Thermostat List	list	Yes	No	Yes
TA652FC-W Thermostat (For Mo-	details	Yes	Yes	No
bile App)				

Hint:

- If *Entry* is *Yes*, then directly enter the Dashboard and there will be data displayed.
- If *Entry* is *No*, there will be no data display when entering this Dashboard directly, and you need to jump to this Dashboard from other Dashboards.

4.5.2 TA652FC-W Thermostat List

Dashboard states

Default state

Default state is root state.

🎉 ThingsBoar	rd	📰 Dashboards 🗲 📑 TA652FC-W Thermostat List 🖸 😩 💡														
♠ Home		TA652FC-W Thermostat List TA652FC-W Thermostat List 👻 👩 Entities 🚫 Realtime - last 5 minutes														
\land Alarms		TA652EC-W Thermostats														
Dashboards		TA652FC-W The	mostats								ų,	ш 🖸				
🛧 Entities	^	Device name 🛧	Label	Туре	Active	Room Temp	Change Over Ter	np Setpoint	Fan status	Unit						
🗔 Devices		24:0A:C4:2C:EB:D4	old_boardxxx	TA652FC-W Thermostat	true	19	0	21.5	Low	°C		\$				
🛅 Assets		9C:9C:1F:18:72:40	87240	TA652FC-W Thermostat	false	24.2	0	16	High	°C	1	\$				
Profiles	^	9C:9C:1F:18:72:B0	right	TA652FC-W Thermostat	false						/	\$				
Device profiles		9C:9C:1F:18:72:B4	872B4	TA652FC-W Thermostat	false	16.9	0	21	High	°C		\$				
Asset profiles		9C:9C:1F:19:4D:98	left	TA652FC-W Thermostat	false						/	\$				
📇 Customers		F0:08:D1:43:1A:E4	Hilary	TA652FC-W	false	21	0	8.5	Off	°C		*				
↔ Rule chains	^			Inormaatat			ltems per paç	je: 10 🔻	1 - 7 of 7		< > Powered by	Thingsboard v.3.5.1				

- Dashboard bar:
 - **TA652FC-W Thermostat List** : Click here to skip to **root state**. Since **default state** is *root state*, click here and there is no response.
 - · 📴 : Click the two ICONS in the upper left corner to display the page in full screen.
 - Sealtime last 5 minutes : Edit time window.
- Thermostats widgets:
 - Fields:
 - * Device name, Label, Type, active.
 - * Room temperature, Change Over Sensor Temperature, Setpoint, Fan status, Unit: Refer to *Monitor state*.
 - Actions:

* Skip to TA652FC-W Thermostat (For Mobile App).
* Popup dialog to editing a device's label.

Import List Dashboard

Tip: A Dashboard file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

In order to use this dashboard, you must to create TA652FC-W Thermostat Device Profile and TA652FC-W Thermostat (For Mobile App). If they don't exist, you can import them. See *Import Device Profile of TA652FC-W Thermostat* or *Import TA652FC-W Detail Dashboard*.

First, you can import this dashboard.

- Download ta652fc_w_thermostat_list.json.
- Dashboards -> + -> Popup dialog: Import dashboard -> Drag and drop *list dashboard File* -> Import.

🎉 ThingsBoard	Dashboar	ds			::	8	enant adm	ninistrator	:
⊞ Assets	Dashboard	S					+	Go	2
📫 Profiles 🗸 🗸	Created time	Import dashboard	×	Public	2	import	dash	board	Î
OTA updates	2023-01-03	1. 3			<u>+</u>	< <	8 /	/	
Edge instances	2022-11-08	1:			<u>+</u>	< *	8,	1	
👚 Edge management 🗸 🗸	2022-11-08	Drag and drop a JSC	N file or Browse file 🗙		<u>+</u>	< *	e ,	1	
Widgets Library	2022-11-08	1: ta652fc_w_thermostat_list.js	on		<u>+</u> -	< *	8 /	/	
Dashboards	2022-11-08	10	Cancel 4 Import		<u>+</u> -	< *	8 /		
Audit Logs	2022-11-08	13:37:16 Sensors	Device Claiming Customer, Demo Customer		<u>+</u>	< *	8 /		
ıl. Api Usage	2022-11-08	13:37:16 Device claiming			<u>+</u>	< <	2 /	1	Ŧ
🔅 System Settings 🗸 🗸			Items per pa	age: 10 💌	1 – 10 of	17	< <	> >	>1
									_
🍇 ThingsBoard	Dashboar	ds				8	enant adm	iinistrator	:
f∰, ThingsBoard	Dashboar	ds			8	8 T	enant adm	ninistrator	:
f∰, ThingsBoard ⊞ Assets ⊡ Devices	 Dashboard 	ds S			0	θ.	enant adm +	ninistrator CH C	:
ThingsBoard	Dashboard Dashboard Created time	ds S ↓ Title	Assigned to customers	Public	8	Θ	enant adır +	oinistrator C C	:
ThingsBoard	Dashboard Dashboard Created time 2023-01-03	ds S ↓ Title 17:45:42 TA652FC-W Thermostat I	Assigned to customers	Public	.∷ 	8 T	enant adır +	iinistrator C C	:
ThingsBoard	Dashboard Dashboard Created time 2023-01-03 2023-01-03	ds S ↓ Title 17:45:42 TA652FC-W Thermostat I 17:16:01 TA652FC-W Thermostat I Mobile App)	Assigned to customers .ist For	Public		⊖ ⊤ <	enant adm + Ê	inistrator C C C Î	:
 ✓ ThingsBoard Image: Assets Image: Devices Image: Profiles Image: OTA updates Image: Entity Views Image: Edge instances Image: Edge management 	Dashboard Dashboard Created time 2023-01-03 2022-11-08	ds S ↓ Title 17:45:42 TA652FC-W Thermostat I 17:16:01 TA652FC-W Thermostat I Mobile App) 13:37:17 Charging Port (For Mobile App)	Assigned to customers ist For Pevice Claiming Customer, Demo Customer	Public		е т < ~ < ~	enant adm + È	inistrator C C A T A T A T A T A T A T A T A T A T A T	÷
FiningsBoard Image: Assets Image: Devices Image: De	Dashboard Dashbaard Dashbaard	ds S ↓ Title 17:45:42 TA652FC-W Thermostat I 17:16:01 TA652FC-W Thermostat I 13:37:17 Charging Port (For Mobile App) 13:37:16 EV Charging Stations	Assigned to customers ist For Pevice Claiming Customer, Demo Customer Demo Customer	Public		• • • • • • • • • • • • • • • • • • •	enant adm + Ê 4 Ê 4 Ê 4	inistrator C C I C I C I C I C I C I C I C I C I C	÷
Image: Constraint of the sector of the se	Dashboard Dashboard Created time 2023-01-03 2022-11-08 2022-11-08	ds S ↓ Title 17:45:42 TA652FC-W Thermostat I 17:16:01 TA652FC-W Thermostat I Mobile App) 13:37:17 Charging Port (For Mobili App) 13:37:16 EV Charging Stations 13:37:16 Air Quality Sensor (For Mobile App)	Assigned to customers ist For Device Claiming Customer, Demo Customer Demo Customer Device Claiming Customer, Demo Customer	Public		• • • • • • • • • • • • • • • • • • •	enant adm + È 4 È 4 È 4	inistrator C	:
Image: Constraint of the sector of the se	Dashboard Dashboard Created time 2023-01-03 2022-11-08 2022-11-08 2022-11-08	ds S ↓ Title 17:45:42 TA652FC-W Thermostat I 17:16:01 TA652FC-W Thermostat I Mobile App) 13:37:17 Charging Port (For Mobili App) 13:37:16 EV Charging Stations 13:37:16 Air Quality Sensor (For Mobile App) 13:37:16 Indoor Air Quality	Assigned to customers ist For Device Claiming Customer, Demo Customer Demo Customer Device Claiming Customer, Demo Customer Demo Customer	Public			enant adm + È 4 È 4 È 4 È 4	inistrator C C C C C C C C C C C C C C C C C C C	÷
Image: Second	Dashboard Dashboard Created time 2023-01-03 2022-01-03 2022-01-08 2022-11-08 2022-11-08 2022-11-08 2022-11-08 2022-11-08	ds S ↓ Title 17:45:42 TA652FC-W Thermostat I 17:16:01 TA652FC-W Thermostat I 13:37:17 Charging Port (For Mobile App) 13:37:16 EV Charging Stations 13:37:16 Air Quality Sensor (For Mobile App) 13:37:16 Indoor Air Quality 13:37:16 Sensors	Assigned to customers Ist For Device Claiming Customer, Demo Customer Demo Customer Demo Customer Demo Customer Demo Customer Device Claiming Customer, Demo	Public			enant adm + È 4 È 4 È 4 È 4 È 4	inistrator C C C C C C C C C C C C C C C C C C C	÷

Next, modify a action's target dashboard and target dashboard state.

• Dashboards -> Click my list dashboard

thingsBoard		Dashboards				:: E	Tenant administrator
ASSETS							
Lon Devices	Da	ashboards					+ C Q
Profiles 🗸		Created time	Title	Assigned to sustamore	Public		
OTA updates			nuc	Assigned to edistanters	T divite		
Entity Views		2023-01-03 17:45:42	TA652FC-W Thermostat List			± <	< 🖻 🗡 🗊 👘
🔐 Edge instances		2023-01-03 17:16:01	TA652FC-W Thermostat (For Mobile App)			± <	< B / T
죾 Edge management 🗸 🗸		2022-11-08 13:37:17	Charging Port (For Mobile	Device Claiming Customer, Demo		± <	5 B Z I
😭 Widgets Library			Арр)	Customer			
Dashboards		2022-11-08 13:37:16	EV Charging Stations	Demo Customer		± <	< 🖻 🗡 🗊
Version control		2022-11-08 13:37:16	Air Quality Sensor (For Mobile App)	Device Claiming Customer, Demo Customer		± <	5 🖻 🗡 🗊

• Edit (red icon on the bottom and right)

	🎉 ThingsBoa	rd		Dashbo	oards >	- TA65	2FC-W	V Thern	nostat	List				::	8	enant ad	ministrato	, :
1 23	Profiles	~	^	TA652FC-W	Thermos	tat List 🛛	A652F	C-W The	ermosta	at List -	[•D	Entiti	es	C Realtime - last 5 mi	nutes	Ŧ		0
٢	OTA updates		Г	TA652FC-W	Thermosta	ats						० ॥						
	Entity Views		ł.	Entity name 🛧	Entity type	Type	active	Room	Temp	Change ()ver Sensor	Temp						
"Ĩ	Edge instances			Entry hand 1	Entry type	1)00	doute		, chip	onange		Temp						
Ŷ	Edge management	~		TA652FC-W- TB	Device	TA652FC- W Thermostat	true	18.1		0			\$					
	Widgets Library																	
-	Dashboards			4									×				_	_
Ð	Version control					Items per page	: 10	*	1 - 1 of 1	ŀ	< <	>	>			2		
ଡ଼	Audit Logs		-									-			Power	ed by Thi	ngsboard	v.3.4.4

• Enter *Edit Dashboard Mode* -> Edit Widget (icon)

👸 ThingsBoard				📲 Dashboards ゝ 📑 TA652FC-W Thermostat List						E LIANG TC Frenant administrator							
d a	Profiles	~	^	۵	-					۵	60	Ŧ	() Realtime -	last 5 minutes	Ŧ	Ð	0
٥	OTA updates			TA652EC-W Thermostat I													
H	Entity Views			171002		men	100										
-	Edge instances			TA652FC-W	Thermosta	its				4	/	<u>∎</u> ×					
Ŷ	Edge management	~		Entity name ↑	Entity type	Туре	active	Room Temp	Change	over Sei	nsor Temp						
H	Widgets Library			TA652FC-W-	Device	TA652FC- W	true	18.1	0			\$					
H	Dashboards					Thermostat							-				
Ð	Version control								_								
4	Audit Logs			4		Items per page	: 10	▼ 1-1of	1	IC 4		51		F			×
il.	Api Usage					por page						<i>e</i> 1		Pow	ered by Th	ingsboard	v.3.4.4

• Action -> Edit Action (icon)

👸 ThingsBoard	📑 Dashboards ゝ 📑 TA6	52FC-W Thermostat List	1 enant administrator				
Devices	♦ ■	¢ 🗔 🤤	F 🕐 Realtime - last 5 minutes 🛓 🚯 🚺				
🖆 Profiles 🗸 🗸	Title *						
🜐 OTA updates	TA652FC-W The	New Entities table	? ×				
Entity Views	TA652FC-W Thermostats						
🚽 Edge instances	Entity name 🛧 Entity type Type	Data Settings	Advanced 5 Actions				
🕤 Edge management 🗸 🗸	TA652FC-W- Device W	Antinun					
Widgets Library	TB Thermos	Actions	+ 4				
Dashboards		Action source 🛧 Name	Icon Type				
Version control		 Action cell button to ta652fc-w detail 	📩 Navigate to other dashboard 6 📝 🗐				
🕑 Audit Logs							
ılı Api Usage							

• Modify Target dashboard -> modify Target dashboard state -> Save

🕵 ThingsBoard	📰 Dashboards > 📑 TA652FC-W Thermostat List 🕄 😌 Tenant administrator	
A Home	GET: /api/dashboard/info/b2d13460-4f7b-11ed-88cf-3bc720ab387f	
⟨··⟩ Rule chains		
🚬 Customers	Action source *	
E Assets	Action cell button	
Devices	Name * Actions	
🔓 Profiles 🗸 🗸	to_tao52tc-w_detail	
OTA updates	settings	
Entity Views	Show/hide action using function	
Edge instances	Type * dashboard	
	Navigate to other dashboard	
Widgets Library	Target dashboard *	
Dashboards	TA652FC-W Thermostat (For Mobile App) 7 ×	
Version control	Target dashboard state	
🕑 Audit Logs	monitor 8 ×	
ılı Api Usage	Open in a new browser tab Set entity from widget	
🔹 System Settings 🗸 🗸 🗸	Crate antity naramatar name	

These values are shown in the following table:

Field	Value
Target dashboard	TA652FC-W Thermostat (For Mobile App)
Target dashboard state	monitor

• Apply changes (red icon)

🕵 ThingsBoard	📱 Dashboards > 📑 TA652FC-W Thermostat List 🛛 🕄 🕃 Tenant adm			
☆ Home	GET: /api/dashboard/info/b2d b-11ed	l-88cf-3bc720ab387f Close	Realtime - last 5 minutes 👤 🕤 🚼	
、→ Rule chains			•	
🔑 Customers	IA652FC-W I her New Entities table	s tadle	? ×	
E Assets	TA652FC-W Thermostats			
[₀] Devices	Entity name ↑ Entity type Type	Settings Advan	ced Actions	
🔓 Profiles 🗸 🗸	TA652FC-W- TA652FC Actions			
OTA updates	TB Device W ACTIONS		+ ~	
Entity Views	Action source	e∱ Name Icon	Туре	
Edge instances	- Action cell I	autton to ta652fc-w detail	Navigate to other dashboard	
兖 Edge management 🛛 🗸				
📑 Widgets Library				
Dashboards				
Version control				

• Apply changes (red icon on the bottom and right)

🎉 ThingsBoard	🖬 Dashboards > 🕂 TA652FC-W Thermostat List 🕄 🕃 Tenant administrator
Devices	📚 🚍 🌼 🛱 🏚 🌣
Profiles 🗸 🗸	TMe [*] TA652EC-W/Thermostat I
OTA updates	
Entity Views	TA652FC-W Thermostats
Edge instances	Entity name ↑ Entity type Type active Room Temp Change Over Sensor Temp
Edge management 🗸 🗸	TA652FC-W- TA652FC- Device W true 18.3 0
😭 Widgets Library	Thermostat
Dashboards	
Version control	
🕑 Audit Logs	items per page: 10 1 − 1 of 1 < < > >
ıl. Api Usage	
🔅 System Settings 🗸 🗸	+ Vertex by Thingsboard v.3.4.4

Update List Dashboard

• First, delete this dashboard: Dashboards -> Click in the row of TA652FC-W Thermostat List -> Popup dialog: Are you sure you want to delete ...? -> Yes.

🎉 ThingsBoard	E Dashboards E 🐥 😌 Tenant administrator
♠ Home	
🛕 Alarms	Q thermostat X
Dashboards 1	Are you sure you want to delete the dashboard 'TA652FC-W Thermostat List'?
🛦 Entities 🔥 🔨	Be careful, after the confirmation the dashboard and all related data will become unrecoverable.
🗔 Devices	
⊞ Assets	No 3 Yes
🔳 Entity Views	□ 2023-05-25 10:28:18 Ust □ ± < ← 혐 ∕2 ii
🖆 Profiles 🔥 🔨	Items per page: 10 - 1 - 5 of 5 - 1 < < > > 1
Device profiles	

• Next, import TA652FC-W List Dashboard.

4.5.3 TA652FC-W Thermostat (For Mobile App)

Dashboard states

Monitor state

Monitor state is root state.



- Dashboard bar:
 - Hidden. Refer to Default state.
- Widgets:

Widget	Description
MONITOR	skip to Monitor state
CONTROL	skip to Control state
PROGRAM	skip to Program state
SETTINGS	skip to Settings state
ADMIN	skip to Admin state
Room Temperature	room temperature
Change Over Sensor Temperature	change over sensor temperature
Setpoint	current setpoint value
Fan Status	"Off", "Low", "Med" or "High"
Temperature history	
	Room temperature & Change Over Sensor temperature
	history. Click 🕓 Realtime - last 7 days
	to edit this timewindow. Refer to Default state

Control state

م ThingsBoard	💶 Dashboards 🔉 📑 TA652FC-W Thermostat (For Mobile App)	□ ≜ ⊖
☆ Home	MONITOR > CONTROL > PROGRAM > SETTINGS >	ADMIN >
🛕 Alarms		
🕂 Dashboards	Setpoint Fan mode	
🔒 Entities 🛛 🗸 🗸	27.5 °C ~ Auto Low Med	High
📩 Profiles 🛛 🔺		
D Device profiles	Program Next setpoint Fan status On Thu. 06:00 PM Control On 27.0°C Low	
B Asset profiles		
🚓 Customers		
<> Rule chains	Override program status Control	_
🙊 Edge management 🛛 🔺	No On	

• Dashboard bar:

Hidden. Refer to *Default state*.

Widget	Description
Setpoint	If you adjust setpoint, override program status is YES (true)
Program	program on or off
PRG next setpoint	next program time & setpoint
Override program status	"YES"(true) or "NO"(false)
Fan Mode	"Auto", "Low", "Med" or "High"
Fan Status	"Off", "Low", "Med" or "High"
Control Mode	"Off" or "On"

Program state

🍇 ThingsBoard	Dashboards > 🕂 TA652FC	-W Thermostat (For Mobile App)
☆ Home	MONITOR > CONTROL > PRO	OGRAM > SETTINGS > ADMIN >
📇 Customers	Program mode	
Assets	No Program 1 Day	1 + 5 +1 7 Days
[₀] Devices	Days of the week	
D Device profiles	🛅 Sunday	>
亞 OTA updates	🛅 Monday	>
📴 Entity Views	🛅 Tuesday	>
🗐 Edge instances	📩 Wednesday	>
🙊 Edge management 🛛 🗸	Thursday	>
Widgets Library	Friday	>
Dashboards	🛅 Saturday	>

• Dashboard bar:

Hidden. Refer to Default state.

Program Mode	Description
NO PROGRAM	Program disabled
1 DAY (MON)	Using 4 set points of Monday every day
1+5+1 (SUN+MON+SAT)	Using 4 set points of Monday from Monday to Friday
7 DAYS (SUN~SAT)	Using 4 set points every day
Sunday,	Skip to Program_setpoints state

Program_setpoints state

ر ThingsBoa	ırd	📰 Dashboards 🗧 TA652FC-W Thermostat (For Mobile App) 🔀 🛕			8 Teni						
♠ Home					<	PROGRAM					
🕂 Alarms						\sim					
Dashboards											
👍 Entities	~				S	Sunday					
🝰 Profiles	^	Program 1				Program 3					
Device profiles Asset profiles		上午 08:00	~ ×	On	10.0 °C ~	下午 06:00	~ ×	On	[20.5 °(· ·
• Customers											
() Rule chains		Program 2				Program 4					
	^	上午 10:00	~ ×	On	27.5 °C ~	下午 11:00	~ ×	On	(26.5 °(>~
📑 Instances											

• Dashboard bar:

Hidden. Refer to *Default state*.

Widget	Description
Program 1 ~ Program 4	time, hour:minute
Control Mode 1 ~ Control Mode 4	On, Off
Setpoint 1 ~ Setpoint 4	setpoint value, temperature

👸 ThingsBoard	Dashboards > TA652FC-W Thermostat (For Mobile App)					
合 Home	MONITOR > CONTROL > PROGRAM > SETTINGS > ADMIN >					
. ♦ Rule chains						
2 Customers	Temperature unit Force entilation					
Assets	°C °F Enabled Disabled					
[₀] Devices						
D Device profiles	Change over mode Temperature offset of internal sensor					
OTA updates	Heat Cool Auto -4.0 °C ✓					
📊 Entity Views	Change over temperature heating Switching differential heating					
🔐 Edge instances	27.0 °C ~					
Edge management 🗸 🗸	Change over temperature cooling Switching differential cooling					
Widgets Library	10.0 °C ~					
Dashboards						

Settings state

• Dashboard bar:

Hidden. Refer to Default state.

Widget	Description
Temp Unit	"°C" or "°F". Reboot the device to take effect
Change Over Mode	"Heat", "Cool" or "Auto"
Change Over Temp Heating	Change over temperature heating
Change Over Temp Cooling	Change over temperature cooling
Force Ventilation	Used in automatic Fan Mode
Temp Offset(Internal Sensor)	Internal sensor temperature offset
Switching Diff Heating	Switching differential heating
Switching Diff Cooling	Switching differential cooling

Admin state

🎉 ThingsBoard	Dashboards > TA652FC-W Thermostat (For Mobile App)						
fraction Home	MONITOR > CONTROL >	PROGRAM > SETTINGS > ADMIN >					
∢·· ≯ Rule chains							
👱 Customers	Time format	Device profile TA652FC-W					
ssets	12 Hours 24 Hours	(Type) Thermostat					
[₀] Devices	Time zone	Model TA652FC-W-TB					
D Device profiles	UTC+08:00 ~	MAC 24:0A:C4:2C:EB:D4					
OTA updates	NTP server *	WI-FI F/W version 1.6.8.0					
Entity Views	pool.ntp.org 🗸 🗧	Reboot					
Edge instances	Synchronize datetime						
죾 Edge management 🗸 🗸	Sync Now	Clear Wi-Fi Configuration					
Widgets Library							

• Dashboard bar:

Hidden. Refer to Default state.

Widget	Description			
Time Format	"12 Hours" or "24 Hours"			
Timezone	See Step 4.2 Add shared attributes of new device			
NTP Server				
	SNTP protocol server URL, e.g. pool.ntp.org,			
	0.pool.ntp.org, 1.pool.ntp.org,			
	time.nist.gov,			
	see Step 4.2 Add shared attributes of new device			
Sync Time				
	Sync time per syncTimeFreq seconds.			
	If you change <i>Timezone</i> or <i>NTP Server</i> , you have to do it.			
	See Step 4.2 Add shared attributes of new device			
	L V			
Device attributes				
	Device name, device profile (type), device label,			
	model, MAC, device Wi-Fi Module F/W version,			
	device Main MCU F/W version			
Reboot	Reboot device			
Clear Wi-Fi Config	Clear device's Wi-Fi configuration			

Import Detail Dashboard

Tip: A Dashboard file can only be imported once. If you have already imported it, you don't need and cannot repeat the import.

If you have already imported it, you can skip this step.

In order to use this dashboard, you must to create TA652FC-W Thermostat Device Profile. If it doesn't exist, you can import it. See *Import Device Profile of TA652FC-W Thermostat*.

- Download ta652fc_w_thermostat__for_mobile_app_.json.
- Dashboards -> + -> Popup dialog: Import dashboard -> Drag and drop *detail dashboard File* -> Import.

المجري ThingsBoard	Dashboards				: e Tenant administrator
tassets	Dashboards			2 imp	ort dashbaard 于 C 0
Lon Devices	Dashboards			2 mpc	
🖆 Profiles 🛛 🗸	Created time Impo	rt dashboard	×	Public	i i
OTA updates	2022-11-08 1(<mark>3</mark>				土くへ自ノ言
Entity Views	Dashb	oard file *			126 B 2 B
Edge instances	2022-11-08 1	Drag and drop a ISON file	or Browse file		
👚 Edge management 🗸 🗸	2022-11-08 1				± < < 🖻 / 🗊
Widgets Library	2022-11-08 11 ta652	2fc_w_thermostatfor_mobi	le_appjson		土 く 木 白 / 前
Dashboards	2022-11-08 13				土 く < 白 / 1
• Version control	0000 11 00 12:07:16	Davice claiming	Cancel 4 Import		126 B 2 =
🕑 Audit Logs	2022-11-08 13:37:10	Device claiming			<u>× </u>
11, Api Usage	2022-11-08 13:37:15	Temperature Sensor (For Mobile App)	Device Claiming Customer, Demo Customer		<u>+ < < 8 / 1 -</u>
📥 Svetam Sattings			Items per pag	e: 10 💌	1 - 10 of 16 < < > >
System Settings V	• •				
ThingsBoard	Dashboards				:: O Tenant administrator
ThingsBoard	 Dashboards Dashboards 				Tenant administrator
ThingsBoard	Dashboards Dashboards				Tenant administrator + C
ThingsBoard Assets Devices Profiles	Dashboards Dashboards Created time ↓	Title	Assigned to customers	Public	E B Tenant administrator : + C Q
 ThingsBoard Assets Devices Profiles OTA updates 	Dashboards Dashboards Created time ↓ 2023-01-03 17:16:01	Title TA652FC-W Thermostat (For Mobile App)	Assigned to customers	Public	:: • Tenant administrator • C Q • • C Q • • • • •
ThingsBoard Assets Devices Profiles OTA updates Entity Views Cota instructors	Dashboards Dashboards Created time ↓ 2023-01-03 17:16:01 2022-11-08 13:37:17	Title TA652FC-W Thermostat (For Mobile App) Charging Port (For Mobile App)	Assigned to customers Device Claiming Customer, Demo Customer	Public	
 Assets Devices Profiles OTA updates Entity Views Edge instances Edge management 	Dashboards Dashboards Created time ↓ 2023-01-03 17:16:01 2022-11-08 13:37:17 2022-11-08 13:37:16	Title TA652FC-W Thermostat (For Mobile App) Charging Port (For Mobile App) EV Charging Stations	Assigned to customers Device Claiming Customer, Demo Customer Demo Customer	Public	
 Devices OTA updates Entity Views Edge instances Edge management Widgets Library 	Dashboards Dashboards Created time ↓ 2023-01-03 17:16:01 2022-11-08 13:37:17 2022-11-08 13:37:16	Title TA652FC-W Thermostat (For Mobile App) Charging Port (For Mobile App) EV Charging Stations Air Quality Sensor (For	Assigned to customers Device Claiming Customer, Demo Customer Demo Customer Device Claiming Customer, Demo	Public	
 Assets Devices Profiles OTA updates Entity Views Edge instances Edge management Widgets Library Dashboards 	Dashboards Dashboards Created time ↓ 2023-01-03 17:16.01 2022-11-08 13:37:17 2022-11-08 13:37:16	Title TA652FC-W Thermostat (For Mobile App) Charging Port (For Mobile App) EV Charging Stations EV Charging Stations Air Quality Sensor (For Mobile App)	Assigned to customers Device Claiming Customer, Demo Customer Demo Customer Device Claiming Customer, Demo Customer	Public C C C C C C C C C C C C C	
 Devices Profiles OTA updates Entity Views Edge instances Edge management Widgets Library Dashboards Version control 	Dashboards Dashboards Created time ↓ 2023-01-03 17:16:01 2022-11-08 13:37:17 2022-11-08 13:37:16 2022-11-08 13:37:16 2022-11-08 13:37:16	Title TA552FC-W Thermostat (For Mobile App) Charging Port (For Mobile App) EV Charging Stations EV Charging Stations Air Quality Sensor (For Mobile App) Indoor Air Quality	Assigned to customers Device Claiming Customer, Demo Customer Demo Customer Device Claiming Customer, Demo Customer Demo Customer Demo Customer	Public C C C C C C C C C C C C C	
 System Sectings ThingsBoard Assets Devices Profiles OTA updates Edge instances Edge instances Edge management Widgets Library Dashboards Version control Audit Logs 	Dashboards Dashboards Created time ↓ 2023-01-03 17:16.01 2022-11-08 13:37:17 2022-11-08 13:37:16 2022-11-08 13:37:16 2022-11-08 13:37:16 2022-11-08 13:37:16	Title TA652FC-W Thermostat (For Mobile App) Charging Port (For Mobile App) EV Charging Stations EV Charging Stations Air Quality Sensor (For Mobile App) Indoor Air Quality Sensors	Assigned to customers Assigned to customers Device Claiming Customer, Demo Demo Customer Demo Customer Demo Customer Demo Customer Demo Customer Demo Customer	Public C C C C C C C C C C C C C	
 Devices Profiles OTA updates Edge instances Edge management Widgets Library Dashboards Version control Audit Logs Api Usage 	Dashboards Dashboards □ Created time ↓ □ 2023-01-03 17:16:01 □ 2022-11-08 13:37:16 □ 2022-11-08 13:37:16 □ 2022-11-08 13:37:16 □ 2022-11-08 13:37:16 □ 2022-11-08 13:37:16 □ 2022-11-08 13:37:16	Title TA652FC-W Thermostat (For Mobile App) Charging Port (For Mobile App) EV Charging Stations EV Charging Stations Air Quality Sensor (For Mobile App) Indoor Air Quality Sensors Device claiming	Assigned to customers Device Claiming Customer, Demo Customer Demo Customer Device Claiming Customer, Demo Customer Demo Customer Demo Customer Device Claiming Customer, Demo Customer	Public	

• Optional, This dashboard can be set as TA652FC-W Thermostat Device Profile's mobile dashboard. See *Modify TA652FC-W Thermostat device profile's mobile dashboard*.

Update Detail Dashboard

- First, clear TA652FC-W Thermostat device profile's mobile dashboard.
- Next, delete this dashboard: Dashboards -> Click in the row of TA652FC-W Thermostat (For Mobile App) -> Popup dialog: Are you sure you want to delete ...? -> Yes.

🎉 ThingsBoard	E Dashboards 🖸 🌲	0	Tenant ad	lministrator	
♠ Home					
\land Alarms	Q thermostat	-		×	
Dashboards	Are you sure you want to delete the dashboard 'TA652FC-W Thermostat (For Mobile App)'?				
🔥 Entities 🗸	Be careful, after the confirmation the dashboard and all related data will become unrecoverable.	4	-	A =	
[₀0] Devices		~	H	-	
🖿 Assets	No 3 Yes	*	Ê	/ 1	
Entity Views	□ 2023-05-25 14:35:44 TA652FC-W Thermostat □ ± <	*	Ê	21	
👜 Profiles 🖌	Items per page: 10 👻 1 - 5 of 5			> >	
D Device profiles					

• Then import TA652FC-W Detail Dashboard.

4.6 TA652FC-W MQTT API

Tip:

- This section applies to both TA652FC-W and TA652FH-W.
- Unless otherwise specified, all specifications applicable to TA652FC-W are also applicable to TA652FH-W.

4.6.1 Overview

TA652FC-W & TA652FH-W MQTT API is an implementation of *ThingsBoard MQTT Device API* (MQTT is a lightweight publish/subscribe messaging protocol).

4.6.2 Features

- MQTT protocol:
 - Support MQTT over TCP

- NOT support MQTT over SSL with mbedtls, MQTT over Websocket, MQTT over Websocket Secure

- Base on ThingsBoard MQTT Device API:
 - Support telemetry upload API
 - Support client-side & shared attributes, and attributes API:
 - * Request attribute values from the server
 - * Publish attribute update to the server
 - * Subscribe to attribute updates from the server
 - Support PRC API:
 - * Server-side RPC: one-way and two-way
 - * Client-side RPC: one-way and two-way
 - Support Claiming devices API

- Support Firmware API
- NOT support Device provisioning API

4.6.3 MQTT Special

- Currently support mqtt schemes
- Currently NOT support mqtts, ws, wss schemes
- MQTT over TCP samples:
 - mqtt://mqtt.eclipse.org: MQTT over TCP, default port 1883:
 - mqtt://mqtt.eclipse.org:1884 : MQTT over TCP, port 1884:

4.6.4 Flow Chart

Tip: The range of values for message fields is referred to in the following sections, see *Telemetry (Time-series data)*, *Shared attributes, Client-side attributes* and *Server-side RPC*.

TELE.01 Time-series Data Upload

Chart: Message:

```
// Message Type: Telemetry upload (MQTT, PUBLISH)
// Topic: v1/devices/me/telemetry
// Payload - TA652FC-W:
{"roomTemp":26.2,"changeOverTemp":26.3}
// Payload - TA652FH-W:
{"roomTemp":26.2,"floorTemp":26.3}
```

See roomTemp, changeOverTemp (only for TA652FC-W), floorTemp (only for TA652FH-W).

See uploadFreq.

See uploadThreshold.

CTRL.01 Control Mode

Chart: Message 1:

Message 2:
```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetControlMode","params":"Off"}
```

See controlMode and remoteSetControlMode.

CTRL.02 Fan Mode & Fan Status (only for TA652FC-W)

Chart: Message 1:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload - TA652FC-W:

{"fanMode":"Auto"}
```

Message 2:

Message 3:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FC-W:
{"method":"remoteSetFanMode","params":"Med"}
```

See *fanMode* (only for TA652FC-W), *fanStatus* (only for TA652FC-W) and *remoteSetFanMode* (only for TA652FC-W).

