

UHF Repeater

Configuration Example

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UHF REPEATER Configuration Example



TRIUMPH-1 AS UHF BASE

HPT435 AS REPEATER

TRIUMPH-1 AS UHF ROVER

TRIUMPH-1 as UHF Base Station Configuration

Please do not forget to attach the UHF/GSM antenna to TRIUMPH-1.

Attaching UHF/GSM Antenna

A broadband, rugged, in-building or outdoor antenna designed to service the whole 406-470 MHz UHF band and GSM quad band. With modest dimensions of 25 mm (OD) x 182 mm (height), this antenna radiates with a typical peak omnidirectional gain of +1 dBi. Internally, the radiating element is DC shunted to help protect the transceiver from nearby, but not direct ElectroStatic Discharge (ESD).

The TRIUMPH-1 modem antenna can be mounted on standard poles (5/8-11inches thread). Attached to the TRIUMPH-1 receiver this antenna gets a part of survey pole, making handling with receiver easy and simple.



Figure 2-1. TRIUMPH-1 External UHF/GSM Antenna

- 1. Start ModemVU.
- 2. Select Triumph 1X Internal Radio and click OK (Figure 2-2).

J Options	
General	
Triumph 1X Internal Radio 🔽	
HPT435	
HPT402	
ALPHA	
JLINK 🗖	
GISmore	
PDL 🗖	
OK Cancel	

Figure 2-2. ModemVU. Options window

3. Select the port receiver is connected to and click *Connect* (Figure 2-3).

7 0	onnection 🛛
	Port's setting
	COM4 💌
Γ	Connect Cancel

Figure 2-3. ModemVU. Connection

4. Select the *ON* mode for *Radio*, click *Apply*, and then click *Connect Radio* button (Figure 2-4).

Figure 2-4. ModemVU TRIUMPH Internal Radio selection

5. In the *Radio Link* tab set the following parameters, and click *Apply* (Figure 2-5):

Radio Link	Serial Interface & Tools	Identification		
				Apply
Protocol:	Simplex Transmitte	r to Repeater	~	
	Frequency (MHz): 452,78	7500	
	Output power (dBm / W): 30 / 1,00	~	
	Modulation Type	e: DQPSK	~	
	Link Rate	e: 19200	~	
	Link Space	e: 25,0 kHz	~	
	Forward Error Correctior	: 🔽 Scrambli	ng: 🗹	

Figure 2-5. Radio Link tab settings

- Protocol: Simplex Transmitter to Repeater
- Frequency (MHz): 406 to 470
- Output power (dBm/W): 30/1.00
- Modulation Type: DQPSK
- Link Rate: 19200
- Link Space: 25.0 kHz
- Forward Error Corrections: ON
- Scrambling: ON
- 6. Quit ModemVU by clicking *Exit* button.

7. Start TriVU. Select port the receiver is connected to and click OK (Figure 2-6).



Figure 2-6. TriVU. Selecting port

- 8. Click *Configuration Receiver*.
- 9. In the *Base* tab click the *Get from receiver* button. Reference geodetic coordinates appear. Click *Apply* (Figure 2-7).

General MinPad Positioning Base Rover Po	orts Event Advanced
Base Station Coordinates (Antenna Phase Center) – GPS/GLO at one time Averaged Avg. Span(s): 180	Station ID: 0 Measurements Sent
GP5 GLONASS Get from receiver	Max.number O System Used
Reference Geodedic Cocrinates	Health: Good 🔄 🔽 Pseudo-range smcothing
.at: 55 ° 47 ′ 54.74418 ″ N ▼ W84 ▼ .on: 37 ° 31 ′ 13.76936 ″ E ▼	CMR Satting Station (D: 0 ← CA/L1 ← P/L1 ▼ P/L2
Alt: +380.2918 m Datum Parameters	Motion: Unknown 💌 GLONASS msg.: 3 🕂
L1 to L2 Antenna Phase Center offsets, meters	Short ID: COGO:
East: 0.0000 North: 0.0000 Height: 0.0000	Long ID:

Figure 2-7. Base tab

10. In the *Ports* tab set the Port D *Output mode* to RTK CMR, and click *Apply*, then OK (Figure 2-8).

Receiver configuration		
ieneral MinPad Positioning Base Rover	Ports Event Advanced	
erial Modem USB Ethernet ICP C	AN BLI	
Serial A	Baud rate: 115200 🛩	
Output: User Defined Period(s):	RTS/CTS	
Serial B		
Input: Command -	Baud rate: 115200	
Dutput: None Pericd(s):	E RIS/CIS	
Serial C	Baudrate: 115200 👻	
Output: None Pericd(s):		
Serial D		
Input: Command - Infrared	Baud rate: 115200 -	
Output: RTK CMR {10,0,1} Pericd(s):	1.00 RTS/CTS	
OK Exit Save Fefresh Apply Sat all	parameters to defaults	

Figure 2-8. Rover tab

HPT435 as Repeater Configuration

Paying attention to a few factors and selecting such system that suits your surveying needs and business strategy enables you to improve the performance, enhance the cost-effectiveness, and increase the user-satisfaction of your RTK survey system.

Antenna Installation

Select the type of antenna that best fits your application and the one that offers the highest dB gain. In addition, setup your system in the highest possible location to minimize obstacles between the transmitting and receiving systems. Always place the antenna on the highest point available. At a minimum, set the antenna to at least ten feet above the terrain using an antenna mast.

Some antennas intended to be attached to the pole mount adaptor (p/n 14-578117-01) are designed to be operated with a ground plane and some without it. Antennas operating without ground plane marked in our catalogue as NGP, e.g. UHF NGP Antenna 1/2, 2.4 dB gain, NMO:

- p/n 30-587307-01 UHF NGP Antenna 406-430 MHz, 1/2, 2.4 dB, NMO
- p/n 30-587308-01 UHF NGP Antenna 430-450 MHz, 1/2, 2.4 dB, NMO
- p/n 30-587309-01 UHF NGP Antenna 450-470 MHz, 1/2, 2.4 dB, NMO

This antennas are NO GROUND PLANE antennas with gain 2.4 dB and NMO specified connector type with should match with your antenna adapter (pole mount or magnet mount). Antennas designed to be operated with ground plane

- p/n 30-587303-01 UHF Antenna 406-430 MHz, 5/8, 5 dB, NMO
- p/n 30-587304-01 UHF Antenna 430-450 MHz, 5/8, 5 dB, NMO
- p/n 30-587305-01 UHF Antenna 450-470 MHz, 5/8, 5 dB, NMO

provide better gain, but to achieve the best performance of your antenna, add a UHF Antenna Ground Plane Disk (p/n 10-587400-01) to the bottom of the antenna for a ground plane. UHF antenna Ground Plane disk improves VSWR and as result increase RF power delivered from transmitter to antenna and system distance range.

To install antenna with ground plane disc (see pictures below):

- 1. Unscrew the cone-shaped cable part;
- 2. Place the ground plane disc between cable parts and screw all parts together;
- 3. Attach cable with ground plane to the UHF antenna;

UHF Repeater Configuration Example HPT435 as Repeater Configuration Antenna Installation

4. Place the antenna on the pole.



Use coaxial cable and connectors that are impedance-matched with the radio equipment, and make sure to use the shortest length of cable to move the signal between the radio and the antenna, e.g.

- p/n 14-578115-01 Accessory UHF Ant Cable BNC/Magn Mount, 12ft¹
- p/n 14-578116-01 Accessory UHF Ant Cable BNC/Mini-Magn Mount, 12ft¹

p/n 14-578117-01 Accessory UHF Ant Cable BNC/Pole Mount, 12ft

1. Start ModemVU.

^{1.} For this type of antenna a metal surface, e.g. car's roof, serves as ground plane.

