Vaisala - How to integrate the Vaisala WXT520 with the Ashtech MicroZ

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Integrating the Vaisala WXT520 with the Ashtech MicroZ



Equipment needed

- Vaisala WXT520 Met-Pack
- •

Vaisala WXT520 cable with DB9 serial connector

- 9V battery
- •

Ashtech MicroZ

•

Ashtech MicroZ Y cable

Software Needed

•

Hyperterminal (Private Edition, Ver. 6.3 by Hilgraeve Monroe, Michigan USA was used for this test)

• Vaisala Configuration Tool Version 2.01 r. 9 (see link below)

Configuring the Vaisala WXT520

We first describe how to configure the WXT520 to output a single XDR NMEA v3.0 0183 message containing the following values: Pressure, Temperature, Humidity, Wind Speed, Wind Direction, Rain Accumulation & Hail Accumulation. The reason we choose an XDR NMEA v3.0 0183 message is because this is the only type of met message the Ashtech MircoZ can receive.

One way to configure the WXT520 is using the Vaisala Configuration Tool. The latest version at the time of writing this is Ver. 2.01 r.9; it can be downloaded at <u>http://www.vaisala.com/services/software.html</u>.

Connect the WXT520 to a Windows computer and start up the Configuration Tool. If you don't see any readings coming in, you will have to go into Configuration Setup via File \rightarrow Configuration Setup. The following window will appear:

Connect using:	COM1 -
F Show connect/disconnect	messages
Port settings	
Bits per second:	19200 💌
Data bits:	8 💌
Parity:	None
Stop bits:	1 💌
Polling interval (3 s 60 min)	
	1.1
Figure 1: COM port settings	K Cancel

Figure 1: COM port settings for communicating with a WXT520 using the Vaisala Configuration Tool.

Confirm the settings above and click OK. In the main window you should now see some values being read by the Configuration Tool from WXT520.

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Wind Minimum: Average: Maximum: Status:	Direction 239 deg Last updated: 14:50:20	Speed 0.3 m/s Next update: 00.00.01	Averaging time (1 s 60 min) Update interval (1 s 60 min) 5 s	×
PTU Temperature: Humidity: Status:	22.1 22.8 3 Last updated: 14:50:20	Barometric pressure: 0.8210 Next update: 00:00:01	Update interval (1 s 60 min)	×
Precipitation Accumulation: Duration: Intensity now: Intensity peak:	0.00 mm	Hail 0.0 hits/cm	Auto report interval (1 s 60 min)	×
Status:	Last updated: 14:50:20	Next update: 00:00:01	Trease contrainty	•

Figure 2. Main window of the Vaisala Configuration Tool. The circled values are readed and from the WXT520 if it is set up to output Wind, PTU and Precipitation.

Now that the Vaisala Configuration Tool is communicating with the WXT520 we can start setting it up to output the XDR NMEA v3.0 0189 message.

From the Settings drop-down menu select "Device..." The following window will appear; check that the settings are as they are shown here:

Device				
Model:	WXT520		Serial number:	E3240001
Version:	2.14		PTU sn:	E3120014
Calibration date:	6.8.2009		Order code:	AAB0BA10B
Info:	N	_	Address:	0 🗸
- Enhancements				
🗖 Enable heatin	ig	Supervi	sion interval (1 s 60	min)
Error messagi	na			60 min
	ng			
Composite message Auto composite interval (1 s 60 min)				
duto transmis.	3011	1.1.1		
- Communicatior	n protocol		User port setting	gs
C SDI-12 v1.3			Port type:	RS-232 💌
🔲 Continuou	is measurements		Bits per second:	19200 💌
• NMEA v3.0			Data bits:	8 💌
🔽 Query only	y	Parity: None 👻		
🔽 Use XDR	for wind message	Stop bits: 1		
C ASCII auto		RS-485 line delay (ms): 25 🚽		
Polling on	ly.			
Response	with CRC			
		Г	OK Ca	ncel Defaults

Figure 3: The Device Configuration window for the WXT520. The key settings in this window are the "Composite Message auto transmission" checkbox and the "Auto Composite interval". Set the interval to what you need it to be. The next key setting in this window is the "Communication protocol". Be sure to select "NMEA v3.0" and check the "Query Only" and the "Use XDR for wind message".

