



# WTX-100 Wireless Transmitter and WRX-100 Wireless Receiver Instruction Manual

**Version 1.0 Issue A 20**

## The WTX-100 Wireless Transmitter and WRX-100 Receiver

### **System Overview.**

Data Acquisition Networks has developed the WTX-100 and WRX-100 series of Wireless transmitters and Receivers which are designed for a wide range of applications in process variable measurement and data transfer. The typical range between a transmitter and receiver is from 50m to 2km depending upon the terrain, the obstructions and the antennas used at each end.

### **WTX-100 Transmitter Overview**

The DAN WTX-100 is a battery powered 25mW UHF wireless transmitter housed in an IP67 rated PVC pipe approx 500mm long. It transmits three process variables and its own battery voltage simultaneously. The three process variables are:

- A. An RTD Pt100 channel which can be wired up in a 2 or 3 wire configuration. The standard unit can measure over the range -20 to +120 °C.
- B. An analogue input channel that can be configured as any of the following simply by moving a solderless jumper.
  - a. 0-20mA
  - b. 4-20mA
  - c. 0-10V
  - d. 2-10V
  - e. 0-4V
  - f. 0-5V
  - g. 1-5V
- C. A pulse input that can be used to total up the pulses from any flowmeter or any other device that generates pulses with an average pulse repetition rate of less than 50 pulses per second.



**Figure 1**  
**The WTX-100**  
**and WRX-100**



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The information is transmitted by packets. In each packet there is substantial additional information which is detailed later in appendix 1. "DAN Wireless Data Structure"

The transmitters are powered by a 6V battery of 4 x 6000mAh alkaline C Cells in series which are intended to provide sufficient power before replacement to make 4 million measurements each lasting 1 second and transmit the 4 million associated packets to the receiver. Given that the period between packets can be adjusted from 5 seconds to 30 minutes, the battery will last for 0.5 years, transmitting every 5 seconds, 1.5 years transmitting every 15 seconds and 3 years transmitting every 30 seconds. The most common settings for monitoring applications would be one transmission every 15 seconds, 30 seconds or 60 seconds for analogue inputs or pulse inputs. Although the battery life will last well in excess of 3 years with transmissions that are less frequent than 30 seconds, DAN recommends replacement of batteries every 1-2 years to avoid leakage and other potential degradation of the batteries due to the environment.

Measurement times can be extended by DIP switch settings. This is not necessary in a standard unit

The transmitters are housed in a 500mm length of 40mm O/D PVC pipe with a waterproof end cap and a waterproof screw fitting base that has a tapped thread. The entire electronics, the batteries and the antenna of the transmitter are all contained in the pipe. The inputs are connected by cable to the transmitter and terminated on the transmitter input terminals.

### ***Receiver Overview.***

The WRX-100 receiver is housed in an IP65 enclosure and is intended to be mounted close to the device where the received information will be further processed. It is powered by a dc source of 10 – 32Vdc.

It has an RS 232C serial port which connects to a laptop through which you can access the data from all WTX-100 transmitters in radio range. The WRX-100 serial port can also be connected to other equipment such as PLC's which can have suitable drivers to extract the values for the packet strings. Speak to DAN personnel for more details on this powerful and effective solution.

The WRX-100 also has 6 analogue outputs and a pulse output which can replicate the four measurements made at the transmitter; (RTD input, analogue input, pulse input and battery voltage)

The 6 analogue outputs are defaulted to 4-20mA but can be individually adjusted to anything in the range 0-20mA. By placing a resistor across the current outputs the signals can also be converted to any of the standard industrial voltages such as 1-5V or 0-10V.

These output signals can be connected to a DAN DM01's measured variable inputs thus allowing one to replace the wiring between any probe and the DM01 with a wireless connection. Clearly more than one wireless transmitter would be needed to wirelessly transmit all 6 analogue variables to the DM01 but only one receiver is needed. The receiver can receive the packets of data from multiple transmitters as each has unique packet identifiers which allow the information to be sorted and routed correctly by the receiver.



## ***LED Indication on the Receiver***

During normal operation the status LEDs show a combined status of all channels. Pressing the single push button for a period of less than five seconds allows each individual channel's error state to be shown. Note that channels displayed on the seven segment display with the decimal point shown are disabled and will never show an error or generate any output. Leaving idle for approximately five seconds will terminate this display mode. Alternatively step past the last channel.

The 'C' LED will 'single blip' when operation is normal and 'double blip' when an error is present on any channel. The low battery and fault open collector outputs always indicate the combined status of all enabled channels.