2. Select *HPT435* and click OK (Figure 2-9).

General]		
Trium	ph 1X Inte	ernal Radi	
		HPT43	5 🔽
		HPT402	2
		ALPHA	۹ 🗆
		JLIN	<
		GISmor	e 🔲
		PDI	- 🗆
	ĸ	Car	ncel

Figure 2-9. ModemVU. Options window

3. Select the port receiver is connected to and click *Connect* (Figure 2-10).

7 0	onnection 🛛 🔣
	Port's setting
	COM4 💌
	Connect Cancel
0	Connect Cancel

Figure 2-10. ModemVU. Connection

4. In the *Radio Link* tab set the following parameters, and click *Apply* (Figure 2-11):

Radio Link	Serial Interface & Tools	Identificatio	on		_
Echo t	o serial port:	OFF		~	Appl
Protocol	Simplex R	lepeater		~	
Frequency (MHz Output power (dBm / W)		tz):	452,787	500	
		M): 45 /	35,0	~	
	Modulation Ty	pe: DQF	PSK	~	
	Link Ra	ate: 192	200	~	
	Link Spa	ce: 25,0	kHz	~	
	Forward Error Correcti	on: 🗹 🛛 Sc	ramblin	g: 🗹 🛛	Exit

Figure 2-11. Radio Link tab settings

- Protocol: Simplex Repeater
- Frequency (MHz): 406 to 470
- Output power (dBm/W): 45/35.0
- Modulation Type: DQPSK
- Link Rate: 19200
- Link Space: 25.0 kHz
- Forward Error Correction: ON
- Scrambling: ON
- 5. Quit ModemVU by clicking *Exit* button.

TRIUMPH-1 as UHF Rover Station

- 1. Attach the UHF/GSM antenna to TRIUMPH-1.
- 2. Start ModemVU.
- 3. Select Triumph 1X Internal Radio and click OK (Figure 2-9).

7 Options	
General	
Triumph 1X Internal F	Radio 🔽
HP	T435 🔲
HP	T402 🔲
AL	PHA 🔲
J	LINK 🔲
GIS	more 🔲
	PDL 🗖
<u></u>	
OK (Cancel

Figure 2-12. ModemVU. Options window

4. Select the port receiver is connected to and click Connect (Figure 2-10).

Forts setting
0.0111
CUM4 🚩

Figure 2-13. ModemVU. Connection

5. Select the ON mode for Radio, click Apply and click Connect Radio button (Figure 2-14).

🗸 Triun	iph Int	erna	al Radio 🛛 🔣
Radio	ON	*	Connect Radio
GSM [OFF	~	Connect GSM
Ар	ply		Exit

Figure 2-14. ModemVU TRIUMPH Internal Radio selection

6. In the *Radio Link* tab set the following parameters, and click *Apply* (Figure 2-11):

J LMR400		
<u>Eile I</u> ools <u>H</u> elp		
Radio Link Serial Interface & Tool:	Identification	
Mode Receiver:	Auto	
Protocol: Simple>	Receiver	
Frequency	7 LMR400	
Output power (dBn Modulation	Eile Iools <u>H</u> elp	
Link	Radio Link Serial Interface & Tools Identification	
Link S	Mode Receiver: only from Repeater	Apply
Forward Error Corn	Protocol: Simplex Receiver 💌	
COM4, 115200	Frequency (MHz): 452,787500	
L A	Output power (dBm / W): 30 / 1,00 💌	
	Modulation Type: DQPSK 💌	
	Link Rate: 19200 💌	
	Link Space: 25,0 kHz 💌	
	Forward Error Correction: 🗹 Scrambling: 🗹	Exit
	COM4, 115200	0:01:52

Figure 2-15. Radio Link tab settings

- Protocol: Simplex Receiver
 - ٠
- Frequency (MHz): 406 to 470
- Output power (dBm/W): 30/1.00
- Modulation Type: DQPSK
- Link Rate: 19200
- Link Space: 25.0 kHz
- Forward Error Corrections: ON

- Scrambling: ON
- 7. Quit ModemVU by clicking *Exit* button.
- 8. Start TriVU. Select port the receiver is connected to and click OK (Figure 2-6).