Note that we have checked the "Query Only" box in the Communication Protocol section. This is so that Wind, PTU and Precipitation data don't come through unless the WXT520 is queried for them. Also note that we check "Composite message auto transmission" so the composite message will automatically be output but the individual Wind, PTU and Precipitation will not. This is crucial. After you are done click

OK.

We now configure the Wind, PTU and Precipitation sensors within the WXT520. From the Settings dropdown menu select "Sensors..." You will get the following window. Check that the settings are as they are shown here:

Wind			
		Direction correction (*)	
Gust averaging:	1 •	[,
		190 .90 0 90 190	
		Averaging time (1 s 60 min)	
Speed unit	m/a I		
Speed unix.			2
Sampling frequency:	4 Hz	Update interval (1 s 60 min)	
		[5	is
PTU			
Temperature unit:	Celsius 💌	Update interval (1 s 60 min)	
Barometric pressure unit:	bar 🔻	[5	is
	,		
Precipitation			
Counter reset:	Automatic	Rain overriow reset (1.00 655.35 mm)	00.00
Council resol.		·····	00.00
Rain unit:	Metric	Hail overflow reset (10.0 6553.5 hits/mm²)	
Hail unit:	Metric	[] F	0.0
		(· · · · · · · · · · · · · · · · · · ·	
Auto second based and	Dain statt/an	Auto report interval (1 s 60 min)	
Auto report based on:		·····	min
		UK Cancel	Defaults

Figure 4: WXT520 sensor settings. The main things to change here are the PTU "Temperature Unit" and the "Barometric pressure unit".

Now we move on to the final step in configuring this WXT520, the Message Settings. From the Settings drop-down menu select "Messages..." The following window will appear. Check that the settings are as they are shown here:

wind message		Composite message	
Direction minimum	E Speed minimum	Direction minimum	🔲 Speed minimum
Direction average	✓ Speed average	Direction average	🔽 Speed average
Direction maximum	Speed maximum	Direction maximum	🔲 Speed maximum
PTU message			
🔽 Barometric pressure	Pressure ref. temp	✓ Barometric pressure	🔲 Pressure ref. temp
Air temperature	Relative humidity	Air temperature	Relative humidity
Precipitation messag	e		
Rain accumulation	Hail accumulation	Rain accumulation	Hail accumulation
Rain duration	Hail duration	Rain duration	Hail duration
🔲 Rain intensity	🔲 Hail intensity	🔲 Rain intensity	🔲 Hail intensity
🥅 Rain peak	🥅 Hail peak	🔲 Rain peak	🔲 Hail peak
Self diagnostic			
Self diagnostic	3.5 V reference	Heating temp.	3.5 V reference
Self diagnostic Heating temp.	□ 3.5 V reference □ Info	 Heating temp. Heating voltage 	□ 3.5 V reference □ Info

Figure 5: The Wind, PTU and Precipitation message boxes are the values that are queried by the Vaisala Configuration Tool as in Figure 2. The values under the Composite Message Section are the values that will be output to and combined with the GPS U files being recorded on the Ashtech MicroZ.

The WXT520 met-pack is now configured to output messages that look like:

\$WIXDR,A,282,D,1,S,0.1,M,1,C,22.0,C,0,H,23.0,P,0,P,0.8211,B,0,V,0.00,M,0,V,0.0,M,1*42

This message will be read by the Ashtech MicroZ and injected into U files being recorded on the GPS receiver.

In order to check that these messages are being output at the specified rate, connect to the WXT520 via Hyperterminal. Below are the settings you need to set in the Hyperterminal. From within Hyperterminal,

click the drop-down menu File and select "Properties".

Connect To Settings		
Viasala Change Icon		
Country/region: United States (1)		
Enter the area code without the long-distance prefix.		
Area code: 303		
Phone number:		
Connect using: COM1		
Configure Use country/region code and area code Redial on busy		
OK Cancel		

Figure 6: Beginning menu to configure Hyperterminal to communicate with the WXT520.

