Analog Outputs on a recordum airpointer

Hardware

Advantech ADAM 4025 Modules can be used to add analog outputs to the airpointer. Each module supports 4 analog outputs, each are used to supply 4-20mA. In the airpointer software the number of analog outputs is limited to 16. Additionally digital outputs can be controlled to supply status signals. Actually we support one failure status and one operational status per analog signal. The test was done with ADAM 4069 relays modules suppling 8 relays per module. Please be aware that these modules are too bulky to be mounted inside the airpointer, best praxis is to mount it close to the data system receiving the analog signals. For the connection to the airpointer just a standard RS232 cable is needed.

Software

In the airpointer LinLog is the software responsible for external connected instrumentation. These could be meteorological sensors, PM monitors or ADAM modules. The other software involved is LinOut. This software is supplying data collected or measured in the airpointer to the outside world. The process to supply a signal to an analog output is working in the following way: LinOut is collecting the actual value of the signal from the software measuring the signal. The signal and its status bytes are checked and converted to a 0-100% value depending on the analog output range configured. The status signals are handled in the following way: As soon any failure status bit is set on a signal, FS status will be set. Checking the operational status of the signal, the BS status will be set as soon the unit is on internal zero or span or the maintenance mode is active. The analog outputs. The normal update cycle is 5 seconds.

Configuration

Hardware

Mount your ADAM modules, including an RS232 to RS485 converter and a little power supply and wire them up. Use the Advantech ADAM-4000-500-Utility program to give each module a unique address. Note the address on the module for easier identification. Please be aware that LinLog will configure all analog outputs to 4-20mA!





NOTE: There is a little switch on the side of the module, this need to be in the "Normal" position to work correct! (In the Init position it is answering only to Address 0)



Configure ADAM Modules in LinLog

Setup modules in LinLog

Chose ADAM and the module type form the list in Configuration -> LinLog -> Configuration. Hint: On some browsers it is necessary to choose a different brand first before you can click on ADAM!?

	2014-00ts2 Graph Download Stationbook Overview (
🗉 🦳 Rules & Actions	LinLog configuration
The system Info	
System Maintenance	Group 2
Ga Service Manager	
co Command Interface	ADAM Submit
G Software Update	ADAM-4011
co & Synchronize USB	ADAM-4011
😔 Backup	ADAM-4011D
co O Restore	ADAM-4012
😦 Disk Manager	ADAM-4013RTD
🗄 🎦 Extras	ADAM-4015
Configuration	ADAM-4015T
co Analog Out	ADAM-4016
G Board Parameter	ADAM-4017
Calibration Parameters	ADAM-4017+
Interface Configuration	ADAM-4018
C System Parameters	ADAM-4018+
G & Calculation and Timing	ADAM-4019+
G Customer/Station	ADAM-4021
G & SLA Settings	ADAM-4024
co Options	ADAM-4050
G AQI Settings	ADAM-4051
😔 Time Settings	ADAM-4052
🗩 🚥 Additional 🚥	ADAM-4053
ep Parameters	ADAM-4055
 Synchronization 	ADAM-4056S
G Features	
G Standards	
Configuration Sources Configuration	
G Sources configuration	

Setup all modules to the same COM port.

Even if it takes some minutes give each output signal a detailed name like: AnalogOut 2PM10 You can do this after clicking on the <Parameter Setup> button.

If you skip this step you can be sure that nobody remembers after a few year what signal is coming out <u>here!</u>_____

