How to use Airlink Raven CDMA/GPRS Modems with Z-max ?

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1 Introduction

This document provides all technical information required in order to connect CDMA or GPRS Airlink modem to:

- o a Z-max base
- an iCGRS base or any other GPS station that is streaming data on a socket (IP address and port number)

This procedure is only valid for the following modems from Airlink:

- Raven GPRS modem G3210 or G3211
- Raven CDMA modem C3210

For the use of Airlink GSM or CDMA modem a special kit from Thales Navigation is designed : Kit external Raven modem for Z-max (Ref:990572-01). This kit includes the following items:

- A Serial cable (Ref:702078) to connect the serial port of Z-max to the modem
- A power cable (Ref: 702079) to power the modem from a battery
- A 11.1V / 6Ah Li-Ion battery (Ref:110284)
- A battery charger (Ref:110049)
- A Blue backpack RTK Z-max (Ref:205044)

2 CDMA/GSM connection to a Z-max base

2.1 Modem activation

The modem activation is a procedure that allow to the modem to be registered to the selected wireless operator. This procedure has only to be done for the first use of the modem. This procedure must be done for the rover and the base modems.

You should refer to the appendix 1, to activate the CDMA or GSM modem.

2.2 Modem configuration

The modem configuration is a procedure that allow to the modem to be configured in order to initialize the modem for the base and to dial the base phone number for the rover. In the case of a connection to a Z-max base, the connection will be based on Circuit Switched Data connection, with invoice based on the duration of communication. Please refer to you local wireless operator to know more about billing.

2.2.1 Base side

The Allegro terminal with FastSurvey shall be connected to Z-max either by Bluetooth wireless link or serial cable to port A.



In Fast Survey utility you will find, a terminal utility that allow sending command to Z-max.

Send the following commands to Z-max for initializing the base modem:

Commands to send with Allegro terminal connected to port B of Z-max:

Command to send to Z-max	Response from Z-max	Comments
\$PASHS,SPD,A,9	\$PASHR,ACK	Set PortA in 115.2Kbps
\$PASHS,DSY,A,B <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
\$PASHS,DSY,B,A <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU <cr><lf></lf></cr>	ОК	Wait 30 seconds before continue
ATS0=1 <cr><lf></lf></cr>	ОК	Set the number of ring before
		connection
\$PASHS,DSY,OFF <cr><lf></lf></cr>	\$PASHR,ACK	Remove the transparent mode

Commands to send with Allegro terminal connected to Z-max through Bluetooth

Command to send to Z-max Response from Z-max Comments

\$PASHS,SPD,A,9	\$PASHR,ACK	Set PortA in 115.2Kbps
\$PASHS,DSY,A,C <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
\$PASHS,DSY,C,A <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU <cr><lf></lf></cr>	OK	Wait 30 seconds before continue
ATS0=1 <cr><lf></lf></cr>	ОК	Set the number of ring before
		connection
\$PASHS,DSY,OFF <cr><lf></lf></cr>	\$PASHR,ACK	Remove the transparent mode

The CDMA/GSM modem base is initialized, and ready to be used by the rover.

2.2.2 Rover side

The Allegro terminal with FastSurvey shall be connected to Z-max either with Bluetooth wireless link or serial cable to port A.



In Fast Survey utility you will find, a terminal utility that allow sending command to Z-max.

2.2.2.1 Dialing to the base

Commands to send with Allegro terminal connected to port B of Z-max

Command to send to Z-max	Response from Z-max	Comments
\$PASHS,SPD,A,9	\$PASHR,ACK	Set PortA in 115.2Kbps
\$PASHS,DSY,A,B <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
\$PASHS,DSY,B,A <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU <cr><lf></lf></cr>	ОК	Wait 30 seconds before continue
ATD Base Phone Number	ОК	Dial to the base phone number
\$PASHS,DSY,OFF <cr><lf></lf></cr>	\$PASHR,ACK	Remove the transparent mode

Commands to send with Allegro terminal connected to Z-max through Bluetooth

Command to send to Z-max	Response from Z-max	Comments
\$PASHS,SPD,A,9	\$PASHR,ACK	Set PortA in 115.2Kbps
\$PASHS,DSY,A,C <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
\$PASHS,DSY,C,A <cr><lf></lf></cr>	\$PASHR,ACK	Set Z-max in transparent mode
AT\APASSTHRU <cr><lf></lf></cr>	OK	Wait 30 seconds before continue
ATD Base Phone Number	OK	Dial to the base phone number
\$PASHS,DSY,OFF <cr><lf></lf></cr>	\$PASHR,ACK	Remove the transparent mode

After a few seconds the rover is connected to the base, and receive data from the base

2.2.2.2 Hang-up the rover

Just disconnect the Airlink modem from its power source.