From here click on the "Settings" tab at the top. The following window will apper. Check that the settings are as they are shown here:

Connect To Settings		
Function, arrow, and ctrl keys act as		
 Terminal keys Windows keys 		
Backspace key sends Ctrl+H C Del C Ctrl+H, Space, Ctrl+H		
Emulation: ANSI Terminal Setup Colors		
Telnet terminal ID: ANSI		
Backscroll buffer lines: 500		
Play sound when connecting or disconnecting Exit program upon disconnecting		
ASCII Setup		
OK Cancel		

From this window click on "ASCII Setup..." to get the following menu. Check that the settings are as they are shown here:



Figure 8: These settings will allow you to send commands to the WXT520 via hyperterminal.

Now that all of this is set, click OK until you get back to the main Hyperterminal menu. You are now ready to connect to the WXT520. Once you connect you will start seeing the Composite Message come through to the terminal.

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L	
,1*40	
\$WIXDR,A,320,D,1,S,0.1,M,1,C,22.1,C,0,H,23.2,P,0,P,0.8211,B,0,V,0.00,M,0,,1*48	,V,0.0,H
\$WIXDR,A,324,D,1,S,0.2,M,1,C,22.1,C,0,H,23.2,P,0,P,0.8211,B,0,V,0.00,M,0,,1*4F	,V,0.0,M
\$WIXDR,A,342,D,1,S,0.1,M,1,C,22.1,C,0,H,23.2,P,0,P,0.8212,B,0,V,0.00,M,0,,1*4F	, V, 0.0, M
\$WIXDR,A,327,D,1,S,0.1,M,1,C,22.1,C,0,H,23.2,P,0,P,0.8211,B,0,V,0.00,M,0,,1*4F	.V.0.0,M
\$WIXDR,A,304,D,1,S,0.1,M,1,C,22.1,C,0,H,23.2,P,0,P,0.8212,B,0,V,0.00,M,0,,1*4D	,V,0.0,N
\$WIXDR,A,281,D,1,S,0.1,M,1,C,22.1,C,0,H,23.2,P,0,P,0.8212,B,0,V,0.00,M,0,,1*41	,V,0.0,M
\$WIXDR,A,301,D,1,S,0.1,M,1,C,22.1,C,0,H,23.2,P,0,P,0.8211,B,0,V,0.00,H,0,,1*4B	.V.0.0,M
_	

Figure 9: Composite message coming through Hyperterminal.

Configuring the Ashtech MicroZ

Now we set up the Ashtech MicroZ GPS receiver to collect met-pack data from the WXT520. Connect

to the Ashtech MicroZ using sharc in terminal mode. From the command line issue the following command:

> sharc --port /dev/ttyS0 --baud 19200 --terminal

Creation Time: Tue Oct 27 21:48:09 2009

Sharc version 1.00b3

Planned Operations

Communications: Direct Connect Port: /dev/ttyS0 Baud: 19200 Parity: N Data Bits: 8 Stop Bits: 1

Actual Operations

Communications: OK OpenConnection:Direct connection achieved... Querying Receiver ID (attempt 0): Receiver ID: \$PASHR,RID,UZ,30,CQ00,---XM--3-----C,1A01*20

Found: UZ,30,CQ00,---XM--3-----C,1A01*20

Terminal->

At this point issue the commands:

Terminal-> \$pashs,out,c,met,on

Terminal-> \$pashs,met,cmd,c,*

Terminal-> \$pashs,met,init,c,no

Terminal-> \$pashs,met,intvl,c,[interval you want]

Now you check that the receiver is ready to start receiving met-data from the WXT520 by issuing the following command:

Terminal-> \$pashq,met Input = \$PASHQ,MET

Now connect the serial cable of the WXT520 to the Y cable of the Ashtech MicroZ and you should start seeing the input single slight turn green at the interval you specified the composite message should be output by the WXT520.

In order to double check that data is being injected into the U files being recorded set the receiver to log some data and then download the U file and run teqc on it as follows:

teqc +ash u +met \$Ufile.met \$Ufile.doy > \$Ufile.090

This command will produce a file with extension "met" where the met data is contained. Here is a sample of what the met data file should look like:

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Online URL: <u>https://kb.unavco.org/article/vaisala-how-to-integrate-the-vaisala-wxt520-with-the-ashtech-microz-528.html</u>