📊 root@201400ts2 🛛 🗙 📗 20	1400ts2 LinLog ×	201400ts2 LinOut ×	Watchdog		+
← → ♂ ŵ	M 192.168.6.127/index.php	é			
	2014-00ts2 Graph D	ownload Stationbook	Overview Calibration	Setu	•
	LinLog - Parameter S	etun			
Rules & Actions	Entroy Furtherer e	ctup			
🗄 🎦 System Info	Parameter Setup	 Step 2/3 			
System Maintenance		• •			_
Go Service Manager Command Interface					
G Software Update	Active				
co & Synchronize USB	Public				
🐵 Backup	Namo	La la contra mun			
GD C Restore	Name	AnalogOut2 PM10			
co Disk Manager	Descision	ma			
Extras	Precision	0.0000			
Configuration	Gas ID	-			
co Board Parameter	Slope/Offset x = (x * Slop	e) + Offset			_
co Calibration Parameters	Slope	1			
 Interface Configuration 	Offset	0			
GD System Parameters	•				
co Hardware	Averaging				-
es & Calculation and Timing	Averaging during status fail	Averaging during calibi	ation 🗠		
es Customer/Station	Averaging typ	Standard			
co Ontions	Wind direction parameter	AnalogOut0 CO			
G AOI Settings	Value for calme				
co Time Settings	Calibration				
🤛 🚥 Additional 🚥	Maintain calibration values				_
GD Parameters	Setpoint Span				
 Synchronization 	Setpoint Zero	0			
es Standards					
E C LinLog					
co Configuration					_
 Sources Configuration 	Can	cel << Prev	Next >> Fi	inish!	
🗉 🎦 LinOut					

Enable AnalogOut handling

Use Setup -> Configuration -> Options, enable "Advanced", find AnalogOutputs in Main Configuration and enable it. Press on <save>. A new entry "Analog Out" will appear, if not press <ctrl>F5 to reload your browser.

	airpointer - Graph Download Stationbook Overview Calibration Setup 🕒	
Bulor & Actions	Configuration - Options	
Custom Info		
± System mo	Advanced ~	
System Maintenance	Main Configuration :	
🗉 🎦 Extras		
Configuration	Modem Configuration	
ø Analog Out	Aux Configuration :	
 Board Parameter 	Alarm	
GD Calibration Parameters		
Interface Configuration	Main Configuration	
 System Parameters 	Show_Failure [on/off]	On O Off
GD Hardware	Activate, to show a failure warning	
co Customer/Station	Alarm_Index_Name	Alarm Index
Options	Alarm Index Unit	-
op AQI Settings	Unit for Linsched Alarm Index	
co Time Settings	Show ServiceIF Links [on/off]	On O Off
Additional	Activate, to show links for the Service Interface	0
on Parameters	Use a Web-Proxy for Updates	• On • Off
G Synchronization	Show Failure to All [on/off]	• On O Off
co Eestures	Activate, to show the failure warning for all users	
en Standarde	I Snow Notices [0n/off]	● On ○ Off
	Is how Stationinfo [on/m]	
The Line out	Show short information of station on login screen	
	ISSL Login Only [on/off]	On Off
Communication	Accorate, to only allow sai logins	0
E Support Programs	Activate, to lock GUI access via the Portal	On Off
🗉 🎦 my Air Quality	Download Legacy Support [on/off]	O on O off
User Administration	If on, the argin teer drive drive and the interface (without adding legacyorder as download parameter) for automatic data download via http interface	
\sim	FinalogOutputs [on/on] Enables AnalogOutputs for yery special configurations	● On ○ Off
	Pump Control [on/off]	On On ff
	Pump control or and show	
	Save	

Find Parameter IDs

It is mandatory that you understand the meaning of our id's to be able to setup the analog outputs. In the airpointer each signal has a unique id this is simply a number that is only used once in the airpointer. The LinSens is using fixed numbers between 1 and 8000, while LinLog is using numbers above 10000. To avoid the same id means different signals in the airpointers life after reconfiguration, a number is only used once. That means if you have configured an ADAM module, you remove it and add it again it will have new numbers as id! You can find a list with all parameters used in your system in Setup -> Configuration -> Parameters: Internal_Id is the id we have to use now. Now you understand why you have added the detailed name, your ids are much easier to find now.

