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Category	■FAQ □SOP	Related OS	N/A					
Abstract	How to set the authentication function of ADAM MQTT?							
Keyword	ADAM-60XX, ADAM-62XX, MQTT, authentication, username, password							
Polatad	ADAM-6217-B, ADAM-6017-D							
Broduct	ADAM-6050-D, ADAM-6051-D, ADAM-6052-D, ADAM-6060-D, ADAM-6066-D							
Product	ADAM-6250-B, ADAM-6251-B ,ADAM-6256-B, ADAM-6260-B, ADAM-6266-B							

Problem Description:

This document explains how to set the authentication function of ADAM MQTT for connecting to the broker that requires username and password for verification.

Answer:

Below is the support table of ADAM MQTT authentication function. User need to check module HW version and upgrade to certain FW version for setting the authentication of MQTT.

DIO Model	FW version	AIO Model	FW version
ADAM-6050/51/52/60/66-D	After v6.02 B01	ADAM-6017-D	After v6.02 B00
ADAM-6250/51/56/60/66-B	After v6.02 B01	ADAM-6217-B	After v6.02 B01

After checking the HW, FW, Utility version (after 2.05.11B17) all support MQTT authentication function, we can start the DEMO. Following are the steps by steps (with ADAM-6250) to test the MQTT function with username/password:



Figure1. Application structure

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1. Build up a mosquitto broker with username/password authentication and run it.

First, in order to test the username/password function, we have to build up a borker which can only be accessed with correct username/password. We can use Webaccess or Mosquitto to build up a MQTT broker with authentication. In this example I use Mosquitto. (For the Webacces MQTT broker setting, you can refer to the end of this document.)

📧 C:\Windows\System32\cmd.exe - mosquitto.exe -v -c "C:\Program Files (x86)\mosquitto\mo 💷 💷 🛋	
Microsoft Windows [版本 6.1.7601]	*
Copyright (c) 2009 Microsoft Corporation. All rights reserved.	н
C:\Program Files (x86)\mosquitto>mosquitto.exe -v -c "C:\Program Files (x86)\mos	
quitto\mosquitto.conf"	
1540971503: mosquitto version 1.4.14 (build date 11/07/2017 0:03:18.53) startin g	
1540971503: Config loaded from C:\Program Files (x86)\mosquitto\mosquitto.conf.	
1540971503: Opening ipv6 listen socket on port 1883.	
1540971503: Opening ipv4 listen socket on port 1883.	

Figure2. Mosquitto broker (username:jjj/password:123) which run on IP:192.168.0.12.

2. Use Adam/Apax .NET Utility to setup the MQTT setting.

We have to setup the ADAM module. There are several parameters we have to fill in (Figure3). After pressing the "Apply" button, we can see the module successfully connect to the broker not only on the broker page (Figure4) but also in the wireshark. (We can see the module connect to the broker with correct username/password in Figure5.)

Information	Network Strea	m/Trap Administration Firmware P2P/Event Access Control Modbus Address	Cloud
MQTT SM	TP		
Publish / S	ubscribe :	🔽 Enable	Apply
Host :		192.168.0.12	
UserName	/Password :	jiji / 123	
Heartbeat /	Deadband :	5 second (s) / 100 milli-second (s)	
Retain Mes	ssage :	I▼ Enable	
Will Topic	:	Advantech/00D0C9FE962E/Device_Status	
Publish Qo	S :	0 •	
Publish To	pic :	Advantech/00D0C9FE962E/data	
Subscribe (QoS :	0 •	
Subscribe '	Topic :	Advantech00D0C9FE962E/ctldo1 Advantech00D0C9FE962E/ctldo2 Advantech00D0C9FE962E/ctldo3 Advantech00D0C9FE962E/ctldo3 Advantech00D0C9FE962E/ctldo5 Advantech00D0C9FE962E/ctldo5 Advantech00D0C9FE962E/ctldo5	

Figure3. Utility setting (under Cloud/MQTT tab)



Figure4. ADAM-6250 connects to the broker.

