

METCRAXII BlueTooth Hints WT41

There are 11 serial bluetooth serial sensors. 3 are run with a ‘serial forwarding mote’ interfaced between the WT41 radio and the sensor which also provides a power measurement in addition to the devices data.

Contents

HOW-TO: Talk Directly to WT41 Radio From Acer-PC	1
HOW-TO: Talk Directly to Serial Forwarding Mote / and set WT41	2
HOW-TO: Check / See BlueTooth Devices/ Connections On Air	3
Basic WT41 – IWRAP Commands	4
Wiring WT41 Interface directly to sensors:.....	5
CSAT-3 Sonic Adaptor.....	5
CSAT QuickRef: RunTime commands to set session operating parameters:	5
PTB220 QuickRef: RunTime commands to set session operating parameters:	6

ACER-PC Testing

Individual radios cannot be changed over the air safely. Instead a direct connection should be used.

HOW-TO: Talk Directly to WT41 Radio From Acer-PC

- 1) Power Up Acer
- 2) Connect Keyspan Serial Adaptor to Acer USB port
- 3) >lsusb To Verify Acer usb device, should see keyspan
- 4) Connect “WT41-Serial” cable to Keyspan, and to WT41 interface RJ45 and to Mote battery.
- 5) Power up WT41. Note: make certain that the ‘usb power only’ jumper is out!
- 6) Check B.T. device on Acer (not completely necessary for direct talking). Open BlueTooth device manager, ‘search’ and look for the named radio
- 7) >minicom usb0
 ctrl-a, P for serial settings
 C for 9600bps
 “+++” To enter WT41 command mode. If the radio didn’t connect to a server yet it may boot into command mode.
 No message The radios are in all messages off mode, so instead type and enter:
 “set” To see the radio settings including name, power
 “set bt power 19 19 19” to set it to highest power
 “set bt name NEW_NAME” if desired
 “set control echo x” 0=for METCRAXII: no messages, 7=all, 6=command echo
 “atmd” to go back to data mode if the radio is connected.

ACER-PC Testing

There are 2 ways to change/alter a WT41 interfaced to a serial forwarding mote: direct connect or over the radio. The former is best.

HOW-TO: Talk Directly to Serial Forwarding Mote / and set WT41

- 1) Power Up Acer
- 2) Connect Keyspan Serial Adaptor to Acer USB port
- 3) >lsusb To Verify Acer usb device, should see keyspan
- 4) Connect "Mote console cable" to Keyspan. Connect battery to mote.
- 5) >minicom usb0
 ctrl-a, P for serial settings
 C for 9600bps
- 6) Power Up mote
 3 quick green led blinks indicate stdio is to the radio.
 ~30 1-sec yel/org/red blinks for radio to start.
 2sec green led blinks for heartbeat when running
 30sec red led when power is sampled and sent
- 7) Press white button twice quickly to swap stdio to console
- 8) Verify "consoleport now active" ? to see commands
 "btradio" To interact with WT41 with commands as above
 ctrl-C To get out of 'btradio':
 "set" To see the radio settings including name, power
 "set bt power 19 19 19" to set it to highest power
 "set bt name NEW_NAME" if desired
 "set control echo x" 0=for METCRAXII: no messages, 7=all, 6=command echo
 "atmd" to go back to data mode if the radio is connected.

ACER-PC Testing

[HOW-TO: Check / See BlueTooth Devices/ Connections On Air](#)

The ACER is Linux based and has the DSM software on it. The BT WT41's and Serial Motes automatically connect to which ever BT server they first see and are called by. For METCRAXII we have BTAP-1 (spare in base), BTAP-2, BTAP-3 servers available. WT41's (I recall) include SPARE-1,2,3 (which for ops will need their name changed), SSW2-c/-, SSW4-c/p, NNE, SW,

- 1) Power Up Acer
- 2) Connect BTAP-1 to Acer USB port (Presumes you're doing an independent check in the base or with the Floor BTAP-2,3 off)
- 3) Verify BT device should see B icon pop up
- 4) Start the BlueTooth tool
- 5) Search to see devices the 'btap' sees out there. You should see the devices listed by friendly name.

"Presently" the default project on the ACER is 'test.' The project config (test.xml) has been edited many times to try different b.t. clients needed for the wireless sensors. If the named client you want to play with is declared in the config. Gordon's software will automatically search for and connect with it, although it can take quite awhile for this to happen. As connections are established, you'll see on the BlueTooth Tool icons on individual devices showing the connection quality, strength.

- 1) >sp set project (likely to test)
- 2) >and
- 3) >aup connections to bt radios will get established
- 4) >rserial btspp:name where name is the one identified in the xml
- 5) >ds data stats should show the typical inject statistics / message rate.

NOTE: if you're trying this in the crater, make sure the Floor DSM is no running or it's 'btap' access point isn't running and connected with the remote radios or else you won't see them.

NOTE: you cannot change settings of the btradios directly over the air. With the serial forwarding motes connected between the sensor and bt radio, it is possible to remotely change things such as power, but that can cause reboots sometimes also due to interaction timing.

Basic WT41 – IWRAP Commands

Here are a few common Iwrap commands, but there are many more, which can be put in master/slave modes, serial/hci, ftp/direct modes, enable security features, low-power BT, etc.