CTRL.03 Set Point & Override Status

Chart: Message 1:

Message 2:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes
```

(continues on next page)

(continued from previous page)

```
// Payload:
{"overrideStatus":false}
```

Message 3:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetSpValue","params":34}
```

Example 4:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetOverrideStatus","params":{}}
```

See spValue, overrideStatus, remoteSetSpValue and remoteSetOverrideStatus.

PRG.01 Program Mode & Program Status

Chart: Message 1:

```
// Message Type: publish client-side attributes update to the server (MQTT, 
→PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"prgMode":"Every-day"}
```

Message 2:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload:

{"prgNextEnable":true}
```

Message 3:

Message 4:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload:
{"prgNextSetpoint":24.5}
```

Message 5:

```
// Message Type: publish client-side attributes update to the server (MQTT,_

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload:

{"prgNextDaysTime":"Wed, 06:00 PM"}
```

Message 6:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request_id
// Payload:
{"method":"remoteSetPrgMode","params":"Sun_mon-fri_sat"}
```

See *prgMode*, *prgNextEnable*, *prgNextCtrlMode*, *prgNextSetpoint*, *prgNextDaysTime* and *remoteSetPrgMode*.

PRG.02 Program Setpoint & Time

Chart: Message 1:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload:

{"prgSpTime00":"10:00"}
```

Message 2:

Message 3:

Message 4:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetPrgSpTime27","params":"23:00"}
```

Message 5:

Message 6:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request_id
// Payload:
{"method":"remoteSetPrgSpValue14","params":21.5}
```

See *prgSpTimeXX*, *prgCtrlModeXX*, *prgSpValueXX*, *remoteSetPrgSpTimeXX*, *remoteSetPrgCtrlModeXX* and *remote-SetPrgSpValueXX*.

SET.01 Upload Device Attributes when the device is started

Chart: Message 1:

Message 2:

```
// Message Type: publish client-side attributes update to the server (MQTT, 
→PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"supportCtrlModeInSchedule":"Yes",
"currentTempUnit":"°C",
"envirTempMin":0,"envirTempMax":50,"envirTempStep":0.1,
"spValueMin":5,"spValueMax":40,"spValueStep":0.5,
"internalOffsetMin":-5,"internalOffsetMax":5,"internalOffsetStep":0.5,
"uploadThresholdMin":0.2,"uploadThresholdMax":5,"uploadThresholdStep":0.1}
```

Message 3 - TA652FC-W:

(continued from previous page)

```
→":0.5,
"changeOverTempHeatingMin":27,"changeOverTempHeatingMax":40,
→"changeOverTempHeatingStep":0.5,
"changeOverTempCoolingMin":10,"changeOverTempCoolingMax":25,
→"changeOverTempCoolingStep":0.5}
```

Message 3 - TA652FH-W:

See model, mac, wifiFWVersion, mcuFWVersion, wifiRSSIMin, wifiRssiMax, wifiRssiStep, uploadFreqMin, uploadFreqMax, uploadFreqStep, syncTimeFreqMin, syncTimeFreqMax and syncTimeFreqStep.

See supportCtrlModeInSchedule, currentTempUnit, envirTempMin, envirTempMax, envirTempStep, spValueMin, sp-ValueMax, spValueStep, internalOffsetMin, internalOffsetMax and internalOffsetStep, uploadThresholdMin, uploadThresholdMax and uploadThresholdStep.

See floorTempLimitedMin (only for TA652FH-W), floorTempLimitedMax (only for TA652FH-W), floorTempLimitedStep (only for TA652FH-W), switchingDiffHeatingMin, switchingDiffHeatingMax, switchingDiffHeatingMin, switchingDiffCoolingMin, switchingDiffCoolingMax, switchingDiffCoolingStep, changeOverTempHeatingMin (only for TA652FC-W), changeOverTempHeatingStep (only for TA652FC-W), changeOverTempCoolingMin (only for TA652FC-W), changeOverTempCoolingMax (only for TA652FC-W), changeOverTempCoolingMin (only for TA652FC-W), changeOverTempCoolingMin (only for TA652FC-W), changeOverTempCoolingMax (only for TA652FC-W), changeOverTempCoolingMin (only for TA652FC-W), changeOverTempCoolingMax (only for TA652FC-W).

SET.02 Settings

Chart: Message 1a:

Message 1b:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetTempUnit","params":"°F"}
```

Message 2a:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload:

{"timeFormat":"12hours"}
```

Message 2b:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetTimeFormat","params":"24hours"}
```

Message 3a:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"method":"remoteSetInternalOffset","params":-3.5}
```

Message 3b:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"internalOffset":-3.5}
```

Message 4a:

Message 4b:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetSwitchingDiffHeating","params":3.5}
```

Message 5a:

Message 5b:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSetSwitchingDiffCooling","params":2.5}
```

Message 6a - TA652FH-W:

Message 6b - TA652FH-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FH-W:
{"method":"remoteSetSystemMode","params":"Heat"}
```

Message 7a - TA652FH-W:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload - TA652FH-W:

{"sensorMode":"Internal"}
```

Message 7b - TA652FH-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FH-W:
{"method":"remoteSetSensorMode","params":"External"}
```

Message 8a - TA652FH-W:

Message 8b - TA652FH-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FH-W:
{"method":"remoteSetFloorTempLimited","params":29.5}
```

Message 9a - TA652FH-W:

```
// Message Type: publish client-side attributes update to the server (MQTT, \_ _{\hookrightarrow} PUBLISH)
```

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```
// Topic: v1/devices/me/attributes
// Payload - TA652FH-W:
{"adaptiveControl":false}
```

Message 9b - TA652FH-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FH-W:
{"method":"remoteSetAdaptiveControl","params":true}
```

Message 10a - TA652FC-W:

```
// Message Type: publish client-side attributes update to the server (MQTT,

→PUBLISH)

// Topic: v1/devices/me/attributes

// Payload - TA652FC-W:

{"forceVent":true}
```

Message 10b - TA652FC-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FC-W:
{"method":"remoteSetForceVent","params":false}
```

Message 11a - TA652FC-W:

Message 11b - TA652FC-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FC-W:
{"method":"remoteSetChangeOverMode","params":"Auto"}
```

Message 12a - TA652FC-W:

Message 12b - TA652FC-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request_$
id
```

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```
// Payload - TA652FC-W:
{"method":"remoteSetChangeOverTempHeating","params":27}
```

Message 13a - TA652FC-W:

```
// Message Type: publish client-side attributes update to the server (MQTT, 
→PUBLISH)
// Topic: v1/devices/me/attributes
// Payload - TA652FC-W:
{"changeOverTempCooling":11.5}
```

Message 13b - TA652FC-W:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload - TA652FC-W:
{"method":"remoteSetChangeOverTempCooling","params":10}
```

See tempUnit and remoteSetTempUnit, timeFormat and remoteSetTimeFormat, internalOffset and remoteSetInternalOffset, switchingDiffHeating and remoteSetSwitchingDiffHeating, switchingDiffCooling and remoteSetSwitchingDiffCooling.

See systemMode and remoteSetSystemMode, sensorMode and remoteSetSensorMode, floorTempLimited and remoteSetFloorTempLimited, adaptiveControl and remoteSetAdaptiveControl.(only for TA652FH-W)

See forceVent and remoteSetForceVent, changeOverMode and remoteSetChangeOverMode, changeOverTempHeating and remoteSetChangeOverTempHeating, changeOverTempCooling and remoteSetChangeOverTempCooling.(only for TA652FC-W)

ADM.01 Request all remote parameters when the device is started

Chart:

Message 1:

```
// Message Type: request attribute values from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/attributes/request/$request_id
// Payload:
{"sharedKeys":"uploadFreq,uploadThreshold,syncTimeFreq,timezone,timeNTPServer"}
```

Message 2:

```
// Message Type: receive response (MQTT, PUBLISH)
// Topic: v1/devices/me/attributes/response/$request_id
// Payload:
{"shared":{"uploadFreq":300,"uploadThreshold":1.5,"syncTimeFreq":86400,
"timezone":480,"timeNTPServer":"pool.ntp.org"}}
```

See uploadFreq, uploadThreshold, syncTimeFreq, timezone and timeNTPServer.

ADM.02 Timer Parameters & upload threshold

Chart: Message 1:

```
// Message Type: receive attribute update from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"uploadFreq":300}
```

Message 2:

```
// Message Type: receive attribute update from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"uploadThreshold":1.5}
```

Message 3:

```
// Message Type: receive attribute update from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"syncTimeFreq":86400}
```

See uploadFreq, uploadThreshold and syncTimeFreq.

ADM.03 Remote Sync Time

Chart: Message 1:

```
// Message Type: receive attribute update from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"timezone":480}
```

Message 2:

```
// Message Type: receive attribute update from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/attributes
// Payload:
{"timeNTPServer":"pool.ntp.org"}
```

Message 3:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteSyncTimeRequest","params":{}}
```

See timezone, timeNTPServer and remoteSyncTimeRequest.

ADM.04 FUOTA (firmware update over the air)

The flow is to download the firmware from your HTTP server. For the flow of downloading firmware from ThingsBoard server, please refer to *Firmware API*.

Chart:

Message 1a:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteWiFiFUOTA",
"params":"http://192.168.1.106/TA652FC-W_WiFi.ino.bin"}
```

Message 1b:

```
// Message Type: send response (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/response/$request_id
// Payload:
{"method":"remoteWiFiFUOTA","results":{"result":"success"}}
```

Message 2a (NOT implemented):

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteMcuFUOTA",
"params":"http://192.168.1.106/TA652FC-W_MCU.bin"}
```

Message 2b (NOT implemented):

```
// Message Type: send response (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/response/$request_id
// Payload:
{"method":"remoteMcuFUOTA","results":{"result":"success"}}
```

See remoteWiFiFUOTA and remoteMcuFUOTA.

ADM.05 Remote Get Memeory Usage

Chart:

Message 1a:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteGetMemoryUsage"}
```

Message 1b:

```
// Message Type: send response (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/response/$request_id
// Payload:
{"iram":162592,"spiram":4194252}
```

See remoteGetMemoryUsage.

ADM.06 Remote Reboot Device

Chart: Message 1:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteRebootDevice","params":{}}
```

See remoteRebootDevice.

ADM.07 Remote Clear Wi-Fi Config

Chart: Message 1:

```
// Message Type: receive server-side RPC request from the server (MQTT, PUBLISH)
// Topic: v1/devices/me/rpc/request/$request_id
// Payload:
{"method":"remoteClearWiFiConfig","params":{}}
```

See remoteClearWiFiConfig.

Claiming

Refer to Claiming API.

Firmware update with ThingsBoard Server

Refer to Firmware API.

4.6.5 Telemetry (Time-series data)

Tip:

- All of these telemetry (timeseries data) is uploaded every uploadFreq seconds.
- If these telemetry (timeseries data) change exceeds uploadThreshold, upload immediately.

roomTemp

changeOverTemp

floorTemp

wifiRssi

Time- series	Туре	Unit	Min	Max	Step/Prec V	/alu	TA652 FC-W	TA652 FH-W	Memo
roomTemp	float	current- Tem- pUnit	en- virTemp- Min	en- virTemp- Max	en- virTemp- Step				Room temperature
changeOverTe	float	current- Tem- pUnit	en- virTemp- Min	en- virTemp- Max	en- virTemp- Step				Change Over Tem- peratue
floorTemp	float	current- Tem- pUnit	en- virTemp- Min	en- virTemp- Max	en- virTemp- Step				Floor Temperatue
wifiRssi (depre- cated)*	int		wifiRssiN	wifiRssi- Max	wifiRssiS- tep				Received Signal Strength Indicator

Table 3: Telemetry (Time-series data)

Tip: In order to reduce the load on ThingsBoard server, *wifiRssi* is no longer sent.

4.6.6 Shared attributes

Tip: All of these shared attributes may be obtained from your ThingsBoard server.

uploadFreq

uploadThreshold

syncTimeFreq

timezone

timeNTPServer

Sharec at- tribute	Туре	Unit	Min	Max	Step/Pr	Value	TA652 FC- W	TA652 FH- W	Memo
up- load- Freq	int	sec- ond	up- load- Fre- qMin	up- load- Freq- Max	up- load- Fre- qStep	Default: 300			Time-series (Telemetry) up- load Frequency. see <i>Step 4.2</i> <i>Add shared attributes of new</i> <i>device</i> .
up- load- Thresh- old	dou- ble	tem- per- a- ture	up- load- Thresh- old- Min	up- load- Thresh- old- Max	up- load- Thresh- old- Step	Default: 1.5			Time-series (Telemetry) up- load Threshold. see <i>Step 4.2</i> <i>Add shared attributes of new</i> <i>device</i> .
sync- Time- Freq	int	sec- ond	sync- Time- Fre- qMin	sync- Time- Freq- Max	sync- Time- Fre- qStep	Default: 86400 (24*3600)			timer period of sync datetime. see Step 4.2 Add shared at- tributes of new device.
time- zone	int	minut				Default: 480 (8*60)			offset UTC. see <i>Step 4.2 Add</i> shared attributes of new de-vice.
ti- meNTF	string					Default: pool.ntp.org (127 char+'0')			SNTP server, eg: pool.ntp.org . see <i>Step 4.2 Add shared at-</i> <i>tributes of new device</i> .

 Table 4: Shared attributes

4.6.7 Client-side attributes

Client-side attribute (static/fixed)

model

mac

wifiFWVersion

mcuFWVersion

Client-side attribute (static/fixed)	Type Unit	Value	TA652 FC-W	TA652 FH-W	Memo
model	string	"TA652FC-W-TB", "TA652FH-W-TB"			Product Model
mac	string	eg: "34:02:86:5F:23:A9"			Mac Address
wifiFWVersion	string	eg: "1.5.5"			WiFi Module F/W version
mcuFWVersion	string	eg: "1.5.4"			Main MCU F/W version

 Table 5: Client-side attribute (static/fixed)

Client-side attribute (static/fixed, metadata)

wifiRssiMin

wifiRssiMax

wifiRssiStep

uploadFreqMin

uploadFreqMax

uploadFreqStep

syncTimeFreqMin

syncTimeFreqMax

syncTimeFreqStep

	1		Chem	-side attribute (sta	tic/fixed, file	(addia)	
Client-side (static/fixed, metae	attribute data)	Туре	Unit	Value	TA652 FC-W	TA652 FH-W	Memo
wifiRssiMin		int		0			the minimum value of <i>wifiRssi</i>
wifiRssiMax		int		255			the maximum value of <i>wifiRssi</i>
wifiRssiStep		int		1			the step value of wifiRssi
uploadFreqMin		int	sec- ond	2			the minimum value of <i>uploadFreq</i>
uploadFreqMax		int	sec- ond	30*24*3600 (2592000)			the maximum value of <i>uploadFreq</i>
uploadFreqStep		int	sec- ond	1			the step value of <i>upload</i> - <i>Freq</i>
syncTimeFreqMin		int	sec- ond	30*60			the minimum value of <i>syncTimeFreq</i>
syncTimeFreqMax		int	sec- ond	30*24*3600			the maximum value of <i>syncTimeFreq</i>
syncTimeFreqStep		int	sec- ond	1			the step value of <i>sync-TimeFreq</i>

 Table 6: Client-side attribute (static/fixed, metadata)

Client-side attribute (semi-static)

supportCtrlModeInSchedule

currentTempUnit

tempResolution

envirTempMin

envirTempMax

envirTempStep

spValueMin

spValueMax

spValueStep

internalOffsetMin

internalOffsetMax

internalOffsetStep

uploadThresholdMin

uploadThresholdMax

uploadThresholdStep

floorTempLimitedMin

floorTempLimitedMax

floorTempLimitedStep

switchingDiffHeatingMin

switchingDiffHeatingMax

switchingDiffHeatingStep

switchingDiffCoolingMin

switchingDiffCoolingMax

switchingDiffCoolingStep

changeOverTempHeatingMin

changeOverTempHeatingMax

changeOverTempHeatingStep

changeOverTempCoolingMin

changeOverTempCoolingMax

changeOverTempCoolingStep

Client-side at- tribute (semi- static)	Туре	Unit	Value	TA652 FC-W	TA652 FH-W	Memo
supportCtrlModeIn- Schedule	string		"Yes" / "No"			Control On/Off in schedule
currentTempUnit envirTempMin	string float	current- Tem- pUnit	"°C"/"°F" 0.0 (°C) / 32 (°F)			Centigrade, Fahrenheit the minimum value of <i>roomTemp</i> <i>changeOverTemp</i> , <i>floorTemp</i>
envirTempMax	float	current- Tem- pUnit	50.0 (°C) / 120 (°F)			the maximum value of <i>roomTemp</i> changeOverTemp, floorTemp
envirTempStep	float	current- Tem- pUnit	0.1 (°C) / 0.5 (°F)			the step value of roomTemp changeOverTemp, floorTemp
spValueMin	float	current- Tem- pUnit	5.0 (°C) / 40 (°F)			the minimum value of <i>spValue prgSpValueXX</i>
spValueMax	float	current- Tem- pUnit	40.0 (°C) / 104 (°F)			the maximum value of <i>spValue prgSpValueXX</i>
spValueStep	float	current- Tem- pUnit	0.5 (°C) / 1.0 (°F)			the step value of <i>spValue prgSpValueXX</i>
internalOffsetMin	float	current- Tem- pUnit	-5.0 (°C) / - 10 (°F)			the minimum value of <i>internalOff-set</i>
internalOffsetMax	float	current- Tem- pUnit	5.0 (°C) / 10 (°F)			the maximum value of <i>internalOff-set</i>
internalOffsetStep	float	current- Tem- pUnit	0.1 (°C) / 0.5 (°F)			the step value of <i>internalOffset</i>
uploadThreshold- Min	float	current- Tem- pUnit	0.2 (°C) / 32 (°F)			the minimum value of upload- Threshold
uploadThreshold- Max	float	current- Tem- pUnit	5.0 (°C) / 41 (°F)			the maximum value of <i>upload-Threshold</i>
uploadThresholdtep	float	current- Tem- pUnit	0.1 (°C) / 0.5 (°F)			the step value of uploadThreshold
floorTempLimited- Min	float	current- Tem- pUnit	20.0 (°C) / 68 (°F)			the minimum value of <i>floorTem-</i> <i>pLimited</i>
floorTempLimited- Max	float	current- Tem- pUnit	5.0 (°C) / 10 (°F)			the maximum value of <i>floorTempLimited</i>
floorTempLimited- Step	float	current- Tem- pUnit	40.0 (°C) / 104 (°F)			the step value of <i>floorTempLimited</i>
120 itchingDiffHeat- ingMin	float	current- Tem- pUnit	0.5 (°C) / 1 (°F)		Chapter	4th JA652EGnW WitEi Thermosta ingDiffHeating
switchingDiffHeat-	float	current-	4.0 (°C) / 8			the maximum value of switch-

Table 7: Client-side attribute (semi-static)

Client-side attribute (application state)

fanStatus

overrideStatus

prgNextEnable

prgNextCtrlMode

prgNextDaysTime

prgNextSetpoint

			,		
Client-side attribute (application state)	Type Unit	Value	TA652 FC-W	TA652 FH-W	Memo
fanStatus	string	"Off", "Low", "Med", "High"			
overrideStatus	bool	true, false			see spValue
prgNextEnable	bool	true, false			Next program en- abled
prgNextCtrlMode	string	"On", "Off"			Next program con- trol On/Off
prgNextDaysTime	float				Next program weekday & time
prgNextSetpoint	float current- TempUnit				Next program set point

Table 8: Client-side attribute (application state)

Client-side attribute (change by server-side RPC, settings)

tempUnit

timeFormat

systemMode

sensorMode

internalOffset

floorTempLimited

switchingDiffHeating

switchingDiffCooling

adaptiveControl

forceVent

changeOverMode

changeOverTempHeating

changeOverTempCooling

					· · · ·	<i>.</i>	,	0	
Client- side at- tribute	Туре	Unit	Min	Max	Step/ Preci- sion	Value	TA65 FC- W	TA65 FH- W	Memo
tem-	string					"°С" / "°Е"			Centigrade, Fahrenheit,
time-	string					г "12hours", "24hours"			see remoteSetTimeFor- mat
system- Mode	string					"Heat", "Cool"			see remoteSetSystem- Mode
sensor- Mode	string					"Internal", "Exter- nal", "Com- bined"			see remoteSetSensor- Mode
inter- nalOff- set	float	cur- rent- Tem- pUnit	inter- nalOff- setMin	inter- nalOff- setMax	inter- nalOff- setStep	"Internal", "Exter- nal", "Com- bined"			Internal Sensor Tem- perture Offset, see <i>re-</i> <i>moteSetInternalOffset</i>
floorTem pLim- ited	float	cur- rent- Tem- pUnit	floorTem- pLimit- edMin	floorTem- pLimit- edMax	floorTem- pLimit- edStep				floor temperature limited (combined mode), see <i>remoteSet-</i> <i>FloorTempLimited</i>
switch- ingDiffH(ing	float	cur- rent- Tem- pUnit	switch- ingDiffHec ingMin	switch- ingDiffHec ingMax	switch- ingDiffHec ingStep				Switching Differ- ential Heating, see remoteSetSwitch- ingDiffHeating
switch- ingDif- fCool- ing	float	cur- rent- Tem- pUnit	switch- ingDiff- Cooling- Min	switch- ingDiff- Cooling- Max	switch- ingDiff- Cooling- Step				Switching Differ- ential Cooling, see remoteSetSwitch- ingDiffCooling
adap- tive- Control	bool					true, false			see remoteSetAdaptive- Control
forceVent	bool					true, false			Force Ventialation, see remoteSetForceVent
changeOv Mode	string					"Heat", "Cool", "Auto"			see remote- SetChangeOverMode
changeOv pHeat- ing	float	cur- rent- Tem- pUnit	changeOve pHeat- ingMin	changeOve pHeat- ingMax	changeOve pHeat- ingStep				Change Over Temp Heating, see remote- SetChangeOverTem- pHeating
changeOv pCool- ing	float	cur- rent- Tem- pUnit	changeOve pCool- ingMin	changeOve pCool- ingMax	changeOve pCool- ingStep				Change Over Temp Cooling, see remote- SetChangeOverTemp- Cooling

Table 9: Client-side attribute (change by server-side RPC, settings)

Client-side attribute (change by server-side RPC, control & program)

controlMode

fanMode

spValue

prgMode

prgSpTimeXX

0 <= XX <= 27, prgSpTime00 ~ prgSpTime27

prgCtrlModeXX

0 <= XX <= 27, prgCtrlMode00 ~ prgCtrlMode27

prgSpValueXX

0 <= XX <= 27, prgSpValue00 ~ prgSpValue27

		progra	am)						
Client- side at- tribute	Туре	Unit	Min	Max	Step/ Preci- sion	Value	TA652 FC- W	TA652 FH- W	Memo
con- trolMode	string					"Off", "On"			see remoteSet- ControlMode
fan- Mode	string					"Auto", "Low", "Med", "High"			see remoteSet- FanMode
spValue	float	cur- rent- Tem- pUnit	sp- Val- ueMin	sp- Val- ue- Max	spVal- ueStep				see remoteSet- SpValue, see overrideStatus
prgMode	string					"No-program", "One- day", "Sun_mon- fri_sat", "Every-day"			see remoteSet- PrgMode
prgSp- Ti- meXX	string					"hh:mm", eg: "23:50"			see remoteSet- PrgSpTimeXX
prgC- trlMod- eXX	string					"On", "Off"			see remoteSet- PrgCtrlMod- eXX
prgSp- Val- ueXX	float	cur- rent- Tem- pUnit	sp- Val- ueMin	sp- Val- ue- Max	spVal- ueStep				see remoteSet- PrgSpValueXX

Table 10: Client-side attribute (change by server-side RPC, control & program)

4.6.8 Server-side RPC

Server-side RPC (remote change client-side attribute)

Tip:

- All of these server-side RPC are **one-way**, no response
- Request format of these server-side RPC: {"method":"remoteSetTempUnit", "params":"°F"}
- **params** value see *Client-side attribute* (*change by server-side RPC, settings*) & *Client-side attribute* (*change by server-side RPC, control & program*)

remoteSetTempUnit remoteSetTimeFormat remoteSetSystemMode remoteSetSensorMode remoteSetInternalOffset remoteSetFloorTempLimited remoteSetSwitchingDiffHeating remoteSetSwitchingDiffCooling remoteSetAdaptiveControl remoteSetForceVent remoteSetChangeOverMode remoteSetChangeOverTempHeating remoteSetChangeOverTempCooling remoteSetControlMode remoteSetFanMode remoteSetSpValue remoteSetPrgMode

remoteSetPrgSpTimeXX

0 <= XX <= 27, remoteSetPrgSpTime00 ~ remoteSetPrgSpTime27

remoteSetPrgCtrIModeXX

0 <= XX <= 27, remoteSetPrgCtrlMode00 ~ remoteSetPrgCtrlMode27

remoteSetPrgSpValueXX

0 <= XX <= 27, remoteSetPrgSpValue00 ~ remoteSetPrgSpValue27

Server-side RPC (re- mote change client- side attribute)	params value type	params value	TA652 FC- W	TA652 FH- W	Memo
remoteSetTempUnit	string	"°C" / "°F"			tempUnit
remoteSetTimeFormat	string	"12hours" "24hours"			timeFormat
remoteSetSystemMode	string	"Heat" "Cool"			systemMode
remoteSetSensorMode	string	"Internal" "External" "Combined"			sensorMode
remoteSetInternalOffset	float				internalOffset
remoteSetFloorTem- pLimited	float				floorTempLimited
remoteSetSwitch- ingDiffHeating	float				switchingDiffHeating
remoteSetSwitch- ingDiffCooling	float				switchingDiffCooling
remoteSetAdaptiveCon- trol	bool	true false			adaptiveControl
remoteSetForceVent	bool	true false			forceVent
remoteSetChangeOver- Mode	string	"Heat" "Cool" "Auto"			changeOverMode
remote- SetChangeOverTem- pHeating	float				changeOverTempHeating
remote- SetChangeOverTemp- Cooling	float				changeOverTempCooling
remoteSetControlMode	string	"Off" "On"			controlMode
remoteSetFanMode	string	"Auto" "Low" "Med" "High"			fanMode
remoteSetSpValue	float				spValue
remoteSetPrgMode	string	"No-program" "One- day" "Sun_mon- fri_sat" "Every-day"			prgMode
remoteSetPrgSpTi- meXX	string	"hh:mm", eg: "23:50"			remoteSetPrgSpTime00 ~ remoteSetPrgSpTime27, see <i>prgSpTimeXX</i>
remoteSetPrgCtrlMod- eXX	string	"On" "Off"			remoteSetPrgCtrlMode00 ~ remoteSetPrgCtrlMode27, see <i>prgCtrlModeXX</i>
remoteSetPrgSpVal- ueXX	float				remoteSetPrgSpValue00 ~ remoteSetPrgSpValue27, see <i>prgSpValueXX</i>

Table 11: Server-side RPC (remote change client-side attribute)

Server-side RPC (remote control)

remoteSetOverrideStatus

remoteSyncTimeRequest

remoteClearWiFiConfig

remoteRebootDevice

remoteWiFiFUOTA

remoteMcuFUOTA

remoteGetMemoryUsage

Server- side RPC	one- way two- way	Request	Response	TA65 FC- W	TA65 FH- W	Memo
remote- SetOver- rideStatus	one- way	{"method":"remote\$ "params":{}}				$\begin{array}{llllllllllllllllllllllllllllllllllll$
re- moteSync- TimeReques	one- way	{"method":"remotes "params":{}}				
remote- Clear- WiFiCon- fig	one- way	{"method":"remote("params":{}}				
re- moteRe- bootDe- vice	one- way	{"method":"remoteF "params":{}}				
re- moteWiFi- FUOTA	two- way	{"method":"remote\ "params":"http: //192.168.1.2/x. img"}	{"method":"remoteWiFiFUOTA", "results":{"result":"success"}}, or {"method":"remoteWiFiFUOTA", "results":{"result":"failure", "descrip- tion":"xxx"}}			
remoteM- cu- FUOTA (NOT imple- mented)	two- way	{"method":"remote "params":"http: //192.168.1.1/y. img"}	{"method":"remoteMcuFUOTA", "results":{"result":"success"}}, or {"method":"remoteMcuFUOTA", "results":{"result":"failure", "descrip- tion":"xxx"}}			
re- moteGet- Memo- ryUsage	two- way	{"method":"remote("params":{}}	{"method":"remoteGetMemoryUsage", "results":{"iram":123123, "spi- ram":2345678}}			

Table 12: Server-side RPC (remote control)

CHAPTER

TA652FH-W WI-FI THERMOSTAT

These references will help you learn more about TA652FH-W Wi-Fi Thermostat, operate it, and even realize your personalized Dashboard.

- Specification
- Add to ThingsBoard | Connect to ThingsBoard | Demo Dashboards
- MQTT Device API

5.1 TA652FH-W — Floor Heating Wi-Fi Thermostat

Caution:

- 1. Turn off all electrical devices (e.g. heater, cooler) that are connected to the unit before installation and maintenance.
- 2. The installer must be a trained service personnel
- 3. Disconnect the power supply before maintenance.
- 4. It must be mounted on a dry clean indoor place.
- 5. Do not expose this unit to moisture.
- 6. Do not expose this unit to dipping or splashing.

5.1.1 Introduction

T65 is a controller that controls heater/cooler on or off to maintain room temperature at a desired level.

When **Heat mode** is used, **Internal sensor**, **Floor sensor** and **combined sensor** can be selected for different application.

When Cool mode is selected, Only Internal sensor will be used.

5.1.2 Feature List

- Voltage supply: 230Vac
- Temperature display in °C or °F
- Temperature measurable range : 0 50 $^{\circ}$ C
- Selection of Heat/Cool
- Adaptive control
- 7days / 5+1+1days, 1day program, no program.
- EEPROM stores all settings
- Adjustable control span
- Short cycle protection for compressor

5.1.3 Wiring

NOTE: Power supply of TA652FH-W is 230Vac.

Terminals	Device
L	230Vac Live
Ν	230Vac Neutral
LO	Heater / Cooler
T1	Floor Sensor 1
T2	Floor Sensor 2

Pull all cables back into the wall beforehand to avoid trapping of wires. Do not use any metal conduits or cables provided with metal sheaths.

Recommend adding fuse or protective device in the live circuit.





5.1.4 Mounting





- 1. Wiring the terminals.
- 2. Put into junction box.
- 3. Mount the bottom plate of LCD board into junction box.
- 4. Connect the wire to the LCD board.
- 5. Assemble the Top and bottom plate of LCD Board.

5.1.5 Dimension in mm:





5.1.6 LCD Interface

LCD Indication



sn item

- 1 Time
- 2 Room Temperature
- 3 Current Set Point
- 4 Temperature Unit
- 5 Current Program
- 6 Heat / Cool Mode
- 8 Output is On (when appear)
- 8 Wi-Fi (appear when connected to router)
- 9 Mode Key: Press to **internal setting 1**. Long hold to **internal setting 2**.
- 10 Clock Key: Press to **set clock**. Hold to **Program** the Schedule
- 11 Short Press: Fan Key, Long Hold: On/Off Key
- 12 Up/Down key: Adjust Set point or Value of setting.
- 13 Blank: the area outside of the previous five keys

Turn On/Off the thermostat

Hold I to turn On / Off the thermostat. When the thermostat is Off. No Output will be activated.

Clock setting

Normally the clock is automatically set once Wi-Fi is connected and synchronize for each day. So manual set is not necessary when it is online.

- Press to start the setting
 Press / I to change the day of week
 Press again to confirm day of week setting and start to adjust hour
 Press / I to change the hour
- Press again to confirm hour setting and start to adjust minutes
- Press / / to change the minutes
- Press again to confirm minutes setting and start to adjust day of week
- Press [blank] to confirm or leave the clock setting. Or return after no key pressed for 20 seconds.

Clock synchronization

When Wi-Fi is connected and time synchronization is need. Please use the App for time synchronization.

Schedule Programming

When 1 day / 5+1+1 day / 7day program is selected in internal setting.

- Hold to start the setting.
- Press / / to adjust the day of week
- Press 🕑 to confirm.
- Press / / V to adjust the time of schedule
- Press 🕑 to confirm.
- Press / V to adjust the setpoint
- Press to confirm.

• Press [blank] to confirm return.

Override Temperature

The Set point can be adjusted by \mathbf{D} / \mathbf{D} .

When it is in program mode, the set point will be overwritten until the next time slot.

can be pressed to release the override status.

Internal parameter setting 1

• Operation:

- Press key to start the setting



- Press [blank] to confirm and move to next setting

ID	Items	Value	Default Value
P00	User Interface Screen Saver	0-3	0
P01	Screen Saver Count down	0-120	20
P02	Display unit	°C / °F	°C
P03	Time Display unit	12/24	12
P04	Temperature Offset	-5°C - 5°C, -10°F-10°F	0°C
P05	Switching Differential Heat	2 - 4°C, 4 - 8°F	2°C
P06	Switching Differential Cool	2 - 4°C, 4 - 8°F	2°C
P07	Program mode	No program (0) / 1day program (1) / 5+1+1 program (2) / 7day program (3)	3
P08	Adaptive Control	Enable / Disable	Disable
P09	System Mode	Heat / Cool	Heat
P10	Sensor Mode	Internal Sensor / External Sensor / Combined mode	Internal Sensor
P11	Floor temperature limited	20-40°C, 68-104°F	40°C

• User Interface Screen Saver:

The thermostat will go to screen saver mode after no key for certain period.

- Mode 0: Nothing will be displayed in screen saver mode.
- Mode 1: Only room temperature will be displayed in screen saver mode.
- Mode 2: Room temperature and Time will be displayed in screen saver mode.
- Mode 3: Display all in screen saver mode.
- Screen Saver Count Down:

The count down time (in seconds) to screen saver mode.

• Display Unit:

Temperature unit in Celsius or Fahrenheit.

• Time Display Unit:

12/24.

• Temperature offset:

The temperature of internal sensor can be calibrated from $-5^{\circ}C - +5^{\circ}C$ in case there is temperature difference between actual value and thermostat.

