THALES

Z-Max.Net – Application Note How to set up a Z-Max or Z-Xtreme as a Direct IP Base



Z-Max.Net

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Overview

1.	INTRODUCTION	2
2.	WHAT YOU NEED	2
3.	Z-MAX BASE CONFIGURATION	2
4.	TCP-COM CONFIGURATION	2
5.	HOW TO CONNECT TO THE Z-MAX BASE FROM THE FIELD	2
6.	TCP-COM INFORMATION	2

1. INTRODUCTION

This document provides all the technical information required in order to setup a Z-Max or Z-Xtreme as a Direct IP base (hereinafter referred to as simple the base).

In this configuration, the base is considered as a "fixed base" installed in an office, and it is connected to a PC via a cable.

The PC is connected to the Internet network through a LAN network or any xDSL connection, and must be visible from the public internet with a <u>static</u> IP address.

This procedure is only valid for a Z-Max or Z-Xtreme receiver that has the B and K options installed.

2. DIRECT IP BASE USING A COMPUTER

2.1 WHAT IT IS

- A software program that uses a PC to connect a GPS receiver to the Internet.
- Practically unlimited connectivity (many GPS receivers can connect simultaneously).
- Ideally suited for streaming correction data to multiple RTK rovers.

2.2 WHAT YOU NEED

- A field terminal like Allegro/MMCE (a serial cable PN 730178 is required to connect the Allegro to the Z-Xtreme, and serial cable PN 702091 is required to connect the MM CE to the Z-Xtreme. These cables are optional for the Z-Max because of the Z-Max Bluetooth capability) with FAST Survey.
- A Z-Max or Z-Xtreme base. Options B and K are both required for an RTK base.
- An RS232 cable, PN 700461, to connect the base to the PC.
- A battery module or any other source power compatible with Z-Max or Z-Xtreme. The power supply kit, PN 111118, is the preferred power source.
- An RS232 to TCP/IP converter. In this application note we will use a software converter which is TCP-COM. This software can be bought/downloaded (license price \$259) at the following address:
 - o http://www.taltech.com/products/tcpcom.html
- A PC with Windows 98/ME/NT/2K/XP/2003, with a one RS232 COM port available, connected to internet and with a static IP address visible from the public internet.

2.3 BASE CONFIGURATION



To set up a base in Direct IP mode, the GPS receiver configuration is simply the RTK base configuration. The following example is done using a serial cable connection to the base.

- 1. In FAST Survey, go to:
 - « Equip » menu
 - « Configure Base » menu
 - « Station » menu
 - o Receiver Type: Chose the correct type from the list
 - Base Ant. Hgt: 0
 - Antenna Type: Pick from list
 - o Elevation mask: 0
 - Log OBEN Data for Avg. RTK Rdgs: unticked
 - « Ports » menu
 - o Type: Cable.
 - o Radio Port: default value is port B.
 - Message Type: select one that is available.
 - Radio Baud Rate: This is the baud rate on the GPS receiver port. We recommend at least 38400.
 - Click "OK" on the top of the window to launch the configuration.
 - To the message "Rod height of zero..." Answer: Yes
 - Set the Reference Station Base position with the known coordinates of the antenna. These coordinates should be determined using OPUS, Auto GIPSY, or some other accurate processing system.
- 2. Connect the Z-Max port B to the PC using the RS232 cable.
- 3. Use TCP-Com RS232/TCP IP converter (refer to section 2.4).

2.4 TCP-COM CONFIGURATION

Once the Z-Max is configured and connected to the PC using the RS232 cable, run TCP-Com program.

1. The following window will appear:

TCP-Com	
<u>File Window Tools H</u> elp	
COM1 - R5232 to TCP/IP	
Serial Port Connector Baud Rate Parity None Data Bits Stop Bits Flow Control Buffer Size: 8192 Create Virtual COM port Buffer data if TCP/IP port closed	TCP/IP Port This PC will act as TCP Client This PC will act as TCP Server Local IP Address 134.20.11.68 Local Port 2101 Use UDP instead of TCP/IP
Wait for timeout before transmit Timeout value (ms): 150	1/0 Options

- 2. On the left part of the window Serial Port you must select the COM port and the appropriate parameters, including baud rate, which correspond to the COM port where the Z-Max is connected.
- 3. On the right part of the window TCP/IP Port you must select:
- This PC will act as TCP server

The local IP address will be automatically filled with the IP address of the PC. Then fill the "Local Port" section with the port number you want to use. Typically for GPS purposes port numbers 210x are used. In the above example the port 2101 is used.