Each channel can be individually enabled and disabled via the configurator allowing unused or unpaired channels to not produce a link fail or to mask another error. This feature also allows a faulty unit to be temporarily disabled to exclude it from the system. Please note that the pairing is not altered or removed so a unit can be placed back into the system by just re-enabling it.

## ***The Concept of Pairing Transmitter Inputs and Receiver Outputs***

To achieve the correct routing of the measured variable from a particular transmitter input to a particular receiver output, DAN uses the concept of "pairing". Pairing can be achieved manually or via the RS 232 connection of the receiver.

All receiver channels must be 'paired' with a remote transmitter channel and be enabled to deliver output. With the internal configurator it is possible to calibrate, test and configure each port. The usual method of pairing would be to put the unit in pairing mode by pressing the push button for five seconds and then each press will move to the next channel. Stop on the one to be paired and move to the remote unit to send a pairing packet to complete the association. All status LEDs will flash and the seven segment display will show the channel being paired for ten minutes before automatically terminating pairing if no channel has been received

The pairing procedure is fully described in the Setup Procedures Section

## ***Calibrating and Mapping Transmitter and Receiver Channels***

Neither the transmitter nor the receiver has any screwdriver adjustments for adjustment of their measuring circuits. All adjustments are carried out in software. This makes it less likely that people will tamper with adjustments and makes for a more secure system.

Each of the 6 analogue receiver outputs is derived from a D-A converter which is set by the circuitry to nominally source 20uA per count with a count range of 0-1000 counts corresponding to 0.00 -20.00 mA sourced output. Thus a 4.00 – 20.00 mA output is achieved with a nominal D-A range of 200 -1000 counts. This is the default calibration of each receiver output. Due to component tolerances, the count values might need slight adjustment to produce the required



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output signal to the accuracy required e.g. 199 counts might correspond to 4.00 mA on channel 1 and 201 counts might correspond to 4.00mA on channel 2.

There is a calibration procedure which is fully described in the set up Section showing you how to adjust the D-A counts to achieve the desired output range.

Once the output is calibrated, the input needs to be set up so that a particular input range corresponds to the calibrated output. DAN calls this “mapping the input to the output.” or “mapping” for short. For example the transmitter range of interest on analogue input 1 might be 175 counts = 0°C and 905 counts = 100.0°C. This range can be mapped onto any available output so that the final result is for example Pt100 on input 1 of the WTX-100 corresponding to 0-100°C = 4-20mA on output 5 of the WRX-100 receiver.

So once the output is calibrated, its calibration need never be touched again except for long term correction of component aging perhaps once per year or per two years as would be normal for any electronic equipment on site.

The ‘**ancal**’ command allows each channel to be calibrated during setup. No restrictions on calibration and mapping values within the 10 bit converter range are forced upon the user. Reverse and normal mapping are all supported. Obviously with no restrictions it is possible to set an output so it will map to a single output value. Output channels have been scaled for a nominal 20mA output at 1000 counts to give maximum range with a small allowance for component tolerances

The measured values from the transmitter can be read on the RS 232 output and noted for the mapping process or the mapping can be done manually. Again this procedure is fully described in the Set Up Section.

### ***Pulse Totalizing***

The pulses are counted in the transmitter and the total count is sent to the receiver in each packet. This count can be read through the RS232 port of the receiver.

The receiver generates a pulse train on its pulse output terminals so that the counts can be totalled up by another counter. The pulse train is nominally a series of pulses of 10 millisecond duration each separated by a space of 10 milliseconds. The length of the pulses and the interval between them can be adjusted via the RS232 port using the “pulse” command followed by a new pulse length in milliseconds. The pulse spacing is always the same length as the pulses.

The number of pulses generated each time a packet is sent is equal to the difference in the new total just received – the previous total received. I.e.

$$\text{Number of pulses NP} = Q(n) - Q(n-1)$$

where  $Q(n)$  is the total received now and  $Q(n-1)$  is the previously received total

So if the total now is  $Q(n) = 1200$  and the previous total  $Q(n-1) = 1155$ , the receiver will generate 45 pulses on the pulse output. If the counter is an electromechanical one, the pulse length



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should be increased to around 35 milliseconds. For the DM01, the default 10 millisecond pulse length is perfect.

