

# ANT-177x : UDP and TCP over IP setup details

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# **Document info**

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1.1	1-Feb-18	David M	Minor changes
1.2	3-Mar-18	David M	2.3.7.1 added image of ANT-1773 with serial connection
2.0	5-Mar-20	David M	TCP over IP using 2.4.2.2



# 1. UDP over IP

### 1.1. ANT-177x Setup

On the ANT-177x GUI navigate to UART setting on the Data page (Home -> Settings -> Data -> click UART to expand).

The UART settings should be as described in Figure 1 below

- 1.1.1. The "Source Port" and "Destination port" should be 1234
- 1.1.2. The "Destination IP:" is the PC (or sending devices) IP address, this case 192.168.0.178
- 1.1.3. "Baud Rate", "Parity", "Size" and "Flow Control" needs to such that it is compatible with the device receiving the serial data

After saving the settings the following should be noted about the State setting:

- 1.1.4. If the "State:" is Off it should be set to On and "save" clicked
- 1.1.5. If the "State:" is On it should be set to Off and "save" clicked, then set to On and save clicked again

http://192.168.0.30	*	—	×
Data			ŕ
Data Source			
GPIO-FEEDBACK			- 1
GPIO2			- 1
UART			- 1
UART Number: ttymxc0			- 1
Source Multicast IP: 0 0 0 0 0 Source Port 1234			
Destination IP: 192 . 168 . 0 . 178 Destination Port: 1234			
Delay(ms): 10			
Baud Rate: 9600			
Parity: None			
size: 8 bit			
Flow Control: None			- 1
State On			
GPS			
<u>GPS Statues</u> Signal: No Data Satellites: 0 System Time: GPS Time: speed: coordinate:			
Save			
-00-	i :	*	*

#### Figure 1: UART settings



## **1.2.** Serial data from PC to UART on ANT-177x

The connection from the PC to the ANT-177x is UDP over IP. **NOTES:** 

Most communication of this type are TCP over IP so programs like Tera-Term will NOT be able to send the data.

### 1.2.1. Sending UDP/IP data from PC to ANT-177x

A program like Packet Sender (<u>https://packetsender.com</u>) or Hercules SETUP utility (<u>https://www.hw-group.com/products/hercules/index\_en.html</u>) can be used to transmitted data to the serial port on the ANT-177x via Ethernet. These programs can handle special characters such as "Carriage return" and "New Line"

The example used will be using Packet Sender; Setup Packet as shown in Figure 2 below

- 2.1.1.1. The Address is that of the ANT-177x
- 2.1.1.2. The Port has to be 1234
- 2.1.1.3. UDP is the type of transmission over IP. This is from a drop down selection menu
- 2.1.1.4. The TCP server and SSL Server are disabled. This can be done by clicking the highlighted section at the bottom of the image.