3 CDMA/GPRS connection to iCGRS

3.1 Modem activation

The modem activation is a procedure that allow to the modem to be registered to the selected wireless operator. This procedure has only to be done for the first use of the modem.

You should refer to the appendix 1, to activate the CDMA/GPRS modem.

3.2 Modem installation for the rover

Before using the Airlink modem, you need to configure the modem and Zmax, in order the connection to iCGRS be automatic after power on of the modem. This configuration procedure must only be done at the first use of the modem.

3.2.1 First step - configuration of the modem

What you need :

- A computer with a serial port
- A Airlink Raven modem (GPRS or CDMA) and its antenna
- A serial cable used for connecting the Raven modem to your computer
- A power source for supplying the modem (see the Li-Ion battery provided by Thales)
- The public IP address and port number of the iCGRS on which you want to be connected, or any other server that is streaming data on a given socket.
- WirelessAce software on your computer (You can download it at http://www.airlink.com/support/modems/modem_utils.asp)

Execute the WirelessAce software, and select the connect button with PPP:COM1 if the Airlink modem is connected on COM1 and enter 12345 for password (default value)

UDP TCP	Port:	COM1	~	Use SOS Mode
SMS PPP	Password:	CHRIST		

The following screen should appear:

Modern Template	e Took			
ect Refresh	Refresh Al Dis		B≞ X ⇔ Copy Clear	Auto Refresh Disabled
GROUPS	NODEM DATA			PRINTABLE VIE
INFO	AT	Name	Value	
	MET1P	Network 1P	69.82.46.160	
STATUS	PNETSTATE	Network State	Network Ready	
COMMON	*NETCHAN	Channel	466	
Serial	*NETRSSI	RSSI (dBm)	-66	
TCP	METERR.	Network, Error Rate	3	
DHC Dynamic IP		Serial Sent	31	
PPP		Serial Received	D	
PassTheu SMTP		Host Mode	AT	
Other Low Power	*POWER MODE	PinPoint Low Power Mode State	ON	
Friends		Number of System Resets	60	
LOGGING		GPS Fix	0	
PINPOINT		Satellite Count	0	
		Latituda	+2720897	
CDMA		Longitude	-12167641	

Once all parameters are displayed on the screen modify the following parameters:

- S53 Destination address -> Set the IP address of the iCGRS station (Ask to the iCGRS manager which IP address is given for the iCGRS)
- S53 Destination port -> Set the selected port of the iCGRS station (Ask to the iCGRS manager which port number is allocated to you)
- S53 Default Dial Code =T
- MD Startup Mode Default =4
- S211 DTR Mode = 1
- TCPS Connection timeout unit =0
- TCPT Connection timeout (minute) =1

Then click "write" for saving these parameters into the modem.

The modem is ready to use.

3.2.2 Second step – configuration of Z-max

What you need:

- A Field terminal like allegro (optional: a serial cable to connect the Allegro terminal to Z-max) with FastSurvey
- A Z-max rover
- A Battery module or any other source power compatible with Z-max



Execute FastSurvey, and after initializing the connection with Z-max :

- Select the "Equip" tab.
- Select "Receiver utilities" button
- Select "Send command to receiver"
- Send the following command to the receiver followed by OK

Command to send to Z-max (*)	Response from Z-max	Comments
\$PASHS,SPD,B,9	\$PASHR,ACK	Set PortB in 115.2Kbps
\$PASHS,PRT,B,232	\$PASHR,ACK	Set port B in RS232 mode
\$PASHS,NME,GGA,B,ON	\$PASHR,ACK	Send GGA message to port B in order
		to intiate the connection to iCGRS
\$PASHS,SAV,Y	\$PASHR,ACK	Save this configuration into Z-max

(*) You can also use a computer, with the appropriate cable connected to Z-max, and send these command with Hyperterminal software utility from Windows suite.

3.2.3 Third step – Using Z-max with Airlink modem

What you need:

- A Z-max rover
- A Airlink Raven modem (GPRS or CDMA)
- A serial cable for connecting the Airlink /Raven modem to Z-max (Ref:702078)
- A cable for connecting the modem to the battery (Ref: 702079)
- A 11.1V 6Ah Li-Ion Battery (Ref:110284)
- All traditional accessories required for on the field work

The Allegro terminal with FastSurvey shall be connected to Z-max either by Bluetooth wireless link or serial cable to port A.