The above method relies upon the total increasing or staying constant if there is no flow between packets. If the transmitter battery is replaced the total count will be lost. This would result in an error if the total is less than the previous received total. To resolve this, the transmitter pulse input and the receiver pulse output must be paired again if the transmitter total is reset by removing the battery. See the Setup Procedure. Note that the transmitter total and receiver total are set equal when paired manually. When set via the RS232 port, the receiver can be forced to produce a particular number of pulses by setting the receiver initial total to a value lower than the transmitter total by the require number of pulses difference.

### ***Turning An Output On or Off***

Each receiver output can be turned off or on. This is a useful facility when servicing a transmitter as it disables the link fail alarm for that channel.  
See the Set up procedure for details.

### ***Link Fail Alarm***

This is an alarm output which is triggered when any receiver channel fails to receive an update from its paired transmitter channel.

The full set of receiver commands are listed in Appendix 2 "DAN WRX-100 Receiver Commands"

## **Installation**

### ***Receiver Installation***

The receiver is housed in an IP65 enclosure with a clear lid which allows you to see the digital display and led's. The receiver should be mounted on a wall or other suitable vertical surface using the standard holes moulded into the enclosure edges so that the IP65 seal integrity is not impaired. Avoid making holes in the base of the box as these will allow water ingress which will damage the receiver. If the area where the transmitter is located is always dry, then the IP rating integrity is of lesser concern but in general it is good practice to ensure the electronics is protected from dust and insects as well as water and water vapour. Maintaining the IP rating of the box is always a good idea to lengthen the life of any electronic equipment in an industrial or outdoor environment.

The receiver antenna should be connected to the antenna bulkhead fitting provided on the box. The antenna can be a ¼ wave whip, an end fed ½ wave dipole or a multi-element yagi antenna depending upon the distances to be traversed by the transmitted signals.

DAN has suitable brackets for the 1/2wave end fed dipole antenna and the yagi antenna. The 1/4 wave whip antenna screws directly onto the bulkhead antenna plug.

DAN suggests that the 1/2wave dipole and the yagi should not be mounted directly against a wall as this will distort the received signal pattern and reduce the distance of operation and the signal strength. These antennas work best when raised above roof height so that the signal pattern is as horizontal as possible for best reception.

The receiver requires a 10-32 V dc supply. This can come from a standard dc plug pack or a battery, depending upon the power reliability requirements.

When commissioning the WRX-100 and WTX-100 you will find it easier and quicker if you have a laptop connected to the serial port of the WRX-100 using Hyperterminal to access the set-up. The WRX-100 has inbuilt instructions and the messages produced are detailed and easily understood.

### ***Transmitter Installation***

The transmitter is best mounted vertically and with the cable entry at the bottom. Use one multi-core cable. 7 cores are required to connect to all the inputs:

- 2 cores for the contact closure
- 3 cores for the RTD
- 2 cores for the current or voltage signal

Connect to the marked terminals as per the photograph.

The transmitter is designed to look like an uninteresting piece of PVC pipe so that it attracts as little attention as possible. It should be attached to a bracket of some sort so that it is held clear of any large walls to minimise the absorption of the transmitted signal. For very short range the antenna efficiency will make little difference, but for any distance of 100m or more, the positioning of the transmitter is important to ensure adequate signal is received by the WRX-100.

The transmitter antenna is a 1/4 wave whip which screws directly onto the RF output on the p.c.b. of the transmitter and is fully contained in the PVC pipe body. In some circumstances where long distances are to be traversed between the transmitter and the receiver, the standard antenna might need to be replaced with a yagi antenna which can be pointed towards the receiver yagi so that maximum distance is achieved. Care will need to be exercised to ensure that the antenna connection does not compromise the waterproofing of the transmitter top which is a tight fitting plastic end cap glued in place and not intended to be removed. If you require a higher gain antenna then it is highly recommended that you locate the transmitter under some covering that will prevent rain from hitting the top where the antenna enters. The best solution is to fit a 16mm diameter cable gland to the end cap and feed the antenna coax and SMA plug through the cable gland. The antenna cable can then



**Figure 2**  
**The WTX-100**  
**module**

be gently adjusted to the correct length after the transmitter is fitted back into the housing and then the cable gland can be tightened to make a watertight seal. When opening the bottom screwed cover, the cable gland should be loosened so that the cable can pass into the body of the pipe as the electronics module is slid out the bottom.

