

# RWLS Bluetooth Connectivity Design

Version: 2.10

Edit date: 3-Jun-2022

## Change History

Version	Who	Changes
1 – 2 /14/2014	Kristopher	Initial version
2 – 6/16/2014	Kristopher	- Add support for simultaneous reading of multiple axle weights. Added "Device Information" service.
2.1 – 7/9/2014	Kristopher	- Updated UUID for axle 0 weight to match UUID used in profile v1. - Added "Cal Config 1" and "Cal Config 2" to name enum.
2.2 – 2/9/2015	Kristopher	- Added characteristics for axle pressure to allow the application to calculate estimated steer.
2.3 – 6/16/2015	Kristopher	- Add discussion about how to allow end-user to re-name the gauge. - Added characteristic to allow the end user to set a custom name for the gauge. For example, they might use this to name the gauge as the Trailer number. - Removed per-axle pressure characteristics because the gauge will now calculate the estimated steer weight value.
2.3 – 9/17/2015	Kristopher	- Use the GAP:Appearance attribute to indicate if the gauge is locked by a Cal PIN code. - Make the "User defined gauge name" read-only if the gauge is locked by a Cal PIN code. - Added a section describing how and when the user is allowed to modify the "User defined gauge name". - Convert system to always transmit weight data in units of pounds regardless of the local UI display setting. The remote user interface will allow the user to select the units of measure independently of the local UI. - Remove the characteristic that indicates the current weight unit used by the local UI.
2.3 – 10/21/2015	Kristopher	- Split out question/answer section into a new document. No change to BT interface specification.
2.4 – 12/15/2015	Kristopher	- Changed gatt definition to allow the host system to program the model-number-string at run-time. No functional changes to the interface exposed to Bluetooth client.
2.5 – 10/21/2016	Kristopher	- Added characteristics to allow the client to read VibratingWire diag values.
2.6 – 2/28/2017	Kristopher	- Extend axle name enumeration to include "cal config 3" and "cal config 4" to work with scale firmware starting at v5.108.
2.7 – 8/12/2019	Kristopher	- Define 2 new UUIDs for reporting diag pressure values for sensor 3 and 4.
2.8 – 12/18/2019	Kristopher	- Update version number to align with new BT module firmware that supports the diag pressure UUIDs for sensors 3 and 4. No other changes to the actual document or BT interface structure.

2.9 – 12/16/2021	Kristopher	<ul style="list-style-type: none"><li>- Update the axle name enumeration to capture many of the new names called for in the top level spreadsheet (maintained by KC) that defines all of the possible gauge input modes.</li><li>- Add 4 additional string UUIDs that are like the Gauge Name string. All 4 additional strings are protected when the CalPin is enabled. The initial use for these strings will be to store authentication codes for the Australian TCA type B system.</li></ul>
2.10 – 6/3/2022	Kristopher	<ul style="list-style-type: none"><li>- Update the BT GATT version to 2.6</li><li>- Add UUIDs for reporting Barometric pressure.</li><li>- Add UUIDs for reporting analog input voltage.</li></ul>

## RWLS Weigh Gauge Profile – Bluetooth 4.0

### Service: Generic Access Profile

UUID = 1800

Security = Open

Characteristic: Device Name

UUID = 2a00

Value = "RWLS-00:00:00:00:00:00"

Properties = Read

Characteristic: Appearance

UUID = 2a01

Value = 0000 = Gauge not locked by Cal PIN

Value = 0001 = Gauge is locked by Cal PIN

Properties = Read

## Service: Device Information

UUID = 180A

Security = Open

Characteristic: Manufacturer Name String

UUID = 2A29

Value = "Right Weigh Inc."

Properties = Read

Characteristic: Model Number String

UUID = 2A24

Value = A string like "201-EBT", or "212-EVW"

Properties = Read

Characteristic: Software Revision String

UUID = 2A28

Value = "<Major>.<Minor><Minor><Minor>"

Properties = Read

Info = This reports the software version of the gauge software.