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File	<u>E</u> dit <u>V</u> iew <u>G</u> o	<u>Capture</u> <u>A</u> nalyze	Statistics Telephon	<u>y W</u> ireless <u>T</u> ools	<u>H</u> elp	
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n	ngtt				Expression ···· +	
No.	Time	Source	Destination	Protocol	Length Info	
	59 6.076112	192.168.0.50	192.168.0.12	MQTT	228 Connect Command	
	60 6.080425	192.168.0.12	192.168.0.50	MQTT	58 Connect Ack	
	61 6.080843	192.168.0.50	192.168.0.12	MQTT	128 Subscribe Request, Subscribe Request	
	62 6.093933	192.168.0.12	192.168.0.50	MQTT	59 Subscribe Ack	
	64 6.182198	192.168.0.12	192.168.0.50	MQTT	59 Subscribe Ack	
	65 6.183307	192.168.0.50	192.168.0.12	MQTT	407 Publish Message, Publish Message	
4	NQ Telemetry Tr	ansport Protoco	1, Connect Comman	nd		-
	Header Flags	: 0x10 (Connect	Command)			
	Msg Len: 171					
	Protocol Nam	e Length: 4				
	Protocol Nam	e: MQTT				
	Version: MQT	F v3.1.1 (4)				
	Connect Flag	s: 0xe6				
	Keep Alive:	5				
	Client ID Le	ngth: 21				
	Client ID: A	DAM6250_00D0C9FE	962E			
	Will Topic L	ength: 36				=
	Will Topic: /	Advantech/00D0C9	FE962E/Device_St	atus		
	Will Message	Length: 88				
	Will Message	<pre> {"status":"dis</pre>	connect","name":	"ADAM6250","mac:	id":"00D0C9FE962E","ipaddr":"192.168.0.50"}	
	User Name Le	ngth: 3				
	User Name: j	jj				
	Password Len	gth: 3				
	Password: 12	3				-
003	30 0a 00 fa e	e 00 00 <mark>10 ab (</mark>	01 00 04 4d 51 54	54 04	MQTT.	*
004	40 e6 00 05 0	0 15 41 44 41 4	ld 36 32 35 30 5f	30 30A	DA M6250_00	
00	50 44 30 43 3	9 46 45 39 36	32 45 00 24 41 64	76 61 D0C9FE	96 2E.\$Adva	
000	60 6e 74 65 6.	3 68 2 1 30 30 4	4 30 43 39 46 45	39 36 ntech/		Ξ
001	R0 00 58 75 21 4	+ 03 70 09 03 0 2 73 74 61 74 -	75 77 22 74 61 74 75 77 22 3a 2 <u>2 64</u>	69 73 X{"c+	at us"."dis	
000	90 63 6f 6e 6	e 65 63 74 22 2	C 22 6e 61 6d 65	22 3a connec	t" "name":	
00	a0 22 41 44 4	1 4d 36 32 <u>35</u>	30 22 2c 22 6 <u>d 61</u>	63 69 "ADAM6	25 0","maci	
	MO Telemetry Ty	ausport Protocol (meett) 1	74 hytes		Packets: 71 · Displayed: 6 (8 5%)	-
	- ng roonouy n	amport i totocor (niqit), i	0,000		TIOLE: DERMI	111

Figure5. Connect packet

3. Use a 3rd party MQTT client (MQTTBox) to get the DI status.

In Figure6, we have to setup a MQTT client for testing the function. In Figure7, enter the right Topic and press Subscribe button, you can get the IO data. In Figure8, enter the right Topic and payload then press Publish button, you can set the DO. You can also observe the DO0 change in the right hand side (Subscribe block) of this figure.

and and a				
		Client Settings Hel		
MQTT Client Id	Append timestamp to MQTT client id?	Broker is MQTT v3.1.1 compliant?		
6a3b0ab5-1585-4c9b-9eb3-769b424	✓ Yes	✓ Yes		
Host	Clean Session?	Auto connect on app launch?		
▼ 192.168.0.12	✓ Yes	✓ Yes		
Password	Reschedule Pings?	Queue outgoing QoS zero messages?		
	✓ Yes	✓ Yes		
Connect Timeout (milliseconds)	KeepAlive (seconds)			
30000	10			
Will - QoS	Will - Retain	Will - Payload		
0 - Almost Once 🔻	No No			
Save	Delete			
	MQTT Client Id 6a3b0ab5-1585-4c9b-9eb3-769b424 Host 192.168.0.12 Password Connect Timeout (milliseconds) 30000 Will - QoS 0 - Almost Once v	MQTT Client Id Append timestamp to MQTT client id? 6a3b0ab5-1585-4c9b-9eb3-769b424 Image: Yes Host Clean Session? 192.168.0.12 Image: Yes Password Reschedule Pings? Image: Yes Yes Connect Timeout (milliseconds) Yes 30000 10 Will - QoS Will - Retain Image:		

Figure6. MQTTBox setting page



Remarks:

 Utility only allows user enter max 20 characters for username and password. However, module can support 49 characters for username and 99 characters for password for the MQTT authentication function. If users need to set longer characters for both username and password, they can use ASCII command to configure this setting.