### Connecting the Transmitter Inputs

#### How to Open the Transmitter.

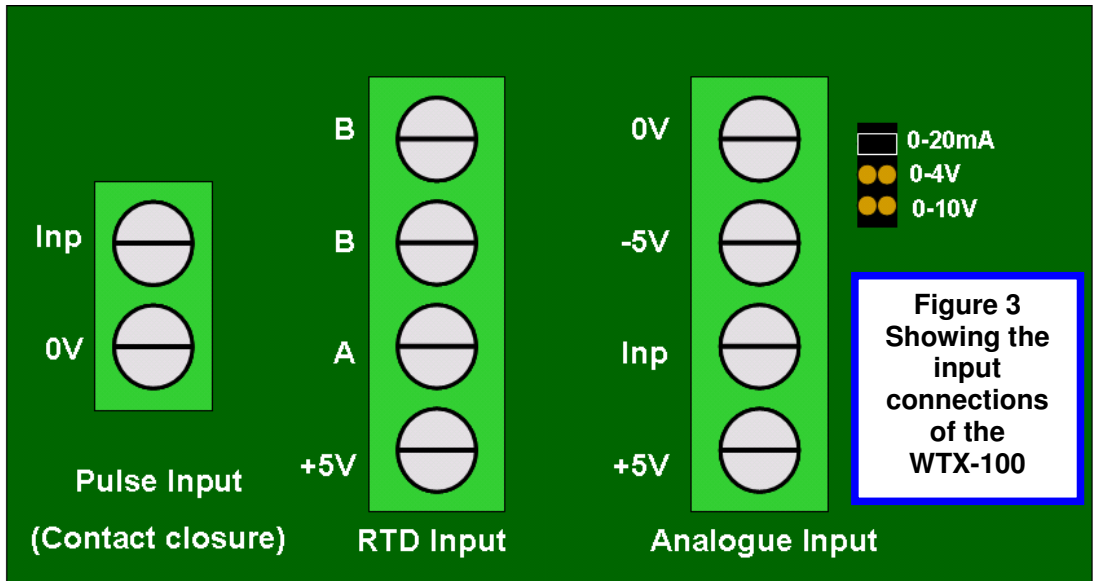
The transmitter has a screwed plug in its base that has a cable gland with a compression fitting through which the input connection cable is passed. Loosen the compression fitting on the cable gland and then unscrew the plug without it twisting the input connection cable. You can now withdraw the transmitter module from the housing. Lift the printed circuit board a couple of millimetres to clear the lip of the end fitting and the whole transmitter module should then slide out easily.

The transmitter has three inputs namely :

- The pulse input (2 way terminal block)
- The RTD input (4 way terminal block)
- The Analogue Input (4 way terminal block)
- 

Whether one, two or all three inputs are being used, the best way for the signals to be brought into the unit is via a multicore cable which feeds through the cable gland recessed in the bottom plug of the transmitter. Then strip back the sheath and separate the wires so that each one input has its wires of the correct length for a neat fit.

Once the cables are connected, locate the transmitter body in position using U Clamps and suitable pipe-work or other mounting arrangement. The transmitter base plug should be only loosely placed in position and the cable gland not tightened yet



#### WTX100 Transmitter Input Connections

The input connections are marked in the above figure.