Characteristic: Firmware Revision String

UUID = 2A26

Value = "2.6"

Properties = Read

Info = This reports the RWLS GATT spec version running on the Bluetooth module.

## Service: RWLS Weight

UUID = 0f9652d2-b1f3-43ff-94bc-2b30d95c5d24

Security = Open

In order to allow the remote application to read the weight of multiple axles without cycling through the available axles, each gauge will implement several weight/name pairs, one for each axle. The following table lists the UUID's for each axle/name pair. Each axle follows has the same characteristics as described for Axle 0 above.

Different gauges will support different numbers of axles. All gauges will implement all of the UUID's listed in the following table. For each non-supported axle, the gauge will report AxleNameEnum value 0. This will allow the remote application to determine which axles to use for weight readouts.

### Axle weight UUID's

Axle	Attribute	UUID
0	Weight(lbs)	baba4957-3cc2-4e47-8af8-d59b23c6c733
	Name	c68223ed-3a76-4c7c-9b1d-06ee8daa9eaa
1	Weight(lbs)	ce014254-c5bd-42af-a67a-2ab91156ec6b
	Name	d1d15f56-c9c1-4aa7-ba05-3fb91a024a23
2	Weight(lbs)	003481b90-3fb5-4cc3-bb55-fa8c436709e
	Name	8bd62e7b-dd15-47ed-bdda-ee1f49ca50c5
3	Weight(lbs)	24f380c2-74ac-4510-8df6-f4461e3c6a6f
	Name	358277a5-e79d-4703-9f99-fd071fdf7922
4	Weight(lbs)	57ada721-3e24-4b39-9987-7601b4767e53
	Name	c3598046-f9a1-49d5-b389-f4c723b61ea4
5	Weight(lbs)	7d2ea577-c73e-435f-9610-5ea12a04db6a
	Name	1cc79e99-eb52-41e3-aada-21e3a24ff9ed

Characteristic: User defined gauge name

UUID = 056198e0-f80c-4fbf-baaf-844d62a8704f

Value Length = string, 20 chars max, string does not need to be null terminated

Properties = Read-write if appearance is 0, Read-only if appearance is > 0.

Write return values:

0x00 = success

0x80 = string too long

0x81 = value read-only due to CalPin lockout

Description = By default this string will be the same as the BT device name. The user can write a custom name into this field so the RWLS app can identify the gauge by the user defined name. The user would likely write the truck or trailer number into this field so various users within a fleet would be able to visually pair to the gauge by looking at the truck/trailer number when they are pairing to multiple gauges on different days or for different jobs.

If the user has locked the gauge with a Cal PIN code, then the user defined gauge name will functionally become read-only. The GAT database will still report that the characteristic is read-write, but any writes to this value will be blocked.

If the gauge is locked by a Cal PIN code and the user wants to update the user defined name, they can temporarily make the name writable by doing the following.

1. Turn the gauge off – but leave power applied to the gauge
2. Press and hold both the CalHi and CalLo buttons, then press the power button
3. Press the “Menu/Enter” button. The gauge will display “-----”.
4. Enter the cal pin. If the user enters the correct pin, the display will show “Good”.
5. While the gauge is displaying “Good”, the user can update the gauge name via the application.
6. After the name has been updated, press the power button. This will make the user defined name read-only and will not modify the users cal pin value.

Characteristic: Aux String 1

UUID = 102d6657-0ae8-4c47-8409-0b657dcc78e8

Value Length = string, 20 chars max, string does not need to be null terminated

Properties = Same permissions as the "User defined gauge name" string.

Characteristic: Aux String 2

UUID = 947566ae-8927-410c-9e38-652cec64870a

Value Length = string, 20 chars max, string does not need to be null terminated

Properties = Same permissions as the "User defined gauge name" string.