- 4. Click on "I/O Options..." button and make sure that:
- "Allow multiple client connections" is ticked, <u>then several Z-Max.Net rovers will be able to</u> <u>connect to the base by using the same IP address and port number</u>.
- "Ignore inbound TCP/IP data from all clients" is ticked,
- "Send inbound serial data to all TCP/IP clients" is ticked.

erver I/O Op	tions
🔽 Allow mu	ultiple client connections
- Inbound TCP	/IP data options
🔿 Transmi	t inbound TCP/IP data from all clients out serial port
Ignore in	bound TCP/IP data from all clients
🔿 Transmi	t inbound TCP/IP data from first connected client only
-Inbound seria	l data options
Send int	pound serial data to all TCP/IP clients
C Ignore in	ibound serial data
O Send int	bound serial data to first connected client only
	<u>D</u> K <u>C</u> ancel

5. In the main window, click on "Activate" button:

🙀 TCP-Com	
<u> Eile W</u> indow <u>T</u> ools <u>H</u> elp	
COM1 - R5232 to TCP/IP	
Serial Port Connector COM1 Baud Rate 115200 Parity None Data Bits 8 Stop Bits 1 Flow Control None Buffer Size: 8192	TCP/IP Port This PC will act as TCP Client This PC will act as TCP Server Local IP Address 134.20.11.68 Local Port 2101
Create Virtual COM port	Use UDP instead of TUP/IP
 Buffer data if TCP/IP port closed Wait for timeout before transmit Timeout value (ms): 150 	I/O Options
De	Activate
COM Status: Open	● ● TCP/IP Status: Listening

At the bottom of the window, the COM Status should be: <u>Open</u> and the TCP/IP Status should be: <u>Listening.</u>

The COM status LED will blink green/red/green/red when the corrections from the Z-Max pass through the serial COM.

In case of a problem when opening the TCP/IP port, the TCP/IP Status will indicate an error.

IMPORTANT: the IP address and the port used must be visible from the public Internet network). Please contact your IT manager or your internet provider for any questions/issues related to this specific point.

6. Congratulations, your Z-Max or Z-Xtreme is now a Direct IP base which can be accessed by multiple users with the above IP address and port number.

2.5 HOW TO CONNECT TO THE Z-MAX BASE FROM THE FIELD

You may use one or more Z-Max.Net Rovers in the field to connect to your Direct IP Base.

In FAST Survey, go to:

- « Equip » menu
- « Configure Rover » menu
- « Ports » menu
 - o At the bottom of the windows, "Base Config", select: Manual
 - Message Type: choose the type which correspond to the way you configure your Base
 - o Type: select GRPS/IP or Direct IP
 - o At the bottom of the windows, "Base Config", click Add
 - Enter a name for your configuration, example: Direct IP
 - Select the Band: 850/1900 for North America and 900/1800 for Europe
 - PIN: to avoid any problem, make sure that your SIM card does not have a PIN code. Then leave this field empty.
 - APN Server / User Name / Password: fill these fields with the parameters provided by your GPRS provider
 - Click on "Base IP Settings:
 - IP address: put the IP address of your Direct IP Base
 - Port: put the port number of your Direct IP Base
 - Click OK on the top of the window
 - Click OK on the top of the window
- Click "OK" on the top of the window to launch the configuration.

2.6 TCP-COM INFORMATION

Here attached a short description of the TCP-Com software:



It is possible to download a free 30-days evaluation version of TCP-Com version 4.1 at http://www.taltech.com/products/tcpcom.html.

With this evaluation version, each connection will be available for 1 hour and will allow you to check your set up.

3. DIRECT IP BASE USING MOXA ADAPTER

3.1 WHAT IT IS

- A low-power serial device for connecting a GPS receiver to the Internet.
- Limited connectivity (only a maximum of 4 computers or rover GPS receivers can connect simultaneously).
- Ideally suited for streaming data to a network RTK server.