ile	Pac T	ket Sender ools Help										· □ ×
Na	ame	Packet Nam	e									
A	SCII	Antrica UD	P over IP -	hello world !								8
н	EX	41 6e 74 72 6	9 63 61 20	55 44 50 20	6f 76 65 72 20	49 50 20 2	2d 20 68 65	5 6c 6c 6	f 20 77 6f 72 6c 64 20 21 20 20 20 20	20 20 20 20 2	20 20 20 20 20 22 🔇	Load File
A	ddre	ess 192.168	0.30			0	Port 1234		Resend Delay 0	🖸 🖾 U	IDP  Send	Save
Sea	rch	Saved Packe	s								Delete Saved Packet	Persistent TC
Set	nd	Name Re	send (sec)	To Address	To Port M	ethod A	SCII			Hex		
C	lear	rLog							🗹 Log Traffic	Save Log	Save Traffic Packet	Copy to Clipboar
С	lear	r Log Time	From IP	From Port	To IP	To Port	Method	Error	☑ Log Traffic ASCII	Save Log	Save Traffic Packet	Copy to Clipboar
C	ilear	r Log Time 11:54:14.054	From IP	From Port 53329	To IP 192.168.0.30	To Port 1234	Method	Error	Log Traffic ASCII "Antrica UDP over IP - hello world !	Save Log 22 41 6e	Save Traffic Packet	Copy to Clipboar 44 50 20 6f 76 65 7
C 1 2	lear	r Log Time 11:54:14.05- 11:00:04.77	From IP You You	From Port 53329 53329	To IP 192.168.0.30 192.168.0.30	To Port 1234 1234	Method UDP UDP	Error	Log Traffic ASCII ANTrica UDP over IP - hello world ! Antrica - hello world !	Save Log 22 41 6e 41 6e 74	Save Traffic Packet 74 72 69 63 61 20 55 72 69 63 61 20 2d 20	Copy to Clipboar 44 50 20 6f 76 65 7 68 65 6c 6c 6f 20
C 1 2 3	lear	Time 11:54:14.05- 11:00:04.77 11:00:02.949	From IP You You You	From Port 53329 53329 53329	To IP 192.168.0.30 192.168.0.30 192.168.0.30	To Port 1234 1234	Method UDP UDP UDP	Error	Log Traffic ASCII Antrica UDP over IP - hello world ! Antrica - hello world ! Antrica - hello world !	Save Log 22 41 6e 41 6e 74 41 6e 74	Save Traffic Packet 74 72 69 63 61 20 55 72 69 63 61 20 2d 20 72 69 63 61 20 2d 20	Copy to Clipboar 44 50 20 6f 76 65 7 68 65 6c 6c 6f 20 68 65 6c 6c 6f 20
C 1 2 3 4	lear iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	Time 11:54:14.054 11:00:04.77 11:00:02.949 10:57:32.500	From IP You You You You	From Port 53329 53329 53329 53329 53329	To IP 192.168.0.30 192.168.0.30 192.168.0.30 192.168.0.30	To Port 1234 1234 1234 1234	Method UDP UDP UDP UDP	Error	ASCII ASCII "Antrica UDP over IP - hello world ! Antrica - hello world ! Antrica - hello world ! Antrica - hello world !	Save Log 22 41 6e 41 6e 74 41 6e 74 41 6e 74	Save Traffic Packet 74 72 69 63 61 20 55 72 69 63 61 20 2d 20 72 69 63 61 20 2d 20 72 69 63 61 20 2d 20 72 69 63 61 20 2d 20	Copy to Clipboar 44 50 20 6f 76 65 7 68 65 6c 6c 6f 20 68 65 6c 6c 6f 20 68 65 6c 6c 6f 20
C 1 2 3 4	ilear ini ini ini	Time 11:54:14.05- 11:00:04.77 11:00:02.949 10:57:32.500	From IP You You You You	From Port 53329 53329 53329 53329 53329	To IP 192.168.0.30 192.168.0.30 192.168.0.30 192.168.0.30	To Port 1234 1234 1234 1234	Method UDP UDP UDP UDP	Error	ASCII ASCII "Antrica UDP over IP - hello world ! Antrica - hello world ! Antrica - hello world ! Antrica - hello world !	Save Log 22 41 6e 41 6e 74 41 6e 74	Save Traffic Packet 74 72 69 63 61 20 55 72 69 63 61 20 2d 20 72 69 63 61 20 2d 20 72 69 63 61 20 2d 20	Copy to Clipboar 44 50 20 6f 76 65 7 68 65 6c 6c 6f 20 68 65 6c 6c 6f 20 68 65 6c 6c 6f 20

Figure 2: Packet Sender



#### **1.2.2.** View Serial data from ANT-177x

Using the Serial (9 way D-type to 3 way header) as serial connection can be made to a PC using a program like Tera Term.

The Term Term session will need the same setting for "Baud Rate", "Parity", "Size" and "Flow Control" as in the section ANT-177x Setup above.

The example shown in Figure 3 below shows that Packet Sender can send the message:

<Carriage return><New Line> "Antrica UDP over IP – hello world! <Carriage return><New Line> Hi "

As can be seen in the lower portion of Figure 3 below the message has been sent twice by clicking the "send" button twice.

Nan													^
ASC	ne Packet Name	ć											
	II Vn"Antrica	UDP over	P - hello work	d ! \r\n Hi	*								0
HE	69 63 61 20 55	44 50 20	6f 76 65 72 2	0 49 50 20 2d	20 68 65	6c 6c 6f 20	77 6f 72	6c 64 20 21 20 20 20 0d 0a 20 20 20	48 69 20 20 2	0 20 20 20 20 20 2	22 🖸	Load File	
Add	ress 192.168.0	.30			0	Port 1234		Resend Delay 0	🕲 🖆 U	OP ▼ Se	end	Save	
earc	h Saved Packets					]				Delete Saved	Packet	] Persister	t TCP
Senr	d Name Res	end (sec)	To Address	To Port M	ethod A	SCII			Hex				
Cle	ar Log							☑ Log Traffic	Save Log	Save Traffic	Packet C	opy to Clip	board
	Time	From IP	From Port	To IP	To Port	Method	Error	ASCII					
1	12:27:27.682	You	57218	192.168.0.30	1234	UDP		\r\n"Antrica UDP over IP - hello w	0d 0a 22	41 6e 74 72 69	9 63 61 20	55 44 50 2	0 6f 1
1 14	12:16:20.872	You	57218	192.168.0.30	1234	UDP		\r\n"Antrica UDP over IP - hello w	0d 0a 22	41 6e 74 72 69	9 63 61 20	55 44 50 2	0 6f 7
¢								LDP:57218 🔹 TCP Serve	er Disabled	SSL Server	Disabled	IPv4 Mo	de
	_	M co	0M4 - Tera T	erm VT				+ _					-
		File E	dit Setup	Control W	/indow	Help							
		"Anti Hi	rica UD i	P <sub>.</sub> over	IP - TP -	hello	wor	·ld !		^			