%aaSETMQTTUNxxx	Set MQTT user name aa: always 01 xxx: user name, if set null module will disable the user- name and password func- tion.	Return: >01 Error: ?01
%aaSETMQTTPWxxx	Set MQTT password aa: always 01 xxx: password, if set null module will disable the user- name and password func- tion.	Return: >01 Error: ?01

Figure9. ASCII command for setting the username/password

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2. Here is a packet about the MQTT client connect the broker with wrong username/password.

▲ *區域連線			
<u>File Edit View Go Capture Analyze Statistics Telephony</u>	<u>W</u> ireless <u>T</u> ools	<u>H</u> elp	
◢ ■ ∅ ⊛ 🐌 🚵 🗙 🖆 🔍 ⇔ ⇔ 🕾 🖗 🖳 🚍 9	Q. Q. 💷		
mqtt		8	Expression ··· +
No. Time Source Destination	Protocol	Length Info	
101 8.604748 192.168.0.78 192.168.0.12	MQTT	139 Connect Command	
102 8.606241 192.168.0.12 192.168.0.78	MQTT	70 Connect Ack	
112 9.610938 192.168.0.78 192.168.0.12	MQTT	139 Connect Command	
113 9.611567 192.168.0.12 192.168.0.78	MQTT	70 Connect Ack	
122 10.614705 192.168.0.78 192.168.0.12	MQTT	139 Connect Command	Ξ.
123 10.615724 192.168.0.12 192.168.0.78	MQTT	70 Connect Ack	
Frame 122: 139 bytes on wire (1112 bits), 139 by	vtes captured (1112 bits) on interface 0	
Ethernet II, Src: LcfcHefe ed:97:4e (28:d2:44:ed)	1:97:4e), Dst: /	AsustekC 52:17:90 (88:d7:f6:52:17:9	0)
Internet Protocol Version 4, Src: 192.168.0.78,	Dst: 192.168.0	.12	
▷ Transmission Control Protocol, Src Port: 51277,	Dst Port: 1883	, Seq: 1, Ack: 1, Len: 73	
MQ Telemetry Transport Protocol, Connect Command	ł		
Header Flags: 0x10 (Connect Command)			
Msg Len: 71			
Protocol Name Length: 4			
Protocol Name: MQTT			
Version: MQTT v3.1.1 (4)			
Connect Flags: 0xc2			
Keep Alive: 10			
Client ID Length: 49			
Client ID: 6a3b0ab5-1585-4c9b-9eb3-769b424cf2	5f1540977060884		
User Name Length: 3			
User Name: abc			
Password Length: 3			
Password: 123			
0010 00 7d 1b b3 40 00 80 06 5d 1d c0 a8 00 4e	c0 a8 .}@	.]N	*
0020 00 0c c8 4d 07 5b c2 e4 3b 4e e0 a0 ce 38	80 18M.[.	. ;N8	
0030 01 04 64 11 00 00 01 01 08 0a 18 d2 f5 c4	01 2fd	/	
0040 cd ce 10 47 00 04 4d 51 54 54 04 c2 00 0a	00 31GN	IQ TT1	
0050 36 61 33 62 30 61 62 35 2d 31 35 38 35 2d	34 63 6a3b0ab	05 -1585-4c	=
	54 63 9b-9eb	- 7690424C	
0080 34 00 03 61 62 63 00 03 31 32 33	4abc	. 123	
MO Telemetry Transport Protocol (morth) 73 bates	4	Packet: 120 - Dimlayed: 26 (20.0%)	Profile: Default
 Mag resented y mansport mondol (high), 75 bytes 		1 ac. 6 to 1 D12p18/90. 20 (20.0%)	I TIOTHE DETAULT

Figure10. Client connects to broker with incorrect username/password.