• Switching Differential:

The difference between switching the heating or controller on and off



• Program Mode:

- 0: No Program Mode, the thermostat control the temperature simply according to single setpoint.
- 1: 1 day program, the thermostat control the temperature according to single schedule.
- 2: **5+1+1 day** program, the thermostat control the temperature according to 5 +1+1 schedule (Mon to Fri, Sat, Sun).
- 3: 7 days program, the thermostat control the temperature according to 7day program (individual program for each day).

Adaptive control

When this function is enable, the thermostat learns the time taken to reach the desired setpoint and turn on the heating / cooling earlier so that the room temperature will reach the setpoint at desired schedule. This is no effect when **No program** is selected.
• Heat / Cool Mode

When **Heat mode** is selected, the thermostat control the room temperature with heating. **Room Sensor**, **Floor Sensor** or **Combined sensor** can be selected.

When **Cool mode** is selected, the thermostat control the room temperature with cooling. Only **Room Sensor**, will be used.

• Sensor Mode

There are 3 different settings of sensor control for Heat Mode. (For Cool Mode. Only Room sensor will be used)

- Room sensor

Thermostat control the room temperature based on Room Sensor

- Floor sensor

Thermostat control the room temperature based on Floor Sensor

- Combined Floor-/Room sensor

Thermostat control the room temperature based on Room Sensor. And the output will be off if floor temperature above "floor temperature limited" for protection.

• Floor temperature limited

It is the temperature limited for floor sensor. When the **Heat Mode** and **Combined Sensor** are selected. The output will turn off when floor sensor sense the temperature to be higher than **floor temperature limited**.

Internal parameter setting 2

• Operation:

- Hold key to start the setting

- Press / I to adjust the value

- Press [blank] to confirm and move to next setting

ID	Items	Value	Default Value
P19	Clear Wi-Fi Configuration	Yes or No	No
P20	Clear Parameter setting (restore default)	Yes or No	No

• Clear Wi-Fi Configuration:

When set to yes, the SSID and Password stored in the thermostat will be cleared so another SSID and Password can be set again.

• Clear Parameter setting:

When set to yes, all internal parameter setting will be restored to default value in next power on (reset)

Minimum off time

The minimum off time for Heat mode is 5 seconds and 4 minutes for Cool mode.

Technical Data

Power supply:	195-250 Vac
Relay Contact Voltage:	230Vac Max. 50/60 Hz
Relay Contact Current:	16A Max.
Sensing Element:	103AT
Terminals:	2 sq. mm Cable
Operating Temperature:	32 - 122 °F / 0 - 50 °C
Storage Temperature:	23 - 122 °F / -5 - 50 °C
Operating Humidity:	5-95%RHnon-condensing

5.2 Add TA652FH-W to ThingsBoard

Tip:

- This section applies to the situation where you add TA652FH-W to ThingsBoard Server.
- If you are adding the first Avantec HVAC device to ThingsBoard Server, please refer to Get Started.

5.2.1 Step 1. Tenant Login

- Open ThingsBoard Web UI in browser, e.g. http://localhost:8080
- Tenant Administrator login ThingsBoard.

ا کربر Thi	ngsBoard
Username (email) * Username (email) * tenant@thingsboard.org Password	
	Forgot Password?

Tenant default username and password, refer to Some important parameters.

5.2.2 Step 2. Import Detail Dashboard of TA652FH-W

See Import TA652FH-W Detail Dashboard.

5.2.3 Step 3. Import List Dashboard of TA652FH-W

See Import TA652FH-W List Dashboard.

5.2.4 Step 4. Provision TA652FH-W device

Step 4.1 Add device

 Devices -> + -> Add new device -> Popup Dialog -> Input Name, Label & Description, select device profile -> Add.

[®] ∰, ThingsBoar	·	^	tenant@thingsboard.org
	Add new device	? ×	
Lustomers	Credentials		<u>+</u> ૯ ૧
Assets	Device details Optional	Optional	2 Add new device
	Name * A8:48:FA:57:D5:20 3		
D Device profiles	Label		8 🔸 🤁 🖬 👘
🔅 OTA updates	AVANTEC Headquarters 3		
Entity Views	Device profile *		
Edge instances			
Edge management	O Create new device profile		
Widgets Library	□ Is gateway		C 🔸 😌 🖬 👘
Dashboards	Description		8 📣 🙃 💼
🕑 Audit Logs	A Thermostal for noor healing 3	• Nevt: Credentials	● 英J· ■ # #
11. Api Usage			
🔅 System Settings		Cancel 5 Add	I< < > >I

Field	Value
Name*	My device name, e.g. TA652FH-W-TB, A8:48:FA:57:D5:20
Device profile*	TA652FH-W Thermostat
Label	My device label, e.g. Avantec Manufacturing Plant
Description	My device description, e.g. A Thermostat for floor-heating

Note: The field with * must be filled in.

• Now my device should be listed first, since the table sort devices using the time of the creation by default.

🕵 ThingsBoard	Let Devices	E3 (Enant@thingsboard.org Tenant administrator
🚬 Customers	Devices profile XIII X	+ C Q
Assets		A
[₀] Devices	Created time V Name Device profile Label Customer	er Publ
D Device profiles	2023-04-18 16:28:06 A8:48:FA:57:D5:20 TA652FH-W Thermostat AVANTEC Headquarters	
OTA updates	2023-03-27 15:21:28 A8:48:FA:57:60:A4 TA652FH-W Fai sir's Thermostat	
Edge instances	2023-02-08 09:46:23 9C:9C:1F:19:4D:98 TA652FC-W left Customer	er A 🗌 < 🖄 🛍 🔦 😲 📋
👚 Edge management 🗸 🗸	2023-02-07 18:41:06 9C:9C:1F:18:72:B0 TA652FC-W Thermostat right Customer	er A 🗌 < 😫 🛍 🐆 😲 📋
Widgets Library	2023-02-02 16:05:09 24:0A:C4:2C:EB:D4 TA652FC-W old_board Customer	er A 🛛 < 🖻 🖻 🛧 🤤 🗊
Dashboards	2023-01-26 17:37:43 MY_DEVICE_NAME TA652FC-W MY_DEVICE_LABEL	
Audit Logs	2022-11-30 10:55:04 Thermometer A-1 default Thermometer A-1	
📩 System Settings 🗸 🗸	tems per page: 10	✓ 1-10 of 20 < < >>

Step 4.2 Add shared attributes of new device

• Devices -> Click *my device* -> Attributes -> Shared attributes -> + -> Popup Dialog -> Input Key, Value type & value -> Add

🕵 ThingsBoard	Lon Devices	C 8 tenant@thingsboard.org
A Home		
	Devices All × Device details	0 ×
Lustomers	Created time ↓ Name	Alarma Evente
E Assets	2 click 4 select "shared	attributes"
Devices 1	Entity attributes scope Shared attributes	• 5 + ट २
D Device profiles	Add attribute ×	
道 OTA updates	□ 2023-02-08 09.46:27 6	Value
Entity Views	2023-02-07 18:41:00 uploadEreg	
Edge instances	Value time Interer value *	
🙊 Edge management 🛛 🗸 🗸	123 Integer - 300	
Widgets Library	2023-01-26 17:37:4:	
Dashboards	Cancel 7 Add	4
🕑 Audit Logs	2022-11-14 10:40:22 Beijing ranch	
11. Api Usage		

Please add the following Shared attributes of TA652FH-W:

Table 1:	Add shared	attributes	of	TA652FH-W
rable 1.	nuu sinarcu	annouco	O1	111052111 11

Key*	Value Type*	Value*	Memo		
uploadFreq	Integer	300	5*60. Telemetry per uploadFreq seconds		
uploadThresh- old	Double	1.5	1.5°C. If the temprature (Telemetry data) change exceeds it, up- load immediately!		
syncTimeFreq	Integer	86400	24*3600. Sync time per syncTimeFreq seconds		
timezone	Integer	480	Please replace with your value . The time offset from UTC, minutes. For example Hongkong is UTC+8:00 time zone, this offset is 480 minutes (8*60)		
timeNTPServer	String	pool.ntp.org	SNTP Server URL, e.g. pool.ntp.org, 0.pool.ntp.org, 1.pool.ntp.org, uk.pool.ntp.org, hk.pool.ntp.org, time.nist.gov,		

Note: The field with * must be filled in.

• Now the shared attributes of my device is like:

👸 ThingsBoard	Lon Devices		C C tenant@thingsboard.org Tenant administrator
fraction Home	Device profile	A8'48'FA'57'D5'20	
∢·· > Rule chains	Devices All ×	Device details	? ×
🔔 Customers	Created time 🦊 Name		Alexandra Consta
≣ Assets		C Details Attributes Latest telemetry	Alarms Events Retuin >
Devices	2023-04-18 16:28:06 A8:48:FA:57:D5:20	Entity attributes scope Shared attributes	- + C Q
D Device profiles	2023-03-27 15:21:28 A8:48:FA:57:60:A4	Shared attributes	- · · · ·
🜐 OTA updates	2023-02-08 09:46:23 9C:9C:1F:19:4D:98	Last update time Key 个	Value
📊 Entity Views	2023-02-07 18:41:06 9C:9C:1F:18:72:80	2023-04-18 16:36:12 syncTimeFreq	86400
Edge instances	2022-02-02 16:05:09 24:04:C4:2C:EP:D4	2023-04-18 16:36:35 timeNTPServer	pool.ntp.org
Edge management 🗸 🗸			
😭 Widgets Library	2023-01-26 17:37:43 MY_DEVICE_NAME	2023-04-18 16:36:24 timezone	480
Dashboards	2022-11-30 10:55:04 Thermometer A-1	2023-04-18 16:35:40 uploadFreq	300
🕑 Audit Logs	2022-11-14 10:40:22 Beijing ranch	2023-04-18 16:35:56 upload Threshold	1.5
ılı Api Usage			
🔹 System Settings 🗸 🗸		Items per page: 10 💌	1 – 5 of 5 < < >>

You may also use:

- Bulk provisioning to provision multiple devices from a CSV file using UI.
- Device provisioning to allow device firmware to automatically provision the device, so you don't need to configure each device manually.
- REST API to provision devices and other entities programmatically.

5.2.5 Step 5. Connect TA652FH-W device

Step 5.1 Copy credentials of new device

To connect the device you need to get the device credentials first. ThingsBoard supports various device credentials. We recommend using default auto-generated credentials which is access token for this guide.

• Devices -> Manage credentials (icon) -> Popup Dialog -> Select Access Token, Ctrl + C.

thingsBoard	Lon Devices				0	0	tenant(Tenant	@thingsboa administra	ard.org itor
🔒 Home	Device profile								
⟨··⟩ Rule chains	Devices All	X						+ (୯୯
Lustomers	Created time 🗸	Name Device pro	file Label	Customer	Publ				
E Assets		TA652FH-	W AVANTEC			A	-	2) <u>-</u>
Devices 1	2023-04-18 16:28:06	A8:48:FA:57:D5:20 Thermost	at Headquarters				E		
D Device profiles	2023-03-27 15:21:28	Device Credentials	×		$\Box <$	Ĺ	Ċ	• 🔮	Ĩ
OTA updates	2023-02-08 09:46:23	Gradantiala tuna		Customer A	$\Box \leq$	e	Ê	• •	Î
Entity Views	2023-02-07 18:41:06	Access token	•	Customer A		8	Ê	• •	Î
🛋 Edge instances		Access token * 3 copy				-	-		-
🙊 Edge management 🛛 🗸	2023-02-02 16:05:09	jnRdZiBT4zYxHklvu8gy		Customer A		2			
Widgets Library	2023-01-26 17:37:43		ABEL		$\Box \leq$	Ê	Ê.	• •	Î
Dashboards	2022-11-30 10:55:04		Cancel Save A-1			Ê	Ê	< 0	Î
logs	2022-11-14 10:40:22	Beijing ranch TA652FC- Thermost	W Beijing Branch at			Ê	Ô	< 😯	Î

Tip: The Credentials (Access Token), which you need to use when you're configuring your hardware, for example, *j9JiCkID9E7uE1WhKxnc*, *lMTQLZ7VSRQSD7ls*.

Step 5.2 Connect device to ThingsBoard

See Connect TA652FH-W to ThingsBoard.

Step 5.3 Publish data to ThingsBoard

Now your device has already published telemetry data to ThingsBoard. You should immediately see them in the Device Telemetry Tab:

م ThingsBoard	Lan Devices	tenant@thingsboard.org : Tenant administrator
☆ Home	Device profile A8:48:FA:57:D5:20	
	Devices All × Device details	? ×
🔑 Customers	Created time ↓ Name	
E Assets		Alarms Events Return
Devices 1	Latest telemetry	Q
D Device profiles	2023-03-27 15:21:28 A8:48:FA:57:60:A4	
: OTA updates	□ 2023-02-08 09:46:23 9C:9C:1F:19:4D:98	Value
🔚 Entity Views	2023-02-07 18:41:06 9C:9C:1F:18:72:B0 2023-04-18 16:52:32 current_f	w_title TA652FH-W-TB 4
Edge instances		w version 2.1.6
👚 Edge management 🛛 🗸	2023-02-02 16:05:09 24:0A:C4:2CEB:D4	
Widgets Library	2023-01-26 17:37:43 MY_DEVICE_NAME 2023-04-18 16:52:33 floorTem	p 15.3
Dashboards	2022-11-30 10:55:04 Thermometer A-1 2023-04-18 16:52:33 roomTem	1p 23.7

5.2.6 Step 6. Assign Device and Dashboards to Customer

One of the most important ThingsBoard features is the ability to assign Dashboards to Customers. You may assign different devices to different customers. Then, you may create a Dashboard(s) and assign it to multiple customers. Each customer user will see his own devices and will not be able to see devices or any other data that belongs to a different customer.

Refer to Step 7.1 Create customers, Step 7.4 Create customer user & Step 7.5 Activate customer user.

Step 6.1 Assign dashboards of TA652FH-W to Customer

• Assign *Detail dashboard* to Customer: **Dashboards** -> Click **Manage assigned customers** (icon) in *Detail dashboard* line -> **Popup Dialog** -> Select *My New Customer* -> **Update**.

ThingsBoard	Dashboards	: e Tenant administrator
🔒 Home		
⟨··⟩ Rule chains	Dashboards	+ C Q
2. Customers	Created time 🕹 Title Assigned to customers Public	· · · ·
E Assets	2 click	'manage assiged customers"
Devices	2023-03-30 17:28:44 Heiniosaa (Pol Mobile App)	± < < ₽ ≠ ∎
Profiles 🗸 🗸	202 Manage assigned customers X	± < < 🖻 🗡 🗊
OTA updates	202: Assigned customers	± < ≤ ≙ Z ≣
Entity Views	2022 An New Customer X Section list	+ < 6 月 / 正
📑 Edge instances		
👚 Edge management 🛛 🗸	202:	± < < 🖻 🗡 🗊
Widgets Library	Cancel 4 Update	土 く 糸 白 / 盲
Dashboards	2022-11-08 13:37:17 Charging Port (For Mobile Device Claiming Customer, Demo Customer	土 く 糸 色 / 言
Version control	2022-11-08 13:37:16 EV Charging Stations Demo Customer	+ くら良之言
🕑 Audit Logs		

Assign List dashboard to Customer: Dashboards -> Click Manage assigned customers (icon) in List dashboard line -> Popup Dialog -> Select My New Customer -> Update.

🎉 ThingsBoard	Tashboards	: O Tenant administrator
🔒 Home		
	Dashboards	+ C Q
22 Customers	Created time 🤟 Title Assigned to customers Public	•
E Assets		2
Devices	2023-03-30 17:28:32 TA652FH-W Thermostat List	± < ∧ ₽ / ∎
🔓 Profiles 🗸 🗸	2022 Manage assigned customers X	土 く 糸 白 / 前
OTA updates	202: Assigned customers	土 く 糸 色 之 正
Entity Views	A Entity list	土くを自之主
📕 Edge instances		
죾 Edge management 🗸 🗸		± < < 혐 ≠ ≣
Widgets Library	Cancel 4 Update	- 土 く 糸 白 / 主
Dashboards	2022-11-08 13:37:16 EV Charging Stations Demo Customer	土く木白ノ市
 Version control Audit Loas 	2022-11-08 13:37:16 Air Quality Sensor (For Mobile App) Device Claiming Customer, Demo	± < < ₿ ≠ i

• It's like this now.

🙀 ThingsBoard		- Dashboards				: S Tenant administrat						
Assets	^ D	ashboards							+			
Lon Devices		ashbourds										
Profiles 🗸 🗸		Created time 🔸	Title	Assigned to customers	Public							
OTA updates		2023-03-30 17:28:44	TA652FH-W Thermostat (For Mobile App)	My New Customer		<u>+</u>	<	•	Ê		Î	1
🔚 Entity Views		2023-03-30 17:28:32	TA652EH-W Thermostat List	My New Customer		ŧ	~	6	Ô		-	1
Edge instances		2020 00 00 17 20.02				-	~					-1
죾 Edge management 🗸 🗸		2023-02-02 12:19:22	Test Claiming	Device Claiming Customer		⊥	<	•	Ê		Î	
Widgets Library		2023-01-09 14:34:32	Firmware			<u>+</u>	<	•	Ê		Î	I
Dashboards		2023-01-03 17:45:42	TA652FC-W Thermostat List	My New Customer		<u>+</u>	<	•	Ê		Î	
Version control		0000.01.00.17:16:01	TA652FC-W Thermostat (For	Mu New Customer			~	4	-		=	
O Audit Logs		2023-01-03 17:16:01	Mobile App)	wy new customer		_	~	-				
ılı Api Usage		2022-11-08 13:37:17	Charging Port (For Mobile App)	Device Claiming Customer, Demo Customer		<u>+</u>	<	•	Ê		Î	-

Step 6.2 Assign TA652FH-W device to Customer

• Devices -> Click Assign to customers (icon) in *My New Device* line -> Popup Dialog -> Select *My New Customer* -> Assign.

thingsBoard	la Devices	C S Tenant administrator
🔒 Home	Device profile	
<> Rule chains	Devices All ×	+ C Q
2 Customers	Created time 🕁 Name Device profile Label Customer	Public 2 Click "Assign to sustamor"
Assets	TA652FHW	
Devices	2023-03-28 11:35/48 A8/48:FA:57/05/20 Thermostat new m	
🔓 Profiles 🗸 🗸	Assign Device(s) To Customer ×	
🛱 OTA updates	2023-03-14 11:51:04	
📰 Entity Views	Please select the customer to assign the device(s) 2023-03-14 11:41:43 Customer*	
Edge instances	My New Customer 3 ×	
🙊 Edge management 🛛 🗸	2023-03-10 15:26:22	
Widgets Library	2023-03-09 16:46:58 Cancel 4 Assign	
Dashboards	2023-02-08 09:33:11 9C:9C:1F:18:72:B0 TA652FC-W right	
S Version control	2023-02-08 09:32:00 9C:9C:1F:19:4D:98 TA652FC-W left	

• It's like this now.

🎉 ThingsBoard	[Device	s						:	3	9	enant a	dminist	rator	
🔒 Home			Device profile												٦
	D	evices	All	×								+	- C	; Q	
2 Customers		Created	time 🕹	Name	Device profile	Label	Customer	Public							1
Assets				10 10 51 53 55 00	TA652FH-W	0	My New	_	,0	-	-			-	
Devices		2023-03	3-28 11:35:48	A8:48:FA:57:D5:20	Thermostat	new fn	Customer		5				V		
🗜 Profiles 🗸 🗸		2023-03	3-27 15:29:08			760A4			<	Ĺ	È	•	0	Î	I
⊕ OTA updates		2023-03	3-14 11:51:04		mermostat	87240			<	Ĺ	Ê	•	•	Î	I
🔚 Entity Views		2023-03	3-14 11:41:43		TAGEOFO W	872B4			<	Ĺ	Ê	•	•	Î	
Edge instances													-		-

5.2.7 Step 7. Open Dashboards of TA652FH-W

- You are logged in as a Customer User or a Tenant user.
- **Dashboards** -> click my list dashboard

م ThingsBoard	🕂 Dashboards					Tenant ad	ministrator
Hi Assers	•						
Devices	Dashboards					+	GQ
🖆 Profiles 🛛 🗸							
OTA updates	Created time ↓ 2 click	Title	Assigned to customers	Public			
📊 Entity Views	2023-03-30 17:28:32	TA652FH-W Thermostat List	My New Customer		± <	۵ 🔶	< T
Edge instances	2023-02-02 12:19:22		r		± <	< ₿	/ 1
	2023-01-09 14:34:32				± <	< P	2 T
😭 Widgets Library	-			_	- •		
Dashboards 1	2023-01-03 17:45:42		mer		± <	< ₿	/ 1
Version control	2023-01-03 17:16:01	T	-		± <	< ₿	/ =
🕑 Audit Logs	2022-11-08 13:37:17	-1 -nin			± <	< ₿	/ 1
ılı Api Usage							•
🔹 System Settings 🛛 🗸			lt	ems per page: 10 💌	1 - 10 of 22	< <	> >

• Select my device -> **Settings** (icon)

🕵 ThingsBoard		📑 Dashboards 🗧 🖬 TA652FH-W Thermostat List						🖸 😫 Tenant administrator					
 [0] Devices	^	TA652FH-W Then	mostat Li	st TA65	2FH-W Th	ermostat List -	Lo Entities	() Rea	ltime - las	t minute 👤		0	
Profiles 🗸 🗸		TA652FH-W Therm	nostats							۹ 💷 🕄			
OTA updates	Ы	Device name ↑	Label	Туре	active	Room Temp	Floor Temp	Setpoint	Unit	A			
Entity Views										3			
Edge instances		A8:48:FA:57:5C:68	75C68	TA652FH-W Thermostat	false	23.7	26.2	21	°C	\$			
👚 Edge management 🗸 🗸		A8:48:FA:57:60:A4	760A4	TA652FH-W Thermostat	false	23.9	26.6	16	°C	\$			
Widgets Library		A8:48:FA:57:D5:20	new fh	TA652FH-W	false	23.4	15.3	16	°C	¢			
Dashboards				mermostat									
• Version control						Items per pa	ge: 10 🔻	1 – 4 of 4	< <	> >1			
🕑 Audit Logs													

• Switch page -> Operation

میں ThingsBoard	📲 Dashboards ゝ 📑 TA652FH-W Thermostat (For Mobile App)	CI CIANG TC Frenant administrator
A Customers	MONITOR > CONTROL > PROGRAM > SETTINGS > ADMIN > 4	
Assets		
[₀] Devices	Room temperature Floor temperature 5	
Profiles 🗸 🗸	15.3°C	
④ OTA updates	Setpoint	
Η Entity Views	23.4 16.0°C	
Edge instances	Temperature history	
👚 Edge management 🗸 🗸 🗸	🕓 Realtime - last 7 days	
Widgets Library		
Dashboards	0 Apr 12 Apr 13 Apr 14 Apr 15 Apr 16 Apr 17 Apr 18	
• Version control	Room temperature Floor temperature	
🕑 Audit Logs		

See TA652FH-W Demo Dashboards Usage.

5.2.8 Your feedback

Don't hesitate to star Avantec on github to help us spread the word.

5.3 Connect TA652FH-W to ThingsBoard

See Connect TA652FC-W to ThingsBoard.

5.4 TA652FH-W Thermostat – Demo Device Profile Usage

5.4.1 Import device profile

Tip: A Device Profile file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

- Download ta652fh_w_thermostat.json.
- **Profiles** -> **Device profiles** -> + -> **Popup dialog: Import device profile** -> Drag and drop *my device profile File* -> **Import**.

🎉 ThingsBoard	Device profiles	E enant@thingsboard.org
Assets	Device profiles 2	! import device profile 🕂 උ ्
 Device profiles OTA updates Entity Views Edge instances Edge management Widgets Library Dashboards 	a import device profile a 22 bevice profile file Drop a JSON file or click to select a file to upload. × ta652fh_w_thermostat.json Cancel 4 Import	Default Image: Second
 (b) Audit Logs (c) Api Usage (c) System Settings (c) System Settings (c) System Settings 	Items per page Device profiles	: 10 1-4 of 4 < < > > : 10 1-4 of 4 < < > > : 10 1-4 of 4 < < > > : 10 1-4 of 4 < < > >
Assets	Device profiles	+ C d
D Device profiles	Created time V Name Profile type Transport type Descrip	tion Default
OTA updates Entity Views	2023-04-18 15:20:44 TA652FH-W Thermostat Default Avante Floor H	c Thermostat leating
Edge instances	2022-10-06 15:54:01 Test Default Default tttt	
Tedge management	2022-04-06 10:44:18 TA652FC-W Default Default	
Widgets Library Dashboards	2022-04-06 10:21:03 thermostat Default Default Thermostat 2022-04-06 10:21:01 default Default Default Default	stat device profile 📄 🛓 🃭 🧃
🕑 Audit Logs		

5.4.2 Modify device profile's mobile dashboard

Device profile's mobile dashboard is for ThingsBoard Mobile Application or ThingsBoard PE Mobile Application.

• **Profiles** -> **Device profiles** -> click *my device profile* -> **Toggle edit mode** (red icon)

🎉 ThingsBoard	Device profiles	1 enant@thingsboard.org
Lol Devices		
D Device profiles	Device profiles	Device profile details
OTA updates	Created time 🕹 🛛 Name	Pr 3
🔛 Entity Views	2 click	Details Transport configuration Alarm rules (0) Device provision
🗒 Edge instances	2023-04-18 15:20:44 TA652FH-W Thermostat	De
	2022-10-06 15:54:01 Test	Rule chain De
😭 Widgets Library	2022-04-06 10:44:18 TA652FC-W Thermostat	De Mobile dashboard
Dashboards		Used by mobile application as a device details dashboard
🕑 Audit Logs	2022-04-06 10:21:03 thermostat	De Queue Name
II. Api Usage	2022-04-06 10:21:01 default	De Assigned firmware
🔹 System Settings 🗸 🗸		Assigned minimale
	¥	Assigned coffware

• Modify *Mobile dashboard* -> **Apply changes** (red icon)

🕵 ThingsBoard	Device profiles	C S tenant@thingsboard.org : Tenant.administrator
[₀] Devices ^		TAGE2EU W/Thermostet
D Device profiles	Device profiles	Device profile details
OTA updates	Created time 🖌 Name	
Entity Views	THEFT	Details Transport configuration Alarm rules (0) Device providence of the second s
Edge instances	2023-04-18 15:20:44 TA652FH-W Thermostat	De
🕤 Edge management 🗸 🗸	2022-10-06 15:54:01 Test	De
Widgets Library	2022-04-06 10:44:18 TA652FC-W Thermostat	Mobile dashboard TA652FH-W Thermostat (For Mobile App)
Dashboards		Used by mobile application as a device details dashboard
🕑 Audit Logs	2022-04-06 10:21:03 thermostat	Queue Name
ılı Api Usage	2022-04-06 10:21:01 default	De Select from a drop-down list.
🔹 System Settings 🗸 🗸		Assigned firmware Choose firmware that will be distributed to the devices
· · · · · · · · · · · · · · · · · · ·	P	Accigned software

These values are shown in the following table:

Field	Value
Mobile dashboard	TA652FH-W Thermostat (For Mobile App)

5.4.3 Clear device profile's mobile dashboard

Sometimes if TA652FH-W Thermostat device profile's mobile dashboard is cleared, TA652FH-W Thermostat (For Mobile App) can only be deleted.

• **Profiles** -> **Device profiles** -> click *my device profile* -> **Toggle edit mode** (red icon)

🕵 ThingsBoard	D Device profiles	C C tenant@thingsboard.org
Lol Devices		TA6525H W Thormostat
D Device profiles	Device profiles	Device profile details
OTA updates	Created time 🕹 🛛 Name	Pr 3
Entity Views	2 click	Details Transport configuration Alarm rules (0) Device provisioning
Edge instances	2023-04-18 15:20:44 TA652FH-W Thermostat	De
🕤 Edge management 🗸 🗸	2022-10-06 15:54:01 Test	Rule chain De
Widgets Library	2022-04-06 10:44:18 TA652FC-W Thermostat	De Mobile dashboard
Dashboards		Used by mobile application as a device details dashboard
🕑 Audit Logs	2022-04-06 10:21:03 thermostat	De Queue Name
II. Api Usage	2022-04-06 10:21:01 default	De Assigned firmware
🔅 System Settings 🗸 🗸		Assigned in miniate
		Assigned software

• Clear *Mobile dashboard* -> Apply changes (red icon)

🎉 ThingsBoard	🖆 Profiles ゝ 🛛 Device profiles	🖸 🔺 😫 _{Tenant administrator} ᠄
☆ Home		TA652EH-W Thermostat
🛕 Alarms	Device profiles	Device profile details
Dashboards	☐ Created time ↓ Name	Pr Details Transport configuration Alarm rules (0) Device provisioning
🚓 Entities 🛛 🔺	TA652FH-W	
🗔 Devices	Thermostat	Name*
Assets	2023-01-03 17:30:02 TA652FC-W Thermostat	
Entity Views	2022-11-08 13:37:20 Charging port	D∉ Default rule chain
🍰 Profiles 🛛 🔺	2022-11-08 13:37:20 Air Quality	De
Device profiles	Temperature	TA652FH-W Thermostat (For Mobile App)
Asset profiles	2022-11-08 13:37:20 Sensor	De Used by mobile application as a device details dashboard
😕 Customers	2022-10-13 13:39:06 default	De Queue
 ↔ Rule chains 		
😤 Edge management 🛛 🔺		Default edge rule chain
្ឋិ Instances		Used on edge as rule chain to process incoming data for devices of this device profile

5.5 TA652FH-W Demo Dashboards Usage

5.5.1 Overview

There are some dashboards related to TA652FH-W, namely TA652FH-W Thermostat List, TA652FH-W Thermostat (For Mobile App) and Office center - TA652FH-W Thermostats. We open the former to start operating TA652FH-W.

ThingsBoard	🕂 Dashboards	8	8	tenant@t Tenant ad	hingsbo dministr	ard.orç ator	:
app OTA updates							
开 Entity Views	Q						×
Edge instances							
죾 Edge management 🗸 🗸	Created time T Title Assigned to customers Public						
Widgets Library	2023-04-18 15:53:33 TA652FH-W Thermostat (For Mobile App)		<u>+</u>	<	*	Ê	Î
Dashboards	2023-04-18 16:04:20 TA652FH-W Thermostat List	55	<u>+</u>	<	*	â	î.
🕑 Audit Logs			Ŧ	<	•	Â	
ılı Api Usage		_	_	•		_	-
🔹 System Settings 🗸 🗸	Items per page: 10 💌	1 - 3	of 3	<	<	>	×

Table 2: TA652FH-W Demo Dashboards

Dashboard	Description	For Web UI	For Mobile App	Entry*
TA652FH-W Thermostat List*	list	Yes	No	Yes
TA652FH-W Thermostat (For Mo- bile App)	details	Yes	Yes	No
Office center - TA652FH-W Ther- mostats**	list & details	Yes	Yes	Yes

Hint:

- If *Entry* is *Yes*, then directly enter the Dashboard and there will be data displayed.
- If *Entry* is *No*, there will be no data display when entering this Dashboard directly, and you need to jump to this Dashboard from other Dashboards.
- •
- TA652FH-W Thermostat List depends on TA652FH-W Thermostat (For Mobile App).
- Office center TA652FH-W Thermostats can be used independently.

5.5.2 TA652FH-W Thermostat List

Dashboard states

Default state

Default state is root state.

👸 ThingsBoard	📲 Dashboards 🔸 📑 TA652FH-W Thermostat List							• 8	Tenant ad	iministrator
☆ Home	TA652FH-W The	mostat List	TA65:	2FH-W The	rmostat List 🖣	Entities	🕓 Realtime	- last minute	Ŧ	
🛆 Alarms	TACCOCIUMITI								0	
📑 Dashboards	TA052FH-W Ther	losiais							Q	
🔒 Entities 🔥 🔨	Device name 🛧	Label	Туре	active	Room Temp	Floor Temp	Setpoint	Unit		
🗔 Devices	A8:4 5C:68	AAAA	TA652FH-W Thermostat	false	23.7	26.2	21	°C		\$
Assets	A8:4 50:A4	7 4tesing	TA652FH-W Thermostat	false	23.9	26.6	16	°C	1	\$
Entity Views	A8 [:] D5:20	520	TA652FH-W Thermostat	false	23.4	25.9	29.5	°C	/	•
Device profiles	EC :0E:40	ai Sir	TA652FH-W Thermostat	false	24	25.9	21	°C	/	\$
Asset profiles					1	tems per page: 10	r 1 - 4 of 4		$\langle \rangle$	N
🟩 Customers										

- Dashboard bar:
 - TA652FH-W Thermostat List : Click here to skip to root state. Since default state is *root state*, click here and there is no response.
 - 🛅 : Click the two ICONS in the upper left corner to display the page in full screen.
 - Realtime last minute : Edit time window.
- Thermostats widgets:
 - Fields:
 - * Device name, Label, Type, active.
 - * Room temperature, Floor Temperature, Setpoint, Unit: Refer to Monitor state.
 - Actions:

* ***** : skip to TA652FH-W Thermostat (For Mobile App).

Popup dialog to editing a device's label.

Import List Dashboard

Tip: A Dashboard file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

In order to use this dashboard, you must to create TA652FH-W Thermostat Device Profile and TA652FH-W Thermostat (For Mobile App). If they don't exist, you can import them. See *Import Device Profile of TA652FH-W Thermostat* or *Import TA652FH-W Detail Dashboard*.

First, you can import this dashboard.

- Download ta652fh_w_thermostat_list.json.
- Dashboards -> + -> Popup dialog: Import dashboard -> Drag and drop *list dashboard File* -> Import.