It is not necessary to send specific command to Z-max, or fast Survey: As soon as the Airlink Raven modem is powered, an automatic connection procedure will occur to the iCGRS station selected during the first step of configuration.

Z-max is ready to be used for RTK operation, with correction data on portB.

3.2.4 Hang-up

Just disconnect the Airlink modem from its power source.

4 Reminder

Port A or B provides serial link and power access to Z-max.

Port A	Port B
RS-232 serial link:	RS-232 / RS-422 serial link
• With hardware (RTS/CTS) flow control software enabled/disabled	 RS232 or 422 selection through \$PASHS command In case of RS422 no hardware flow
	control
+12V DC power:	+12V DC power
• Current shall be lower than 800mA	• Current shall be lower than 800mA
 Protected against short-circuit 	 Protected against short-circuit
Pinout:	Pinout:
1- +12V DC voltage	1- +12V DC voltage
2- GND	2- GND
3- CTSA	3- CTSA/RX-
4- RTSA	4- RTSA/TX+
5- RXDA	5- RXDA/RX+
6- TXDA	6-TXDA/TX-
7- 1 PPS OUT	7- EVENT



5 Troubleshooting

Symptoms	Action
Z-max is not responding	 Check the cable or the Bluetooth link Check if the baud rate match with current baud rate in Z-max
No response after a dial to a Z-max base	 Check the connection of the antenna on the modem Check with a cell phone if the area is covered by the operator Check the power and the configuration of the base Check that Z-max is not busy (already online)
No response after a dial to a iCGRS station	 Check the connection of the antenna on the modem Check with a cell phone if the area is covered by the operator Check IP and port parameters of the station Check the port is not busy (already online)
Frequently disconnection to the base	• Check the connection of the antenna on the modem
No response after AT command	 Check baud rate of port A (115.2Kbps) Check the +12V power of the modem. In any case the voltage shall be between 10 and 28V

Appendix 1

Activation of CDMA and GPRS Raven modem From Airlink

How to activate CDMA and GPRS Airlink Raven Modem ?

CDMA Raven modem for Verizon operator :

1) Before activate the modem you need the following items:

- 1 PC with XP or Win2K Operating System
- 1 CDMA Raven modem for Verizon C3210, its antenna and a source of power
- 1 Serial cable to connect the modem to your PC

- 1 software from Airlink Setup wizard for Verizon that can be downloaded at the Airlink Web site (http://www.airlink.com/support/modems/modem_utils.asp).The file to download is "SetupWizard1.zip" for Verizon operator . If you do not have .NET installed on your PC you will have to download the "SetupWizard2.zip" instead.

- The Phone number provided by the operator. For this, the operator will require the ESN number given on the label of the modem.

2) To activate the modem follow this procedure:

- Connect the modem to the PC through the serial cable
- Connect the antenna and the power to the modem
- Install the downloaded Setup Wizard software on the PC by using unzip utility

- Execute the Setup Wizard software in the Windows Start Program menu, **unselect** "Setup a DUN connection" and then select Next

🚝 AirLink CDMA Setup Wiz	🚝 AirLink CDMA Setup Wizard 🛛 🛛 🔀		
AirLink	Welcome to AirLink Communications		
	When you press "Next", setup will proceed with the following actions:		
	🔽 Update Firmware		
	🗹 Activate Modem		
ALC ALL	Configure Private Networking		
	🔽 Update PRL List		
	🔽 Test Modem Setup		
0-0	Setup a DUN Connection		
	verizon wireless		
	< Back Next > Cancel		

- Select the serial port on which the modem is connected and then Next

🐖 AirLink CDMA S	etup Wizard	X
	igs that your modem is connected to the serial port n before proceeding.	verizon wireless
	Port Select which com port you would like to use Auto Detect Port Settings	
	Baud Rate, Data Bits, Parity, Stop Bits 115200 8 None 1 Flow Control None	
	< <u>B</u> ack Next >	Cancel

- Check the ESN number of the modem and then Next

🕶 AirLink CDMA Setup Wizard	
Your Device Setup has collected the following informa	ation about your device.
If this is not correct, please the value	Model: Raven Technology: CDMA Carrier: Verizon ESN: 09900948759 COM Settings: 115200,8,N,1 e reset the modem and wait for res to reload.
	< <u>B</u> ack <u>N</u> ext > Cancel

- Skip this step by selecting Next

🚝 AirLink	« CDMA Setup Wizard	×
AirLi	Aleos Firmware ink occasionally releases new versions of modem firmware may include new features and fixes to minor bugs.	
	Press 'Check for Updates' to communicate with AirLink servers and check if updates for your modem are available.	
	Press 'Update Now' to update your modem's firmware. This operation will take a few moments to complete.	
	< <u>B</u> ack <u>N</u> ext > Cano	cel