Hint: You may wonder what greyed values are. This are values not used anymore, you can get rid of it by using Setup -> Configuration -> Synchronization

	🚍 airp	ointer 💳		ationbook Overview Calibration Setup	0							
Rules & Actions	Param	neter Configu	ration									
Rules & Actions System Maintenance System Maintenance Configuration on Analog Out on Board Parameters Or Calibration Parameters motorface Configuration	ADAM-4 ADAM-4 AQI Inc Base Ur Dummy Dummy	4024 4069 dex hit fAir f_data										
op System Parameters	One	Lunxingu One										
co Hardware co Customer/Station	Restore	defaults										
op Options	All Ids ar	e restored to stan	dard values	Restore								
ap Time Settings	ADAM-4	4024										
Additional Synchronization		109122	Internal Id 109122	Name AnalogOut0 CO [mA]	Visible	Overview	Group 5	Parameter 1				
co Features		108972	108972	AnalogOut0 NO [mA]			4	1				
© Standards		109146	109146	AnalogOut0 Temp [mA]			6	1				
E D LinOut		109152	109152	AnalogOut1 [V]			6	2				
E Communication		108978	108978	AnalogOut1 NO2 [mA]			4	2				
Support Programs Support Programs		109128	109128	AnalogOut1 PM2.5 [mA]			5	2				
User Administration		109158	109158	AnalogOut2 [V]			6	3				
		108984	108984	AnalogOut2 NOx [mA]			4	3				
		109134	109134	AnalogOut2 PM10 [mA]			5	3				
		109164	109164	AnalogOut3 [V]			6	4				
		108990	108990	AnalogOut3 O3 [mA]			4	4				
		109140	109140	AnalogOut3 SO2 [mA]			5	4				
	Save	Delete										
	ADAM-4	1069										
		109170	Internal Id 109170	Name DigitalOut0 NOX FS [digit]	Visible	Overview	Group 7	Parameter 1				
		109218	109218	DigitalOut0 PM2.5 FS [digit]			8	1				

Configure Analog Out

	airpointer Graph Download Stationbook Overview Calibration Setup 🕒		
🗉 🍋 Rules & Actions	Configuration - Analog Out		
Kules & Actions System Info			
System Maintenance	Advanced ~		
🗉 🎦 Extras	Analog Out 1		
🗉 🛅 Configuration	Analog Out 2		
 Analog Out 	Analog Out 3		
co Board Parameter	Analog Out 4		
Calibration Parameters	Analog Out 5		
op System Parameters	Analog Out 6		
co Hardware	Analog Out 7		
G Customer/Station	Analog Out 8		
C Options	Analog Out 9		
G AQI Settings	Analog Out 10		
Additional	Analog Out 11		
co Parameters	Analog Out 12		
G Synchronization	Analog Out 13		
GD Features	Analog Out 14		
😅 Standards	Analog Out 15		
E C LinCog	Analog Out 16		
Communication	Appleg Out 1		
🗉 🦰 Support Programs		[
🗉 🎦 my Air Quality	Enter your note for analog out setup like "SO2 concentration"	03 Ausgang	
User Administration	AnalogOut_01_id Parameter (I do signal that should be send to Analog out (id 0 to turn off)	108648	$[0 \le value \le]$
	AnalogOut_01_min	0	
	minium values of analog out range (in unit of signal) typically 0 AnalogOut 01 max	400	
	maxium values of analog out range (in unit of signal) example 1000	400	
	AnalogOut_out_out_out Parameter_id of the analog output	108990	$[0 \le value \le]$
	Analogout_01_BS_id Baramaters Idofthe distal substitueed for status not sampling (id 0 to ture off)	109200	$[0 \le value \le]$
	AnalogOut_01_FS_id	109194	[0 ≤ value ≤]
	Parameter_Id of the digital output used for status fail (id 0 to turn off) Save		
	Analog Out 2		
	AnalogOut_02_note	СО	

For each analog out put you have to setup a set of 7 parameters.

AnalogOut_xx_note: Type in a header to this output like, "Ozone" or "O3 Ausgang" that's O3 Output in German.

AnalogOut_xx_id: That is the Internal_id of the signal you want to be shown as analog output.

AnalogOut_xx_min: This is the lowest point of your analog output range, in most cases it is 0.