🙀 ThingsBoard	Tashboards	8	0	tenant@thingsboard.org Tenant administrator
Devices	2 im	port	dash	board
D Device profiles	Dast Import dashboard			+ C Q
費 OTA updates				<u>^</u>
Entity Views	Dashboard file			
Edge instances		-	+	
🕤 Edge management 🗸 🗸	Drop a JSON file or click to select a file to upload. ×	55	±	< < 🖻 🔳
Widgets Library	□ 20 ta652fh_w_thermostat_list.json	5	Ŧ	< < 🖻 🕯
Dashboards			+	< 6 0 1
🕑 Audit Logs	Cancel 4 Import		-	
11. Api Usage	2022-12-28 18:07:38 TA552FC-W Inermostat (For Mobile App)		±	< < 🖻 🔳 📜
🔹 System Settings 🛛 🗸	Items per page: 10 👻	1 - 10	of 14	I< < > >I
₱ ∰ ThingsBoard		::	8	tenant@thingsboard.org

			Tenant administrator
[₀] Devices			
D Device profiles	Dashboards		+ C Q
OTA updates	□ Created time ↓ Title	Assigned to customers Public	·
Entity Views		7	
Edge instances	2023-04-18 16:04:20 TA652FH-W Thermostat List		
👚 Edge management 🗸 🗸	2023-04-18 15:53:33 TA652FH-W Thermostat (For Mobile App)		# ± < ≤ 8 ≇
🕂 Widgets Library	2023-02-02 11:33:27 Test Claiming	Customer A	11 ± < < 🖻 🕯
Dashboards	2023-02-02 11:31:59 Claiming		11 ± < < 🖻 🕯
II. Api Usage	2023-02-02 11:31:51 Manage claiming device		₩±<<88.
🔹 System Settings 🛛 🗸		Items per page: 10 👻	1 - 10 of 15 🗸 < > >

Next, modify a action's target dashboard and target dashboard state.

• Dashboards -> Click my list dashboard

🕵 ThingsBoard	Hashboards	답 😫 tenant@thingsboard.org Tenant administrator
Lo□ Devices		
Device profiles	Dashboards	+ C Q
OTA updates	Created time 🕹 Title Assigned to customers	Public
Entity Views	2 click	Or click
Edge instances	2023-04-18 16:04:20 TA652FH-W Thermostat List	
죾 Edge management 🗸 🗸 🗸	2023-04-18 15:53:33 TA652FH-W Thermostat (For Mobile App)	
Widgets Library	2023-02-02 11:33:27 Test Claiming Customer A	
Dashboards	2023-02-02 11:31:59 Claiming	
Audit Logs	2023-02-02 11:31:51 Manage claiming device	
ılı Api Usage		
🔅 System Settings 🗸 🗸		Items per page: 10 1 - 10 of 15 (くく) >>) 英 J ・ 回 巻 器

• Edit (red icon on the bottom and right)

👸 ThingsBoard	Dashboards	> 📲 T.	A652FH-W T	hermosta	at List			D	tenant@thin Tenant admi	gsboard.org nistrator
Lo□ Devices	TA652FH-W Thern	nostat Lis	t TA652	FH-W Ther	mostat List -	Lo Entities	🕓 Realtir	ne - last n	ninute 👤	
D Device profiles										
OTA updates	TA652FH-W Therm	ostats						C	2 🖩 🖸	
Entity Views	Device name 🛧	Label	Туре	active	Room Temp	Floor Temp	Setpoint	Unit		
Edge instances	A8:48:FA:57:60:A4	Fai sir's	TA652FH-W Thermostat	false	22.6	23.3	16	°C	\$	
Edge management 🗸 🗸	A8:48:FA:57:D5:20	new fh	TA652FH-W	false	22.1	15.3	16	°C	*	
🐈 Widgets Library			Thermostat							
Dashboards	Plant Floor Heating	Avantec Plant	TA652FH-W Thermostat	false	20	22.3	16	°C	\$	
🕑 Audit Logs					ltems per pag	ne: 10 🔻 1	- 3 of 3			
ılı Api Usage					iterite per pag			```		
🔹 System Settings 🗸 🗸 🗸										3
· · · · · · · · · · · · · · · · · · ·									Powered b	

• Enter *Edit Dashboard Mode* -> Edit Widget (icon)

🕵 ThingsBoard	- Dashboards	> 📑 T	A652FH-W 1	hermosta	at List			B	tenant@thing Tenant admir	sboard.org istrator	^g :
Lustomers	♦ ■					\$	Ŧ	🕓 Realtime - la	st minute	Ŧ	::
E Assets	Title *										
[₀] Devices	TA652FH-	W The	ermost	at L							
D Device profiles	TA652FH-W Therm	ostats						4 🚺	± ×		
:@: OTA updates	Device name	Label	Type	active	Room Temp	Floor Temp	Setnoint	Unit			
Entity Views		Lubor	1900	delive	Room remp	riou remp	octpoint	ont	- 1		
Edge instances	A8:48:FA:57:60:A4	Fai sir's	TA652FH-W Thermostat	false	22.6	23.3	16	°C	\$		
죾 Edge management 🗸 🗸	A8:48:FA:57:D5:20	new fh	TA652FH-W Thermostat	false	22.1	15.3	16	°C	\$		
📑 Widgets Library	Plant Floor Heating	Avantec Plant	TA652FH-W Thermostat	false	20	22.3	16	°C	\$		
Dashboards		Tidite	memostat						_		
🕑 Audit Logs					Items per page	e: <u>10</u> 🔻	1 - 3 of 3	$ \langle \rangle \rangle$	>1		
ılı Api Usage											
🔅 System Settings 🗸 🗸								P	owered by .		×

• Action -> Edit Action (icon)

🎉 ThingsBoard	📲 Dashboards ゝ 📑 TA652FH-W Thermostat List	: Stenant@thingsboard.org
🗄 Assets	* =	🔹 🗔 \Xi 🕓 Realtime - last minute 🛓 🚼
[₀] Devices		
D Device profiles	IA652FH-W INE New Entitles table	⊘ × ∣
————————————————————————————————————	TA652FH-W Thermostats	
Entity Views	Device name ↑ Label Type Data S	ettings Advanced 5 Actions
Edge instances	TA652FH A8:48:FA:57:60:A4 Fai sir's W	
Edge management 🗸 🗸	Thermos ACUONS	+ ~
Widgets Library	A8:48:FA:57:D5:20 new fh W Thermos Action source ↑ Name	Icon Type
Dashboards	Plant Floor Avantee TA652FH Heating Plant Thermos Avantee Heating Plant	···· • ····· · · · · · · · · · · · · ·
🕑 Audit Logs	Action cell button to_ta652th	Hw_detail Vavigate to other dashboard 6

- ThingsBoard 📲 Dashboards 🔉 📑 TA652FH-W Thermostat List 0 Assets GET: /api/dashboard/info/43e55270-cedd-11ed-9b15-dd2dac50548f me - last minute Close 404: OK Devices Navigate to other dashboard -D Device profiles 2 Target dashboard * OTA updates Entity Views TA652FH-W Thermostat (For Mobile App) 7 × Edge instances Target dashboard state monitor 8 × Q + Edge management Open in a new browser tab Widgets Library 🔽 Set entity from widget State entity pa Dashboards By default Î (d) Audit Logs II. Api Usage Cancel 9 Save 🔅 System Settings
- Modify Target dashboard -> modify Target dashboard state -> Save

These values are shown in the following table:

Field	Value
Target dashboard	TA652FH-W Thermostat (For Mobile App)
Target dashboard state	monitor

• Apply changes (red icon)

🏷 ThingsBoard	🚦 Dashboards > 👫 TA652FH-W Thermostat List 🛛 🕄 😮 tenant@thingsboard.org	
Assets	GET: /api/dashboard/info/43e55270-cedd-11ed-9b15-dd2dac50548f	
Devices		
D Device profiles	IA652FH-W The New Entitles table 2 ×	ĸ
費: OTA updates	TA652FH-W Thermostats	
Entity Views	Device name	
Edge instances	A8:48:FA:57:60:A4 Fai sir's W Thermos Actions + Q	
 Edge management Widgets Library 	TA652FH A8:48:FA:57:D5:20 new fh W Thermos Action source ↑ Name Icon Type	
Dashboards	Plant Floor Avantec W Heating Plant W Thermos Action cell button to_ta652fh-w_detail State Navigate to other dashboard	
💩 Audit Logs		
ılı Api Usage		
🔅 System Settings 🗸 🗸	Items per page: 10 💌 1 - 1 of 1 < >	

• Apply changes (red icon on the bottom and right)

🕵 ThingsBoard	Dashboards	> 📑 T	A652FH-W T	hermosta	at List			• 6	tenant@thing Tenant admin	sboard.org istrator	:
Assets	= خ					\$	Ŧ	🕓 Realtime -	last minute	Ŧ	0
Lon Devices	Title *										
D Device profiles	TA652FH-	WINe	ermost	atl							
i OTA updates	TA652FH-W Therm	ostats						1	* * ×		
Entity Views	Device name \land	Label	Туре	active	Room Temp	Floor Temp	Setpoint	Unit			
Edge instances			TA652EH-W						-		
兖 Edge management 🗸 🗸	A8:48:FA:57:60:A4	Fai sir's	Thermostat	false	22.6	23.3	16	°C	*		
Widgets Library	A8:48:FA:57:D5:20	new fh	TA652FH-W Thermostat	false	22.1	15.3	16	°C	\$		
Dashboards	Plant Floor Heating	Avantec Plant	TA652FH-W Thermostat	false	20	22.3	16	°C	\$		
🕑 Audit Logs											
ıl. Api Usage					Items per page	e <u>10 ▼</u> 1	- 3 of 3	I< <			
🗱 System Settings 🗸 🗸 🗸										ア	
· · · · · · · · · · · · · · · · · · ·									Powered by		

Update List Dashboard

• First, delete this dashboard: Dashboards -> Click in the row of TA652FH-W Thermostat List -> Popup dialog: Are you sure you want to delete ...? -> Yes.

🎉 ThingsBoard	E Dashboards 🖸 🌲	8			
🛧 Home					
\land Alarms	Q thermostat			>	×
Dashboards	Are you sure you want to delete the dashboard 'TA652FH-W Thermostat (For Mobile App)'?				
📤 Entities 🗸	Be careful, after the confirmation the dashboard and all related data will become unrecoverable.	4	n	. =	
[₀0 Devices		~	8	-	·
💼 Assets	No 3 Yes	*	2	/	i
Entity Views	2023-03-30 17:28:44 TA652FH-W Thermostat My New Customer 🛛 🛨 <	*	Ê	/2	i]
💼 Profiles 🔥 🔨	Items per page: 10 - 5 of 5			5	2
Device profiles					

• Next, import TA652FH-W List Dashboard.

5.5.3 TA652FH-W Thermostat (For Mobile App)

Dashboard states

Monitor state

Monitor state is root state.

8	🧞 ThingsBoard	Dashboards > - TA652FH-W Thermostat (For Mobile App)
[•0	Devices	MONITOR > CONTROL > PROGRAM > SETTINGS > ADMIN >
din a constante da la constant	Profiles 🗸 🗸	
٢	OTA updates	Room temperature Floor temperature
H	Entity Views	15.4°C
÷	Edge instances	Setpoint
Ŷ	Edge management 🛛 🗸	23.5 16.0°C
	Widgets Library	Temperature history
-	Dashboards	Realtime - last 10 hours
Ð	Version control	30
4	Audit Logs	10 0 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00
ıh	Api Usage	Room temperature
\$	System Settings 🛛 🗸	- Floor temperature

• Dashboard bar:

Hidden. Refer to *Default state*.

Widget	Description
MONITOR	skip to Monitor state
CONTROL	skip to Control state
PROGRAM	skip to Program state
SETTINGS	skip to Settings state
ADMIN	skip to Admin state
Room Temperature	room temperature
Floor Temperature	floor temperature
Setpoint	current setpoint value
Temperature history	
	Room temperature & Change Over Sensor temperature
	history. Click Realtime - last 10 hours
	to edit this timewindow. Refer to Default state

ری ThingsBoard 	Dashboards > 🕂 TA652Fi	H-W Thermostat (Fo	or Mobile App)
[₀] Devices	MONITOR > CONTROL > PI	ROGRAM > SETTI	NGS > ADMIN >
🛂 Profiles 🗸 🗸			
🜐 OTA updates	Setpoint	Program	Next setpoint
Entity Views	16.0 °C ∨	On	Tue, 06:00 PM 21.0°C
Edge instances			
죾 Edge management 🗸 🗸	Override program status	Control	
Widgets Library	No		On
Dashboards			

Control state

• Dashboard bar:

Hidden. Refer to *Default state*.

Widget	Description
Setpoint	If you adjust setpoint, override program status is YES (true)
Program	program on or off
PRG next setpoint	next program time & setpoint
Override program status	"YES"(true) or "NO"(false)
Control Mode	"Off" or "On"

Program state

👸 ThingsBoard	Dashboards > 🗕 TA652FH-W	/ Thermostat (For Mobile App)
[₀] Devices	MONITOR > CONTROL > PROGR	AM > SETTINGS > ADMIN >
Profiles 🗸 🗸		
@ OTA updates	Program mode	
Entity Views	No Program 1 Day	1 + 5 + 1 7 Days
🔐 Edge instances	Days of the week	
죾 Edge management 🗸 🗸	📩 Sunday	>
Widgets Library	📅 Monday	>
Dashboards	📅 Tuesday	>
Version control	📅 Wednesday	>
(d) Audit Logs	📅 Thursday	>
	📩 Friday	>
	🛅 Saturday	>
System Settings 🗸 🗸		

- Dashboard bar: Hidden. Refer to *Default state*.
- Widgets:

Program Mode	Description
NO PROGRAM	Program disabled
1 DAY (MON)	Using 4 set points of Monday every day
1+5+1 (SUN+MON+SAT)	Using 4 set points of Monday from Monday to Friday
7 DAYS (SUN~SAT)	Using 4 set points every day
Sunday,	Skip to Program_setpoints state

👸 ThingsBoard	Dashboards >	• 🕂 TA652FH-V	N Thermostat (For Mobile	Арр)		
fraction fra		< PROGRAM				
∢·· ≯ Rule chains						
👱 Customers	Sunday					
E Assets	Program 1	_	Program 3			
[₀] Devices	上午 08:00 ◎ ╯́ ×	23.0 °C ∽	下午 06:00 ⊙ ✓ ×	23.0 °C ∽		
Profiles 🗸 🗸						
: OTA updates	Program 2		Program 4			
Entity Views	⊦午 10:00 ◎ ✓ ×	18.0 °C ∽	际午 11:00 ◎ ╯́ ×	18.0 °C ∽		
Edge instances	<u></u>		<u> </u>			

Program_setpoints state

• Dashboard bar:

Hidden. Refer to *Default state*.

Widget	Description
Program 1 ~ Program 4	time, hour:minute
Setpoint 1 ~ Setpoint 4	setpoint value, temperature

Settings state

🎉 ThingsBoard	- Dashboar	ds ゝ 🕂 TA6	552FH-W Thermo	ostat (For Mob	ile App)
f Home	MONITOR >	CONTROL >	PROGRAM >	SETTINGS >	ADMIN >
⟨··⟩ Rule chains					
🚬 Customers	Temperature unit (Yo	ur thermostat needs t	o be i Adap	tive control	
Assets	°C	°F		Enabled	Disabled
Devices					
Profiles 🗸 🗸	System mode		Tem	perature offset of inte	ernal sensor
🔅 OTA updates	Heat	Cool		0.0 °C	· •
🕂 Entity Views	Sensor mode (Only 'I	nternal' will be used in	'Coo Swite	ching differential hea	ting
Edge instances	Internal E	xternal Combin	ed	1.0 °C	~
🕤 Edge management 🗸 🗸	Eloor temperature lin	nited (external sensor)	Swite	ching differential coo	lina
Widgets Library	30	.0 °C ∨		1.0 °C	> ~
Dashboards					

• Dashboard bar:

Hidden. Refer to *Default state*.

Widget	Description
Temp Unit	"°C" or "°F". Reboot the device to take effect
Adaptive control	Enabled or disabled
System Mode	"Heat" or "Cool"
Sensor Mode	
	"Internal" / "External" / "Combined" senosr can be selected when it is in "Heat" mode. Only "Internal" Sensor will be used when it is in "Cool" mode.
Floor temperature limited	external sensor temperature offset
Temp Offset(Internal Sensor)	Internal sensor temperature offset
Switching Diff Heating	Switching differential heating
Switching Diff Cooling	Switching differential cooling

🕵 ThingsBoard	🖬 Dashboards > 🕂 TA652FI	H-W Thermostat (For Mobile App)				
✿ Home	MONITOR > CONTROL > PF	ROGRAM > SETTINGS > ADMIN >				
💒 Customers	Time format	Device profile TA652FH-W				
Assets	12 Hours 24 Hours	(Type) Thermostat				
Devices	Time zone	Model TA652FH-W-TB				
🗜 Profiles 🗸 🗸	UTC+08:00 ~	MAC A8:48:FA:57:D5:20				
OTA updates	NTP server (uk.pool.ntp.org, 1.p	Wi-Fi F/W version 2.1.6.0				
📊 Entity Views	hk.pool.ntp.org	Reboot				
Edge instances	Synchronize datetime					
Edge management 🗸 🗸	Sync Now	Clear Wi-Fi Configuration				
🕂 Widgets Library						

Admin state

• Dashboard bar:

Hidden. Refer to *Default state*.

Widget	Description
Time Format	"12 Hours" or "24 Hours"
Timezone	See Step 4.2 Add shared attributes of new device
NTP Server	
	SNTP protocol server URL, e.g. pool.ntp.org,
	0.pool.ntp.org, 1.pool.ntp.org,
	time.nist.gov,
	see Step 4.2 Add shared attributes of new device
Sync Time	
	Sync time per syncTimeFreq seconds.
	If you change <i>Timezone</i> or <i>NTP Server</i> , you have to do it.
	See Step 4.2 Add shared attributes of new device
	A V
Device attributes	
	Device name, device profile (type), device label.
	model, MAC, device Wi-Fi Module F/W version,
	device Main MCU F/W version
Reboot	Reboot device
Clear Wi-Fi Config	Clear device's Wi-Fi configuration

Import Detail Dashboard

Tip: A Dashboard file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

In order to use this dashboard, you must to create TA652FH-W Thermostat Device Profile. If it doesn't exist, you can import it. See *Import Device Profile of TA652FH-W Thermostat*.

- Download ta652fh_w_thermostat__for_mobile_app_.json.
- Dashboards -> + -> Popup dialog: Import dashboard -> Drag and drop detail dashboard File -> Import.

thingsBoard	E Dashboards	0	8	tenant@thingsboard.org Tenant administrator
Lo□ Devices		2 impor	t das	hboard
D Device profiles	Dast Import dashboard X			+ C Q
OTA updates				
Entity Views	Dashboard file			
Edge instances	20		+	
🕤 Edge management 🗸 🗸 🗸	\square 2r Drop a JSON file or click to select a file to upload. \times	55	±	< < 🖻 🗊
Widgets Library	ta652fh w thermostat for mobile app ison	5	Ŧ	< < 8 =
Dashboards			+	2 6 0 1
🕑 Audit Logs	Cancel 4 Import		-	
11. Api Usage	2022-12-28 17:58:03 TA652FC-W Thermostat List		*	< < 🖻 🗊 🚬
🔅 System Settings 🗸 🗸	Items per page: 10	1 - 10	of 13	I< < > >I

🕵 ThingsBoard	Dashboards	E 🕒 tenar Tena	nt@thingsboard.org nt administrator
Lon Devices			
D Device profiles	Dashboards		+ C Q
OTA updates	☐ Created time ↓ Title Assigned to customers Public		^
Η Entity Views	TASEDELI W Thermostet /Ear		
Edge instances	2023-04-18 15:53:33 TAO52FH-W THEMOSTAL (FOR Mobile App)	₩ ± <	
Edge management 🗸 🗸	2023-02-02 11:33:27 Test Claiming Customer A	₩ ± <	< 🖻 🔳
🐈 Widgets Library	2023-02-02 11:31:59 Claiming		< 🖻 👔
Dashboards	2023-02-02 11:31:51 Manage claiming device		6 D E
🕑 Audit Logs		■ ■ → ~	
ılı Api Usage	2022-12-28 18:07:38 TA652FC-W Thermostat (For Mobile App)	₩ ± <	▲ 🗎 🖡 .
🔹 System Settings 🛛 🗸	Items per page: 10 👻	1 - 10 of 14	$\langle \rangle \rangle$
	× .		

• Optional, This dashboard can be set as TA652FH-W Thermostat Device Profile's mobile dashboard. See *Modify TA652FH-W Thermostat device profile's mobile dashboard*.

Update Detail Dashboard

- First, clear TA652FH-W Thermostat device profile's mobile dashboard.
- Next, delete this dashboard: Dashboards -> Click in the row of TA652FH-W Thermostat (For Mobile App) -> Popup dialog: Are you sure you want to delete ...? -> Yes.

🕷 ThingsBoard	🗄 Dashboards 🖸 🌲	0	Tenant ad		
♠ Home					
\land Alarms	Q thermostat	-		×	
🔡 Dashboards 1	Are you sure you want to delete the dashboard 'TA652FC-W Thermostat (For Mobile App)'?				
🛔 Entities 🗾	Be careful, after the confirmation the dashboard and all related data will become unrecoverable.	4	-	A =	
[₀0] Devices		~		-	
🖿 Assets	No 3 Yes	*	Ê	/	
Entity Views	□ 2023-05-25 14:35:44 TA652FC-W Thermostat □ ± <	*	Ê	2	
🖆 Profiles 🔥	ttems per page: 10 1 − 5 of 5			> >	
D Device profiles					

• Then import TA652FH-W Detail Dashboard.

5.5.4 Office center - TA652FH-W Thermostats

Dashboard states

Office state

Office state is root state.

🍇 ThingsBoard	📰 Dashboards 🗧 📑 Office center - TA652FH-W Thermostats		C C tenant@ti Tenant ad	hingsboard.org
🚹 Home	Office center			::
		TA652EH-W Thermostats	n	H Q M C
2 Customers	+			
Assets		Thermostat name	Unit xPos yPos	
Devices		88:88:88:88:11 Alice	0.12 0.20	~ 🖍 🗐
D Device profiles	Alice Bob Chris Dora	88:88:88:88:22 Bob	0.44 0.19	~ / 1
OTA updates	Office 1 Office 2 Office 3 Office 4	00-00-00-00-22 Chrie	0.64 0.19	
Entity Views	A8:48:FA:57:D5:20	60.00.00.00.00.33 CHIIS	0.04 0.19	
Edge instances	Room temperature: 22.1°C	A8:48:FA:57:60:A4 Dora • 22.6 23.3	°C 0.85 0.20	~ 🖍 🗊
👚 Edge management 🛛 🗸	Setpoint: 16.0°C	A8:48:FA:57:D5:20 Edward • 22.1 15.3	°C 0.15 0.69	~ 🖍 🗊
😭 Widgets Library	Thermostat details	A8:9C:1F:19:4D:98 Frank 6 20 22.3	°C 0.80 0.69	~ /
Dashboards				
🕑 Audit Logs				
ıl. Api Usage				
🔹 System Settings 🛛 🗸	*			
		<		•

• Dashboard bar:

Office center

: Click here to skip to **root state**. Since **default state** is *root state*, click here and there is no response.

- Thermostats List:
 - Fields:
 - * Thermostat name, Label, active.
 - * Room temperature, Floor Temperature, Setpoint, Unit, xPos, yPos.
 - Actions:

*

- * D : Skip to *Map state*.
- ⁺ : Open a dialog, to add a new thermostat.
- * *Chart state*.
- *
 Open a dialog, to edit a thermostat.
 - : Open a dialog, to edit a thermostat.
- Map widget:

- Copen a box, to show some text. - Thermostat details : Skip to *Chart state*.

Map state



• Map widget:

- Click to enter drag-drop mode, you can modify the position of the thermostat. Click again to save the modification and exit drag-drop mode.

Chart state



Import Office Center Dashboard

Tip: A Dashboard file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

In order to use this dashboard, you must to create TA652FH-W Thermostat Device Profile. If it doesn't exist, you can import it. See *Import Device Profile of TA652FH-W Thermostat*.

- Download office_center___ta652fh_w_thermostats.json.
- Dashboards -> + -> Popup dialog: Import dashboard -> Drag and drop *Office center dashboard File ->* Import.

🎉 ThingsBoard	Dashboards			0	۰	8			
♠ Home	Dashboards	Import dashboard	×	2 im	port o	lashb	oard 日	C	Q
🛕 Alarms	Duonbourdo	3						0	
🔡 Dashboards 1	Created time	Dashboard file *	Public						
🛔 Entities 📃 🔺	2022-05-25 14-			L	~	6	n	A ¹	-
🗔 Devices	2023-03-25 14.	Drag and drop a JSON file or Browse file	×	<u> </u>	~				- 1
Assets	2023-05-25 10:			<u>+</u>	<	*	Ê	1	Î
🖬 Entity Views	2023-05-25 10:	office_centerta652fh_w_thermostats.json		Ŧ	<	*	Ľ	1	Î
🛍 Profiles 🖍	2023-03-30 17:	4 Cancel	Import	+	×°	6	Ľ	A ¹	Ê
Device profiles		Item	is per page: 10 👻	1 - 10) of 22			>	>1
Asset profiles				J					
🐲 ThingsBoard	- Dashboards					9		L	
≎ مر					÷		Tenant a	dministra	itor
A Home					Ť		Tenant a	dministra	itor
A Home ▲ Alarms	Dashboards				Ŧ		Tenant a	dministra C	tor
 Alarms Bashboards 	Dashboards	↓ Title Assigned to customers	Public		Ť		Tenant a	dministra C	_{itor} :
 Alarms ▲ Alarms ▲ Entities 	Dashboards		Public	<u>+</u>	<	•	Tenant a	C C	tor :
Home Alarms Dashboards Entities Gu Devices	Dashboards Created time 2023-05-31 14		Public	±	<	*	Tenant a +	C	
Alarms Alarms Dashboards Co Devices Assets	Dashboards Created time 2023-05-31 14 2023-05-25 14		Public	* *	<	*	renant a + È	C C	tor •
 ▲ Home ▲ Alarms ■ Dashboards ▲ Entities ▲ Entities ▲ Assets ■ Entity Views 	Dashboards Created time 2023-05-25 10 2023-05-25 10		Public	± ± ±	 <th>÷</th><th>Fenant a + Ê</th><th>C C i</th><th></th>	÷	Fenant a + Ê	C C i	
 Home ▲ Alarms ■ Dashboards ▲ Entities ▲ Entities ▲ Entity Views ▲ Profiles 	Dashboards Created time 2023-05-31 14 2023-05-25 14 2023-05-25 10 2023-05-25 10	↓ Title Assigned to customers .30:08 Office center - TA652FH- W Thermostats	Public	* * *		*	Fenant a + È È	C C C	
 Home Alarms Dashboards Entities Entities Assets Entity Views Profiles Device profiles 	Dashboards Created time 2023-05-31 14 2023-05-25 14 2023-05-25 10		Public	* * * 1-10	< < < of 23	* *	Fenant a + Ê		

• Edit the position: Click in a row -> Enter xPos/yPos in Popup dialog -> **Save**.

🎉 ThingsBoard	Dashboards	s 🗧 Soffice center - TA652F	H-W Thermostats	11	≜ 8	Tenant adr		
♠ Home	Office center							::
\land Alarms		Edit TA652FC-W thermosta	at: A8:4 ×		_		0	
Dashboards	+			stats		ц +	Q	
🚓 Entities 🔥 🔨		AVANTEC thermostat name*	AVANTEC thermostat label	abel Active	e Room Temp			
🗔 Devices		A0	75CC LAA	5C68AAAA 🔴	23.7	~ 1	1	Î
Assets	Office 1	2 xPos 0.1 3	yPos 0.2	60A4tesing 🔴	23.9	~		1
Entity Views								_
🏚 Profiles 🛛 🔺		Customer		D520 🔴	23.4	\sim		•
Device profiles	T			ai Sir 🛛 🔴	24	\sim	/	Î
Asset profiles	Office 5		4	7				
😕 Customers			Cancel Save					
 ↔ Rule chains 								
🙊 Edge management 🛛 🔺								

🎉 ThingsBoard	🔚 Dashboards ゝ 📑 Office center - TA652FH-W Ther	mostats 🖸	≜ 0	Tenant administrator	
🛧 Home	Office center			8	
🛕 Alarms	+	TA652FH-W Thermostats		D + Q Ⅲ C	h
💾 Dashboards	-	Thermostat name 🛧 Label Active	Room Temp		
🛦 Entities 🖍	75C AAA	A8:4 57:5C:68 75 AAAA	23.7	~ / 1	
🗔 Devices					
Assets	Office 2 Office 3 Office 4	A8: ':60:A4 76 Itesing	23.9	~ /	
🛄 Entity Views		A8:4 7:D5:20 71 0	23.4	~ / 🔳	
🔹 Profiles 🛛 🔨		F0/67 0F/40 F	24		
Device profiles		EU.02 UE.40 P	24	~ /	
Asset profiles	Office 5				
📇 Customers					
 ↔ Rule chains 	*				
😤 Edge management 🛛 🔺					

Update Office Center Dashboard

• First, delete this dashboard: Dashboards -> Click in the row of Office center - TA652FH-W Thermostats -> Popup dialog: Are you sure you want to delete ...? -> Yes.

🎉 ThingsBoard	Tashboards	::	.	8	Tenant ad		
A Home							
\land Alarms	Q thermostat			-			×
Dashboards 1	Are you sure you want to delete the dashboard 'Office center - TA652FH-W Then	mos	tats'?				
🛔 Entities 🔥	Be careful, after the confirmation the dashboard and all related data will become unrecoverable.			6	Ê		
[₀□ Devices					-	-	
🖿 Assets	N	0	3 Yes	*	2	/	Î
Entity Views	2023-05-31 14:30.08 Office center - TA652FH- W Thermostats	1	<u>+</u> <	*	Ê	/ 2	
💼 Profiles 🔥 🔨	Items per page: 10 -	1	I - 5 of 5				
Device profiles							

• Next, import TA652FH-W List Dashboard.

5.6 TA652FH-W MQTT API

See TA652FC-W MQTT API.

CHAPTER

TA692FC-L-5 LORAWAN THERMOSTAT

These references will help you learn more about TA692FC-L-5 LoRaWAN Thermostat, operate it, and even realize your personalized Dashboard.

- Specification
- Add to ThingsBoard | Demo Dashboards
- LoRaWAN Device API

6.1 TA692FC-L – FCU Thermostat Series

Operating Voltage	$230 \text{ VAC} \pm 10\%$
Measurable range	0 - 40 °C, 0.1°C
LoRaWAN	Class C
EU868 band	868.1 MHz ~ 868.5 MHz
AS923 band (Optional)	923.2 MHz ~ 923.4 MHz

6.1.1 Features

- Wireless thermostats for fan coil units
- 1.5" VA TN with backlit lite grey text on dark background
- Touch keys x 5
- Flush-mount installation in an 86 x 86 / British single-gang wall-box
- White gloss housing with light grey silk-printed keys
- Controls:
 - 3-speed fan
 - One DC 0...10V valve actuators
- Used in systems with:
 - Fan coil units
 - Heating and cooling appliances

6.1.2 Technical Specification

Transmitting power	21.0dBm
Receiving sensitivity	-140dBm
Effective range outdoors	TBD
Measuring temperature	$0 \sim 40^{\circ} \text{C}$
Controlling temperature	5 ~ 35°C
Adjustable span	$1.0^{\circ}\text{C} \sim 4.0^{\circ}\text{C}$
Sensing Element	103AT
Storage Temperature	-5 ~ 50°C
Measuring accuracy/resolution	$\pm 0.5^{\circ}C$
On/Off Relay Contact Rating	230VAC 2(1)A max
AO Contact Rating	10VDC 1mA max
Terminals	2 mm^2 cable
Operating Temperature	0 ~ 50°C
Operating Voltage	230 VAC $\pm 10\%$
Operating Humidity	$5 \sim 95\%$ R.H. non-condensing

6.1.3 Order Code

Symbols	Fan Con- trol	Heating	Cooling	LoRa	Frequnecy
TA692FC- L-1	3-Speed	On/Off heater	On/Off valve	LoRoWAN	endpoint 868.1M~868.5MHz, or 920M~925MHz
TA692FC- L-2	0~10V	On/Off heater	On/Off valve	LoRoWAN	endpoint 868.1M~868.5MHz, or 920M~925MHz
TA692FC- L-3	0~10V	On/Off heater	0~10V modu- lating	LoRoWAN	endpoint 868.1M~868.5MHz, or 920M~925MHz
TA692FC- L-4	0~10V	0~10V modu- lating	0~10V modu- lating	LoRoWAN	endpoint 868.1M~868.5MHz, or 920M~925MHz
TA692FC- L-5	3-Speed	_	0~10V modu- lating	LoRoWAN	endpoint 868.1M~868.5MHz, or 920M~925MHz

6.1.4 Dimensions / Outline

- Protruding part 86.0mm(W) x 86.0mm(H) x 16.5mm(D)
- Concealed part 64.0mm(W) x 66.5mm(H) x 26.6mm(D)


6.1.5 Product pictures







6.1.6 Wiring Example for TA692FC-L-1

Symbols	Terminals
L	Live
Ν	Neutral
Q1	Control output Fan speed 1, 230VAC
Q2	Control output Fan speed 2, 230VAC
Q3	Control output Fan speed 3, 230VAC
Y1	Control output for Cool Valve ON/OFF, 230VAC
Y2	Control output for Heater ON/OFF, 230VAC

6.1.7 Terminal Labels on TA692FC-L-1



6.1.8 Wiring Example for TA692FC-L-2



Symbols	Terminals
L	Live
Ν	Neutral
G	Control output to EC Fan 010VDC
Y1	Control output Cool valve ON/OFF. 230VAC
Y2	Control output Heater ON/OFF. 230VAC

6.1.9 Terminal Labels on TA692FC-L-2



6.1.10 Wiring Example for TA692FC-L-3



Symbols	Terminals
L	Live
Ν	Neutral
G	Control output to EC Fan 010VDC
Y1	Modulating control to Cool valve 010VDC
Y2	Control output Heater ON/OFF. 230VAC

6.1.11 Terminal Labels on TA692FC-L-3



6.1.12 Wiring Example for TA692FC-L-4



Symbols	Terminals
L	Live
Ν	Neutral
G	Control output to EC Fan 010VDC
Y1	Modulating control to Cooling valve 010VDC
Y2	Modulating control to Heating valve 010VDC

6.1.13 Terminal Labels on TA692FC-L-4







Symbols	Terminals
L	Live
Ν	Neutral
Q1	Control output Fan speed 1, 230VAC
Q2	Control output Fan speed 2, 230VAC
Q3	Control output Fan speed 3, 230VAC
Y1	Control output to Cooling valve 010VDC

6.1.15 Terminal Labels on TA692FC-L-5



6.1.16 Output diagrams

• Fan controls - Q $_1$ Q $_2$ Q $_3$ - in Auto Fan Mode. Applicable to TA692FC-L-1, TA692FC-L-5 Except when Power Off, TA692FC-L is always running at low-fan (Q $_1$ On).