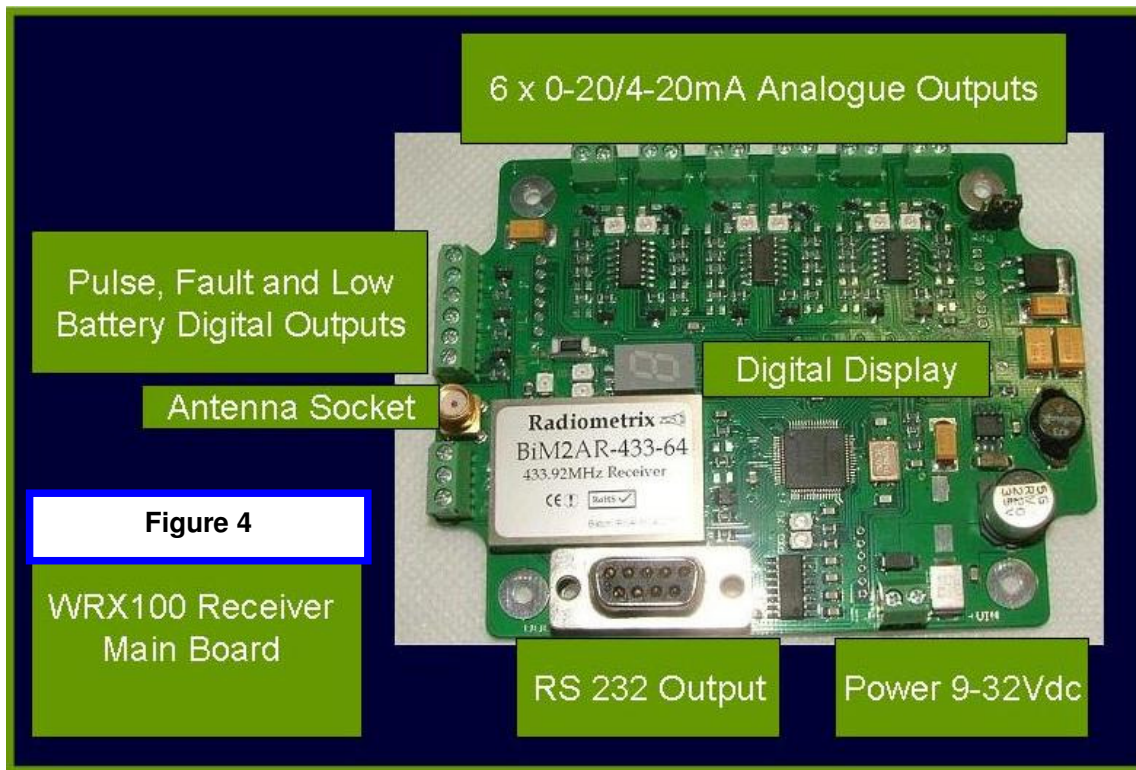
### Replacing the Transmitter Batteries

The transmitter is powered by 4 C Cells connected in series. We recommend that you use alkaline batteries such as Duracell or Eveready to power the transmitter. Slide the transmitter module out of its housing as described and remove the batteries. Remember to replace all four batteries at the same time.

The total pulse count will be reset to zero when the batteries are replaced. If the receiver's total is greater than zero then the transmitter's total will be less than the receiver's total, resulting in a fault. The receiver counting function will be suspended until this fault is cleared. To clear it you will need to pair the transmitter and receiver again. The pairing process forces the receiver to the same count as the transmitter. See the Set up procedure for details.

### WRX-100 Receiver Connections.

The receiver connections are depicted in the figure below:



Note that switch 6 must be on if you are using a microprocessor based RTD calibrator that simulates resistance electronically. The amplifiers of the transmitter are turned off during the sleep time in run mode. The table below shows the switch combinations to use in both run mode (switch 6 off) and configuration mode (switch 6 on). Switch 7 controls the transmitter indication

led's and to conserve as much power as possible switch 7 should be turned off once the transmitter has been configured and paired and the functionality has been confirmed.

## ***Configuring the transmitter***

### **Operation**

The units transmit at a fixed base of between 5 seconds to 30 minutes with some randomness so as to maintain average of the base period from the sensors over time. The randomness makes it statistically impossible for two transmitters to clash repeatedly. The LEDs indicate the current status (when LED DIPSW-7 is ON). LED A will 'single beep' when normal operation and 'double beep' when in configuration mode (CON DIPSW-6 ON). LED B will have a short flash for a normal transmission and a longer flash for any configuration or forced transmission. Both LEDs will have a very long double flash when the soft reset via both buttons is activated or on power up.

The soft reset capability allows the DIPSW settings to be reset after any configuration without affecting any pulse count and gives the ability to change the period or measure time without having to power cycle the unit.

The device continues to operate as normal using the DIPSW settings from the last reset or soft reset during configuration until a button(s) are pressed for more than 5 seconds, then the currently set DIPSW settings apply for that transmission only allowing pairing, and mapping packets to be sent without affecting other channels. All readings are always sent for any packet type.

Either button pressed for five seconds when normally operating will force a packet transmission over and above any current settings. Holding either button continuously will send forced packets every 5 seconds till it is released.

## ***Transmitter Configuration Table***

The following picture shows the DIP switches on the transmitter plus the A and B pushbuttons.