- Input the MSL code (for Verizon it should be 000000) and then Next

🕶 AirLink CD	MA Setup Wizard 🛛 🛛 🔀
	wation e process of activating your device by unlocking access to configuration.
	MSL Master Subsidy Lockcode (aka. NAM LOCK CODE, aka. Activation Code). The code provided by the carrier used to unlock the device and allow for entering account parameters.
	< <u>B</u> ack <u>N</u> ext > Cancel

- Input the Phone number given by the operator in the MDN field and then next

🚝 AirLink CD	MA Setup Wizard 🛛 🔀
Device Actin Enter the	vation appropriate account values provided by the carrier.
	MDN 909-762-5420 Mobile Directory Number The ten digit phone number provided by the carrier. This is the number known to the outside world. MIN/MSID 909-762-5420 Mobile Idendtification Number/Mobile Subscriber ID The ten digit number assigned by the carrier for internal use only. May be the same as MDN.
	< <u>B</u> ack <u>N</u> ext > Cancel

- Except if the provider give you the SID and NID parameters skip this section by next

🕶 AirLink CDMA	Setup Wizard
Device Activati Enter the ap	on propriate network values provided by the carrier.
S	SID I system IDentification IDs are numbers assigned to wireless carriers in a specific egion. Enter the SID value provided by the carrier. If none was provided leave the default value shown.
N SI	NID 65535 Ietwork IDentification IIDs identify the carrier operating the wireless network in a pecific region. Enter the NID value provided by the carrier. If one was provided leave the default value shown.
	< <u>B</u> ack <u>Next</u> > Cancel

- Except if the provider give you different values for NAI and Password parameters skip this section with next

🕶 AirLink CDMA Setup Wizard	
Device Activation Configure parameters required for network access.	verizon wireless
NAI 9097625420 Image: Nail State of the state of	
< <u>B</u> ack <u>N</u> ext >	Cancel

- Select Automatic B option and the Next

😝 AirLink CD	MA Setup Wizard	
Roaming Pr	eference	verizon wireless
	Preferred Serving System Automatic B Sets whether or not to allow roaming. This is important no matter if you are using the device for Circuit-Switched data calls or 1xRTT connections. Home Only means only registers on the Home SID Automatic will allow any Home or Roaming carrier Automatic A will start on A carriers and switch to B Automatic B will start on B carriers and switch to A If you have questions on what roaming value to choose, contact your carrier's sales or support representative.	
	< <u>B</u> ack <u>N</u> ext >	Cancel

- Push the test button

🕶 AirLink CDMA Setup Wizard	
Cellular Module Update	verizon wireless
CDMA Module Firmware Test The CDMA Module contains firmware essential to the succesful operation on the 1xRTT network. Occassionaly, you may experience a module that has firmware in need of an update. Push the 'Test' button to determine if the firmware is up-to-date. Test	
< <u>B</u> ack <u>N</u> ext >	Cancel

- Check if the Firmware version is up to date and then Next

😝 AirLink CDMA Setup Wizard	
Cellular Module Update	verizon wireless
	CT CT MICHOSS
CDMA Module Firmware Test]
Your CDMA module firmware is up-to-date.	
Carrier: VERIZON	
Firmware Version R2_1_0_6SB_VZW_S_H	
Module PK Index: 3	
Module PKOI: 2	
RSA Keys: 578	
Select 'Next' to continue with the activation process	
< Back Next >	Cancel

- Select the public internet option and then next

😝 AirLink CDMA Setup Wizard		
Device Activation Select you network connection type	e.	verizon wireless
Connection Type Public Internet Private Connection	Public Network configurations are the default Internet settings made available by the carrier. No special configuration is required to enable access to the Internet.	
	< <u>B</u> ack <u>N</u> ext >	Cancel

- Check if the PRL list is up to date , if not select update button, else next

🕶 AirLink	c CDMA Setup Wizard 🛛 🔀
The	the Preferred Roaming List PRL is a list of carrier codes the device should use to connect re network.
	Maintaining an updated PRL is important to keeping costs and performance at optimal levels. Setup will attempt to determine if your list is up-to-date and update it if necessary. Your PRL list is up-to-date. Update
	< <u>B</u> ack <u>N</u> ext > Cancel

- Check that everything is OK (you will probably have to wait few minutes) and then next

🕶 AirLink CDMA Setup Wizard	
Testing Modem Tests modem for basic cellular and I	P network connectivity.
Co Your moden	ngratulations. n is properly configured.
💙 Channel	466
RSSI	-91
💙 Status	Network Ready
V IP Address	70.219.103.242
V Ping	www.airlink.com
L	
	< <u>B</u> ack <u>N</u> ext > Cancel

- Congratulations, your CDMA modem is activated then select finish.