Figure 3: Data seen out of ANT-177x UART / Serial



# 1.3. Serial data from UART on ANT-177x to PC

## **1.3.1.** Sending data from ANT-177x via on bard UART

If using Tera Term from the setup in Serial data from PC to UART on ANT-177x above data can either be copied and pasted or typed in.

### **1.3.2.** Viewing Data from ANT-177x from UDP / IP connection

A program called SocketTest (<u>https://sourceforge.net/projects/sockettest/</u>), but this requires Java to be installed, can be used to view the packets from the ANT-1777x Ethernet connection. So, the example is that the following was copied and pasted into the Tera Term

<Carriage return><New Line>

"Antrica UDP over IP – hello world! <Carriage return><New Line>

<carriage return><new Line: Hi "

and then "this is typing" was typed in, see Figure 4 below. Tera Term will require a few setting changes to enable easy viewing of the characters typed. So, setup -> terminal; "Receive:" set to "AUTO", and check "local echo"

Figure	4	Term	Term	serial	innut
riyure	-	<i>i enni</i>	<i>i ei iii</i>	Seriar	mput



Using the SocketTest program. Setup is shown in Figure 5 below; select the UDP tab, the server details are the PC and the port is 1234. Click "Start Listening" (and this will then change to "stop listening".

Packets can also be seen out of the serial of the ANT-177x; if the ANT-177x IP address is put into the client section (near the bottom), along with port 1234. It appears that only text can be sent and no special characters.

As can be seen in Figure 5 in the conversation window, if a copy and paste is used the message comes out in one block and a typed in message is transmitted character by character.



Figure 5 : SocketTest setup and "decode"

Server				
IP Address 192.168.0.178			1	
Ded 4024	Red Ob	a Listanin a	1 N	
F01 1234	Eon Sio	plastering	Soci	etTest v 3
Conversation				
> Server Started on Port : 1234				
> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
R[192.168.0.30:1234]:				
Antrica UDP over IP - hello world !				
HI DI402 469 0 20:42241 T				
R[192.100.0.30.1234]. 1				
R[192.100.0.30.1234].11				
R[192.106.0.30.1234].1				
R[192.100.0.30.1234]. 5				
D[102 169 0 20:1234].				
R[102 168 0 30:1234]: c				
R[192.168.0.30:1234]				
R[192 168 0 30:1234] t				
RI192 168 0 30:12341 v				
R[192,168.0.30;1234]; p				
R[192.168.0.30:1234]; i				
R[192.168.0.30:1234]; n				
R[192.168.0.30:1234]: g				
Client				Save
IP Address 0.0.0.0	Port 0	E	ort	Clear
				Glear



# 2. TCP over IP

# 2.1. ANT-177x Setup

The ANT-1773 requires upgrading to 2.4.2.2, the code is located: <u>https://www.dropbox.com/s/xyftp1lckfvialp/version\_2.4.2.2.rar?dl=0</u> The upgrade guide is: <u>https://www.dropbox.com/s/s42wyfy6h4gpyhj/ANT-177x\_FirmwareUpgrade.pdf?dl=0</u> but the SD card method is recommended: <u>https://www.dropbox.com/s/yao2uvc4xfgcgqw/SD%20Update%20Guide.pdf?dl=0</u> but this will reset the ANT-177x\_so if the config file is required to be save then see: <u>https://www.dropbox.com/s/s8rc4e1f8w58yu0/ANT-177x\_ConfigSaveRestore\_NeptuneGuard.pdf?dl=0</u>

In this example the ANT-1773 is on 192.168.1.51.