3.2 WHAT YOU NEED

- A field terminal like Allegro/MMCE (a serial cable PN 730178 is required to connect the Allegro to the Z-Xtreme, and serial cable PN 702091 is required to connect the MM CE to the Z-Xtreme. These cables are optional for the Z-Max because of the Z-Max Bluetooth capability) with FAST Survey
- A Z-Max or Z-Xtreme receiver base. Options B and K are both required for an RTK base.
- A Z-Max RS232 cable (Thales Navigation Part Number : 700461)
- A battery module or any other source power compatible with Z-Max or Z-Xtreme. A battery module or any other source power compatible with Z-Max or Z-Xtreme. The power supply kit, PN 111118, is the preferred power source.
- A Moxa interface RS232-to-TCP/IP converter. This equipment is made up of one RS232 serial link on one side and an Ethernet link on the other side. Power supply can be a main adapter (provided with the Moxa Serial to Ethernet system), or any other DC source between 9V to 30V. For external environment an extended temperature range model exists (NP5110-T), which is able to work from -40°C to 85°C. A CD is provided in order to make easier the installation.
- Only during the installation, a computer connected to the LAN with Internet Explorer or equivalent.

3.3 BASE CONFIGURATION



- 1. To set up a base in Direct IP mode, the GPS receiver configuration is simply the RTK base configuration. The following example is done using a serial cable connection to the base.
- 2. In FAST Survey, go to:

8 / 17

- The Equip menu
- The Configure Base menu
- The Ports menu
 - Type: Cable
 - o Radio Port: default value is Port B
 - Message Type: select between Ashtech (CPD) / CMR / RTCM RTK / RTCM DIFF / CMR+ / RTCM 3.0
- Click **OK** on the top of the window to launch the configuration
- 3. Connect the Z-Max Port B to the NP5110 Moxa adapter using the RS232 cable, connect the Ethernet (RJ45) cable of your network on the other side, and then connect the power on the Moxa adapter.

3.4 NP5110 CONFIGURATION

The configuration of the NP5110 requires a computer connected to the LAN network through another Ethernet connection.

A CD from Moxa is provided with the adapter, which contains a software that is running on a PC. This CD contains documentations on the adapter, a and a software that allows to configure the Serial to Ethernet adapter for the first use. All information in relation with the installation of the NP5110 adapter software is given with the Quick Installation Guide of the adapter.

Execute the Nport Administrator software.

The following screen should appear :

			<i>a</i>		
Function		Co	nfiguration - U	NPort(s)	Clabur
Monitor Port Monitor COM Mapping		Image: Constraint of the sector of the se			
lessage Log - 0 Monitor L	og · 0				
No Time		Description			

Right-click on the Configuration item, and then select "Broadcast search". The following screen should appear, with a different MAC address.

Exit Search Search	IP Locate	Configure Web	figuration - 1 M	Dort(s)	
NPort	No A	Model		IP Address	Status
Monitor Port Monitor COM Mapping		INPORCOTIU			
essage Log - 1 Monitor Log	1-0]				
lo Time 27/07/2006 16	35:13	Description Found NPort(s): 1			

The default IP address is 192.168.127.254. Depending on the LAN network, this address may be recognized or not. Refer to your network administrator on how to reserve a static IP address for your Nport5110 in the MAC-IP mapping table when using DHCP server or BOOTP server.

In case of DHCP server, select the line corresponding to your NP5110, right-click and select configure. The following windows should appear:

Information Madel Name	Accessible IPs	Auto Warning	IP Address	Report	Passwor
NPort 5110	Basic	Network	Serial	Oper	ating Mode
MAC Address 00:90:E8:0D:51:E7	Server Name	NP5110_1813			
Serial Number 1813					
	Time Zone	01/01/2000			- -
Firmware Version	Local Date	00:00:00			
VEI 2.0	Time Server	100.00.00			-
System Uptime 0. days, 00b:04m:39s	Modify				
0 days, 001.0411.003	Enable Web) Console			
	🗸 Enable Teln	et Console			