AnalogOut_xx_max: This is the highest point of your analog output range.

AnalogOut_xx_out_id: That is the Internal_id of the analog output you want to use. (on the ADAM 4025)

AnalogOut_xx_BS_id: That is the Internal_id of the digital output you want to use for operational status.

AnalogOut_xx_FS_id: That is the Internal_id of the digital output you want to use for failure status.



Best praxis is to have two browser windows open, one with this setup and the other with the parameter list. In this way you can copy and paste the id's.

Check the setup

Of course at the end you need to measure the current output for each signal, but using the service interface of LinOut and LinLog can be a big help:

I	admin@201400ts2	× 🔢 201400ts2 LinLog	×	201400ts2 LinOut	× 🔢 Watchdog	× +			-	o ×	
\leftarrow) С ф	0 🔏 192.168.6.12	7/cgi-bin/linout.c	:gi?page=analogout	:⟨=en		(lii\ 🗉] © ≡		
LinOu Home A	InOut Service Interface, normal Operation										
Analo	g Out Data										
n	Note	Parameter	Value	Unit	Time	Analog range	percent out	mA out	FS out	BS out	
1	03 Ausgang	03	-2.2	ppo	20201015 14:21:50	0.0 - 400.0 ppb	-0.0 %	3.91 mA	0	-	
2	00	00	102.5	ppin	20201015 14:21:50	0.0 - 20.0 ppm	3.0 %	4.40 IIIA	0	0	
2	302	302	103.0	ppo	2020101514.21.50	0.0 - 1000.0 ppb	10.4 70	0.94 MA	0	0	
3	NU	NO	108.0	ppo	2020101514.21.50	0.0 - 1000.0 ppB	10.8 %	5.73 mA	0	0	
4	NO2	NO2	1636.1	ppo	20201015 14:21:50	0.0 - 1000.0 ppb	100.0 %	20.00 mA	0	0	
5	NOX	NOx	272.0	ppb	20201015 14:21:50	0.0 - 1000.0 ppb	27.2 %	8.35 mA	0	0	
6	PM2.5	PM2.5	88.7	µg/m³	20201015 14:21:50	0.0 - 1000.0 µg/m³	8.9 %	5.42 mA	0	0	
7	PM10	PM10	150.5	µg/m³	20201015 14:21:50	0.0 - 1000.0 µg/m³	15.1 %	6.41 mA	0	0	
8	Air Temperature	Air Temp	10.9	°C	20201015 14:21:50	-20.0 - 80.0 °C	10.9 %	5.74 mA	0	0	
	This document is generated by linout, the interfoxe part of the c/Gby system Copyright by <u>WWW (C+C) rCdurl, etu</u> 20201015 14:21:53										

(Luckily this are generated test data only and not the air I am sitting in)

admin@201400ts	2 × 🔢 201400ts2 LinLog	× 👖 201400ts2 L	inOut X	📗 Watchdog	× +		- 0	×		
← → ♂ ŵ	👽 🔏 192.168.6.127/cgi-	bin/linlog.cgi?page=act&g	grp=4&wtb=1⟨=e	n		♡ ☆	III\ 🗉 🤅) ≡		
LinLog Service Inte	inLog Service Interface, normal Operation ome Raw values Actual Calibration Average 1 Average 3 Software RS232 USB List									
Actual Values Grp4	ADAM-4024									
Number	Parameter	Value	Value_all	Unit	Status: BS-FS-SS	Time	ID			
G4P1	AnalogOut0 NO	5.7072	· · · ·	mA	000	20201015 14:24:51	0	_		
G4P2	AnalogOut1 NO2	20.0000	-	mA	000	20201015 14:24:51	0			
G4P3	AnalogOut2 NOx	8.3232	-	mA	000	20201015 14:24:51	0			
G4P4	AnalogOut3 O3	3.9152	-	mA	000	20201015 14:24:51	0			
			This document is generated Copyright 20	by linlog, the logging part of by <u>WWW.recordum.eu</u>)201015 14:24:51	the rOSy system I					