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Function	DP1	DP2	DP3	DP4	DP5	DP6	DP7	DP8
<b>Run Mode</b>								
Sleep Time 5 Sec	Off	Off	Off	X	X	Off	Off = Indic LED's Off On = Indic LED's On	X
Sleep Time 15 Sec	On	Off	Off	X	X	Off		X
Sleep Time 30 Sec	Off	On	Off	X	X	Off		X
Sleep Time 560Sec	On	On	Off	X	X	Off		X
Sleep Time 2 mins	Off	Off	On	X	X	Off		X
Sleep Time 5 mins	On	Off	On	X	X	Off		X
Sleep Time 15 mins	Off	On	On	X	X	Off		X
Sleep Time 30 mins	On	On	On	X	X	Off		X
Measurement Time 1 sec	X	X	X	Off	Off	Off		X
Measurement Time 2 sec	X	X	X	On	Off	Off		X
Measurement Time 5 sec	X	X	X	Off	On	Off		X
Measurement Time 30 sec	X	X	X	On	On	Off		X
<b>Configuration Mode</b>								
Pairing Pulse Input pu1	Off	Off	Off	Off	X	On	Off = Indic LED's Off On = Indic LED's On	X
Pairing RTD input an1	On	Off	Off	Off	X	On		X
Pairing Analogue input an2	Off	On	Off	Off	X	On		X
Reserved	On	On	Off	Off	X	On		X
Pairing Battery Voltage an4	Off	Off	On	Off	X	On		X
Reserved	On	Off	On	Off	X	On		X
Reserved	Off	On	On	Off	X	On		X
Reserved	On	On	On	Off	X	On		X
Map RTD Input An1	On	Off	Off	On	X	On		X
Map analogue Input An2	Off	On	Off	On	X	On		X
Reserved	On	On	Off	On	X	On		X
Map Battery Voltage An4	Off	Off	On	On	X	On		X
Reserved	On	Off	On	On	X	On		X
Reserved	Off	On	On	On	X	On		X
Reserved	On	On	On	On	X	On		X

Set up the transmitter in accordance with the Run Mode once it is configured correctly, paired with the receiver channels and mapped correctly.

So first use the Configuration Mode settings to set the transmitter and then change to Run mode once the transmitter and receiver are working together.

**REMEMBER THE BATTERY CONSUMPTION IN CONFIGURATION MODE IS SOME 500 TIMES MORE THAN IN RUN MODE SO THAT IT IS NOT ADVISABLE TO KEEP THE TRANSMITTER DIP SWITCH 6 ON MORE THAN IS NECESSARY IF YOU WISH TO SAVE BATTERY POWER.**



## Setup Procedures.

There are two methods of setting the WTX-100 and WRX-100 into operation. These are:

- Manually using the pushbuttons on both the transmitter and receiver. Choose this method when the pulse output and analogue outputs of the receiver are to be set up and there is no laptop to set them up.
- Using a computer connected to the WRX-100 RS232 port. This procedure can be used when setting up the pulse and analogue channels and must be used when the RS232 port is to be connected to another device.

## ***Manual Configuration Procedures***

The following are the manual procedures for pairing and mapping. These procedures are the ones to use if you do not have a computer connected to the receiver's serial port

### ***Manual Pairing Procedure (See figure 5)***

1. Set the WRX-100 Receiver to pairing mode by pressing the receiver configuration button for 5 seconds at which time the display digit and the 3 led's will commence flashing.
2. Select the required channel on the receiver by pressing the pushbutton to advance the channel number. One press for each increment. Note the display shows A then n then the channel number or d then o then 1 for the pulse output.
3. Now go to the transmitter and Turn LEDs on (DIPSW-7).
4. Turn configuration on (DIPSW-6).
5. Select channel to pair with DPSW1 – DPSW3 (see table).
6. Hold A-Button for five seconds until the packets are sent. Once they are sent the Display on the WRX-100 will extinguish.
7. Repeat the above steps 1 to 6 for each of the output channels to be paired

### ***Manual Mapping Procedure (see figure 5)***

1. Connect the required input signal to the WTX-100 and first set it to the value to be mapped as the Low Value
2. Turn on DPSW1 and DPSW2 to the required input channel (RTD or Analogue).



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3. **IMPORTANT NOTE DO NOT ATTEMPT TO MANUALLY MAP BATTERY VOLTAGE BY TURNING ON DPSW3 AS THIS WILL INEVITABLY RESULT IN ERRONEOUS OUTPUT VALUES. Battery voltage is only to be mapped via a laptop so that you can access the Low value and the high value of the input correctly.**
4. Set DPSW4 and DPSW6 on
5. Press the A-Button for five seconds till sent. You will note the B led flashes on for almost one second at the end of the mapping.
6. Setup the 'HI' mapping point, onto the input then press the B-Button for five seconds till sent. You will note the B led flashes on for almost one second at the end of the mapping.
7. Repeat steps 1 to 5 for the other input channel
8. Return all switches to your required sleep and measure periods, configuration OFF and press both A & B-buttons for 5 seconds to 'soft reset' settings. Currently set switch settings now apply to all channels.
9. Confirm operation and turn LEDs off (DIPSW-7).