🚝 AirLink CDMA Setup Wizard	
	Setup Complete
	Thank You for choosing AirLink Communications
veriz	AirLink Communications 3159 Corporate Place Hayward, CA 94545 510-781-9760
	< <u>B</u> ack <u>Finish</u> Cancel

GPRS Raven modem for all operators :

1) Before activating the modem you need the following items:

- 1 PC with XP or Win2K Operating System

- 1 GPRS Raven modem for G3210, its antenna and a source of power

- 1 Serial cable to connect the modem to your PC

- 1 software from Airlink Wireless Ace 3G that can be at the Airlink Web site

(http://www.airlink.com/support/modems/modem_utils.asp). If you do not have .NET installed on your PC refer to the following address http://www.airlink.com/support/dotnet.asp.

- The APN (Access Point Name), the password and the username. These parameters are given by your operator when you subscribe to GPRS. If one of this parameters is missing, you will not be able to register your GPRS modem.

2) To activate the modem follow this procedure:

- Connect the modem to the PC through the serial cable
- Connect the antenna and the power to the modem
- Install the downloaded Wireless Ace 3G software on the PC by using unzip utility

- Execute the Wireless Ace 3G software in the Windows Start Program menu and select the Connect button

🖋 сом2 -	AirLink \	VirelessAc	e3G v20050	126							
File Modem	Template	e Tools									
Connect	🕼 Refresh	💰 Refresh All	X Disconnect	/ Write	! Reset	🚔 Load	🔛 Save	🗈 Сору	\mathbf{x} Clear	 Auto Refresh:	Disabled 💌

- Select PPP connection and the serial port on which the GPRS modem is connected. Fill the password with the default value (12345), and then OK

Connect to	o Modem				
UDP TCP SMS	Port:	COM2	~	🔲 Use SOS Mode	
PPP	Password:		Cance	9	

- On the left of the screen select Misc, and fill the following field :

*NETUID with the user name provided by the operator *NETPW with the password provided by the oprator

! Be careful, respect the case !

then select at the left the GPRS parameter list

💋 СОМ2	- AirLink '	WirelessAce30	6 v20050126			
File Moder	n Template	e Tools				
De Connect	, 🚺 Refresh	😰 Refresh All Di	Sconnect Write Reset	🔚 🗈 🗙 Save Copy Clear	Auto	Refresh: Disabled 🗸
Write succe	essful					
G	ROUPS	MODEM DATA				PRINTABLE VIEW
	INFO	AT	Name	Value	New Value	
S	TATUS	*DATE	Date and Time	04/14/2005 18:47:02		
со	MMON	OPRG	Enable Over-the-Air Programi	ng 1	•	
	<u>Misc</u> Serial	*NETPHONE	Phone Number			
	TCP	*DPORT	Device Port	12345		
	DNS	*NETUID	Network User ID	[CLEAR]	ISPDA@CINGULARGI	
	amic IP PPP	*NETPW	Network Password	[CLEAR]	CINGULAR1	
р.	assThru SMTP	*HOSTPAP	Request PAP	0	•	
Lov	Other V Power	*STATUSCHK	Checking SMS Status (Second	ls) 0		
	Friends	\$53	Destination Address			
LO(GGING	\$53	Destination Port	0		
TELE	METRY	S53	Default Dial Code	т	•	
ADD	RLIST					
	GPRS					
	???					

- Fill the field + CGDCONT, in the following form "1,IP, APN given by the operator". **! Be careful respect the case !** and then click on the write button to record these paremeters in the modem.

Modem	Template	Tools									
🖳 🗸	😰 Refresh	🔹 Refresh All	区 Disconnect	/ Write				Сору 🗈		Auto Refresh:	Disabled
ite successf	ul										
GRO	DUPS N	NODEM DAT	ĨA							PRIN	TABLE VIEW
	NFO	AT	Name Define PD	D t		e New			_		
STA	TUS			P conte	×t 1,,	μse,	CINGO	LAK			
COM	MON Misc										
:	Serial TCP										
	UDP DNS										
Dynam	NIC IP										
	sThru SMTP										
Low P											
	iends 										
LOGG											
TELEME											
ADDR											
<u>G</u>	<u>PRS</u>										
	???										

- You can exit the Wireless Ace 3G utility software, and after few minutes you should check that the Reg (Registered) light on the modem is ON. Congratulations your modem is activated.