Go to Network tab, and select Modify IP configuration:

nformation	Accessible IPs	Auto Warning	IP Address F	Report	Password
NPort 5110	Basic	Network	Serial	Oper	ating Mode
	- Modify				_
MAC Address 00:90:E8:0D:51:E7	IP Address	192.168.1	27.254]	
Serial Number	Modify				_
1813	Netmask	255.255.2	255.0]	
	Gateway]	
Firmware Version	IP Configuration	DHCP	-		
Ver 2.0	DNS Server 1]	
System Uptime	DNS Server 2]	
0 days, 00h:04m:39s	- Modify				
	Community Nam	e public	11MF'		
	Location				
	Contact				

Select OK.

Wait for a while, and the NP5110 device will be updated. In order to check the new address of the device, select again configuration and Broadcast search, and the device is installed on your network, with the address allocated by the DHCP server.

帿 Administrator-Configura	tion				
<u>File Function Configuratio</u>	n <u>V</u> iew <u>H</u> elp				
Exit Search Search	正P Locate	Configure Web			
Function		Con	figuration - 1 N	Port(s)	
□ D NPort	No 🛆	Model	MAC Address	IP Address	Status
Configuration Monitor Port Monitor COM Mapping Pr Address Report		NPort 5110	00:90:E8:0D:51:E7	134.20.11.33	
					•
Message Log - 3 Monitor Log	g·0]				
No Time	[Description			
1 27/07/2006 10 2 27/07/2006 11 3 27/07/2006 11	6:35:13 F 6:42:05 C 6:43:51 F	Found NPort(s): 1 Configuration Change Found NPort(s): 1	d: NPort 5110 (00:90:E	8:0D:51:E7)	_
Now: 27/07/2006 16:46:19					

Now the configuration of the NP5110 device, can be done through a web interface embedded in the NP5110 board. You can quit the Nport Administrator software.

For this access just type http:// followed by the IP address allocated by DHCP server, in your favorite web navigator.

The following screen should appear:

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⊢ Précédente 🔹 🔿 🗸 🙆 👔	🖞 🛛 🐼 Rechercher 🛛 🔬 Favoris 🧐 M	Λέσία 🔇 🖏 🖕 🥌 🕎 - 📴 🖪				
dresse 🙆 http://134.20.11.33						
Google -	🔽 <u>G</u> Search 👻 🚿 🍄 Cheo	ik 🔸 🌂 AutoLink 🔸 🔚 AutoFill 🚾 Options 🖉				
MOXA	www.mo	oxa.com				
Nain Menu	Welcome to ND.	utio web concele t				
	weicome to NPC	ort's web console !				
🔲 Basic Settings						
Network Settings	Model Name	NPort 5110				
Cartal Settings	MAC Address	00:90:E8:0D:51:E7				
Coperating Settings	Serial No.	1813				
Accessible IP Settings	Firmware version	2.0 0 days 00h 11m 47c				
🗀 Auto Warning Settings	System optime 0 days, obn: 11m: 47s					
🗀 Monitor	NPort's web console provide the following function groups.					
🗀 Change Password	Basic Settings					
🗀 Load Factory Default 👘	Server name, real time clock, time server IP address, and Web console, Telnet console Enable.					
🗀 Save/Restart	Disable function.					
	Network Settings					
	IP address, netmask,	default gateway, static IP or dynamic IP, DNS, SNMP, IP location report.				
	Serial Settings					
	Baud rate, start hits, data hits, stop hits, flow control, UART FIFO.					
	,					
	Operating Settings					
	Operation mode, TCP	alive check, inactivity, delimiters, force transmit timeout.				
	Accessible IP Settings	5				
	"Accessible ID or Acce	scible ID group". Displie to percent all ID's connection				

Select Operating setting port1 and fill the menu according to the following screen:

<u>Fichier Edition Affichage Fay</u>	roris <u>O</u> utils <u>?</u>	3 () () () () () () () () () (
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Adresse 🕘 http://134.20.11.33		v ∂0
Google -	💌 <u>C</u> Search 👻 🚿 🍄 Cheo	sk 👻 AutoLink 👻 🗐 AutoFill 🔽 Options 🤌
	www.mo	oxa.com
Main Monu		
		Port=01
Basic Settings	Operation mode	TCP Server Mode
🔲 Network Settings	TCP alive check time	7(0 - 99 min)
🔁 Serial Settings	Inactivity time	
- Port 1		
Coperating Settings	Max connection	
Port 1	Ignore jammed IP	© No C Yes
Accessible IP Settings	Allow driver control	
Monitor	· [Data Packing
Change Password	Packing length	0 (0 - 1024)
🔲 Load Factory Default	Delimiter 1	0 (Hex) 🗆 Enable
🗋 Save/Restart	Delimiter 2	0 (Hex) 🗆 Enable
	Delimiter process	Do Nothing 🔄 (Processed only when Packing length is 0)
	Force transmit	0 (0 - 65535 ms)
		TCP Server Mode
	Local TCP port	4001
	Command port	966
		Submit

The NP5110 device is configured:

- To be in TCP server mode
- With 4 maximum clients at the same time
- With the port number 4001

Click Submit and then Save/Restart.

Now you need to configure the serial link of the NP5110 adapter. For this go to the serial setting port1, and fill the screen with the corresponding baud rate of Z-Max or Z-Xtreme base port B. See the following screen.

Précédente 🔹 🔿 🚽 🔯	📸 🛛 🧟 Rechercher 🛛 😹 Favoris	s 🞯 Média 🧐 🛃 - 🎒 🔟 - 🖹 月
fresse 🙋 http://134.20.11.33		× .
oogle -	💌 🖸 Search 👻 🚿	🌮 Check 👻 AutoLink 👻 🔚 AutoFill 🚾 Options 🖉
MOXA	. www.	moxa.com
Main Menu	Serial Settings	
🗀 Overview		
🗀 Basic Settings		Port=01
📄 Network Settings	Port alias	
🔁 Serial Settings		Serial Parameters
Port 1	Baud rate	19200 💌
Operating Settings	Data bits	8 💌
Port 1	Stop bits	
Auto Warning Settings	Parity	None V
Monitor		
🔲 Change Password	Flow control	
🗀 Load Factory Default 🗧	FIFO	© Enable O Disable
🗎 Save/Restart	Interface	JRS-232 Only
		Submit
		COMMIT

Then Click on submit and Save/Restart.

In the case of the use of a Z-Max rover using GPRS connections, you will need to make this device visible on the public internet via a static IP address. For this, please refer to your Network administrator.

You should provide to your network administrator the IP address (in this example 134.20.11.33) and the port number (in this example 4001).

The external public address corresponding to this device will probably be different than the address allocated by the DHCP server (in this example 134.20.11.33, and port 4001), but refer to this external address for using a Z-Max.Net rover.

Congratulations you base is ready.

In case of problems when using the NP5110 adapter, please refer to the documentation provided with the equipment. To reset the equipment, push the reset button at least 5 seconds.

3.5 CONNECTING TO THE Z-MAX BASE FROM THE FIELD

You may use a Z-Max.Net rover receiver in the field to connect to your Z-Max Direct IP Base. In FAST Survey, go to:

- The Equip menu
- The Configure Rover menu
- The Ports menu
 - o At the bottom of the Base Config window, select: Manual
 - Message Type: choose the type which correspond to the way you configure your Base
 - Type: select **GRPS/IP** or **Direct IP**
 - o At the bottom of the windows, "Base Config", click Add
 - Enter a name for your configuration, example: Direct IP
 - Select the Band: 850/1900 for North America and 900/1800 for Europe
 - PIN: to avoid any problem, make sure that your SIM card does not have a PIN code. Leave this field empty.
 - APN Server / User Name / Password: fill these fields with the parameters provided by your GPRS provider
 - Click Base IP Settings:
 - IP address: enter the IP address of your Z-Max Base
 - Port: enter the port number of your Z-Max Base
 - Click **OK** on the top of the window
 - Click **OK** on the top of the window
- Click **OK** on the top of the window to launch the configuration.

3.6 NP5110 MOXA ADAPTER INFORMATION

Go to the following web site for more information on this product:

http://www.moxa.com/product/NPort_5110.htm