• Cooling Valve (Y 1)

PI control of Cooling Valve (Y 1) in Cool Mode.

Applicable to TA692FC-L-3, TA692FC-L-4, TA692FC-L-5.

TA692FC-L employs proportional-integrative modulating control (PI).

Diagram shows changing in temperature difference versus Y1 voltage level over time.





• Cooling Valve (Y1) in Fan-Only Mode Applicable to TA692FC-L-3, TA692FC-L-4, TA692FC-L-5.



If Fan-Only Mode is selected, Y1 simply shuts off.



6.1.17 LCD Display Content



Icons

Label	Description
6	Room temperature
7	Temperature Setpoint
9	System Mode icon Cool mode Heat mode
12	Y1 output status indicator
13	Y2 output status indicator
14	Fan status indictor Auto Fan Mode no icon - Manual Fan Mode
	High Fan Speed indicator
	Med Fan speed indicator
	Low Fan speed indicator

Buttons

Keys	Function
(iii)	
	Menu Key
	Short press: change mode
	Press-n-hold: Internal setting
83	
	Fan Speed
	Short press: cycle-through
	L->M->H->Auto->L
U U	Power On/Off Key
Λ	
	Traverse Up in Setting Menu
∇	Traverse Down in Setting Menu

6.1.18 Internal Parameter Menu in TA692FC-L-5

Items	Selection	Default
System Mode (P00)	Cool / Fan-only (CL/FAN)	Cool (CL)
Calibration (P04)	$-4^{\circ}C \sim 4^{\circ}C$	0°C
Span for Cool (P09)	1.0°C ~ 4.0°C	1.0°C
K-Factor(1/K) (P10)	1 ~ 9	3
P-band Cool (P12)	1.0oC ~ 4.0°C	4.0°C
I-Time Cool (P14)	5 ~ 180 sec	30 sec

6.1.19 Advanced Parameter Menu in TA692FC-L-5

Items	Selection	Default
Restore Default on the next power-cycle (P20)	Disabled/Enabled (DIS/EN)	Disabled(DIS)
LoRa status (P36)	Active/disconnect (on/dis)	Active (on)
Dev EUI (P37 ~ P44)	HEX. Read-only	-

6.2 Add TA692FC-L-5 to ThingsBoard

Tip:

- This section applies to the situation where you add a TA692FC-L-5 to the ThingsBoard PE. It implement two-way communication between a TA692FC-L-5 and a ThingsBoard PE.
- Only ThingsBoard PE supports **Platform Integrations** feature.

Tip:

- If you only need one-way communication from TA692FC-L-5 to ThingsBoard, you can use **chirpstack v3** + **ThingsBoard CE** or **chirpstack v4** + **ThingsBoard CE**.
- Refer to ThingsBoard getting started for ChirpStack v3 and ThingsBoard Integration for ChirpStack v3 .
- Refer to ThingsBoard getting started for ChirpStack v4 and ThingsBoard Integration for ChirpStack v4.

6.2.1 Introduction

Note: The frequency of LoRaWAN device and gateway must match!

Warning: ChirpStack v4, the latest version, doesn't handle downlink data from ThingsBoard PE v3.5.x.

The ChirpStack open-source LoRaWAN Network Server stack provides open-source components for LoRaWAN networks. After integrating ChirpStack with ThingsBoard, you can connect, communicate, process and visualize data from TA692FC-L-5 thermostat in the ThingsBoard IoT platform.

Item	Description
LoRaWAN Device	TA692FC-L-5, Frequency 868 MHz*
LoRaWAN Gateway	MTCAP-868-041A, Frequency 868 MHz*
LoRaWAN Network Server	ChirpStack v3**
LoRaWAN Application Server	ThingsBoard PE v3.5.x**

6.2.2 Prerequisites

Tip: You need a ChirpStack instance that can be accessed by your ThingsBoard PE instance.

- If your ThingsBoard PE instance is installed in a LAN, you may also install a ChirpStack instance in the same LAN.
- If your ThingsBoard PE instance is installed in the cloud, you may also install a ChirpStack instance on the corresponding cloud host.
- Obtain the following TA692FC-L-5 LoRaWAN Paramters from your equipment vendor.

Paramter	
TA692FC-L-5, Frequency 868 MHz	
Class C	
868.1MHz ~ 868.5MHz	
YOUR_DEV_EUI, eg: 00:12:BD:FF:FE:02:AD:04	
YOUR_APP_KEY, eg: 72357538782F413F4428472B4B625065	

Note: These parameters are different for every thermostat.

• Setup the MTCAP-868-041A

- First-Time Setup of Gateway
- Optional: Firmware Upgrade

• Install a ChirpStack v3 instance on

- Amazon AWS, or
- Microsoft Azure, or
- Google Cloud, or
- Debian/Ubuntu, or
- Docker Compose

• Subscribe or install a ThingsBoard PE instance

- Use ThingsBoard Cloud, or
- Install your own ThingsBoard PE instance

6.2.3 Step 1. MTCAP configuration

• Configuring LoRa Packet Forwarder.

6.2.4 Step 2. ChirpStack configuration

- Connect gateway to ChirpStack.
- Connect device to ChirpStack.

6.2.5 Step 3. Integrating ChirpStack with ThingsBoard PE

Refer to ChirpStack Integration.

Step 3.1 Uplink Converter

Before creating the integration, you need to create/import an Uplink converter in Data converters. Uplink is necessary in order to convert the incoming data from the device into the required format for displaying them in ThingsBoard. To view the events, enable **Debug**. In the function decoder field, specify a script to parse and transform data.

NOTE Although the Debug mode is very useful for development and troubleshooting, leaving it enabled in production mode may tremendously increase the disk space, used by the database, because all the debugging data is stored there. It is highly recommended to turn the Debug mode off when done debugging.

sample uplink message

Let's review sample uplink message from ChirpStack:

```
{
    "applicationID": "1",
    "applicationName": "TA692FC-L-5-Application",
    "deviceName": "Sales-Office",
    "devEUI": "ABK9//4CrQQ=",
    "rxInfo": [{
        "gatewayID": "AIAAAAACDgs=",
        "time": null,
        "timeSinceGPSEpoch": null,
        "rssi": -52.
        "loRaSNR": 8.5,
        "channel": 2,
        "rfChain": 0.
        "board": 0,
        "antenna": 0,
        "location": {
            "latitude": 22.31025463915414,
            "longitude": -245.77515719803597,
            "altitude": 0,
            "source": "UNKNOWN",
            "accuracy": 0
        },
        "fineTimestampType": "NONE",
        "context": "LZVORA==",
        "uplinkID": "p7k/E6nyQpeMTwedtMqHgA==",
        "crcStatus": "CRC_OK"
    }],
    "txInfo": {
        "frequency": 868500000,
        "modulation": "LORA".
        "loRaModulationInfo": {
            "bandwidth": 125,
            "spreadingFactor": 12,
            "codeRate": "4/5",
            "polarizationInversion": false
        }
    },
    "adr": true,
    "dr": 0,
```

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```
"fCnt": 114,
"fPort": 10,
"data": "AOAA12QCAwIBKAAeAw==",
"tags": {},
"confirmedUplink": false,
"devAddr": "ABCDuw==",
"publishedAt": "2023-06-15T08:24:14.436509221Z",
"deviceProfileID": "e87f230b-51a7-407a-aa6c-468308601139",
"deviceProfileName": "TA692FC-L-5-868 Thermostat"
}
```

Device fields

- As you can see the device EUI arrives in the devEUI field. We will use it as a device name in ThingsBoard.
- As you can see the device profile name arrives in the **deviceProfileName** field. We will use it as a **device Type** (**device profile name**) in ThingsBoard.
- As you can see the device name arrives in the deviceName field. We will use it as a device label in ThingsBoard.

Table 1: ChirpStack fields v.s. ThingsBoard fields in this case :widths: auto :header-rows: 1

No.	ChirpStack field	Editable	ThingsBoard field	Editable
1	devEUI	No	deviceName	No
2	deviceProfileName	No	deviceType (deviceProfileName)	Yes ¹
3	deviceName	Yes ²	deviceLabel	Yes ²

Notes

In the converter it will be indicated like this:

```
var deviceLabel = data.deviceName; // "Sales-Office"
var deviceName = base64ToHexWithoutUppercase(data.devEUI); //'0012bdfffe02ad04', unique
var deviceType = data.deviceProfileName; //"TA692FC-L-5-868 Thermostat"
var result = {
    deviceName: deviceName,
    deviceType: deviceType,
    deviceLabel: deviceLabel
}
```

¹ In this case, if **deviceType (deviceProfileName)** of the device is modified, the device may not be able to receive messages from ChirpStack or send messages to ChirpStack.

 $^{^{2}}$ Both are the same only when ThingsBoard automatically creates the device. They are not automatically kept in sync afterwards.

Device data

Device data is encoded in the "data" field. The Base64 encoded data here is:

"data": "AOAA12QCAwIBKAAeAw=="

Let's convert them into roomTemperature, setTemperature, fanMode and fanState, etc.

In the decoded form we have the following string: 00 E0 00 D7 64 02 03 02 01 28 00 1E 03

- **00 E0** is the value for roomTemperature, 22.4.
- 00 D7 is the value for setTemperature, 21.5.
- 64 is the value for coolProportionalOutput, 100%.
- **02** is the value for fanMode, MED.
- **03** is the value for fanState, HIGH.
- **02** is the value for threshold, 0.2.
- **01** is the value for systemMode, COOL.
- **28** is the value for coolPBand, 4.0.
- **00 1E** is the value for coolITime, 30.
- **03** is the value for kFactor, 3.

In the converter it will be indicated like this:

```
var result = {
  attributes: {
    setTemperature: parseInt(incomingHexData.substring(4, 8), 16)/10,
    coolProportionalOutput: parseInt(incomingHexData.substring(8, 10), 16)/100,
    fanMode: fanModeStateMeta[parseInt(incomingHexData.substring(10, 12), 16)],
    fanState: fanModeStateMeta[parseInt(incomingHexData.substring(12, 14), 16)],
   threshold: parseInt(incomingHexData.substring(14, 16), 16)/10,
    systemMode: systemModeMeta[parseInt(incomingHexData.substring(16, 18), 16)],
    coolPBand: parseInt(incomingHexData.substring(18, 20), 16)/10,
    coolITime: parseInt(incomingHexData.substring(20, 24), 16),
   kFactor: parseInt(incomingHexData.substring(24, 26), 16)
  },
  telemetry: {
   roomTemperature: parseInt(incomingHexData.substring((0, 4), 16)/10
  }
}
```

Importing uplink Converter

- Download ChirpStack uplink converter for TA692FC-L-5.
- Data converters -> + -> Import converter.

	Current subscription ThingsBoard Cloud Prototype	L :
 Integrations center Integrations 	Data converters + C	Q
다. Data converters 1	Created time ↓ Name Tj Create new converter	
 ↔ Rule chains 	2 1 Import converter	
👚 Edge management 🛛 🗸		
🛠 Advanced features 🛛 🗸		
Resources	Items per page: 10 1 − 2 of 2 < >	

• Popup dialog: Import converter -> Drag and drop the converter file -> Import.

	Data convert Current subscription ThingsBoard Cloud Prototype Status Current subscription ThingsBoard Cloud Prototype Status Current subscription ThingsBoard Cloud Prototype	:3	۰	:
🙆 Integrations center 🛛 🔺	Data converters	+	C	Q
	Import converter X			
ţ Data converters				
↔ Rule chains	Converter file * nk			:
😤 Edge management 🛛 🗸				:
🛠 Advanced features 🛛 🗸	Drag and drop a JSON file or Browse file X			-
Resources	abirataly unlink converter for to 6026 L 5 icon			
😫 Widgets Library				
Resources library	Cancel Import			
Notification center				
1. Api Usage	Items per page: 10			
₽ White Labeling				

• Show it in the list of Data Converters.

ThingsBoard	Integrations center >	Curr 다 Data converters	rent subscription ThingsBoard Cloud	8	۵	:
 Integrations center Integrations 	Data converters			+	G	۹
ၞ Data converters	Created time ↑	Name	Туре			
↔ Rule chains	2023-06-01 17:40:12	ChirpStack uplink converter for TA692FC-	L-5 Uplink			:
😤 Edge management 🛛 🗸						
🛠 Advanced features 🛛 🗸						
Resources		Items per	rpage: 10 💌			

You can change the decoder/encoder function while creating the converter or after creating it. If the converter has already been created, then click on the "pencil" icon to edit it. Copy the configuration example for the converter (or your own configuration) and insert it into the decoder/encoder function. Save changes by clicking on the "checkmark" icon.

Step 3.2 Downlink Converter

You can customize the downlink according to your configuration. Let's consider an example where we send an shared attribute update message - **remoteSetSetTemperature**.

```
data: msg.remoteSetSetTemperature
```

Also, indicate the required parameters in the metadata:

```
metadata: {
    "cs_devEUI": "$Device_EUI"
}
```

Example for downlink converter:

```
var remoteSetSetTemperature = msg.remoteSetSetTemperature;
var fPort = 91:
var content = Math.round(remoteSetSetTemperature * 10);
var contentBase64 = Uint16ToBase64(content);
// Result object with encoded downlink payload
var result = {
   // downlink data content type: JSON, TEXT or BINARY (base64 format)
   contentType: "TEXT",
   // downlink data
   data: contentBase64,//JSON.stringify(data),
   // object: {...}, //ChirpStack v4 // decoded object (when application coded has_
\rightarrow been configured)
   // Optional metadata object presented in key/value format
   metadata: {
            DevEUI: metadata.cs_devEUI, //ChirpStack v3
            fPort: fPort
                                         //ChirpStack v3
   }
};
function Uint16ToBase64(value) {
   let myArr = new Uint8Array(2);
   myArr[0] = value >> 8; // High byte
   myArr[1] = value >> 0; // Low byte
   let myStr = Uint8ArrayToString(myArr);
   return btoa(myStr);
}
function Uint8ArrayToString(fileData){
 var dataString = "";
  for (var i = 0; i < fileData.length; i++) {</pre>
   dataString += String.fromCharCode(fileData[i]);
  }
  return dataString;
}
```

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return result;

Where **cs_devEUI** is device EUI, it will be taken from the device uplink message.

Importing downlink Converter

- Download ChirpStack downlink converter for TA692FC-L-5.
- Data converters -> + -> Import converter.

	Data convert Current subscription ThingsBoard Cloud Prototype Current subscription Status Active	:
🙆 Integrations center 🛛 🔺	Data converters + C	Q
➡ Integrations		
ၞ Data converters 1	Created time ↓ Name Tj Create new converter	
↔ Rule chains	2 1 Import converter	
😤 Edge management 🛛 🗸 🗸		
🛠 Advanced features 🛛 🗸		
Resources	Items per page: 10	
😫 Widgets Library		

• Popup dialog: Import converter -> Drag and drop the converter file -> Import.

	rd 🔯 ı	ntegrations ce > 1 Data convert	- 53	۹	
-	• Da	Import converter ×	+	C	0
∃ Integrations	Du	Converter file *		Ŭ	
ট্ Data converters					
 ↔ Rule chains 		Drag and drop a JSON file or Browse file X nk			:
👚 Edge management	~				:
🛠 Advanced features	~	chirpstack_downlink_converter_for_ta692fc_l_5.json			•
Resources	^	3 Cancel Import			
😫 Widgets Library		1-2of2 K			
A					

• Show it in the list of Data Converters.

	Integrations center >	다 Data converters	Current subscription ThingsBoard Clou Status Active		•	:
 Integrations center Integrations 	Data converters			+	C	۹
ţ Data converters	Created time ↑	Name	Туре			_
↔ Rule chains	and the second					
👚 Edge management 🛛 🗸	2023-06-05 17:35:36	ChirpStack downlink converter fo	r TA692FC-L-5 Downlink			:
🛠 Advanced features 🛛 🗸						
Resources		1	tems per page: 10 👻			

Step 3.3 Create Integration

Step 3.3.1 Get Application API key from ChirpStack

• To get the API key we need to open Application server UI, open **API keys** tab from the left top menu and **Create** an API key.

€	ChirpStack	Q Search organization, application, gateway or device	? 🔒 admin
\mathbb{R}	Gateway-profiles		
	Organizations	Global API keys	2 + CREATE
	All users		
٩	API keys 1	ID Name	
chirp	ostack 👻	Rows per page: 10 👻	0-0 of 0 < >
A	Org. dashboard	•	

• Input your API key name -> Create API key.

€	ChirpStack	Q Search organization, application, gateway or device ? early admin
\mathbb{R}	Gateway-profiles	Global API keys / Create
	Organizations	
•	All users	API key name *
٩	API keys	Thingsboard integration 1 A descriptive name for the API key
chirp	ostack 👻	
f	Org. dashboard	Z GREATE APTRET

• Copy your token.



• Show it in the list of global API keys.

	ChirpStack	Q Search organization, application, gateway or device	? \varTheta admin
*	Org. users	Applications	+ CREATE
٩	Org. API keys		
.≞≡	Service-profiles	ID Name Service-profile Description	
뉁	Device-profiles	2 TA692ECLI-5-Application localities service profile TA692ECLI-5-868 Thermostat TA692ECLI-5-015 T	hermostat
\bigcirc	Gateways		
	Applications 1	Rows per page: 10 + 1-1 c	.f1 < >

Step 3.3.2 Adding ChirpStack intergration on ThingsBoard

Now that the Uplink converter and Downlink converter have been created, and we have all required data, it is possible to create an integration.

• Integrations -> select a integration type: ChirpStack -> input name: *TA692FC-L-5 ChirpStack integration* -> enable integration, debug mode and allow create devices or assets -> Next.

	đ	Add Integratio	Cur	rent subscription ThingsBoard Clou		•	8 Tenant ad		
O Users			"						
Integrations center	I	0	2	3	4		2 🛨	G	Q
Integrations		Basic settings	Uplink data converter	Downlink data converter	Connection	tus	Remote		
‡ Data converters				Optional		4.4.5			
 ↔ Rule chains 		Integration type* ChirpStack	3		×			Ŭ	
😤 Edge management 🛛 🗸									
ℜ Advanced features		TA692FC-L-5	ChirpStack integration 4						
Resources		Enable integr	ration 5						
😫 Widgets Library		Debug mode							
Resources library		Allow create	devices or assets						
Notification center									
🕕 Api Usage									
P White Labeling									
🗱 Settings					6 Nort				
Security					Next	- 1 of 1			

• Select Uplink data convert: TA692FC-L-5 downlink from ChirpStack.

	Add Integration
😝 Users	
Integrations center	
➡ Integrations	Basic settings Uplink data converter Downlink data converter Connection us Remote
ţ Data converters	ChirpStack Optional
↔ Rule chains	Select avisting uplink data converter 7
👚 Edge management 🛛 🗸 🗸	
Advanced features	ChirpStack uplink converter* 8 X
E Resources	
😫 Widgets Library	Create new uplink data converter
Resources library	
Notification center	
11. Api Usage	
P White Labeling	
🏟 Settings	Rack Next
Security	

• Select Downlink data convert: TA692FC-L-5 uplink from ChirpStack.

	Current subscription ThinesBoard Cloud Prototype Add Integration
😝 Users	
🙆 Integrations center 🛛 🔺	
➡ Integrations	Basic settings Uplink data converter Downlink data converter Connection tus Remote
ţ Data converters	ChirpStack Optional
 ↔ Rule chains 	
👚 Edge management 🛛 🗸 🗸	
🛠 Advanced features 🛛 🗸	Downlink data converter ChirpStack downlink converter for TA692FC-L-5
Resources	
😫 Widgets Library	Create new downlink data converter
Resources library	
Notification center	
🖪 Api Usage	
P White Labeling	
🗱 Settings	
😯 Security	

• Check **Base URL** -> copy **HTTP endpoint URL** -> paste your ChirpStack **Application server URL** -> paste your ChirpStack **Application server API Token**.

	Current subscription ThingsBoard Cloud Prototype Add Integration
\varTheta Users	
🙆 Integrations center 🛛 🔺	
Integrations	Basic settings Uplink data converter Downlink data converter Connection
다. Data converters	ChirpStack Optional
↔ Rule chains	Base URL* Attps://thingsboard.cloud 13
😤 Edge management 🛛 🗸 🗸	
🛠 Advanced features 🛛 🗸	HTTP enapoint URL https://thingsboard.cloud/api/v1/integrations/chirpstack/2056bafd-9ab3 14
Resources	
😫 Widgets Library	http://13.48.187.149:8080 15
Resources library	Application const. All Tokinst
Notification center	eyJhbGci0iJIUzI1NilsInR5cCl6lkpXVCJ9.eyJhcGlfa2V5X2lkljoiYTI3Mzc1ZGEtYjYE
🖪 Api Usage	
P White Labeling	Execute remotely
🌣 Settings	
Security	

• Show it in the list of integrations.

ThingsBoard	Integrations center	> 🕣 Integrations	Current subscription ThingsBoard Cloud Prototype Status Active	а 🌲	8 Ienant adr	ninistrator	
😝 Users							
Integrations center	Integrations				+	GQ	
Integrations	Created time ↓ Na	ame Type	Daily activity	Status	Remote		
ቲ Data converters	IA	692FC-L-5					
 ↔ Rule chains 	2023-06-05 17:35:36 Ch int	irpStack ChirpStack egration		Active		ĕ Î	
👚 Edge management 🛛 🗸 🗸							
★ Advanced features			Items per page: 10 💌	1 – 1 of 1			

NOTE: It is recommended to enable Debug mode for debug purposes to see uplink/downlink events on integration.

Step 3.3.3 Configure an Integration for your ChirpStack application

To create integration on ChirpStack Network server stack, we need to do the following steps:

- Login to ChirpStack Network server stack user interface (Default login/password admin/admin).
- We go to the tab Applications in the left menu and open our application (our application is named Application).

	ChirpStack		Q Search organ	nization, application, gateway or device ? each admin
*	Org. users	Applications		+ CREATE
٩	Org. API keys			
E	Service-profiles	ID Name	Service-profile	Description
	Device-profiles	2 TA692EC-I -5-Application	localbost service profile	TA692EC-L-5-868 Thermostat TA692EC-L-5-915 Thermostat
\bigcirc	Gateways			
	Applications 1			Rows per page: 10 ▾ 1-1 of 1 < >

• Open the Integrations tab and create a HTTP integration.



- Let's go to the **Integrations** tab in ThingsBoard. Find your ChirpStack integration and click on it. There you can find the HTTP endpoint URL. Click on the icon to copy the url.
- Fill the fields with endpoint url from ThingsBoard integration:

	ChirpStack	Q Search organization, application, gateway or device ? 😝 admin
	Network-servers	Applications / TA692FC-L-5-Application
Ē	Organizations	DEVICES MULTICAST GROUPS APPLICATION CONFIGURATION INTEGRATIONS
• «	All users API keys	Add HTTP integration
chirp	ostack 👻	5 JSON reliable to accorded
•	Org. users	Headers ADD HEADER
٩	Org. API keys	Endpoints
a ≡ ∓∺	Service-profiles	6 https://thingsboard.cloud/api/v1/integrations/chirpstack/127834db-ff11-8a6e-edc6-30da3828f2d7
Ŕ	Gateways	Chirpstack will make a PUSI request to this URL(s) with event as query parameter. Multiple URLs can be defined as a comma separated list. Whitespace will be automatically removed.
	Applications	7 ADD INTEGRATION

Step 3.3.4 Importing rule chain for Downlink

In order to send Downlink, we use the rule chain to process shared attribute update. To get **devEUI** from device we have to import rule-chain.

- Download Rule chain: TA692FC-L-5 downlink to ChirpStack.
- Rule chains -> + -> Import rule chain -> Popup dialog: Import rule chain -> Drag and drop the Rule chain file -> Import.

ThingsBoard	Current subscription Thin Status Activ	ngsBoard Cloud Prototype 🖸 🗘	:
e Users	Rule chai	2 + C	Q
🙆 Integrations center 🛛 🔺	Import rule chain X		
		Create new rule chain	
រិ្ម Data converters		1 Import rule chain 3	+
↔ Rule chains 1	Drag and drop a JSON file or Brov se file X		:
😤 Edge management 🛛 🗸 🗸			
🛠 Advanced features 🛛 🗸	ta692fc_l_5_downlink_to_chirpstack.json		:
Resources 🔨			:
😫 Widgets Library	Cancel		
Resources library			
Notification center	Items per page: 10 V		

• Show it in the list of Rule chains -> Click on the row.

ThingsBoard	↔ Rule chains	Current subscription Thi Status Act	ingsBoard Clour	□ ♠	8	enant ad	Iministrat	tor 🚦
e Users	Rule chains					+	C	Q
 Integrations center Integrations 	□ Created time ↓	Name		Root				
ၞ Data converters	2023-06-07 14:13:38	TA692FC-L-5 downlink to ChirpStack			<u>+</u>	p.	-	
↔ Rule chains					Ŧ	pa -	-	Î
😤 Edge management 🛛 🗸			tomo nov name: 10 —					
🛠 Advanced features 🛛 🗸		1	tems per page. 10 V					

• Show the rule chain details.

	↔ Rule chains > ↔ TA692FC-L-5 downlink to ChirpStack Q Current subscription ThingsBoard Cloud Prototype CL-5 downlink to ChirpStack Q Status Active	Tenant administrator
🕒 Users	Q Search nodes	()
Integrations center	→ Filter	
1 Integrations	O ╤ asset profile switch	
ၞ Data converters	Q = check alarm status → C = originator stributes = get required fields → C = originator stributes = get required fields → C = originator stributes → C = originator stributes	
 ↔ Rule chains 		
😤 Edge management 🛛 🗸		
🛠 Advanced features 🛛 🗸	Q ╤ check relation	
Resources		₩ × ×

• Check the node of **get required fields**.

	←> Rule chains > ←> TA692FC-L-5 downlink to ChirpStack	Q. Current subscription (ThingsEased Close) : + C + C - Trenant administrator
^	Q. Search nodes < The filter A	get required fields 2 × Enrichment - originator attributes
		Details Events Help
		Rame* Get required fields
* *		I tell Fallure
^	evice profile switch	Feth Imp
,		Olett attribute keys
	0 ∓ gap geofencing filter	IntegrationName × devEUI × Hint: use \$(netsdataKy) for value from metsdata, \$[nessagekey] for value from message body
		Shared attribute keys
^		enn, une spectaarakky jin vinde nommenaan, spiessageky jin vinde nommenaage undy Server attribute keys
nticati		Hint use S(netadatakey) for value from metadata, S[nessagerkey] for value from message body Latest time-series data keys
	≓ ₊ Enrichment ∧	Hint use \$(net5datakq)) for value from metadata, \$[nessagekcy] for value from message body Fetch timestamp for the latest telemetry values
	C = calculate delta	If selected, the latest telemetry values will also include timestamp, e.g. "temp": "(ts:15/4329305897, "value";42)"

• Check the node of **Send downlink**.

9 Users		Q Search nodes	Send downlink
Integrations center	^	Filter ^	Action - integration downlink
∃ Integrations		Q = asset profile switch 0	Details Events Help
ቲ. Data converters		check alam status	Name*
Rule chains			Send downlink
Edge management	•	Q ╤ check fields presence	Integration*
Advanced features	•		TA692FC-L-5 ChirpStack integration
Resources	^	Q	
😭 Widgets Library		⊖ = entity type	Description
Resources library			
Notification center			
Api Usage		Q = gps geofencing filter	
P White Labeling		⊖ = message type	

Step 3.3.5 Configure the root rule-chain

• **Rule chains** -> Click on the row.

ThingsBoar	ď	⟨· ⟩	Rule chains		Current subscript Sta	ion ThingsBoa tus Active	rd Cloud		Ļ	8	enant ad	ministrat	tor 🚦
 Integrations 1 Data converters 		Ru	le chains								+	G	۹
↔ Rule chains 1			Created time	Name 🛧				Root					
😤 Edge management	~		2022-10-11 13:27:25	Generate Report						<u>+</u>	P		1
🛠 Advanced features	*	2	2022-10-11 13:27:26	Root Rule Chain				\checkmark		÷	8		-
Resources	^ "							_		-	1		
😭 Widgets Library						Items pe	er page: 10 💌						
🗞 Resources library													

• Drag and drop the **Rule Chain** node -> Popup dialog: **Add rule node: rule chain** -> Input your node name, *eg: Downlin to ChirpStack* -> Select the Rule Chain, *eg: TA695FC-L-5 downlink to ChirpStack* -> **Add**.



	<→ Rule chains	>	٩	Current subscription ThingsBoard Cloud Prototype Status Active	:: 🌲 😫 Tenant administrator
Device profiles	Q rule	× <			9 ::
Asset profiles	\Xi Filter	~			
🛎 Customers	=+ Enrichment	~	message type	Ty duplicate to specific g	
\varTheta Users	1그 Transformation		Post attributes or RP	Duplicate To Group En	
 Integrations center Integrations 	F Action	· · · · · · · · · · · · · · · · · · ·	True False	Success	€ save attributes Save Attributes
្ម្ Data converters	🖍 Analytics	~		Post attributes	
↔ Rule chains	🛆 External	~	= entity type	message type switch Post telemetry	Save Timeseries
👚 Edge management 🛛 🗸	<> Flow	^		Message Type Switch (RPC Request from Devi	ice)
🛠 Advanced features 🛛 🗸	C (c) min shrin		Success		= log Log RPC from Device
Resources	Covide chain	device profile device Profile Device Profile	le Node	Other	
😫 Widgets Library				RPC Request to Devic	
Resources library				Generate Report	O ≡ Log Other
Notification center					\mathbf{X}
🔝 Api Usage					RPC Call Request
P White Labeling					
🌣 Settings					
🚱 Security 🔨 🔨					Generate Report
वन Two-factor authenticati					C cu rule chain
😯 Roles					Downlink to Chi
at Self Registration					

• Now, root rule chain looks like this:

• Add link from Message Type Switch to Downlink to ChirpStack -> Popup dialog: Select a link label: Attributes updated -> Add.

	<> Rule chains	>	t Rule Chain (Root)	Q Current subscription Thing Status Active	sBoard Cloud Prototype	E B Tenant adr	ninistrator
Device profiles Asset profiles	Q rule 〒 Filter	× < ~					()
a Customers	₩ Enrichment	~	= message type Post attributes or RP	True	2		
🕒 Users 🖄 Integrations center 🛛 🔺	다. Transformation	~			7	save attributes Save Attributes	þ
Integrations	Action	~	True	lse Success	(Post attributes)		
⊈ Data converters	External	~	Add link	? × age type switch	Post telemetry	save timeseries Save Timeseries	þ
😤 Edge management 🗸 🗸 🗸 🗸 🗸	 ✓→ Flow 	^	Link labels	age Type Switch	(RPC Request from Device)		
ℜ Advanced features ▼ Resources ▲	 ✓ rule chain 		Attributes Updated × 1		Other	$D \equiv \frac{\log}{\log RPC \text{ from Device}}$	•
Widgets Library			Care		RPC Request to Device	log	
Notification center					Generate Report	Log Other	
🖪 Api Usage						✓ rpo call request RPC Call Request	•
₽ White Labeling ↓ Settings							
Security						O ↔ Generate Report	10
87R Two-factor authenticati 😯 Roles						C ←→ rule chain Downlink to Chi	

• Save the root rule chain.



Step 3.4 Processing Uplink message

• When device sends uplink message, you will receive an uplink event on integration and data from the device.

	D Integrations center > 🔁 Integrations	Current subscription ThingsBoard Cloud Prototype Status Active	C3 🌲 🙁 Tenant administrator	
Entity Views	TA692FC-L-5 ChirpStack	integration		
na Profiles	Message X			
Device profiles	Crested time ↓ N	Audit Logs Version control Attributes	Latest telemetry Alarms	
Asset profiles	2023-06-05 17:35:36 T { ir "applicationID": "2",			
🚨 Customers	"applicationHame": "TA692FC-L-5-Application", "deviceName": "Sales-Office", "deviceName": "Sales-Office",	у	⇒ ≣ C	
😝 Users	"rxInfo": [["gatewayID": "AIAAAAACDgs=",	m Type Message	Status Error	
Integrations center	"time": null, "timeSinceGPSEpoch": null,	Uolink	ок	
Integrations	"rss1": -59, "loRaSNR": 8.5, "channal": 2			
t), Data converters	"rf(hain": 0, "board": 0,	Uplink •••	ок	
↔ Rule chains	"antenna": 0, "location": {	Uplink •••	OK a	
*******************	"latitude": 22.51025465915414, "longitude": -245.77515719803597, "altitude": 0	Downlink •••	ок	
	"source": "UNKNOWN", "accuracy": 0		ок	
📑 Widgets Library	<pre>}, "fineTimestampType": "NONE", "ineTimestampType": "NONE",</pre>	Uplink	ок	
Resources library	<pre>context : MURAPA== , "uplinkID": "0rY8sktT0WEFex9m90leQ==", "crcStatus": "CRC 0K"</pre>	Downlink •••	OK	
Notification center	}], "txInfo": {			
🗈 Api Usage	"frequency": 868500000, "modulation": "LORA", "legandulation": f	a siline see	OK	
₽ White Labeling	LORAHOGULATIONINTO : (Uplink •••	ок Эдэ)*, 🖂 🕹 1
Settings	Close	Uplink •••	ок	
Security		-	1-10-0110 1/ / N NI	
2FR Two-factor authenticati		items per page: 10 👻		

• The created device with data can be seen in the section **Device groups** -> All.

ThingsBoard	🗔 Devices 🔸 🗔 All	Current subsc	ription ThingsBoard Cloud F	α 🌲	Contract and Tenant and	dministrat	
☆ Home	👩 All 🗔 Groups	s					
🖻 Plan and billing							
🛆 Alarms	Devices \Xi Device Filter	Include customer entities			+	C	Q
E Dashboards	☐ Created time ↓ Name	Device profile Label	State Customer name	Groups	Is gateway		
III Solution templates NEW		TA692FC-L-5-868				•	_
👍 Entities 🔥	2023-06-08 14:46:40 0012bdfffe02ad	d04 Sales-Office Thermostat	Active			V	
🗔 Devices						•	i
Assets			Items per page: 10 👻			>	>1
Entity Views							

• Received data can be viewed in the Uplink converter. In the "In" and "Out" blocks of the Events tab:

ThingsBo	ard 🔯 Integrations center ゝ 🤤 Data converters	Current subscription ThingsBoard Cloud Pro Status Active	itotype 🕄 🌲	B Tenant administrator
📤 Entities	^	ChirpStack uplink converter for	TA692FC-L-5	-
🗔 Devices 🚺				×
🖿 Assets				elations
🖬 Entity Views	"timeSinceGPSEpoch": null, "rssi": -51,			
💼 Profiles	"loRaSNR": 9.5, "channel": 0,			· 📋 C
Device profil	"rfChain": 0, "board": 0,			
Asset profile	"antenna": 0, "location": {			Error
📇 Customers	"latitude": 22.31025463915414, "longitude": -245.77515719803597,			
🕒 Users	"source": "UNKNOWN", "source": "			
Integrations ce	<pre>}, "fineTimestampType": "NONE",</pre>			
	<pre>"context": "VIiAhA==", "uplinkID": "h5FAJMVHRNCgV20kYbyhh0==".</pre>			
1 Data convert	"crcStatus": "CRC_OK" }],			
 ↔ Rule chains 	"txInfo": { "frequency": 868100000,			
🙊 Edge managem	"modulation": "LORA", "loRaModulationInfo": {			
🛠 Advanced featu	"bandwidth": 125, "spreadingFactor": 12,			
Resources	"polarizationInversion": false			
😫 Widgets Libr	}, "adr": true.			
💠 Resources lil	"dr": 0,			
Notification cer				Close
🔝 Api Usage				
7 White Labeling		Items per page: 10		I< < > >I
🏟 Settings				

	Dintegrations center > th Data converters			tenar	
Entities	Data converter Out ChirpStack uplink converter	for TA6	92FC-L-5		@ ×
 Assets Entity Views 	Created time	netry	Alarms	Events F	telations ,
台 Profiles 🔥	<pre>2023-06-0517 "deviceName: "0012bdTtre02a004", "deviceType": "TheoSecU-t-Se8 Thermostat", "deviceLabel": "Sales-Office", "attributes": { "upolicationId": "2"</pre>			4	- î C
Asset profiles	"applicationName": "16092FC-L-5-Application", "devEUT: "0012bdfffe02adda", "devEUT: "0012bdfffe02adda",	In	Out	Metadata	Error
Customers	"txInfo": { "txInfo": { "frequency": 86810000,			•••	
 Integrations center 	"modulation": "LURA", "loRaModulationInfo": { "bandwidth": 125_				
Entegrations	"spreadingFactor": 12, "codeRate": "4/5", "polarizationInversion": false				
t Data converters ↔ Rule chains	} } "*Port": 10, "				
😤 Edge management 🛛 🗸 🗸	aevaar : 0000001, "dr": 0, "setTemperature": 11.5, "setTemperature": 10				
 ★ Advanced features ✓ ▲ Resources 	"fanNode": "MED", "fanState": "OFF", "theshold": 0.2,				
😫 Widgets Library	"systemMode": "OFF", "coolPBand": 4, "coolTiame": 30,				
 Resources library Notification center 	"kFactor": 3				
🖪 Api Usage					
 White Labeling Settings 	Hems per page:	10 👻] 1 - 10 of	15 <	< > >I

Step 3.5 Processing Downlink message

• We go to the **Device group** section in the **All** folder, to see this with an example. We add a **remoteSetSetTemperature** of the device in the **Shared attributes** (initialize the **remoteSetSetTemperature** to **25.5**).

	🗔 Devices ゝ 🗔 All	Current subscription ThingsBoard Clou :
♠ Home	2 Groups	
Plan and billing		0012bdfffc02cd04
\land Alarms	device.devices = device.device-filter-til	Device details
Dashboards	Created time ↓ Name	
Solution templates		Attributes Latest telemetry Alarms Events Remain > 4
🔒 Entities 🔥 🔨	2023-06-08 14:46:40 0012bdfffe02ad04	Shared attributes Shared attributes -
Loo Devices 1	2023-05-29 17:13:42 F0:08:D1:43:1A:E4	
Assets	2023-03-30 16:57:58 A8:48:FA:57:D5:20	□ Last update time Key ↑ Value
Entity Views	_	
📩 Profiles 🔥 🔨	paginator.iter	paginator.items-per-page
Device profiles		

ThingsBoard	🗔 Devices 🔸 🗔 All	Current subscription ThingsBoard Cloud Prototype Status Active	12 🌲 😝 Tenant administrator
🛧 Home	Cat All		
🖶 Plan and billing	Add attribute	×	
\land Alarms	device.devices	_	⊘_ ×
Dashboards	Created time	re	
III Solution templates NEW		atest teleme	etry Alarms Events Record >
🔥 Entities 🔥 🔨	2023-06-08 14:4 Value type 123 Double 22	15.5 utes scope	
🗔 Devices	2023-05-29 17:1	attributes	→ + C Q
💼 Assets	2023-03-30 16:5	Cancel	Value
Entity Views	-	1 – 8 paginator.items-per-	page-separator 8 < < > >
💼 Profiles 🛛 🔺	paginator.iter		paginator.items-per-page 10 -
Device profiles			

• Now, We have indicated the **remoteSetSetTemperature** of the device in the **Shared attributes**. Now we edit it by clicking on the "pencil" icon.

ThingsBoard	🗔 Devices 🔸 🗔 All	Current subscription ThingsBoard Cloud Prototype :: 🜲 😩 Tenant admin	inistrator
♠ Home	🗔 All 🗔 Groups		
Plan and billing		00101455-00-404	
\land Alarms	device.devices = device.device-filter-tit	Device details	? ×
📑 Dashboards	□ Created time ↓ Name		
III Solution templates NEW		Details Attributes Latest telemetry Alarms Events	Ren >
🚓 Entities 🔷	2023-06-08 14:46:40 0012bdfffe02ad04		~
🗔 Devices	2023-05-29 17:13:42 F0:08:D1:43:1A:E4	remoteSetSetTemperature	^
Assets	2023-03-30 16:57:58 A8:48:FA:57:D5:20	□ Last update time Key ↑ Value	
Entity Views	0022-02-27 15-17-50 AP-49-EA-57-60-A4	2023-06-19 17:55:03 remoteSetSetTemp 25.5	1
🖆 Profiles 🛛 🔺	A0.40.1 A.07.00.A4		
Device profiles	2023-02-08 09:41:15 9C:9C:1F:18:72:B0	1 – 1 naninator itams.nar.nana.sanarator 1	
Asset profiles	paginator.iter	· · · pognition items per page separator i	
📇 Customers		paginator.items-per-page	10 🔻

• Then we make changes to the attribute (change the remoteSetSetTemperature to 19.5) and save the data.

ThingsBoard	🗔 Devices 🔸 🗔 All	Current subscription ThingsBoard Cloud Prototype C 4 Courter admenistra	ator
☆ Home	La All La Groups		
🖶 Plan and billing		00106466002404	
🛕 Alarms	device.devices = device.device-filter-tit	Device details	×
📑 Dashboards	☐ Created time ↓ Name		
III Solution templates NEW	-	Z Details Attributes Latest telemetry Alarms Events F	Renation >
🔒 Entities 🔨	2023-06-08 14:46:40 0012bdfffe02ad04	0	~
🖬 Devices	2023-05-29 17:13:42 F0:08:D1:43:1A:E4		- ~
Assets	2023-03-30 16:57:58 A8:48:FA:57:D5:20	Last update time Value type Double value 123 Double 195 1	
Entity Views	2023-03-27 15-17-59 A8:48:FA-57-60:A4	2023-06-19 17:55:03	
🔹 Profiles 🛛 🔨		Cancel Up	date
Device profiles	2023-02-08 09:41:15 9C:9C:1F:18:72:B0	1 – 1 popiester temp per page separater 1 – 1/2 – 2 – 2	
Asset profiles	paginator.iter	r - r paginator, tellis-pel-page-separator r	
😕 Customers		paginator.items-per-page 10	•

• Received data and data that was sent can be viewed in the downlink converter. In the In block of the Events tab,



we see what data entered and the **Out** field displays messages to device:

Step 3.6 Visiual Data

Use the Dashboards to work with data. Dashboards are a modern format for collecting and visualizing data sets. Visibility of data presentation is achieved through a variety of widgets.

- 1. Update Avantec Widgets.
- 2. Import TA692FC-L-5 Detail Dashboard.
- 3. Import TA692FC-L-5 List Dashboard.
- 4. Modify TA692FC-L-5-868 Thermostat device profile's mobile dashboard.

For more information about the dashboard, please refer to here.
6.3 MultiTech Conduit® MTCAP-868-041A

6.3.1 MTCAP Series

Refer to MultiTech Conduit® AP Access Point for LoRa® Technology (MTCAP Series).

The MultiTech Conduit® AP conveniently provides deep in-building connectivity and improved performance for network operators and enterprises connecting thousands of IoT assets by harnessing the power of the LoRaWAN® protocol.

Easy to deploy, the Conduit AP access point extends LoRa® connectivity in commercial buildings like hotels, convention centers, offices and retail facilities providing coverage in difficult to reach areas cell tower or rooftop deployments may not penetrate.

6.3.2 MTCAP-868-041A

Refer to:

- WebSite: MTCAP-868-041A
- Data Sheet: MultiTech Conduit® AP Access Point for LoRa® Technology (EU868)
- Quick Start Guide: Conduit AP Quick Start Guide
- Application Note: Configuring mDot with Conduit AP using LoRa
- Software Guide: mPowerTM Edge Intelligence Conduit AEP Software Guide

Ethernet Only mPower Programmable Access Point with external LoRa antenna and EU/UK Accessory Kit.

Accessory kit includes power supply and blade(s), LoRa antenna, Ethernet cable, mounting bracket and Quick Start Guide.

First-Time Setup of Gateway

Note: This configuration works with the LoRa packet forwarder. You may choose to use Ethernet with LoRa or Cellular with LoRa (if your model has a cellular radio).

This setup wizard helps you configure the main features of your device for initial setup. In most cases, you can accept the provided defaults. See **First-Time Setup** in the software guide for more details.

1. Go to your browser's address line and enter the default IP address for the gateway to access the UI: 192.168.2.1. Most browsers display a warning about HTTP addresses being unsafe. Click on **Advanced** and continue to 192.168.2.1.



- 2. Upon power up for the first time, the device will be in commissioning mode. The system requires you to set up an administrative user. Enter your desired username and click **OK**.
- 3. Enter a desired password for the administrative user and click **OK**. This password must be of sufficient length and strength (with a mix of character classes such as letters, numbers, and symbols). Enter the password again to confirm. Click **OK**.
- 4. The login page appears. Enter username and password.
- 5. First-Time Setup Wizard appears.
- 6. For Call Home,
 - a. Accept all default settings (disabled).
 - b. Click Next.

7. Set the date, time, and time zone.

- a. If the information is correct, accept the default values.
- b. Otherwise, update Date, Time, and/or Time Zone.
- c. Click Next.

8. Configure LAN network interfaces Eth0 and Br0.

- a. Accept all default settings **eth0** assigned to the bridge **br0** (with DHCP set automatically). **NOTE**: You will need to make additional configuration changes for Ethernet under Network Interfaces after **First-Time Setup**. See *Using Ethernet with LoRa Packet Forwarder*.
- b. Click Next.

First-Time Setup Wiza	rd X				
Network Interface Conf	iguration - eth0				
Bridge	br0 ~				
Network Interface Conf	Network Interface Configuration - br0				
IPv4 Address	192.168.2.1				
Mask	255.255.255.0				
	Back Next				

9. Configure your device's Cellular connection.

- a. If you have no cellular radio (Ethernet only) in your device or plan to use Ethernet with the LoRa packet forwarder, accept all defaults with **Enabled** deactivated (Cellular is disabled) and APN left blank.
- b. If you have a cellular radio model and plan to use **Cellular** with the LoRa packet forwarder, select **Enabled** (Cellular is enabled).
- c. If required by your network carrier, enter your **APN** (Some carrier networks may set it automatically via OTA registration. Leave it blank in that case).

d. Click Next.

The sum	
First-Time Setup Wizard	×
Cellular Configuration	
Enabled	
APN	
	Back Next

10. For Cellular Authentication,

- a. Accept all defaults (NONE).
- b. Click Next.

11. For Remote Management,

- a. Accept all defaults (disabled).
- b. Click Next.

12. For HTTP/HTTPS Access,

- a. Accept all defaults (enable HTTP to HTTPS via LAN).
- b. Click Next.

13. For Bootloader Protection (setting a u-boot password),

- a. Disable Bootloader Protection (defaults vary with firmware version).
- b. Click Finish.
- 14. To save your changes, click Save and Apply.

Configuring LoRa Packet Forwarder

Using Ethernet with LoRa Packet Forwarder

If you are planning to use Ethernet with the LoRa Packet Forwarder, then you must make this configuration change below before configuring and running Packet Forwarder. If you are using a Cellular connection with LoRa, you can skip these steps.

1. Go to Network Interfaces. Click the pencil for the eth0 interface.

MULTITECH	mPower [™] Edge Intelligence Conduit AP - Application Enablement Platform 2 ad				😩 admin 🔹		
	NETW	ORK INTER	FACES CO	NFIGURATIO	N 💿	₽ ₽	Reset To Default
Home	NAME	DIRECTION	TYPE	IP MODE	IP ADDRESS	BRIDGE	OPTIONS
R LoRaWAN ®	eth0	WAN IPv4	Ethernet	DHCP Client	192.168.21.107/24		2 🖍
ø Setup	br0	LAN IPv4	Bridge	Static	192.168.2.1/24	br0	1
Network Interfaces 1 Global DNS DDNS Configuration DHCP Configuration LLDP Configuration SMTP Configuration							
SNMP Configuration							

2. Under Network Interface ETH0,

- a. change **Direction** to **WAN**.
- b. Under Mode, select DHCP Client.
- c. Click Submit.

MULTITECH	mPower [™] Edge Intelligence Conduit AP - Application Enablement Platform admin ▼			
	NETWORK INTERFACE CONFIGURA	ATION - ETHO 💿		
Home	Direction			
🗑 LoRaWAN ®	WAN • 1			
ø Setup	IPv4 Settings			
Network Interfaces	Mode	Gateway		
Global DNS	DHCP Client • 2	192.168.21.1		
DDNS Configuration	IP Address	Primary DNS Server		
DHCP Configuration	192.168.21.107	8.8.8.8		
LLDP Configuration	Mask	Secondary DNS Server		
SMTP Configuration	255.255.255.0	8.8.4.4		
SNMP Configuration	C Enable IP Masquerading			
Time Configuration				
🐻 Firewall	802.1X Authentication			
	Authentication Method			
R lunnels	NONE *			
🎝 Administration				
≕¥ Status & Logs	✓ Submit 3		× Cancel	
Commondo				

3. Go to Administration > Access Configuration > HTTPS, Enable HTTPS via WAN, then click Submit.

MULTITECH	mPower [™] Edge Intelligence Conduit AP - Application Enablement Platform L admin ▼ MTCAP-868-041A Firmware 6.3.0
Home	Web Server
R LoRaWAN ®	HTTP Port
🏟 Setup	80 HTTP Redirect to HTTP via LAN VIA WAN
式 Firewall	443 HTTPS via WAN
ය. Tunnels	Session Timeout (minutes)
2. Administration	30

4. Click Save and Apply.

Configuring the Gateway

To activate LoRa Packet Forwarder Mode on your device:

1. For LoRaWAN > Network Settings > LoRa Mode, select PACKET FORWARDER under Mode. If Manual Configuration is showing, click Normal Configuration to switch.

MULTITECH	MPOwer [™] Edge Intelligence Conduit AP - Application Enablement Platform 1 admin ▼ Admin ■		
Home	LoRa Mode		
@ LoRaWAN ®	PACKET FORWARDER * 2		
Network Settings 1	Status		
🐻 Firewall	Packet Forwarder 4.0.23-r43.0 RUNNING		
器 Tunnels	LoBa Card Information hide :		
administration			
=¥ Status & Logs	Gateway EUI 00-80-00-00-02-0E-0B Frequency Band 868		
▶ Commands	Gateway Info		
H Apps	UUID 2210C113-7643-2B1A-16B7-		
🕜 Help	Serial Number		
	LoRa Packet Forwarder Configuration (Manual Mode) 3 Show Normal Configuration		
	Config Card 1 (examples) Import 🛓		

- 2. For LoRaWAN > Network Settings > LoRa Packet Forwarder Configuration,
 - a. You should select the network to use from the drop-down under Network: Manual, Radio Bridge ChirpStack, The Things Network, Senet, or Loriot. In this case, select Manual.
 - b. Select the appropriate Channel Plan for the Packet Forwarder. Choose from the drop-down menu:

US915: 915, AU915: 915, AS923-1: 915, AS923-2: 915, AS923-3: 915, AS923-4: 915, KR920: 915, EU868: 868, IN865: 868, RU864: 868, or ISM2400: 2400. In this case, select EU868.

- c. Type your LoRaWAN Network Server address your ChirpStack IP.
- d. Type upstream port & downstream port: 1700.
- e. Click Submit.

MULTITECH	mPower [™] Edge Intelligence Conduit AP - Application Enablement Platfo MTCAP-868-041A Firmware 6.3.0	orm 😩 admin
⑦ Help	LoRa Packet Forwarder Configuration (Normal Mode)	Show Manual Configuration
	Network Settings 2 Network Channel Plan	
	Basics	show 🗘 -
	- Server Settings - 4	hide 🗘 -
	Image: Server Address Upstream Port Image:	
	Forward CRC	show 🗘
	— Channel Config —	show 🗘
	Duty Cycle	show 🗘
	Intervals	show 🗘
	ChirpStack Gateway Bridge Configuration	
	Chirpstack Gateway Bridge not installed. Instructions for installing the service can be fo	und here
	Enabled	
	Submit	🕄 Reset To Default

- 3. Then, click Save and Apply.
- 4. Confirm that the Packet Forwarder is now running under **Status**. Show the **LoRa Card Information** and copy the **Gateway EUI** (save for later).

MULTITECH	mPower™ Edge Intelligence Conduit AP - Application Enablement Platform MTCAP-868-041A Firmware 6.3.0	🙎 admin 🔹
	LORAWAN NETWORKING (2)	
Home	LoRa Mode	
LoRaWAN B		
Network Settings	PAREITORWARDER	
🕸 Setup	Status	
式 Firewall	Packet Forwarder 4.0.23-r43.0	
윪 Tunnels		
administration	LoRa Card Information	hide 🗘
≕¥ Status & Logs	Gateway EUI C 00-80-00-00-02-0E-0B	

5. Make sure to properly add your gateway and any end devices to the network based on their specific system and instructions. For this example, we will configure the gateway and end device using **Manual**.

Optional: Firmware Upgrade

Tip: To install mPower 6.3.0, the Conduit gateway must be upgraded to mPower 6.0.0 or higher. Customers that are running earlier versions of mPower should use the following upgrade process.



• Download a new firmware form here.

irce Code MultiTech.com	Type text to search here	
	in the content of the	
Downloads	User	
	Register	
Conduit: mPower Models (MTCDT-X-2XXA or MTCDTIP-x-2xxA)	 Log in 	
imware Files; (Changelog See mPower software guide for upgrade instructions	Sitemap	
MTCDT 6.2.0 (cigned firmword) with Palages Notes	 View all pages 	
MTCDT 6.3.0 (signed immware) with Release Notes		
MTCDT 5.3.8-s1 (signed firmware) with Release Notes	Pages	
Previous Versions	 Privacy Statement 	
	 Terms of Use 	
Conduit Access Point and Conduit IP67 200 Series: mPower Models	 Sitemap 	
(MTCAP and MTCDTIP2)	Search Results	
MTCAP and MTCDTIP2 6.3.0 (signed firmware) with Release Notes	Home	
MTCDTIP2 6.0.4 (signed firmware) with Release Notes	News	
MTCAP 6.0.1 (signed firmware) with Release Notes	Products	
MTCAP 5.3.8s-s1 (signed firmware) with Release Notes	 Sottware Developeds 	
Previous Versions	Downloads	
Conduit: ml inuv Model	Forums	
	 Device HQ 	
ICD1 Commissioning Image:(Changelog Upgrade Instructions)	Dragonfly	
mLinux 6.3.0 with Release Notes TBD	General	
mLinux 6.0.1 with Release Notes	Lora Network Server	
mLinux 5.3.31 with Release Notes	0 mD0tXt00t	
	 Conduit: AED Model 	

• Updrade: For Administartion > Firmware Upgrade > Choose Firmware Upgrade File, select *a new firmware* > Open > Start Upgrade >

MULTITECHO	mPower™ Edge Intelligence Conduit AP - Application Enablement Platform MTCAP-868-041A Firmware 6.0.4
Home	
Save and Apply	
LoRaWAN ®	Firmware Upgrade
Setup	3 Choose Firmware Upgrade File No file selected
Firewall	
Tunnels	6 Start Upgrade
Administration 1	← → ~ ↑ GW MTCAP → MTCAP_6.3.0_upgrade-signed ~ ♂ ♀ Search MTCAP_6.3.0_upgrad
User Accounts	Organize 🔻 New folder 🗄 👻 🛄 👔
Self-Diagnostics (beta)	log Date modified
Access Configuration	Loka Doc 4 MTCAP_6.3.0_upgrade-signed.bin 27/4/2023 5:16 am GW MTCAP-868-041A 9 mtcap-release-notes 6.x.x.pdf 6/6/2023 4:08 am
RADIUS Configuration	MTCAP_6.3.0_upgrade-signed
MQTT Broker	Old-config
X.509 Certificate	File name: MTCAP_6.3.0_upgrade-signed.bin
X.509 CA Certificates	5 Open Cancel
Remote Management	
Notifications	
Web UI Customization	
Firmware Upgrade 2	

• Click **OK** in a popup dialog.

Upgrade can take up to 10 min continue?	utes. Do you wa	ant to
	✓ ОК	🗙 Cancel

• Wait a few minutes. After the firmware upgrade is successful, MTCAP will automatically restart. If the upgrade is successful, you will see the new version number after logging in.

MULTITECH	mPower [™] Edge I MTCAP-868-041A	ntelligence Conduit AP - Applicat Firmware 6.3.0	ion Enablement	Platform 🔹 admin 🔻
	DEVICE INFORM	ATION		
Home	Ma dal Museli an		0	2000/////TE40/000
	Model Number	MICAP-868-04TA	Current Time	2023/6/14 ト+12:10:22
(R) LORAWAN ®	Serial Number	21829071	Up Time	00:23:50
Network Settings	Firmware	6.3.0	WAN Transport	Ethernet
			Current DNS	8.8.8.8, 8.8.4.4
🕸 Setup	WAN		LAN	
Network Interfaces	Ethernet (eth0)			
Global DNS	Mode	DHCP Client	 -Q- No network interface configured as LAN 	
	MAC Address	00:08:00:4B:F9:16		
DDNS Configuration	IPv4 Address	192.168.21.107	LoRa	
DHCP Configuration	Mask	255.255.255.0		
	Gateway	192.168.21.1	Model Number	MTCAP-LORA-868
LLDP Conliguration	DNS	8.8.8, 8.8.4.4	Hardware	MTCAP-LORA-1.5
SMTP Configuration	802.1X Auth	Nees	Frequency Band	868
SNMP Configuration	Туре	None	EUI	00-80-00-00-00-02-0E-0B
Time Configuration	Last update: 下午12:10:23	3		

6.4 ChirpStack v3

6.4.1 Quick start Amazon AWS

Refer to Quickstart Debian or Ubuntu.

This section describes the steps needed to setup the ChirpStack stack including all requirements on a single machine. It has been tested on the following distributions (but with non or minimal modifications it will work on other versions too):

• Ubuntu 20.04 LTS

Please refer to the other install pages for more generic installation instructions.

Assumptions

Many configurations of these packages are possible. Dependent software packages could be installed on any number of remote servers, and the packages themselves could be on their own servers. However, in order to simplify the initial installation, we will assume the following deployment architecture:

- All ChirpStack components and their dependencies will be installed on a single server instance.
- The ChirpStack Gateway Bridge component will be installed on the server, but can also be installed on the gateway itself.
- No firewall rules are setup.

Of course, optimizations may need to be made depending on the performance of your systems. You may opt to move the PostgreSQL database to another server. Or you may decide to put your MQTT broker on a different system, or even use a different server than the one recommended in this document. These and other installation changes are beyond the scope of this document. However, you should be able to find the information here that would make these changes relatively straight-forward.

Prerequisites

1. Launch an Amazon EC2 instance:

Item	Description
Software Image (AMI)	Ubuntu Server 20.04 LTS (HVM), SSD Volume Type, 64-bit (x86)
Virtual server type (instance	t3.micro, Family: t3, 2 vCPU, 1 GiB Memory, Current genera-
type)	tion: true
Firewall (security group)	ssh; https; 8080, tcp, http; 1700, udp, LoRaWAN uplink
Configure storage	1 x 8 GiB, Volume type: gp2, Root volume (Not encrypted)

- 2. Allocate Elastic IP address.
- 3. Associate Elastic IP address with the EC2 instance.

Install dependencies

- **MQTT broker** A publish/subscribe protocol that allows users to publish information under topics that others can subscribe to. A popular implementation of the MQTT protocol is Mosquitto.
- · Redis An in-memory database used to store relatively transient data.
- PostgreSQL The long-term storage database used by the open source packages.

Use the package manager apt to install these dependencies:

```
sudo apt update
sudo apt install mosquitto mosquitto-clients redis-server redis-tools postgresql
```

Setup PostgreSQL databases and users

To enter the command line utility for PostgreSQL:

sudo -u postgres psql

Inside this prompt, execute the following queries to set up the databases that are used by the ChirpStack stack components. It is recommended to change the usernames and passwords. Just remember to use these other values when updating the chirpstack-network-server.toml and chirpstack-application-server.toml configuration files. Since these two applications both use the same table to track database upgrades, they must have separate databases.

```
-- set up the users and the passwords
-- (note that it is important to use single quotes and a semicolon at the end!)
create role chirpstack_as with login password 'dbpassword';
create role chirpstack_ns with login password 'dbpassword';
-- create the database for the servers
create database chirpstack_as with owner chirpstack_as;
create database chirpstack_ns with owner chirpstack_ns;
-- change to the ChirpStack Application Server database
```

(continues on next page)

(continued from previous page)

```
\c chirpstack_as
-- enable the pq_trgm and hstore extensions
-- (this is needed to facilitate the search feature)
create extension pg_trgm;
-- (this is needed to store additional k/v meta-data)
create extension hstore;
-- exit psql
\q
```

Setup ChirpStack software repository

ChirpStack provides a repository that is compatible with the Ubuntu apt package system. First make sure that both dirmngr and apt-transport-https are installed:

sudo apt install apt-transport-https dirmngr

Set up the key for this new repository:

sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys 1CE2AFD36DBCCA00

Add the repository to the repository list by creating a new file:

Update the apt package cache:

sudo apt update

Install ChirpStack Gateway Bridge

Note: If you intend to run the ChirpStack Gateway Bridge only on gateway(s) themselves, you can skip this step.

Install the package using apt:

```
sudo apt install chirpstack-gateway-bridge
```

log output:

```
The configuration file is located at:
/etc/chirpstack-gateway-bridge/chirpstack-gateway-bridge.toml
Some helpful commands for chirpstack-gateway-bridge:
Start:
$ sudo systemctl start chirpstack-gateway-bridge
Restart:
$ sudo systemctl restart chirpstack-gateway-bridge
```

(continues on next page)

(continued from previous page)

```
Stop:
$ sudo systemctl stop chirpstack-gateway-bridge
Display logs:
$ sudo journalctl -f -n 100 -u chirpstack-gateway-bridge
```

The configuration file is located at /etc/chirpstack-gateway-bridge/chirpstack-gateway-bridge.toml. The default configuration is sufficient for this guide.

Start the ChirpStack Gateway Bridge service:

```
# start chirpstack-gateway-bridge
sudo systemctl start chirpstack-gateway-bridge
```

```
# start chirpstack-gateway-bridge on boot
sudo systemctl enable chirpstack-gateway-bridge
```

Install ChirpStack Network Server

Install the package using apt:

```
sudo apt install chirpstack-network-server
```

log output:

```
The configuration file is located at:
/etc/chirpstack-network-server/chirpstack-network-server.toml
Some helpful commands for chirpstack-network-server:
Start:
$ sudo systemctl start chirpstack-network-server
Restart:
$ sudo systemctl restart chirpstack-network-server
Stop:
$ sudo systemctl stop chirpstack-network-server
Display logs:
$ sudo journalctl -f -n 100 -u chirpstack-network-server
```

The configuration file is located at /etc/chirpstack-network-server/chirpstack-network-server.toml and must be updated to match the database and band configuration. See below two examples for the **EU868** and **US915** band. For more information about all the ChirpStack Network Server configuration options, see here or ChirpStack Network Server configuration.

After updating the configuration, you need to restart the ChirpStack Network Server and validate that there are no errors.

Start the ChirpStack Network Server service:

```
# start chirpstack-network-server
sudo systemctl start chirpstack-network-server
# start chirpstack-network-server on boot
sudo systemctl enable chirpstack-network-server
```

Print the ChirpStack Network Server log-output:

sudo journalctl -f -n 100 -u chirpstack-network-server

EU868 configuration example

```
[general]
log_level=4
[postgresq1]
dsn="postgres://chirpstack_ns:dbpassword@localhost/chirpstack_ns?sslmode=disable"
[network_server]
net_id="000000"
  [network_server.band]
  # name="EU_863_870"
  name="EU868"
  [[network_server.network_settings.extra_channels]]
  frequency=867100000
  min_dr=0
  max_dr=5
  [[network_server.network_settings.extra_channels]]
  frequency=867300000
 min dr=0
  max_dr=5
  [[network_server.network_settings.extra_channels]]
  frequency=867500000
 min dr=0
 max_dr=5
  [[network_server.network_settings.extra_channels]]
  frequency=867700000
  min_dr=0
  max_dr=5
  [[network_server.network_settings.extra_channels]]
  frequency=867900000
  min_dr=0
 max_dr=5
```

US915 configuration example sub-band 1 (125kHz channels 0 - 7 & 500kHz channel 64)

[general] log_level=4 [postgresql] dsn="postgres://chirpstack_ns:dbpassword@localhost/chirpstack_ns?sslmode=disable" [network_server] net_id="000000" [network_server.band] # name="US_902_928" name="US915" [network_server.network_settings] enabled_uplink_channels=[0, 1, 2, 3, 4, 5, 6, 7, 64]

US915 configuration example sub-band 2 (125kHz channels 8 - 15 & 500kHz channel 65)

This is the same channel-plan as used by The Things Network.

```
[general]
log_level=4
[postgresql]
dsn="postgres://chirpstack_ns:dbpassword@localhost/chirpstack_ns?sslmode=disable"
[network_server]
net_id="000000"
[network_server.band]
# name="US_902_928"
```

```
name="US915"
```

```
[network_server.network_settings]
enabled_uplink_channels=[8, 9, 10, 11, 12, 13, 14, 15, 65]
```

Install ChirpStack Application Server

Install the package using apt:

sudo apt install chirpstack-application-server

log output:

```
The configuration file is located at:
/etc/chirpstack-application-server/chirpstack-application-server.toml
```

(continues on next page)

```
(continued from previous page)
Some helpful commands for chirpstack-application-server:
Start:
$ sudo systemctl start chirpstack-application-server
Restart:
$ sudo systemctl restart chirpstack-application-server
Stop:
$ sudo systemctl stop chirpstack-application-server
Display logs:
$ sudo journalctl -f -n 100 -u chirpstack-application-server
```

The configuration file is located at /etc/chirpstack-application-server/ chirpstack-application-server.toml and must be updated to match the database configuration. See below a configuration example which matches the database which we have created in one of the previous steps. For more information about the ChirpStack Application Server configuration options, see ChirpStack Application Server configuration.