Note: The Mapping Procedure is not required for the pulse output

### ***Configuring the WRX-100 and WTX-100 via a PC***

The configuration procedures described below are applicable to a Windows based PC using Hyperterminal as the configuration software.

With the receiver connected to power and antenna, plug in a serial cable to the DB9 plug on the WRX-100 board or else connect to the headier provided. Connect the other end of the cable to your PC.

Open Hyperterminal. In the following the square brackets [ and ] denote text that you are required to type in to achieve the setup required. Do not actually type the “[ “ or the “] “ The brackets are just for clarity

Type [+++.] The WRX-100 should respond with:

Entering Concentrator Configurator

>

Type [list help] and you will get the following response:



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### Appendix 1 DAN Wireless Data Structure

The DAN wireless structure has been developed to be as intuitive as possible

Here is a typical message packet while the unit is running

**Updated an1, sensor=177, mapped=200**

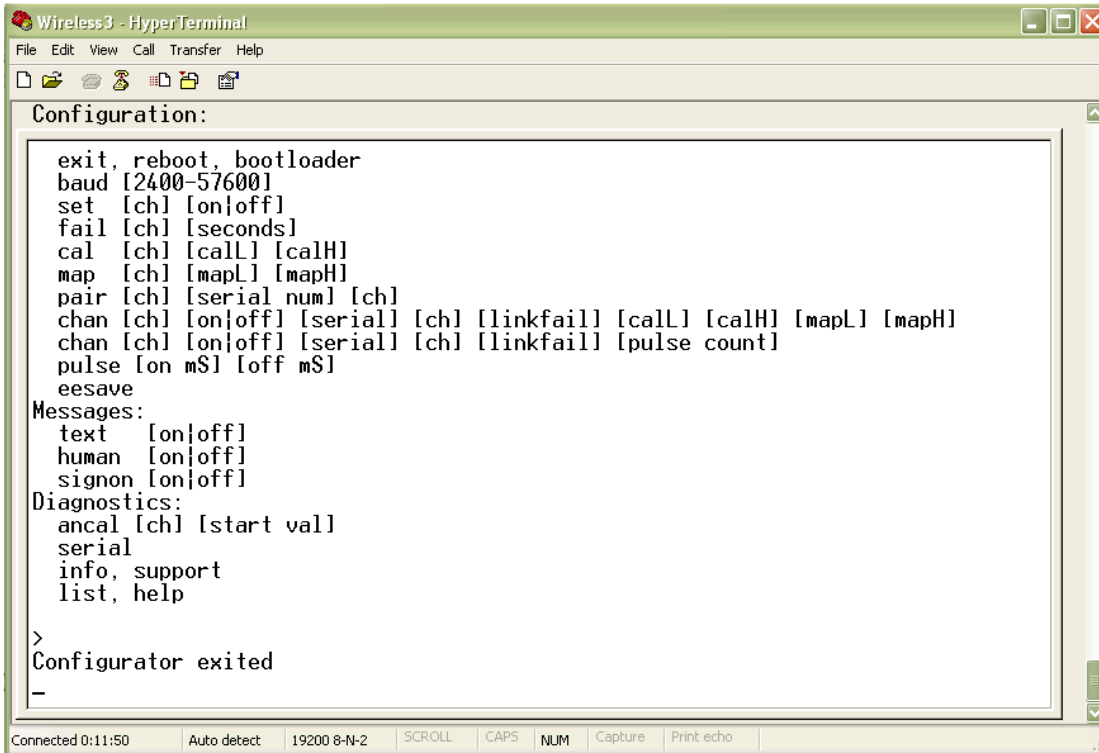
**Updated an3, sensor=289, mapped=1023**

**PERIODIC,514920464,RSSI,206,SEQ,116,S1,M0,c,x,p,b,c,pu1,0,an1,177,an2,0,an4,289**

Let us go through the meaning of each of the fields:

The 'Updated' fields refer to the paired channels. In this example the

## Appendix 2 DAN WRX-100 Receiver Commands



```

Wireless3 - HyperTerminal
File Edit View Call Transfer Help
Configuration:
exit, reboot, bootloader
baud [2400-57600]
set [ch] [on|off]
fail [ch] [seconds]
cal [ch] [calL] [calH]
map [ch] [mapL] [mapH]
pair [ch] [serial num] [ch]
chan [ch] [on|off] [serial] [ch] [linkfail] [calL] [calH] [mapL] [mapH]
chan [ch] [on|off] [serial] [ch] [linkfail] [pulse count]
pulse [on mS] [off mS]
eesave
Messages:
text [on|off]
human [on|off]
signon [on|off]
Diagnostics:
ancal [ch] [start val]
serial
info, support
list, help
>
Configurator exited
-
Connected 0:11:50 Auto detect 19200 8-N-2 SCROLL CAPS NUM Capture Print echo