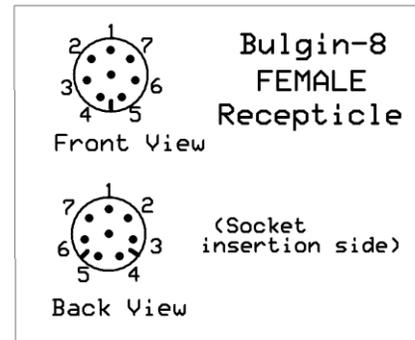
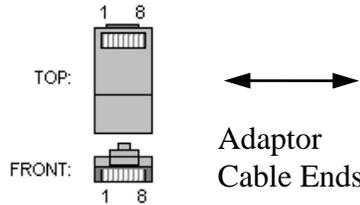
REMEMBER: These are only valid when the Boot Mode is '0' and it comes up on the serial/console port, not USB/

Function	Command Example	Description
Toggle Cmmnd/Data Mode	+++<cr>	Escape Sequence, Guard-Time = 1 Second (don't enter anything before/after it). Send them individually don't copy/paste. Response = "READY." when it goes into Cmd.
	ATMD	To Go from Command Mode to Data/Pass Through Mode. Must be connected to have effect
Connections:		
	INQUIRY 5	Report up to 5 devices that are visible
	call {address}{target}{mode} call 00:07:80:4f:d4:ea 1101 rfcmm call 0	1101 = SPP serial port profile
Set Ups:		
Check	SET	Reports Current Values: SET BT BDADDR 00:07:80:46:6d:49 SET BT NAME WT41-A SET BT CLASS 001f00 SET BT IDENT BT:47 f000 4.0.0 Bluegiga iWRAP SET BT LAP 9e8b33 SET BT PAGEMODE 4 2000 1 SET BT POWER 19 19 19 SET BT ROLE 0 f 7d00 SET BT SNIFF 0 20 1 8 SET BT MTU 667 SET CONTROL BAUD 38400,8n1 SET CONTROL CD 00 0 SET CONTROL ECHO 7 SET CONTROL ESCAPE 43 00 1 SET CONTROL GAIN 0 5 SET CONTROL MSC DTE 00 00 00 00 00 00 SET CONTROL PREAMP 1 1 SET CONTROL READY 00 SET PROFILE SPP Bluetooth Serial Port
Power Level	set bt power RESET set bt power set bt power 19 19 19	Returns to default Tx pwr setting Shows current settings (default, maximum, inquiry) WT41 is Class-1, max=20dbm but entry is 19
Baud Rate	set control baud 38400,8n1 set control baud 115200,8n1	Uart Setup: 38400,N,8,1 Default setup for IWRAP serial interface

Wiring WT41 Interface directly to sensors:

RJ45 Pin on WT41 Interface Module

- 1 = Gnd
- 2 = Gnd
- 3 = RTS (if needed) req to sensor
- 4 = CTS (if needed) ack from sensor
- 5 = Tx from radio to Sensor
- 6 = Rx to radio from Sensor
- 7 = +12
- 8 = +12



Standard DE-9 RS232 Pin Definitions / Signal Directions:

DTE pin	Signal	DCE - DTE (PC)	DCE=Sensor/Modem	DTE=PC/Computer
1	DCD	→		DCE announces that a connection is established
2	PC-Rx	→		Data received; 1 is transmitted "low", 0 as "high"
3	PC-Tx	←		Data sent; 1 is transmitted "low", 0 as "high"
4	DTR	←		DTE announces that it is powered up and ready to communicate
5	Gnd			
6	DSR	→		DCE announces that it is ready to communicate
7	PC-RTS	←		DTE asks DCE for permission to send data
8	CTS	→		DCE agrees on RTS
9	RI			DCE signals the DTE that an establishment of a connection is attempted

CSAT-3 Sonic Adaptor

CSAT-3 Signal	Adaptor Cable to WT41				CSAT-3 Pin
	RJ45 Pin (on WT41 board)	Color	Female Bulgin		
Radio-Rx from CSAT	6	Green	5	←	B
Radio-RTS req to CSAT	3 (Not Needed)	GreenStripe	4	→	G
Radio-CTS ack from CSAT	4 (Not Needed)	Blue	3	←	H
Radio-Tx to CSAT	5	BlueStripe	6	→	C
Ground	1,2	Brown/BrownStripe	8		E
+12 VDC	7,8: Power to CSAT	Org/OrgStripe	1		D

CSAT QuickRef: RunTime commands to set session operating parameters:

& toggles between unprompted & prompted mode (*Note this gets programmed into non-volatile memory, so be sure to use it again to re-initiate continuous data output*)

T terminal command mode (or use '&' toggle-off unprompted)

?? Check / Verify operating parameters

rs 1 turn on sync characters (0=off)
ri 1 turn on internal RTS drivers (needed if rts control not available from host)
sr2718 (to program the EEPROM)
D continuous data mode (or use '&' toggle-on unprompted)
A2 1hz
A9 10hz
Ac 20hz
Ad 30hz
Ag 10hz (oversampling mode, 60hz sampling, 10hz out)
Ah 20hz (oversampling mode, 60hz sampling, 20hz out)
Ae 60hz

PTB220 QuickRef: RunTime commands to set session operating parameters:

S To stop output while in the Run mode
R To start output in the Run mode
These commands are available after typing the 'S' for stop while in the Run mode. Note that the Stop mode Command Prompt = ">")

? Shows all basic barometer settings.
OPEN 1 Opens command communications while in stopped/pollled mode....Note id# may be different
ADDR x Sets id# other than 1
SMOD Show the default mode setting
SMODE RUN Set the auto-sending mode for the barometer.
 In RUN mode continuous outputting begins from power-up.
SERI 1200, E, 7, 1, f (b,p,d,s,x) Set or inspect serial bus settings.
FORM Shows the output format.
FORM "B1 " 4.2 P1 " " 3.1 T1 " #r #n Sets the output format of the barometer.
 DSNote: The spaces in the statement are needed.
UNIT mbar, C Sets the pressure and temperature units
AVRG 5 Sets averaging time in seconds, 0 .. 60
SCOM Allows unique poll command other than 'send'
INTV 5 Sets message output interval in seconds for asynchronous communications: 0 .. 225