```
[general]
log_level=4
```

```
[postgresql]
dsn="postgres://chirpstack_as:dbpassword@localhost/chirpstack_as?sslmode=disable"
```

```
[application_server.external_api]
jwt_secret="M9LoHX3wPQlcB2ziakV6qs/F2vL0vkAtrRv1yTu5Kks="
```

Note: you must replace the jwt_secret with a secure secret! You could use the command openssl rand -base64 32 to generate a random secret.

Start the ChirpStack Application Server service:

```
# start chirpstack-application-server
sudo systemctl start chirpstack-application-server
# start chirpstack-application-server on boot
sudo systemctl enable chirpstack-application-server
```

Print the ChirpStack Application Server log-output:

sudo journalctl -f -n 100 -u chirpstack-application-server

6.4.2 Connecting a gateway

Login into the ChirpStack Application Server web-interface. The default credentials are:

- Username: admin
- Password: admin

Optional: Adding a Network Server

Refer to Network servers.

ChirpStack Application Server is able to connect to one or multiple ChirpStack Network Server instances. Global admin users are able to add new Network Servers to the ChirpStack Application Server installation.

Note: once a Network Server is assigned to a Service Profile or Device Profile, a Network Server can't be removed before deleting these entities, it will return an error.

When creating a new Network Server, ChirpStack Application Server will create a Routing Profile on the given Network Server, containing the hostname:ip of the ChirpStack Application Server installation. In case your ChirpStack Application Server installation is not reachable on localhost, make sure this hostname:ip is configured correctly in your ChirpStack Application Server Configuration. This Routing Profile is updated on Network Server updates and deleted on Network Server deletes.

1. Go to **Network-servers** -> +Add.

← -	→ C ① ▲ 不安全 13	3.4 .149:8080/#/network-servers	0-7	Q	Ê	☆	X	*		Z	:
€	ChirpStack	Q Search organization, application						?	θ	admin	
ŧ	Dashboard	Network-servers						2	+	ADD	٦
** ** **	Network-servers 1										
\bigcirc	Gateway-profiles	Name			Serve	ar.					
	Organizations				Gerve						
•	All users										
٩	API keys		Rows per page:	10	Ŧ			<		>	

2. Type some parameters -> ADD NETWORK-SERVER.

Item	Description
Network-server name	localhost network server
Network-server server	llocalhost:8000

€	ChirpStack		Q Search organization, application, gateway or device ? (e) admin
ŧ	Dashboard		Network-servers / Add
** **	Network-servers		
\mathbb{R}	Gateway-profiles		GENERAL GATEWAY DISCOVERY TLS CERTIFICATES
	Organizations		Network-server name *
•	All users	1	A name to identify the network-server.
٩	API keys	2	Network-server *
chirp	ostack 👻	2	localhost:8000 The 'hostname:port' of the network-server, e.g. 'localhost:8000'.
ŧ	Org. dashboard		3 ADD NETWORK-SERVER
•	Org. users		

3. Show Network servers.

€	ChirpStack	Q Search organization, application, gateway or device	?	e admin
ŧ	Dashboard	Network-servers		+ ADD
81 81	Network-servers			
\bigcirc	Gateway-profiles	Name		
	Organizations	Name Server		
•	All users	localhost network server localhos	t:8000	
٩	API keys	Rows per page: 10 👻	I-1 of 1 🔹	< >

Optional: Creating a Service-profile

Refer to Service profiles.

The Service Profile can be seen as the "contract" between an user and the network. It describes the features that are enabled for the user(s) of the Service Profile and the rate of messages that can be sent over the network.

When creating a Service Profile, ChirpStack Application Server will create the actual profile on the selected Network Server, and will keep a reference record so it knows to which organization it belongs.

1. Go to Service-profiles -> +Create.

€	ChirpStack	Q Search organization, application, gateway or device	? 🔒 admin
†	Org. dashboard	Service-profiles	2 + CREATE
٩	Org. API keys	Name ID	Network Server
≟ ≡	Service-profiles 1	and the second	
₩ ®	Device-profiles Gateways	Rows per page: 10 👻	
	Applications	· · · · · · · · · · · · · · · · · · ·	

2. Type some parameters -> CREATE SERVICE-PROFILE

Item	Description
Service-profile name	localhost service profile
Network-server name	localhost network server
Add gateway meta-data	Enable

€	ChirpStack	Q Search organization, application, gateway or device ? each admin
ŧ	Dashboard	Service-profiles / Create
8- 8-	Network-servers	
$\widehat{\mathbb{N}}$	Gateway-profiles	Service-profile name *
::	Organizations	A name to identify the service-profile.
•	All users	2 Network-server *
۹,	API keys	The network-server on which this service-profile will be provisioned. After creating the service- profile, this value can't be changed.
chirp	stack 👻	Add gateway meta-data
A	Org. dashboard	3 GW metadata (RSSI, SNR, GW geoloc., etc.) are added to the packet sent to the application-server.
•	Org. users	Enable network geolocation
٩,	Org. API keys	When enabled, the network-server will try to resolve the location of the devices under this service- profile. Please note that you need to have gateways supporting the fine-timestamp feature and
Ē	Service-profiles	that the network-server needs to be configured in order to provide geolocation support.
L.	Device-profiles	Device-status request frequency 0
R	Gateways	Frequency to initiate an End-Device status request (request/day). Set to 0 to disable.
	Applications	Minimum allowed data-rate * 0 Minimum allowed data-rate. Used for ADR
		Maximum allowed data-rate *
		0
		Maximum allowed data rate. Used for ADR.
		Private gateways
		Gateways under this service-profile are private. This means that these gateways can only be used by devices under the same service-profile.
		4 CREATE SERVICE-PROFILE

3. Show Service profiles.

⇐	Q Search organization,	Q Search organization, application, gateway or device ? eadmin			
🔍 API keys	Service profiles				
chirpstack 👻	Service-promes		• • • • • • •		
n Org. dashboard	Name	ID	Network Server		
L Org. users					
🔦 Org. API keys	localhost service profile	6b9a7 347- 7090f081c137	localhost network server		
▲≡ Service-profiles		Rows per page: 10 👻	1-1 of 1 < >		
∃⊨ Device-profiles					

Adding a gateway

Refer to Connecting gateway.

This guide describes how to connect your gateway to ChirpStack and how to validate that it is successfully communicating with the ChirpStack Network Server. At this point it is expected that you have the ChirpStack Application Server and ChirpStack Network Server components up and running.

Requirements

Before continuing, please make sure that you have installed both a packet-forwarder and the ChirpStack Gateway Bridge. The packet-forwarder that is installed on your gateway and the steps needed to install the ChirpStack Gateway Bridge vary per gateway vendor and model. In some cases you must also install the ChirpStack Gateway Bridge on the gateway. Please refer to the ChirpStack Gateway Bridge Gateway installation documentation, which contains instructions for various gateway models.

Packet-forwarders

There are different packet-forwarder implementations. The packet-forwarder that is installed on your gateway depends on the gateway vendor and model. The packet-forwarders that are compatible with ChirpStack:

- ChirpStack Concentratord
- Semtech UDP Packet Forwarder
- Semtech BasicStation

Configuration

Packet-forwarder

The packet-forwarder that is configured on your gateway must forward its data to the ChirpStack Gateway Bridge. As it controls the LoRa® chipset of the gateway, it also must be configured for the correct frequencies. A mismatch in frequencies means that the gateway will not receive uplinks sent by a device and / or is unable to send downlink payloads when the downlink frequency is outside the configured frequency range. Usually gateway vendors provide configuration examples for various bands. Please validate that the configuration matches the band and channels in the ChirpStack Network Server Configuration.

Add gateway

Tip: If you have not yet connected your ChirpStack Application Server instance with a ChirpStack Network Server instance, you must do this first. See *Optional: Adding a Network Server*. Also you must connect the organization with the network-server by *Optional: Creating a Service-profile*.

1. Go to Gateways in the web-interface, and click +Create.

	ChirpStack	Q				? \varTheta admin
e,	API keys	Gateways	:			2 + CREATE
chirp	ostack 👻	cutentije				
A	Org. dashboard	Last	Name	Gateway ID	Network	Gateway activity (30d)
•	Org. users	seen		outonay ib	server	catenaj acantj (coa)
٩	Org. API keys	1.25			100	
. ≡	Service-profiles					
井	Device-profiles			Rows per	r page: 10 👻	
\bigcirc	Gateways 1					
	Applications					

2. Complete the form. Make sure that the **Gateway ID** field is equal to the Gateway ID of your gateway. If this value is incorrectly configured, data received by your gateway will be rejected. Then click **Create Gateway**.

Item	Description
Name	Headquarters-Gateway
Description	MTCAP-868-041A<
Gateway ID (EUI64)	YOUR_GATEWAY_ID, eg:008000000020e0b
Network-server name	localhost network server
Service-profile name	localhost service profile

€	ChirpStack	Q Search organization, application, gateway or device ? e admin
•	Dashboard Network-servers	Gateways / Create
● ■ •	Gateway-profiles Organizations All users	GENERAL TAGS METADATA Gateway name * Headquarters-Gateway The name may only contain words, numbers and dashes,
e hirp	API keys Istack 🗸	Gateway description * MTCAP-868-041A
ŧ	Org. dashboard	
•	Org. users	Gateway ID * 00 80 0 2 0e 0b MSB C
٩,	Org. API keys	Network-server * Iocalhost network server
	Service-profiles Device-profiles	Select the network-server to which the gateway will connect. When no network-servers are available in the dropdown, make sure a service-profile exists for this organization.
$\widehat{\mathbb{N}}$	Gateways	Service-profile localhost service profile
	Applications	Select the service-profile under which the gateway must be added. The available service-profiles depend on the selected network-server, which must be selected first. Gateway-profile Select gateway-profile

3. Show Gateways.

€	ChirpStack	Q s				? 🔒 admin	
chirp	ostack 👻	Gateways				+ CREATE	
A	Org. dashboard	Succinajo					
•	Org. users	Last			Network		
٩	Org. API keys	seen	Name	Gateway ID	server	Gateway activity (30d)	
. =	Service-profiles	a few	Headquarters-	00000	localhost		
	Device-profiles	ago	Gateway	00800	server		
\bigcirc	Gateways			Rows per pa	ige: 10 🔻	1-1 of 1 < >	
	Applications						
13.48.18	7.149:8080/#/organizations/1/gateway	'S					Þ

Validate

There are a few ways to validate if your gateway is correctly configured.

Last seen at

Event when no LoRa(WAN) data is received by the gateway, it will send gateway statistics periodically. Usually this stats interval is configured to 30 seconds. As ChirpStack Application Server will update the gateway **Last seen at** timestamp when it receives statistics, this is the easiest way to validate that the gateway is correctly configured.

Note: it might take a short while before statistics are sent by your gateway. You must refresh the page in order to see the (new) **Last seen at** value.

∉	ChirpStack	٩				? 🕒 admin
chirp	ostack 👻	Gateways	;			+ CREATE
A	Org. dashboard	, , .				
•	Org. users	Last	ו		Notwork	
٩	Org. API keys	seen	Name	Gateway ID	server	Gateway activity (30d)
. ≡	Service-profiles	a few	Headquarters-	2 ₀₀₈₀	localhost	
ᆂ	Device-profiles	ago	Gateway	00800 320605	server	
\bigcirc	Gateways 1			Rows per pa	ge: 10 👻	1-1 of 1 < >
	Applications					

LoRaWAN frames

After opening the overview page of your gateway, you will see a **LoRaWAN frames** tab. This will show all LoRaWAN frames that are received and sent by your gateway. In case of received frames, this means that you will also see received frames from devices that are not yours and / or that are not yet configured. Therefore this screen is useful to validate if your gateway is able to receive LoRaWAN frames and forward these to ChirpStack.

€	ChirpStack	Q Search organization, application, gateway or device ? early admin
•	All users API keys	Gateways / Headquarters-Gateway
chir	ostack -	GATEWAY DETAILS GATEWAY CONFIGURATION CERTIFICATE GATEWAY DISCOVER
:	Org. users	⑦ HELP II PAUSE
۹.	Org. API keys	2 Jun 15 2:24:14 PM UnconfirmedDataUp (867.1 MHz) (SF12) (BW125) (FPort: 10) (FCnt: 106) (DevAddr: 001083bb) v
	Device-profiles	Jun 15 2:09:14 PM (UnconfirmedDataUp) (867.5 MHz) (SF12) (BW125) (FPort: 10) (FCnt: 105) (DevAddr: 001083bb) v
\bigcirc	Gateways	Jun 15 1:57:04 PM UnconfirmedDataUp (867.7 MHz) (SF12) (BW125) (FPort: 10) (FCnt: 104) (DevAddr: 001083bb) Jun 15 1:42:04 PM UnconfirmedDataUp 868.1 MHz (SF12) (BW125) (FPort: 10) (FCnt: 103) DevAddr: 001083bb
	Applications 🗸	Jun 15 1:27:04 PM (InconfirmedDatalin) (867 1 MHz) (SF12) (BW125) (FPort 102) (DevAddr: 001083bb) V

Troubleshooting

See Troubleshooting gateway.

6.4.3 Connecting a device

Refer to Connecting device.

This guide describes how to connect your LoRaWAN device with ChirpStack and how to validate that it can successfully activate. At this point it is expected that you have the ChirpStack Network Server and ChirpStack Application Server components installed and that you have successfully connected a LoRa gateway to it.

Requirements

Before continuing, there are a couple things you need to know about your device. This information is usually provided by the device vendor.

- DevEUI
- LoRaWAN MAC version implemented by the device
- Regional Parameters revision implemented by the device
- OTAA: Device root-keys (when no external join-server is used)

Login

Login into the ChirpStack Application Server web-interface. The default credentials are:

- Username: admin
- Password: admin

Optional: Creating a Device profile

Before you can add the device to ChirpStack, you have to create a Device-profile if you haven't done this already. In general it is a good practice to create separate device-profiles for different types of devices. A device-profile contains the capabilities of your device. For example if it uses ABP or OTAA for activation, which LoRaWAN version and Regional Parameters revision is implemented by the device, etc... It can also be configured with a function to decode the payloads sent by the devices using the device-profile.

1. Within the ChirpStack Application Server web-interface, click Gateways and then Create.

€	ChirpStack	Q Search organization, application, gateway or device	e ? \varTheta admin
f	Org. dashboard		
<u>.</u>	Org. users	Device-profiles	+ CREATE
٩	Org. API keys		
E	Service-profiles	Name Network	: Server
井	Device-profiles		
\bigcirc	Gateways	Rows per page: 10 👻	< >
	Applications		

2. Under the **General** tab, fill in the required fields.

Item	Description
Name	TA692FC-L-5-868 Thermostat
Network-server	localhost network server
Region	EU868
LoRaWAN MAC version	LoRaWAN 1.0.3
LoRaWAN Regional parameters revision	А
ADR algorithm	Default ADR algorithm (LoRa only)
Uplink interval (seconds)	1000
Device-status request frequency (req/day)	1

	ChirpStack	Q Search organization, application, gateway or device ? earch admin
ŧ	Dashboard	Device-profiles / Create
•: •: •:	Network-servers	
\bigcirc	Gateway-profiles	GENERAL JOIN (OTAA / ABP) CLASS-B CLASS-C CODEC
	Organizations	1 Device-profile name *
•	All users	A name to identify the device-profile.
٩	API keys	2 Network-server *
chirp	ostack 👻	The network server on which use device-profile will be provisioned. After creating the device-profile, this value can't be changed.
ŧ	Org. dashboard	CRAWAN MAC version * 3 1.0.3
•	Org. users	The LORAWAN MAC version supported by the device.
٩	Org. API keys	4 A
. ≡	Service-profiles	Revision of the Regional Parameters specification supported by the device.
	Device-profiles	5 Default ADR algorithm (LoRa only)
\bigcirc	Gateways	The ADR algorithm that will be used for controlling the device data-rate.
	Applications	Max EIRP * O
		Maximum EIRP supported by the device.
		Uplink Interval (seconds)*
		The expected interval in seconds in which the device sends uplink messages. This is used to determine if a device is active or inactive.
		CREATE DEVICE-PROFILE

3. Under the **Join (OTTA/ABP)** tab, fill in the required fields.

Item	Description
Join (OTAA / ABP)	yes, Device supports OTAA

€	ChirpStack	Q Search organization, application, gateway or device ? e admin
ŧ	Org. dashboard	Device prefiles / Create
•	Org. users	Device-profiles / Create
٩	Org. API keys	
.≞≡	Service-profiles	GENERAL JOIN (JIAA / ABF) CLASS® CLASS® CUDEC
	Device-profiles	1 vice supports OTAA
\bigcirc	Gateways	CREATE DEVICE-PROFILE
	Applications	

4. Under the **Class-B** tab, fill in the required fields.

Item	Description
Supports Class-B	no

∉	ChirpStack	Q Search organization, application, gateway or device ? e admin
↑	Org. dashboard Org. users	Device-profiles / Create
٩	Org. API keys	GENERAL JOIN (OTAA / ABP) CLASS-B CLASS-C CODEC
1 1 1 1	Service-profiles Device-profiles	Device supports Class-B
R	Gateways	CREATE DEVICE-PROFILE
	Applications	

5. Under the **Class-C** tab, fill in the required fields.

		Item	Description	
		Supp Class	ports Class-C yes s-C confirmed downlink timeout (seconds) 300	
	ChirpSta	ick	Q Search organization, application, gateway or device	? e admin
<u>+</u>	All users			
٩	API keys		Device-profiles / Create	
chirp	stack	•		
ŧ	Org. dashboard		GENERAL JOIN (OTAA / ABP) CLASS-B CLASS-C	CODEC
•	Org. users		1 vevice supports Class-C	
٩	Org. API keys	- 1	Select this option when the device will operate as Class-C device immediately after activation. In case it sends a Dev command when it changes to Class-C, do not select this option.	iceModeInd mac-
<u>≞</u> ≡	Service-profiles	- 1	2 Class-C confirmed downlink timeout * 300	
	Device-profiles		Class-C timeout (in seconds) for confirmed downlink transmissions.	
R	Gateways	- 1	CREATE	DEVICE-PROFILE
	Applications	T		

6. Under the Codec tab, fill in the required fields. Then click create device-profile.

Note: The data here may not be decoded. It's here just for debugging convenience.

Item	Description
Payload codec	Custom JavaScript codec functions

(continues on next page)

(continued from previous page)