The UART settings should be as described in Figure 6 below

Navigate to Setup of Home -> Settings -> Data -> "UART<->Ethernet"

- 2.1.1. Protocol to be TCP
- 2.1.2. The "Source Port" and "Destination port" can as required, in this example it's 4000
- 2.1.3. The "Destination IP:" is the PC (or sending devices) IP address, this case 192.168.1.123
- 2.1.4. "Baud Rate", "Parity", "Size" and "Flow Control" needs to such that it is compatible with the device receiving the serial data

After saving the settings the following should be noted about the State setting:

- 2.1.5. If the "State:" is Off it should be set to On and "save" clicked
- 2.1.6. If the "State:" is On it should be set to Off and "save" clicked, then set to On and save clicked again

Figure 6 : serial setup in ANT-1773 web GUI

Data
<u>UART&lt;-&gt;Ethernet</u>
UART Number: ttymxc0
Protocol
Source Multicast IP: 0 .0 .0 .0 Source Port 4000
Destination IP 192 . 168 . 1 . 123 Destination Port: 4000
Delay(ms): 50
Baud Rate: 9600
Parity: None
size: <b>8 bit</b>
Flow Control: None
State On
<u>GPS</u>

IP address 192.168.1.123 is the desktop PC



# 2.2. Serial data from PC to UART on ANT-177x

The connection from the PC to the ANT-177x is TCP over IP, a program like Tera Term will work

### 2.2.1. Sending TCP/IP data from PC to ANT-177x

The "TCP over IP" connection using Tera Term.



Tera Term: TCP/IP setup	Tera Term: Terminal setup	×
Host list  192.168.1.51  Add	Terminal size New-line       120     X     60     Receive:     AUTO	ОК
192.168.1.51   192.168.0.222  192.168.0.131  192.168.0.200  myhost.example.com  Up  Remove Down	✓ Term size = win size Auto window resize Transmit: CR ~	Cancel Help
□ Telnet Keep alive 300 Sec.(0 to turn off)	Terminal ID:     VT100     ✓     ✓     Local echo       Answerback:     □     Auto switch (VT<-	>TEK)
<ul> <li>✓ Auto window close</li> <li>Port#: 4000 Term type: xterm</li> <li>OK Cancel Help</li> </ul>		

## 2.2.2. View Serial data from ANT-177x

The physical RS-232 data port using Tera Term to connect

Figure 8 : RS-232 port setup

Tera Term: Serial port setup			Tera Term: Terminal setup		X
Port: Baud rate: Data: Parity: Stop: Flow control:	COM3       ~         9600       ~         8 bit       ~         none       ~         1 bit       ~         none       ~	OK Cancel Help	Terminal size 120 × 60 ☑ Term size = win size △ Auto window resize Terminal ID: VT100 ~ Answerback:	New-line Receive: AUTO ✓ Transmit: CR ✓ ☑ Local echo	OK Cancel Help
Transmit delay	v c/char 0 mse	ec/line			

The string "typed into TCP over IP terminal" is typed in the TCP-over-IP Tera Term window. This appears on the Tera Term RS-232 serial port window.

Figure 9 : TCP-over-IP -> Serial port data flow

	VT (	COM3	- Tera Te	rm VT			VT	192.16	8.1.51 -	Tera Term	VT	
	File	Edit	Setup	Control	Window	Не	File	Edit	Setup	Control	Window	Help
t Text out of	yped RS-2	into TC 232 p	P over IF oort on	'terninal UAV			t yped	into TC	P over IF	'terminal		



## 2.3. Serial data from UART on ANT-177x to PC

Unfortunately, the TCP over IP **from** the ANT-177x is not detected by Tera term so another program is required to view the packets from the ANT-177x. The example used here is "netcat".

This is available within MobaXterm or as DOS executable.

MobaXterm - <a href="https://mobaxterm.mobatek.net/">https://mobaxterm.mobatek.net/</a>

```
DOS executable, nc.exe is within the file netcat-win32-1.12.zip downloadable from : 
<u>https://montcs.bloomu.edu/Networking/Software/netcat/</u>
or <u>https://eternallybored.org/misc/netcat/</u>
```

Tera Term setup for the RS-232 connection to the ANT-177x is shown in Figure 10.

Figure 10 : RS-232 port setup

Tera Term: Terminal setup		×
Terminal size <b>17</b> X 43 V Term size = win size	New-line Receive: AUTO v Transmit: CR+LF v	OK Cancel
Auto window resize Terminal ID: VT100  Answerback:	✓ Local echo	Help EK)

#### 2.3.1. MobaXterm nc command

In this guide the MobaXterm nc command is used with the line:

nc -l 4000

In Figure 11Figure 12 a simple script was used to send messages from the Tera Term window with an increasing number for line ID. The response can be seen in the MobaXterm window.

Figure 11 : TCP-over-IP -> Serial port data flow using MobaXterm nc command





### 2.3.2. DOS prompt nc.exe

In this guide the nc.exe DOS command is used with the line:

nc.exe -1 -p 4000

In Figure 12, again a simple script was used to send messages from the Tera Term window with an increasing number for line ID. The response can be seen in the DOS prompt.

Figure 12 : TCP-over-IP -> Serial port data flow using DOS nc.exe





# 3. UAV modules connectivity

# 3.1. ANT-1773 / Nano