<u>1</u> - Select Server	A	dd Server
LServer	acd IP RCV	
Manual mode only		
2 - Get list of receivers from	n Server-	GPS
3 - Select Receivers or pre	ess OK to	connect
TCP:83.220.250.6:8002: COM9:115200:1 COM8:115200:1 COM8:115200:1	≪PDDC	7 ^
COM6:115200:1 COM5:115200:1 COM4:115200:1		
COM3:115200:1 COM2:115200:1 COM11:115200:1 COM10:115200:1		~
ОК	Cano	el

Figure 2-16. TriVU. Selecting port

9. Click Configuration ▶ Receiver.

10. In the Positioning tab set RTK fixed Positioning Mode, then click Apply (Figure 2-17).

Receiver configuration	
General MinPad Positioning Base R Positioning Mode Enable Solutions C Standalone ✓ Standalone C MD (WAAS Diff.) C RTK Float	over Ports Event Advanced Satellite management Satellites tracked Satellites used in pos GPS GLONASS GALILEO SBAS GPS GLONASS GALILEO SBAS
RTK Fixed Positioning Masks Elv. mask(d): 5 PDOP mask: 30.00 RAM Enabled Alarm: Manual Alarm limit(m): 555.6	pm lock use pm lock use pm lock use pm lock use 1 IV 9 IV 17 IV IV 25 IV IV 2 IV IV 17 IV IV 25 IV IV 3 IV IV 10 IV 18 IV 27 IV IV 4 IV IV
Cur. Datum: W84 🔽 🗖 Iono-Correction Datun Parameters 🗍 Tropo-Correction OK Exit Save Refresh Apply S	All to lock None to lock All to use None to use

Figure 2-17. Positioning tab

11. In the *Rover* tab set Positioning Mode to RTK fixed mode (Figure 2-18), then click *Apply*:



Figure 2-18. Rover tab

12. In the *Ports* tab set the *Input* mode for port D to CMR, then click *Apply* and OK (Figure 2-19).

7 Receiver configura	tion		
General MinPad Position	ning Base Rover Ports	Event Advanced	
Serial Modem USB	Ethernet ICP CAN E	BLI	
Serial A Input: Command 💌		Baud rate: 115200 💌	
Output: User Defined	Period(s):]	M RTS/CTS	
Input: Command -		Baud rate: 115200 💌	
Output: None	Poricd(s):	E RIS/CIS	
Serial C Input: Command 💌		Baud rate: 115200 💌	
Output: None	✓ Pericd(s):	RTS/CTS	
Serial D Input: CMR 💌	🗖 Infrared	Baud 'ate: 115200 💌	
Output: None	▼ Pericd(s):	RTS/CTS	
OK Exit Save Re	fresh Apply Set all parame	eters to defaults	

Figure 2-19. Ports tab

13. The receiver will obtain the RTK Fixed solution (Figure 2-20).

GP:	G	LONAS	is G	ALIL	EC	SBAS	L	ocation	222
#	EL	AZ	CA	P1	P2	L2	L5	TC	SS
04	29+	308	48	33	33	??		10	30+
11	14	192	42	22	22	??		9	55+
13	29+	244	48	34	34	77		10	55+
16	5+	118	38	16	16	77		1	30+
17	7	264	39	22	22	36		10	30+
20	79+	172	55	48	48	??		17	55+
23	59+	244	57	46	46	??		17	55+
25	7+	200	39	15	15	77		5	30+
32	57+	122	54	46	-6	77		17	55+
Sate	allites (1.6.1	1 • 3						

Figure 2-20. TriVU. RTK fixed



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