```
var fanModeStateMeta = {
0: "OFF",
1: "LOW"
2: "MED",
3: "HIGH".
4: "AUTO"
};
var systemModeMeta = {
0: "OFF",
1: "COOL".
2: "FAN-ONLY"
};
if(fPort==10){
dataX.roomTemperature = ((bytes[0] << 8) + bytes[1])/10;</pre>
dataX.setTemperature = ((bytes[2] << 8) + bytes[3])/10;</pre>
dataX.coolProportionalOutput = bytes[4]/100;
dataX.fanMode = fanModeStateMeta[bytes[5]];
dataX.fanState = fanModeStateMeta[bytes[6]];
dataX.threshold = bytes[7]/10;
dataX.systemMode = systemModeMeta[bytes[8]];
dataX.coolPBand = bytes[9]/10;
dataX.coolItime = (bytes[10] << 8) + bytes[11];</pre>
dataX.kFactor = bytes[12];
return {
    data: {
    roomTemperature: dataX.roomTemperature,
    setTemperature: dataX.setTemperature,
    coolProportionalOutput: dataX.coolProportionalOutput,
    fanMode: dataX.fanMode.
    fanState: dataX.fanState,
    threshold: dataX.threshold,
    systemMode: dataX.systemMode,
    coolPBand: dataX.coolPBand,
    coolItime: dataX.coolItime,
    kFactor: dataX.kFactor
    3
};
}
```

}

€	ChirpStack	Q Search organization, application, gateway or device ? each admin
÷	Dashboard	Device-profiles / Create
© • • • • • • • •	Network-servers Gateway-profiles Organizations All users API keys pstack • Org. dashboard	GENERAL JOIN (OTAA / ABP) CLASS-B CLASS-C CODEC TAGS Payload codec
··· • • • • • • • • • • • • • • • • • •	Org. users Org. API keys Service-profiles Device-profiles Gateways Applications	The function must have the signature function Decode(fPort, bytes) and must return an object. ChirpStack Application Server will convert this object to JSON. 1 // Encode encodes the given object into an array of bytes. 2 // - fPort contains the LoRaWAN FPort number 3 1// - obj is an object, e.g. ("temperature": 22.5] 4// - variables contains the device variables e.g. ("calibration": "3.5") (both the key / value are of type string) 5// The function must return an array of bytes, e.g. [225, 230, 255, 0] 6 function Encode(fPort, obj, variables) {
		<pre> return []; * * * * * * * * * The function must have the signature function Encode(fPort, obj) and must return an array of bytes. * CREATE DEVICE-PROFILE </pre>

7. Show Device profiles.

€	ChirpStack		Q Search organization, application, gateway or device ?					
ħ.	Org. dashboard							
	Org. users		Device-profiles					
•	Org. API keys							
≡	Service-profiles		Name	Network Server				
1i-	Device-profiles		TA692FC-L-5-868 Thermostat	localhost network s	erver			
Ø	Gateways			Rows per page: 10 👻 1-1 o	f1	< >		
	Applications							
		r						

Optional: Adding an Application

Devices are grouped by applications. For example you could group your temperature sensors under one application and weather stations under an other application.

1. If you haven't created an application yet to which you want to add the device, click **Applications**, then click **Create**.

∉	ChirpStack	${f Q}$ Search organization, application, gateway or device	? e admin		
f	Org. dashboard				
•	Org. users	Applications	+ CREATE		
٩	Org. API keys				
. ≡	Service-profiles	ID Name Service-profile Description			
낦	Device-profiles	·	ř		
\bigcirc	Gateways				
	Applications	kows per page. To ♥			

2. Fill in the required fields and Create Application.

Item	Description
Name	TA692FC-L-5-Application
Description	TA692FC-L-5-868 Thermostat, TA692FC-L-5-915 Thermostat
Service-profile name	localhost service profile

€	ChirpStack	Q Search organization, application, gateway or device ?	e admin
# ::	organizations		
•	All users	Applications / Create	
٩	API keys		
chirp	ostack 👻	Application name * TA692FC-L-5-Application	
f	Org. dashboard	The name may only contain words, numbers and dashes.	
•	Org. users	Application description * TA692FC-L-5-868 Thermostat, TA692FC-L-5-915 Thermostat	
٩	Org. API keys	Service-profile *	
. ≡	Service-profiles	3 localhost service profile The service-profile to which this application will be attached. Note that you can	▼ t change this
	Device-profiles	value after the application has been created.	
R	Gateways	4 СКЕАТЕ А	PPLICATION
	Applications	•	

3. Show Applications.

∉	ChirpStack	Q Sea				ice ? 👌 admin
chirp	ostack 👻					
Ħ	Org. dashboard		Applic	+ CREATE		
•	Org. users					
٩	Org. API keys		ID	Name	Service- profile	Description
. ≡	Service-profiles					74602501 5 060
11	Device-profiles		1	TA692FC-L-5- Application	localhost service profile	Thermostat, TA692FC-L-5- 915 Thermostat
\mathbb{R}	Gateways				Rows per page: 10	▼ 1-1 of 1 < >
	Applications	•				

Creating a device

1. Click the (newly created) **application** to which you want to add your device.

€	ChirpStack	Q Search organization, application, gateway or device ? e admin						
chirp	ostack 👻	A					PEATE	
Ħ	Org. dashboard	Арриса	tions					
•	Org. users							
٩	Org. API keys	ID	Name	Service-profile	Description			
≜ ≡	Service-profiles	1 2	TA692FC-L-5- Application	localhost service profile	TA692FC-L-5-868 TA692FC-L-5-915	Thermostat, Thermostat		
	Device-profiles			Rows per page:	10 👻 1-1 of	1 <	>	
\bigcirc	Gateways							
	Applications 1							

2. Under the **Devices** tab, click **Create**.

	ChirpStack	Q Search organization, application, gateway or device	? 🛛 admin
+	All users	Applications / TA692FC-L-5-Application	DELETE
٩	API keys		
chirp	ostack 👻	DEVICES MULTICAST GROUPS APPLICATION CONFIGURATION	INTEGRATIONS
A	Org. dashboard	+ CREATE	SELECTED DEVICES
•	Org. users		
٩	Org. API keys	Last seen Device Device EUI Device profile	Link Battery
≜ ≡	Service-profiles	name	margin
	Device-profiles		
\bigcirc	Gateways	Rows per page: 10 👻	< >
	Applications		

3. Fill in the required fields and select the device-profile that you want to associate with your device and save the device.

Item	Description
Name	Sales-Office
Description	TA692FC-L-5-868 device
Device EUI (EUI64)	YOUR_DEVICE_EUI, eg:0012bdfffe02ad04
Device profile	TA692FC-L-5-868 Thermostat

€	ChirpStack	Q Search organization, application, gateway or device ? early admin
^	Dashboard Network-servers	Applications / TA692FC-L-5-Application / Devices / Create
\bigcirc	Gateway-profiles	GENERAL VARIABLES TAGS
	Organizations	Device name *
•	All users	1 Sales-Office
٩	API keys	Device description *
chirp	stack 👻	2 TA692FC-L-5-868 device
ŧ	Org. dashboard	3 Device EUI* 00 12 bd ad 04 MSB C
•	Org. users	Device-profile *
٩	Org. API keys	
. ≡	Service-profiles	Disable frame-counter validation
T	Device-profiles	Note that usedning the name-counter variation will compromise security as it ensures people to perform reprey-attacks.
\bigcirc	Gateways	Device is disabled ChirpStack Network Server will ignore received uplink frames and join-requests from disabled devices.
	Applications	
		5 GREATE DEVICE

4. Depending the device-profile is configured for OTAA or ABP, the next page will ask you to enter the device root-keys (OTAA) or device session-keys (ABP).

In case your ChirpStack Network Server is configured with a join-server and your (OTAA) device will use this join-server for activation, then there is no need to enter the root-keys.

	Item	Description
	Application ke	y YOUR_DEVICE_EUI, eg:72357538782F413F4428472B4B625065
Æ	ChirpStack	Q Search organization, application, gateway or device 🕜 🕒 admin
chirp	stack 👻	Applications / TA692FC-L-5-Application / Devices / Sales-Office
f	Org. dashboard	
•	Org. users	DETAILS CONFIGURATION KEYS (OTAA) ACTIVATION DEVICE DATA LORAV >
٩	Org. API keys	
. ≡	Service-profiles	Application key*
	Device-profiles	To Long WAN 16 derices house your derice appends Long WAN 1.1, update the device-profile first.
\bigcirc	Gateways	2 SET DEVICE-KEYS

5. Show **Devices**.

....

Applications

æ	ChirpStack		Q s	earch organization, a	pplication, gateway or (device	?	e admin	
•	All users	Applications / TA	602EC-1-5-	Application			Г	DELETE	
٩	API keys		spincations / TAbyzPC-L-o-Application						
chirp	ostack 👻	DEVICES	MULTICAST G	ROUPS APPLICATIO	N CONFIGURATION	INTEGRA	TIONS		
ŧ	Org. dashboard				+	CREATE	SELEC	TED DEVICES	
<u>+</u>	Org. users								
٩	Org. API keys	Last	Device	Device FUI	Device profile		Link	Battery	
≜ ≡	Service-profiles	seen	name	Denice Lor	berice prome		margin	buttery	
ᆂᆣ	Device-profiles	n/a	Sales-Office	00121 .04	TA692FC-L-5-868 Thermostat		n/a	n/a	
\bigcirc	Gateways				Rows per page:	10 🗸	1-1 of 1	< >	
	Applications	•							

Validate

1. After adding your LoRaWAN device to ChirpStack, validate that your device is able activate (in case of OTAA) and send data. Clicking the device in the ChirpStack Application Server web-interface.

∉	ChirpStack		Q Sear	ch organization, appli	cation, gateway or device	?	e admin
•	All users						DELETE
9	API keys						
chirpstack 👻		DEVICES MULTICAST GROUPS APPLICATION CONFIGURATION INTEGRATIONS					
ħ	Org. dashboard				+ CREATE	SELEC	TED DEVICES
	Org. users						
	Org. API keys	Lastern	Device name	Device EUI	Device profile	Link margin	Battery
=	Service-profiles	Last seen					
71-	Device-profiles	a few secor	Sales- Office	001 d04	TA692FC-L-5-868 Thermostat	n/a	n/a
Ø	Gateways				Powe per page: 10 -	11of1	
	Applications				Nows per page. To V	1-1 01 1	

2. Open in one window the **Device data** and in an other window the **LoRaWAN frames** tab. Then turn on your device or trigger an uplink transmission. In case of an OTAA device you should first see a JoinRequest followed by a JoinAccept message in the **LoRaWAN frames** tab.

∉ 🖉 ChirpStack	Q Search organization, application, gateway or device ? 😝 a						
Organizations							
All users	Applications / IA092FC-L-5-Application / Devices / Sales-Office						
API keys	DETAILS CONFIGURATION KEYS (OTAA) ACTIVATION DEVICE DATA LORAWAN FRAMES						
chirpstack •							
n Org. dashboard	(2) HELP II PAUSE 👱 DOWNLOAD 📕 CL						
Org. users	Jun 15 5:01:43 PM UnconfirmedDataDown) (868.1 MHz) (SF12) (BW125) (FCnt. 1) (DevAddr: 0036a891) (GW: 0080000000020e0b)						
Org. API keys	Jun 15 5:01:42 PM UnconfirmedDataUp (868.1 MHz) (SF12) (BW125) (FPort: 10) (FCnt: 2) (DevAddr: 0036a891)						
≡ Service-profiles	Jun 15 5:01:10 PM (UnconfirmedDataDown) (868.5 MHz) (SF12) (BW125) (FCnt: 0) (DevAddr: 0036a891) (GW: 008000000020e0b)						
-⊧ Device-profiles	Jun 15 5:01:09 PM UnconfirmedDataUp (868.5 MHz) (SF12) (BW125) (FPort: 10) (FCnt: 1) (DevAddr: 0036s891)						
Gateways	Jun 15 5:00:39 PM (JoinAccept) (868.1 MHz) (SF12) (BW125) (GW: 0080000000020e0b)						
Applications	Jun 15 5:00:39 PM (JoinRequest) (868.1 MHz) (SF12) (BW125) (DevEUI: 0012bdfffe02ad04) V						

3. When the device sends its first data payload, you should also see a Join and Up event in the Device data tab.

	ChirpStack	Q Search organization, application, gateway or device ? 😝 admin						
٩	API keys	Applications / TA692FC-L-5-Application / Devices / Sales-Office						
chirp	stack 👻							
ŧ	Org. dashboard	DETAILS CONFIGURATION KEYS (OTAA) ACTIVATION DEVICE DATA LORAWAN FRAMES						
•	Org. users							
٩	Org. API keys							
E	Service-profiles	Jun 15 5.02:13 PM up (867.7 MHz) (SF12) (BW125) (FCnt. 3) (FPort 10) (Unconfirmed) V						
	Device-profiles	Jun 15 5.01:42 PM up (868.1 MHz) (SF12) (BW125) (FCnt. 2) (FPort 10) (Unconfirmed) V						
\bigcirc	Gateways	Jun 15 5.01.09 PM up (868.5 MHz) (SF12) (BW125) (FCnt. 1) (FPort 10) (Unconfirmed) V						
	Applications	Jun 15 5.01.09 PM join (DevAddr: 00368891)						

Troubleshooting

See Troubleshooting device.

6.5 TA692FC-L-5-868 Thermostat – Demo device profile usage

6.5.1 Import device profile

Tip: A Device Profile file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

- Download ta692fc_1_5_868_thermostat.json.
- **Profiles** -> **Device profiles** -> + -> **Popup dialog: Import device profile** -> Drag and drop *my device profile File* -> **Import**.
| | Brofiles > Device profiles Current subscription ThingsBoard Cloud Prototype Current subscription Status Active | |
|-----------------------------------|--|----------------------|
| E Assets | 2 import | device profile |
| 🖬 Entity Views | Device prof Import device profile × | + C Q |
| 💼 Profiles 🛛 🔺 | | |
| Device profiles | Created t 5 Cription Default | |
| Asset profiles | L 2023-06-0 le | ± N T |
| 🟥 Customers | 2022-10-1 Drag and drop a JSON file or Browse file X | 1 N T |
| 😫 Users | ter Thomastet | |
| Integrations center | 2022-10-1 ta692fc_I_5_868_thermostat.json rHeating | ± P î |
| Integrations | Contend the Contend of | 1 P 🗊 |
| ្ម្មា Data converters | 2022-10-11 13:27:25 default Default Default Default Verault device | + 10 11 |
| ↔ Rule chains | ttems per page: 10 		 1 − 5 of 5 < | |
| ବ Edge management 🛛 🗸 | | |
| ThingsBoard | Profiles > D Device profiles Current subscription ThingsBoard Cloud Prototype Status (Active) | Tenant administrator |
| E Assets | | |
| Entity Views | Device profiles | + C Q |
| 🍰 Profiles 🛛 🔺 | Created time I Name Profile time Transport type Description Default | |
| Device profiles | | |
| Asset profiles | 2023-06-06 12:09:18 TA692FC-L-S-868
Thermostat Default Default Default Default Image: Comparison of the second seco | ± 🖻 🗊 |
| 👱 Customers | items per page: 10 		 1 − 5 of 5 | |
| 😫 Users | | |

6.5.2 Modify device profile's mobile dashboard

Device profile's mobile dashboard is for ThingsBoard Mobile Application or ThingsBoard PE Mobile Application.

• **Profiles** -> **Device profiles** -> click *my device profile* -> **Toggle edit mode** (red icon)

ThingsBoa	rd ^{form}	🏥 Profiles ゝ 🛛 De	vice profiles		Current subscription ThingsBoard Cloud Prototype 2: A Constraint administrator
i Assets III Entity Views		Device profiles			TA692FC-L-5-868 Thermostat 2 2 ×
ProfilesDevice profiles		Created time ↓ 2 click	Name	Profi	Cetails Transport configuration Alarm rules (0) Device provisioning 3
Asset profiles		2023-06-06 12:09:18	TA692FC-L-5-868 Thermostat	Defa	Open details page Export device profile Make device profile default
👥 Customers					Delete device profile
Users				aı	Copy device profile Id
Integrations center	^	-		- 11	
➡ Integrations					Name* TA692FC-L-5-868 Thermostat
1그 Data converters					
<-> Rule chains					Default rule chain
Edge management	~				

• Modify *Mobile dashboard* -> **Apply changes** (red icon)

	📩 Profiles > 🛛 De	vice profiles		Current subscription ThingsBoard Clour Status Active Tenant administrator							
Entity Views	Device profiles		1	TA692FC-L-5-868 Thermostat							
 Profiles Device profiles 	Created time ↓	Name	Profi	Details Transport configuration Alarm rules (0) Device provisionin							
R Asset profiles	2023-06-06 12:09:18	TA692FC-L-5-868 Thermostat	Defai	Name* 2							
😕 Customers				TA692FC-L-5-868 Thermostat							
e Users		-		Default rule chain							
Integrations center											
				Mobile dashboard TA692FC-L-5 Thermostat (For Mobile App) 1 ×							
C Data converters	_			Used by mobile application as a device details dashboard							
Edge management				Queue							

These values are shown in the following table:

Field	Value
Mobile dashboard	TA692FC-L-5 Thermostat (For Mobile App)

6.5.3 Clear device profile's mobile dashboard

Sometimes if TA692FC-L-5-868 Thermostat device profile's mobile dashboard is cleared, TA692FC-L-5 Thermostat (For Mobile App) can only be deleted.

• **Profiles** -> **Device profiles** -> click *my device profile* -> **Toggle edit mode** (red icon)

	🖆 Profiles 👌 🛯 Device profiles	Current subscription ThingsBoard Cloud Prototype :: 4 Constraint administrator
assets		
Entity Views	Device profiles	TA692FC-L-5-868 Thermostat
🍰 Profiles 🔥 🔨		
Device profiles 1	Created time ↓ Name Pr 2 click	of Contails Transport configuration Alarm rules (0) Device provisioning
Asset profiles	2023-06-06 12:09:18 TA692FC-L-5-868 De	fal Open details page Export device profile Make device profile default
👛 Customers	D Garmen Same S	Delete device profile
e Users		81 P Conv device profile Id
Integrations center		
➡ Integrations		Name* TA692FC-L-5-868 Thermostat
1 Data converters	and the loss of	
<> Rule chains		Default rule chain
Edge management		

• Clear *Mobile dashboard* -> Apply changes (red icon)

	🖆 Profiles ゝ 🛛 Device profiles		Current subscription ThingsBoard Cloud Prototype C:						
Assets	1		TA692FC-I -5-868 Thermostat						
Entity Views	Device profiles		Device profile details						
🖆 Profiles 🔥		Drofi							
Device profiles		FION	Details Transport configuration Alarm rules (0) Device provisioning						
Asset profiles	2023-06-06 12:09:18 TA692FC-L-5-868 Thermostat	Defa	Name*						
😄 Customers			TA692FC-L-5-868 Thermostat						
🕒 Users	1		Default sula elecie						
Integrations center			Default rule chain						
∃ Integrations	A DOCTOR AND		Mobile dashboard						
九 Data converters	and the second second		TA692FC-L-5 Thermostat (For Mobile App)						
↔ Rule chains			used by mobile application as a device details dashooard						
🙊 Edge management 🛛 🗸		_	Queue						

6.6 TA692FC-L-5 Demo Dashboards Usage

6.6.1 Overview

There are two dashboards related to TA692FC-L-5, namely TA692FC-L-5 Thermostat List and TA692FC-L-5 Thermostat (For Mobile App). We open the former to start operating TA692FC-L-5.

ThingsBoard	🖬 Dashboards >	All	Current subscription The Status Ac	ningsBoard Cloud	D 🌲	B	.i nt administr	ator
☆ Home	All	Groups						
🖻 Plan and billing								
\land Alarms	Dashboards 🧧	📀 Include customer entities				-	⊦ C	Q
Dashboards	Created time ↓	Title	Customer name	Groups				- 1
III Solution templates NEW								
🚓 Entities 🛛 🔨	2023-06-06 16:11:46	TA692FC-L-5 Thermostat List				4		
🗔 Devices	2023-06-06 16:06:34	TA692FC-L-5 Thermostat (For Mobile App)				4	1	Î
🛅 Assets			Ite	ems per page: 10 👻			< >	>1
Entity Views								

Dashboard	Description	For Web UI	For Mobile App	Entry*
TA692FC-L-5 Thermostat List	list	Yes	No	Yes
TA692FC-L-5 Thermostat (For Mo-	details	Yes	Yes	No
bile App)				

Hint:

- If *Entry* is *Yes*, then directly enter the Dashboard and there will be data displayed.
- If *Entry* is *No*, there will be no data display when entering this Dashboard directly, and you need to jump to this Dashboard from other Dashboards.

6.6.2 TA692FC-L-5 Thermostat List

Dashboard states

Default state

Default state is root state.

ThingsBoard	TA692FC-L-5 Thermostat List Current subscription ThingsBoard Cloud	🖸 🌲 😫 Tenant administrator 🕴
☆ Home	TA692FC-L-5 Thermostat List TA692FC-L-5 Thermostat List - 👩 Entities 🚫 Realtime	- last 5 minutes 👲 🖬 🖸
🖶 Plan and billing		
\land Alarms	IA692FC-L-5 Inermostats	
Dashboards	Device name ↑ Label Type Active Room Temperature('C) Set Temperature('C) System Mode Fan	, State
III Solution templates NEW	TA692FC-L-5- 0012bdfffe02ad04 0ffice 0ffice Tweet 23 19.5 COOL HIG	H 🖍 🗘 👘
🛔 Entities 🔥 🔨	inermostat	
Devices		
Assets		
🛄 Entity Views		
📩 Profiles 🔥 🔨		
Device profiles		
Asset profiles		
🚓 Customers		
😫 Users		
Integrations center	Items per page: 10 ▼ 1 − 1 of 1	ас с 🔿 м 🖉 .

- Dashboard bar:
 - TA692FC-L-5 Thermostat List : Click here to skip to root state. Since default state is *root state*, click here and there is no response.
 - 🚺 : Click the two ICONS in the upper left corner to display the page in full screen.
 - S Realtime last 5 minutes : Edit time window.
- Thermostats widgets:
 - Fields:
 - * Device name, Label, Type, active.
 - * Room temperature, Set Temperature, System Mode, Fan status: Refer to *Monitor state*.
 - Actions:

* 🔯 : skip to TA692FC-L-5 Thermostat (For Mobile App).

: Popup dialog to editing a device's label.

Import List Dashboard

Tip: A Dashboard file can only be imported once. If you have already imported it, you do not need and cannot repeat the import.

If you have already imported it, you can skip this step.

In order to use this dashboard, you must to create TA692FC-L-5 Thermostat Device Profile and TA692FC-L-5 Thermostat (For Mobile App). If they don't exist, you can import them. See *Import Device Profile of TA692FC-L-5 Thermostat* or *Import TA692FC-L-5 Detail Dashboard*.

First, you can import this dashboard.

- Download ta692fc_l_5_thermostat_list.json.
- Dashboards -> + -> Popup dialog: Import dashboard -> Drag and drop list dashboard File -> Import.

	Dashboards >	All	Current subscription (ThingsBoard Cloud Status (Active)	d Prototype	≜ 9			
A Home	All							
🖻 Plan and billing		Import dashboard	×		2 imr	oort d	ashbo	bard
🛕 Alarms	Dashboards	3	_			+	G	Q
Dashboards 1	□ Created time ↑	Dashboard file *	Gr	oups				
III Solution templates NEW		Drag and drop a JSON f	ile or Browse file 🗙					
🛦 Entities 🔥 🔨	2023-05-25 10:32:30					Ŧ	_	Î
Con Devices	2023-05-29 16:08:21	ta692fc_l_5_thermostat_list.jso	n			Ŧ	/	Î
Assets	2023-06-06 16:06:34		Cancel Import			Ŧ	1	î
Entity Views								
💼 Profiles 🛛 🔺			Items per page:	10 💌 11 - 1	6 of 16 🛛 🕹	<		
Device profiles								
Device profiles ThingsBoard Cloud Platform	Dashboards >	ST All	Current subscription ThingsBoard Cloud Status Active		≜ ⊖	Tenant ad	dministra	or :
Device profiles Coud Platform Home	E Dashboards >	Sroups	Current subscription ThingsBoard Cloud Status Active		≜ 0	Tenant ad	dministra	or :
Device profiles Device profiles ThingsBoard Cloud Platform Home Plan and billing	E Dashboards >	Sroups	Current subscription ThingsBoard Clouc Status Active		≜ ⊖	Tenant ad	dministra	or :
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 Device profiles ThingsBoard Cloud Platform Home Plan and billing Alarms Dashboards 	Dashboards All Dashboards Created time ↑	All Groups Include customer entities Title	Current subscription ThingsBoard Clour Status Active	oups	▲ ⊖	Tenant ac	dministra C	۰ ۲ :
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Device profiles	Dashboards > If All Dashboards Created time ↑	All Groups Include customer entities Title	Current subscription ThingsBoard Clour Status Active	oups	• 0	Tenant ac +	dministra C	α : ۹
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 Device profiles Device profiles Cloud Platform Home Plan and billing Alarms Dashboards Solution templates Solution templates Entities Assets Entity Views 	Dashboards > If All Dashboards Created time ↑ Dashboards Created time ↑ Dashboards	All Groups Include customer entities Title TA692FC-L-5 Thermostat List	Current subscription ThingsBoard Clour Status Active Customer name Gr	oups	• 0	Tenant ac +	C C C	∝ :

Next, modify a action's target dashboard and target dashboard state.

• Dashboards -> Click my list dashboard

ThingsBoard	Dashboards >	All	Current subscriptio Statu	n ThingsBoard Cloud Prototype s Active	а 🌲	B . Tena	nt adminis	trator
☆ Home	All	Groups						
🖻 Plan and billing								
▲ Alarms	Dashboards 🧧	🔗 Include customer entities					+ C	Q
Dashboards	□ Created time ↑	Title	Customer name	Groups				
III Solution templates NEW								
🚓 Entities 🔥 🔨								- 1
🐻 Devices		and the second sec				4	<u> </u>	Î
🖿 Assets	2023-06-06 16:11:46	TA692FC-L-5 Thermostat List	2 click			1	<u> </u>	1
Entity Views				Items per page:	11 - 16 of 16	IZ.		
📩 Profiles 🛛 🔨				items per page.	11 13 01 10		` '	

• Edit (red icon on the bottom and right)

ThingsBoard	Dash	> 📰.	> 📑 T/	4692FC	-L-5 Thermo	subscription Thir Status Activ	ngsBoard Cloud		а 🌲	8	Tenant	administ	trator
🛧 Home	TA692FC-L-5 T	hermost	at List	TA	692FC-L-5 Thermostat L	ist - [00	Entities	() Realtime	- last 5 min	utes	Ŧ		8
🖶 Plan and billing													
\land Alarms	TA692FC-L-5 Tr	ermostate	5							ų I			
Dashboards	Device name 🛧	Label	Туре	Active	Room Temperature(°C)	Set Tempera	ture(°C) S	ystem Mode	Fan State				
III Solution templates NEW	0012bdfffe02ad04	Sales- Office	TA692FC-L- 5-868	true	22.4	19.5	C	OOL	HIGH			1	
🔥 Entities 🔥			Inermostat									-	
[₀0] Devices													
Assets													
Entity Views													
🖞 Profiles 🔥						Items per page:	10 👻	1 - 1 of 1					
Device profiles						l					_	(
R Asset profiles													

• Enter *Edit Dashboard Mode* -> Edit Widget (icon)

ThingsBoard	Dash >	> .	> 📑 T,	4692FC	-L-5 Thermo Currer	t subscription (Status	ThingsBoard C Active	loud I	а 🌲	8	ēnant admi	nistrator
A Home	. الج					•	<u>ج</u> م	C Realtin	ie - last 5 mi	nutes	± 4	9 C
🖻 Plan and billing	Title*			_	_							
<u>∧</u> Alarms	TA692FC	:-L-5	Therr	nost	at							
Dashboards	TA692FC-L-5 Th	ermostat	s							4 🗹	± ×	
III Solution templates NEW	Device name 🛧	Label	Туре	Active	Room Temperature(°C)	Set Tem	perature(°C)	System Mode	Fan State			
Entities	0012bdfffe02ad04	Sales- Office	TA692FC-L- 5-868	true	22.4	19.5		COOL	HIGH	1 1	\$	
Assets			mernostat									
Entity Views												
🏥 Profiles 🛛 🔺												
Device profiles										+		×
Asset profiles						ltems per pag	e: 10 🔻	1 - 1 of 1			>I	

• Action -> Edit Action (icon)

ThingsBoard	📲 Dash > 📲 > 📲 TA	A692FC-L-5 Thermo Current subscription ThingsBoard Cloud Prototype : : + E Tenant administrator : Status (Active)
A Home	♦ ■	🔹 🗔 = 🕐 Realtime - last 5 minutes 生 😗 🖸
🖻 Plan and billing		
🛕 Alarms	TA692FC-L-5 Ther	IA092FC-L-3 INERMOSTATS (2 X
📑 Dashboards	TA692FC-L-5 Thermostats	
III Solution templates NEW	Device name 🛧 Label Type	Data Settings Advanced Actions 5
▲ Entities ▲	0012bdfffe02ad04 Office Cffice Dffice TA692FC- L-5-868 Thermostat	Actions + Q
assets		Action source 🛧 Name Icon Type
Entity Views		= Action cell button Edit thermostat 🖍 Custom action (with HTML template) 📝 📋
💼 Profiles 🛛 🔨		
Device profiles		Action cell button Thermostat detail 🥵 Navigate to other dashboard 6
R Asset profiles		Items per page: 10
📇 Customers		

• Modify Target dashboard -> modify Target dashboard state -> Save

ThingsBoard	Dash > TA692FC-L-5 Thermo Current subscription ThingsBoard Cloud Prototype Status Active	[] 🌲 😝 Tenant administrator
🛧 Home	Edit action	🗙 inutes 🛓 🗐 🖸
🖻 Plan and billing		
\land Alarms	Туре*	@ ×
Dashboards	Navigate to other dashboard	
III Solution templates	Target dashboard *	
🔥 Entities	Deshboard* TA692FC-L-5 Thermostat (For Mobile App) 7	×
🗔 Devices		+ ~
🖶 Assets	monitor 8	×
🗰 Entity Views		IL template)
💼 Profiles 💦	Open in a new browser tab	
Device profiles	Set entity from widget	ard 🧪 📕
Asset profiles	State entity parameter name By default	
📇 Customers		
e Users	Cance	Save
Integrations center	ttems per page	

These values are shown in the following table:

Field	Value
Target dashboard	TA692FC-L-5 Thermostat (For Mobile App)
Target dashboard state	monitor

• Apply changes (red icon)

ThingsBoard	📲 Dash > 📲 TA	A692FC-L-5 Thermo Current subscription ThingsBoard Cloud Prototype C3 ACTIVE Tenant administrator	:
☆ Home	♦ ■	🔅 🗔 = 🔇 Realtime - last 5 minutes 🛓 🗐	0
🖻 Plan and billing			
\land Alarms	TA692FC-L-5 Ther	TA092FC-L-5 Thermostats	×
📑 Dashboards	TA692FC-L-5 Thermostats		
III Solution templates NEW	Device name 🛧 Label Type	Data Settings Advanced Actions 10	
🚓 Entities 🖍	0012bdfffe02ad04 Sales- L-5-868	Actions	
🗔 Devices	Office Thermostat	Actions + G	~
Assets		Action source	
🖬 Entity Views		Action cell button Edit thermostat Custom action (with HTML template)	
🔹 Profiles 🛛 🔨			-
Device profiles		= Action cell button Thermostat detail 🔯 Navigate to other dashboard 🖍	Ĩ
Asset profiles		Items per page: 10 👻 1 – 2 of 2 < 🔅	
🚓 Customers			

• Apply changes (red icon on the bottom and right)

	Dash >	📲 > 📑 T/	A692FC-L-5 Therm	Current subscription T O Status Ac	hingsBoard Clouc	la 🌲 🗧	' Tenant administrator	:
☆ Home	♦ ■			\$ (🗔 \Xi 🕓 Realtin	e - last 5 minutes	± •9	8
🖶 Plan and billing	Title*							
\land Alarms	TA692FC-	L-5 Therr	nostat					
📑 Dashboards	TA692FC-L-5 Therr	mostats					1 ± ×	
III Solution templates NEW	Device name ↑ L	abel Type	Active Room Tem	perature(°C) Set Tempe	rature(°C) System Mode	Fan State		
🛦 Entities 🔨 🔨	0012bdfffe02ad04 C	Sales- Dffice TA692FC-L- 5-868 Thermostat	true 22.3	19.5	COOL	HIGH	/ \$	
 Assets Entity Views 								
🖞 Profiles 🔨							11	
Device profilesAsset profiles				Items per page:	10 • 1 - 1 of 1	K K		
👥 Customers							\smile	

Update List Dashboard

• First, delete this dashboard: Dashboards -> Click in the row of TA692FC-1-5 Thermostat List -> Popup dialog: Are you sure you want to delete ...? -> Yes.

ThingsBoard	Lashboards > LAII Current subscription ThingsBoard Cloud Prototype C & C Image Coursent a Status Cactive Coursent a	
♠ Home	🖬 All 📲 Groups	
🖻 Plan and billing		
\land Alarms	Da Are you sure you want to delete the dashboard 'TA692FC-L-5 Thermostat List'? +	GQ
Dashboards	Be careful, after the confirmation the dashboard and all related data will become unrecoverable.	
III Solution templates NEW		
🔥 Entities 🔥	No 3 Yes	
🗔 Devices	2023-06-06 16:11:46 TA692FC-L-5 Thermostat List	2 📋
Assets	items per page: 10 👻 11 – 16 of 16 🛛 🕻 🔇	
Entity Views		

• Next, import TA692FC-1-5 List Dashboard.

6.6.3 TA692FC-L-5 Thermostat (For Mobile App)

Dashboard states

Monitor state

Monitor state is root state.



• Dashboard bar:

Hidden. Refer to Default state.

• Widgets:

Widget	Description
MONITOR	skip to Monitor state
CONTROL	skip to Control state
SETTINGS	skip to Settings state
Room Temperature	room temperature
Set Temperature	current setpoint value
System Mode	"OFF", "OFF", "COOL" or "FAN-ONLY"
Fan Mode	"OFF", "LOW", "MED", "HIGH" or "AUTO"
Fan Status	"OFF", "LOW", "MED" or "HIGH"
Cool Proportional Output	0 ~ 100%
Temperature history	
	Room temperature history. Click
	🕓 Realtime - last 7 days
	to edit this timewindow. Refer to Default state

ThingsBoal	rd ^{form}	📕 Dashboards > 🕂 TA	4692FC-L-5 Th	ermostat (For Mobi	Current subsci	iption Th Status Ac	ningsBoard Cloud	C 🌲	9
🛧 Home		MONITOR >		CON	TROL >		SETTINGS >		
🖶 Plan and billing				1					
\land Alarms									
📑 Dashboards		Set Temperature (°C)		Fan Mode	Fan State		System Mode		
Solution templates	NEW	19.5		MED	HIGH		COOL		
📤 Entities	^	Set Temperature (5.0~35.0°C)		Set Fan Mode			Set System Mode		
Co Devices		19.5		OFF LOW M	MED HIGH AUTO		OFF COOL	FAN-ONLY	
Assets			~						
Entity Views									
🍰 Profiles	^								
Device profiles									
Asset profiles									
🚨 Customers									
e Users									
Integrations center	^								

Control state

• Dashboard bar:

Hidden. Refer to Default state.

• Widgets:

Widget	Description
Set Temperature	current setpoint value
Set Fan Mode	change fan mode
Set System Mode	change system mode

	Dashboards >	TA692FC-L-5 Th	ermostat (For Mobile App)	Current subscription	ThingsBoard Cloud Prototype	о 🌲	8
🛧 Home	MONITOR >		CONTROL >		SETTINGS >		
🖶 Plan and billing					-		
\land Alarms							
Dashboards	P-Band for Cool (°C)		I-Time for Cool (senconds)		K-Factor		
🗰 Solution templates 🛛 🛚	• 4.0		30		3		
📤 Entities	Set P-Band for Cool (1.0	0~4.0°C)	Set I-Time for Cool (5~180 se	econds)	Set K-Factor (1~9)		
🗔 Devices	1.5		6		2		
Assets					-		
Entity Views							
🍰 Profiles	 Threshold (°C) 						
Device profiles	0.2						
Asset profiles							
😤 Customers	Set Threshold (0.2~5.0°	°C)					
😫 Users	4.2	~					
Integrations center	`						
➡ Integrations							

Settings state

• Dashboard bar:

Hidden. Refer to Default state.

• Widgets:

Widget	Description
Set P-Band for Cool	1.0 ~ 4.0 °C
Set I-Time for Cool	5 ~ 180 seconds
Set K-Factor	1~9
Set Threshold	0.2 ~ 5.0 °C

Import Detail Dashboard

Tip: A Dashboard file can only be imported once. If you have already imported it, you don't need and cannot repeat the import.

If you have already imported it, you can skip this step.

In order to use this dashboard, you must to create ta692fc-l-5 Thermostat Device Profile. If it doesn't exist, you can import it. See *Import Device Profile of ta692fc-l-5 Thermostat*.

- Download ta692fc_l_5_thermostat__for_mobile_app_.json.
- Dashboards -> + -> Popup dialog: Import dashboard -> Drag and drop *detail dashboard File* -> Import.

ThingsBoard	Dashboards >	La Current subscription Things Status Current Subscription Things	Board Cloud Prototype 🖸 🛕 A B Tenant administrator
♠ Home	All	Groups	
🖻 Plan and billing		Import dashboard	× 2 import dashboard
\land Alarms	Dashboards	3	+ C Q
Dashboards	□ Created time ↓	Dashboard file *	Groups
Solution templates	2023-06-06 16:11:46	Drag and drop a JSON file or Browse file	× ± / i
Lon Devices	2023-06-06 16:06:34	ta602fc 5 thermestat for mobile ann icon	± / i
≣ Assets	2023-05-29 16:08:21	4	± / i
Entity Views	2023-05-25 10:32:30	Cancel	port
💼 Profiles 🛛 🔺		lana	
Device profiles		nems ;	per page. To V T Toor To
ThingsBoard	Dashboards >	Current subscription Things Status Cactive	sBoard Cloud Prototype 🕄 🌲 😝 Tenant administrator 🕴
ThingsBoard	Dashboards >	Current subscription Things Status Active	Board Cloud Prototype : A B Tenant administrator :
ThingsBoard Cloud Platform	E Dashboards >	La Current subscription Things Status (Active)	sBoard Cloud Prototype : T A B Tenant administrator
ThingsBoard Cloud Platform Home Plan and billing Alarms	E Dashboards >	All Current subscription Things Status Cactive Groups Onclude customer entities	Board Cloud Prototype C A Tenant administrator : + C Q
ThingsBoard Cloud Platform Home Plan and billing Alarms Dashboards	Dashboards > All Dashboards Created time ↓	All Current subscription Things Status Active Groups Include customer entities Title Customer name	sBoard Cloud Prototype : • • • • • • • • • • • • • • • • • •
 China planta ThingsBoard Cloud Platform Home Plan and billing Alarms Dashboards Solution templates 	Dashboards > All Dashboards Created time ↓ 2023-06-06 16-06-34	All Current subscription Things Status Active Groups Groups Include customer entities Title Customer name TA992FCL-5 Thermostat (For The Customer name TA992FCL-5 Thermostat (For The Customer name TA992FCL-5 Thermostat (For The Customer name	Board Cloud Prototype : Tenant administrator : + C Q Groups
Cloud Platform Home Plan and billing Alarms Dashboards Solution templates Entities Dasinge	■ Dashboards > ■ All Dashboards Created time ↓ 2023-06-06 16:06:34	Current subscription Things Status Active Groups Groups Include customer entities Title Customer name TA692FCL-5 Thermostat (For Mobile App)	Board Cloud Prototype : + C Q Groups
Cloud Platform Home Plan and billing Alarms Dashboards Solution templates Entities A	Dashboards > All Dashboards Created time ↓ 2023-06-06 16.06.34	Current subscription Things Status Active Groups Groups Groups Title Customer name TA692FC-L-5 Thermostat (For Mobile App)	Board Cloud Prototype : · · · · · · · · · ·
ThingsBoard Cloud Platform Home Plan and billing Alarms Solution templates Entities Entities Assets Entity Views	Dashboards > All Dashboards Created time ↓ 2023-06-06 16-06-34	All Current subscription Things Status Active Groups Groups Include customer entities Title Customer name TA692FC-L-5 Thermostat (For Mobile App)	Beard Cloud Prototype :

• Optional, This dashboard can be set as ta692fc-1-5 Thermostat Device Profile's mobile dashboard. See *Modify ta692fc-l-5 Thermostat device profile's mobile dashboard*.

Items per page: 10 👻

> >|

Update Detail Dashboard

Device profiles

- First, clear TA692FC-L-5-868 Thermostat device profile's mobile dashboard.
- Next, delete this dashboard: Dashboards -> Click in the row of TA692FC-L-5 Thermostat (For Mobile App) -> Popup dialog: Are you sure you want to delete ...? -> Yes.

ThingsBoard	📕 Dashboards ゝ 👫 All	Current subscription ThingsBoard Cloud Prototype Status Active	C 🌲	B Tenant administrator	
♠ Home	All Groups				
- Plan and billing					
🛕 Alarms				+ C Q	
Dashboards 1	Are you sure you want to delete the dash	ooard 'TA692FC-L-5 Thermostat (For Mobile	App)'?		
III Solution templates NEW	Be careful, after the confirmation the dashboard a	nd all related data will become unrecoverable.	_	<u> </u>	
🛦 Entities 🔨 🔨				± / 1	
🗔 Devices		No	3 Yes	=	
🏥 Assets	2023-05-29 16:08:21			⊻ / ∎	
🗰 Entity Views	2023-06-06 16:06:34 TA692FC-L-5 Thermostat (Fr Mobile App)	or .		± 🖍 2 🔳	
🤖 Profiles 🔥 🔨		Items per page: 10 👻	11 - 16 of 16	IK K > >1	
Device profiles					

• Then import TA692FC-L-5 Detail Dashboard.

6.7 TA692FC-L-5 LoRaWAN API

Tip:

• This section applies to TA692FC-L-5.

6.7.1 Overview

6.7.2 Payload format in LoRA packet used by TA692FC-L-5

Uplink | port 10

Byte	Data	Content	Range
0	data.RoomTemperature (High Byte)	Room Temperature(°C) = D_Room_Temperature/10	0 ~ 400
1	data.RoomTemperature (Low Byte)		
2	data.SetTemperature (High Byte)	Set Temperature(°C) = D_Set_Temperature/10	50 ~ 350
3	data.SetTemperature (Low Byte)		
4	data.CoolProportionalOutput	Cool Proportional Output : 0-100%	$0 \sim 100$
5	data.FanMode	0:OFF 1:LOW 2:MED 3:HIGH 4: AUTO	0 ~ 4
6	data.FanState	0:OFF 1:LOW 2:MED 3:HIGH	0 ~ 3
7	data.threshold (*)	Temperature change: $0.2^{\circ}C \sim 5.0^{\circ}C$	2 ~ 50
8	data.SystemMode	0:OFF 1:COOL 2:FAN-ONLY	0 ~ 2
9	Data.CoolPBand	P-Band for Cool : 1.0° C ~ 4.0° C	$10 \sim 40$
10	Data.CoolItime (High Byte)	I-Time for Cool : $5 \sim 180$	5 ~ 180
11	Data.CoolItime (Low Byte)		
12	Data.Kfactor	K-Factor : 1 ~ 9	1~9

Downlink | port 90

Byte	Data	Content	Range
0	data.SetTemperature (High Byte)	Set Temperature(°C) = D_Set_Temperature/10	50 ~ 350
1	data.SetTemperature (Low Byte)		
2	data.FanMode	0:OFF 1:LOW 2:MED 3:HIGH 4:AUTO	0 ~ 4
3	data.threshold ¹	Temperature change: $0.2^{\circ}C \sim 5.0^{\circ}C$	2 ~ 50
4	data.SystemMode	0:OFF 1:COOL 2:FAN-ONLY	0 ~ 2
5	Data.CoolPBand	P-Band for Cool : 1.0° C ~ 4.0° C	$10 \sim 40$
6	Data.CoolItime (High Byte)	I-Time for Cool : $5 \sim 180$	5 ~ 180
7	Data.CoolItime (Low Byte)		
8	Data.Kfactor	K-Factor : 1 ~ 9	1~9

Downlink | port 91

Byte	Data	Content	Range
0	data.SetTemperature (High Byte)	Set Temperature(°C) = D_Set_Temperature/10	50 ~ 350
1	data.SetTemperature (Low Byte)		

Downlink | port 92

Byte	Data	Content	Range
0	data.FanMode	0:OFF 1:LOW 2:MED 3:HIGH 4:AUTO	0 ~ 4

Downlink | port 93

Byte	Data	Content	Range
0	data.threshold ²	Temperature change: $0.2^{\circ}C \sim 5.0^{\circ}C$	2 ~ 50

¹ D_update_threshold determines the minimum change in ambient room temp required to trigger a send event i.e. uplink. The range is from 0.2 to 5 centigrade. However, this parameter is limited by another named, "sending interval", hardcoded 15 seconds.

e.g. if change in temp > 0.2°C, or, fan status change, or user press a button etc., sends uplink immediately

 2 D_update_threshold determines the minimum change in ambient room temp required to trigger a send event i.e. uplink. The range is from 0.2 to 5 centigrade. However, this parameter is limited by another named, "sending interval", hardcoded 15 seconds.

e.g. if change in temp > 0.2°C, or, fan status change, or user press a button etc., sends uplink immediately

Downlink | port 94

Byte	Data	Content	Range
0	data.SystemMode	0:OFF 1:COOL 2:FAN-ONLY	0 ~ 2

Downlink | port 95

Byte	Data	Content	Range
0	Data.CoolPBand	P-Band for Cool : 1.0° C ~ 4.0° C	$10 \sim 40$

Downlink | port 97

Byte	Data	Content	Range
0	Data.CoolItime (High Byte)	I-Time for Cool : 5 ~ 180	5 ~ 180
1	Data.CoolItime (Low Byte)		

Downlink | port 95

Byte	Data	Content	Range
0	Data.Kfactor	K-Factor : 1 ~ 9	1~9

CHAPTER

SEVEN

RELEASE NOTES

Release notes about documents, MQTT protocol, widgets, dashboard, etc.

- Release Notes
- Upgrade instructions

7.1 Release Notes

7.1.1 v2.3.4 (Nov 8, 2023)

• Modify two wrong links in Add TA692FC-L-5 to ThingsBoard.

7.1.2 v2.3.3 (Sep 25, 2023)

- Avantec Dashboard
 - New widget Buttons navigation bar.
 - Update widget Tabs navigation bar.
 - Update widget Update time value with pattern key.
 - Update widget Setting list.
 - Update dashboard TA692FC-L-5 Detail Dashboard
 - Update dashboard TA652FC-W Detail Dashboard
 - Update dashboard TA652FH-W Detail Dashboard

7.1.3 v2.3.2 (July 5, 2023)

- Avantec Dashboard
 - Updated TA692FC-L-5 Detail Dashboard
 - Updated TA652FC-W Detail Dashboard
 - Updated TA652FH-W Detail Dashboard

7.1.4 v2.3.1 (July 5, 2023)

- Avantec Widgets
 - New widget Entities cards.

7.1.5 v2.3 (June 20, 2023)

- Add TA692FC-L-5's documents
 - Add TA692FC-L-5 Specification
 - Add TA692FC-L-5 LoRaWAN Device API
 - New appliction note: Add TA692FC-L-5 to ThingsBoard
 - Add TA692FC-L-5 List Dashboard
 - Add TA692FC-L-5 Detail Dashboard
- Avantec Widgets
 - New widget Update shared string attribute with segmented switch.

7.1.6 v2.2 (June 1, 2023)

• TA652FC-W MQTT API/Protocol

- New feature: support (control mode) on/off in schdule.
 - * New client-side attributes: supportCtrlModeInSchedule (string), prgNextCtrlMode
 (string), prgCtrlModeXX (string).
 - * New Server-side RPC: remoteSetPrgCtrlModeXX.

Avantec Widgets

- New widget for on/off in schdule Styled button of string value with pattern key.
- Fixed bug: primary color of some widgets about button can't be used in ThingsBoard v3.5.1.
- Fixed bug: Setting list is not disyplayed properly in ThingsBoard v3.5.1.

• TA652FC-W Dashboards

- TA652FC-W List Dashboard

* New feature: support for modifying device label.

- TA652FC-W Detail Dashboard

* New feature: support (control mode) on/off in schdule.

• TA652FH-W Dashboards

- TA652FH-W List Dashboard

- * New feature: support for modifying device label.
- New dashboard Office Center Dashboard

7.1.7 v2.1 (Apr 18, 2023)

• TA652FC-W/TA652FH-W MQTT API/Protocol

- New shared attributes: uploadThreshold (double).
- New client-side attributes: uploadThresholdMin, uploadThresholdMax, uploadThresholdStep (double).
- Refactor all documentation
- Refactor all widgets
- Refactor all dashboards

7.1.8 v1.0 (Jul 24, 2020 / Dec 20, 2022)

Inital version.

7.2 Upgrade instructions

- Update Widgets Bundles:
 - Update Avantec Widgets
- Update Dashboards:
 - TA652FC-W
 - * Update TA652FC-W List Dashboard
 - * Update TA652FC-W Detail Dashboard
 - TA652FH-W
 - * Update TA652FH-W List Dashboard
 - * Update TA652FH-W Detail Dashboard
 - * Update Office Center Dashboard
 - TA692FC-L-5
 - * Update TA692FC-L-5 List Dashboard
 - * Update TA692FC-L-5 Detail Dashboard
- Update F/W:
 - OTA Updates

CHAPTER

EIGHT

AVANTEC AND THE PROJECT

Learn about the project and the company.

• About us | Copyrights and Licenses

8.1 About us

Avantec Manufacturing Limited was founded in 1983. We specialize in designing and manufacturing HVAC, telecom and VoIP products.

The company's headquarter is located in Kwun Tong, Hong Kong. This owned property hosts 40 staffs from R&D, Marketing, Shipping, Purchasing and Accounting Departments. Our products are distributed worldwide for years with CE, FCC, PTT and ROHS approvals.

We have a representative office and product development center in downtown Shenzhen.

We also work for customers on OEM projects. We have different R&D teams responsible for product design, software / PCB / tooling development and product approvals. We follow the rapid technology change and provide the products meeting customer's expectation and requirements.

With the abundant experience in this industry, our expertise is guaranteed. We are confident in providing you with innovative products meeting your requirements and in high quality. We are definitely looking forward to establishing a long term business partnership with you!

http://www.avantec.com.hk

8.2 Copyrights and Licenses

8.2.1 Copyrights

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