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No.		Time	Source		Destin	ation			Protoc	ol		Length In	nfo					•
	101	8.604748	192.168	3.0.78	192.	168.0	.12		MQTT			139 C	onnect	Command				
	102	8.606241	192.168	3.0.12	192.	168.0	. 78		MQTT			70 C	onnect	Ack				
	112	9.610938	192.168	3.0.78	192.	168.0	.12		MQTT			139 C	onnect	Command				
	113	9.611567	192.168	3.0.12	192.	168.0	.78		MQTT			70 C	onnect	Ack				
1	122	10.614705	192.168	3.0.78	192.	168.0	.12		MQT			139 C	onnect	Command				E
	123	10.615724	192.168	3.0.12	192.	168.0	.78		MQTI			70 C	Connect	Ack				
⊳	Frame	123: 70 b	ytes on	wire (560 bit	s), 70	0 byte	es ci	apture	d (560	bits) on int	erface	0				
⊳	Ether	net II, Sr	rc: Asus	tekC_52	17:90	(88:d)	7:f6:	52:1	7:90),	Dst:	LcfcH	efe_ed:9	7:4e (2	28:d2:44	:ed:97	:4e)		
⊳	Inter	net Protoc	ol Vers	ion 4,	Src: 19	2.168	.0.12	, Ds	t: 192	.168.0	.78							
⊳	Transi	mission Co	ontrol P	rotocol	, Src P	ort: 1	1883,	Dst	Port	51277	, Seq	: 1, Ack	: 74, I	en: 4				
4	MQ Te	lemetry Tr	ransport	Protoc	ol, Con	nect /	Ack											_
	⊳ Hea	der Flags	: 0x20 ((Connec	t Ack)													
	Msg	Len: 2																
	Ack	nowledge	Flags: 0	0x00					(=)									
	Ket	urn Code:	Connect	tion Ke	fused: I	not au	thori	zed	(5)									
	00 0	0 40 44 -	1 07 4-	00 47	56 53	17.00	00.00	45	00	(D N		-						
00	100 2	8 d2 44 e 10 38 22 b	d 97 4e	88 d/	+6 52 : 00 00	-0 -8	08 00	45	28	(.DN 8"@	к.	E.						
00	120 0	10 JO ZZ D 10 Ap 07 5	6 48 88 h c8 4d	e0 e0	ce 38	-2 e4	3h 97	80	ao 18	.о								
00	30 0	1 04 81 d	5 00 00	01 01	08 0a (01 2f	cd ce	18	d2			/						
00	040 f	5 c4 <mark>20 0</mark>	2 00 05															
	Z b	iQ Telemetry T	ransport Prot	ocol (mqtt),	4 bytes							P	ackets: 130	·Displayed:	26 (20.0%))	Profile: D	efault

Figure11. Broker responses with a "connect act" with "not authorized".

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- 3. Webaccess MQTT broker setup SOP (After v8.3.3)
 - a. Open the project manager and click the MQTT Broker.

	Advantech WebAccess Project Manager Quick Start Help Logout								Logout	
	Current Project(s)									
Project Name	Project	Dashboard	Description	TCP Port	Timeout	Update	Delete			
CloudProject	<u>Configure</u>	<u>Edit</u>	Project Description	PC060607	0	4592	0	<u>Update</u>	<u>Delete</u>	
demo	<u>Configure</u>	Edit	Project Description	127.0.0.1	0	0	0	<u>Update</u>	<u>Delete</u>	
WISE2410	Configure	<u>Edit</u>	Suzhou Summit 2018	127.0.0.1	0	4592	0	<u>Update</u>	<u>Delete</u>	
			Please select one of above a	available Projec	ts to start!!					
Integrity Checking	Backup Restor	re <u>Admin/Proj</u>	ect User ODBC Log Data Source	WebAccess Ex	<u>spress</u> <u>Dashboar</u>	<u>d Settings</u> <u>Se</u>	tup HTTPS Se	ervice MQ	TT Broker	
System Lo	g <u>Action Log</u>	<u>Alarm Log</u> <u>A</u>	<u>nalog Tag Log</u> <u>Analog Change L</u>	og <u>Discrete Tag</u>	<u>g Log Text Tag l</u>	Log <u>Event Lo</u>	g <u>LogData N</u>	faintenance		
			Project Con	ifiguration						
			Create Ne	w Project						
	I	Project Name								
	Projec	t Description	Project Description							
	Project Nod	e IP Address	PC020609							
	Project Nod	e HTTP Port	0							
	Project Prima	ary TCP Port	4592							
	Pro	ject Timeout	0							
	Remote Access Code									
R	etype Remote .	Access Code								
I	og Changes to	System Log	○ Yes ● No							
			Submit for N	lew Project						

b. Enter the username/password you want and press "Submit" button.

		MQTT Broker	
			MQTT Broker Settings
	Enable	• Yes O No	
	UserName	admin]
	Password		Show Password
	TCP Port	1883	
	TLS Port	8883	
Wel	bsocket Port	51328	
Websock	tet TLS Port	51329	
Project No	de Public IP		
			[Cancel] Submit

c. Done!