```

The full set of commands are described below:

### **Configurator Command Reference**

- Current **[ch]** names are an1 to an6, do1 and pu1 for pulse input
- **'exit'**  
Leave the configurator. Configurator will automatically time out after no activity when not in an active command state.
- **'reboot'**  
What it says. ON reboot, the unit displays the current software version The current configuration is saved into EEPROM before rebooting.
- **'bootloader'**  
Before using this command it is advisable to execute the **'list'** command to capture current configuration as it will be erased during the software upgrade.

.Using a serial port terminal program like HyperTerminal @19200 baud enter '+++'  
(without quotes) to enter the configurator. Enter the command **'bootloader'** and when



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'XMODEM NOW!' is shown after the device reboots, start an XMODEM transfer of the newly supplied software file to the device. After a couple of minutes it will have update the firmware and rebooted.

Now the pre-bootload configuration can be restored to the unit by feeding the lines captured with the 'list' command back into the configurator or by manually entering them.

- **'baud [2400-57600]'**  
Without parameters displays current baud rate, with a valid value from 2400 to 57600 it changes the baud rate after the next reboot or power cycle.
- **'set [ch] [on|off]'**  
Without parameters displays currently enabled and disabled channels. Supplying a channel displays only that channels status. Supplying a channel and on or off will enable or disable that channel.
- **'fail [ch] [seconds]'**  
Without parameters displays current link fail times for all channels. Supplying a channel displays only that channels value. Supplying a channel and a value in seconds will configure that channels link fail. Each channel has its own individual link fail time allowing differing settings between channels and device types.  
e.g. fail an2 600 (linkfail on an2 is 600 seconds)
- **'cal [ch] [calL] [calH]'**  
Without parameters displays all channels cal values. Cal values calibrate the output driver circuit to the chosen points typically 4mA and 20mA. The **'anocal'** command would normally be used to set these parameters for all channels in the workshop as part of initial setup. Supplying a channel displays only that channels values. Supplying a channel and both calL and c will set that channels output calibration points.  
e.g. cal an3 200 1000 (set nominal default calibration 4mA and 20mA on AN3)
- **'map [ch] [mapL] [mapH]'**  
Without parameters displays all channel map values. Map values calibrate the remotely paired channels mapping values to the corresponding calibration points in the output driver circuit, typically 4mA and 20mA (at the remote end). Supplying a channel displays only that channels status. Supplying a channel and both mapL and mapH will set that channels remote channels mapping to the calibration points.  
e.g. map an3 200 1000 (set nominal remote mapping 4mA and 20mA on AN3)
- **'pair [ch] [serial number] [ch]'**  
Without parameters displays all channel pairings. With a channel parameter displays just that channels pairing. Supplying an output channel with a remote unit serial number and a remote channel will set pairing for that channel to the remote unit's channel.  
e.g. pair an1 4105 an2 (pair unit 4105/an2 to an1 on this unit)
- **'chan [ch] [on|off] [serial number] [ch] [fail] [calL] [calH] [mapL] [mapH]'**  
**chan [ch] [on|off] [serial number] [ch] [fail] [pulse count]**  
This rather large command allows every value for a channel to be displayed and or configured in one go. This command comes into its own when new software is to be loaded into the unit. Perform a **'list'** command or just **'chan'** command to list current settings. Bootload new software and then feed these lines back into the configurator to re-configure the device to its previous settings before bootloading. The bootloading



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process erases all settings. All values have been described in previous commands. Two versions of the command exist to allow for pulse configured outputs or analogue configured outputs.

- **'eesave'**.  
Allow internal EE status to be saved at any point
- **'text [on|off]'**  
Enable or disable some useful text output messages when setting up channels.
- **'human [on|off]'**.  
Enable or disable incoming packet decoded text output messages
- **'signon [on|off]'**.  
Enable or disable the sign on text output message
- **'serial'**  
Returns the serial number of the unit
- **'info'**  
Returns the hardware and software version information of the WRX-100
- **'support'**  
Returns DAN information
- **Help**  
Lists the WRX-100 commands
- **list'**  
Lists the current configuration of the WRX-100