Characteristic: Aux String 3

UUID = 122063ec-5e34-46d3-a528-09d65961aa04

Value Length = string, 20 chars max, string does not need to be null terminated

Properties = Same permissions as the "User defined gauge name" string.

Characteristic: Aux String 4

UUID = 17160881-6530-4f04-98a9-0f0f65ed1958

Value Length = string, 20 chars max, string does not need to be null terminated

Properties = Same permissions as the "User defined gauge name" string.

## Diagnostic UUID's

Diag Item	Value Unit	BT Properties	UUID
PSI Sensor 1	Scaled PSI	Read, Notify	e4533146-dac9-4908-a1f5-f06e125c676d
PSI Sensor 2	Scaled PSI	Read, Notify	1caa90ca-62ab-4046-ac0a-a47a8c02a961
PSI Sensor 3	Scaled PSI	Read, Notify	b478ced4-1621-417c-b3bb-090b30781cc3
PSI Sensor 4	Scaled PSI	Read, Notify	75fe2ad6-8ce4-46dc-a2b5-1a877c5779c7
VW Sensor 1	Scaled Hz	Read, Notify	7aa590d3-3ec7-4f1a-bbb5-53115c561c5f
VW Sensor 2	Scaled Hz	Read, Notify	549fe015-ed7-4c68-88d6-f4d5375ef607
VW Sensor 3	Scaled Hz	Read, Notify	9dd11602-4eb8-4fc9-a822-02a80de52446
VW Sensor 4	Scaled Hz	Read, Notify	f9a7f88f-17d7-45fd-9ae4-0923bdc71930
Barometric PSI	Scaled PSI	Read, Notify	881ddff9-ce98-4815-82f8-0710ef5afaa5
Analog Input Voltage 1	Scaled Volts	Read, Notify	e08d7d95-8646-4a32-9d5a-2ca621d2b394
Analog Input Voltage 2	Scaled Volts	Read, Notify	1140b722-cfd7-4ab9-8445-731169f4b9ca

Diagnostic value scaling and unit descriptions:

**Scaled PSI:** These values represent the absolute pressure detected by the PSI sensors. The value is a floating point number that is represented using unsigned integer. To convert the unsigned integer into a floating point pressure value, divide the value read from the Bluetooth interface by 100.0.

**Scaled Hz:** These values report the frequency of the Vibrating Wire type sensors. The frequency values are read over the Bluetooth interface as unsigned integers. To convert the unsigned integer into a floating point frequency in units of Hertz, divide the unsigned integer by 100.0.

**Scaled Volts:** These values report the voltage of the analog inputs. The floating point voltage number is read over the Bluetooth interface as a scaled unsigned integer. To convert the unsigned integer into a floating point Voltage unit, divide the unsigned integer by 10,000.0.

## Enumerations:

**WARNING:** Only add new items to the end of this list.

Enum Name	Axle Name Enum
Enum Value	Meaning / Name
0	Axle not configured
1	Axle Group 1
2	Axle Group 2
3	Axle Group 3
4	Axle Group 4
5	Estimated Steer Axle
6	Measured Steer Axle
7	Drive Axle
8	Trailer A
9	Trailer B
10	Cal Config 1
11	Cal Config 2
12	Cal Config 3
13	Cal Config 4
14	Lift Axle
15	Lift Axle 1
16	Lift Axle 2
17	Front Axle
18	Rear Axle
19	Drive Axle 1
20	Drive Axle 2

## Configuration examples:

### Single air input gauge – average mode

There is only one weight calculated in this mode. The weight will be reported through the axle-0-weight descriptor. The name for the first axle will be "Axle 1".

### Single air input gauge – 2CAL mode

There are two weights calculated in this mode. The descriptors will be used as follows:

Axle-0-weight = weight calculated using the first calibration set

Axle-0-name = "Cal Config 1"

Axle-1-weight = weight calculated using the second calibration set

Axle-1-name = "Cal Config 2"

