Davis Weather Stations KB - Prodata Weather Systems

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Prodata Weather Systems

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General – please read

> ✳ **Troubleshooting:** This knowledgebase (KB) provides *troubleshooting* advice for existing Davis weather stations (mainly Vantage Pro 2 and Vue models); for Weatherlink data loggers; and for other specialist accessories such as MeteoBridge. For UK/EU **pre-purchase** questions, please see our main website.

> ✳ **Prodata customers:** Please use this KB as a first port of call for troubleshooting. For problems which cannot be resolved please refer to our general guidelines for contacting support. Using self-help as a first step will help get your problem fixed quickly and allow us to deploy our support resources to best effect.

HOW TO USE: This knowledgebase is designed to be easy to use, but please be sure to read the 'How to use' topic for a few basic tips.

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ACCESS: This KB is primarily intended to assist customers of Prodata Weather Systems. Access to other users is not guaranteed and may not be freely available in future.

STATUS: This KB is frequently revised and extended. Most topics are reasonably up-to-date, but a few are still in progress or identified simply for future inclusion. Please let us know if there are any further topics that you feel are missing or ought to be a priority to add/complete. Comments on any information that could be out of date or incorrect are also welcome.

SALES ENQUIRIES: Full details of weather station systems from Davis and other reputable makes are available on the Prodata Weather Systems website and its associated secure online shop. Please note that we can only usually ship to addresses in the UK and EU.

> ❗ **Comments:** You are welcome to add ratings and comments to topics, but please remember two things: First, we are **not** Davis; we cannot answer for them and can only provide free support to our own customers. If you have an unresolved problem then contact your own supplying dealer. Second, comments should relate to the usefulness of the information provided here – it's not helpful to mark down a topic just because your hardware might have

developed a fault. Comments should rate the information provided here and not the hardware please.

How to use this KB – please read

Using this knowledgebase

This knowledgebase is designed to be viewed on-screen in a standard web browser and should be easy and intuitive to use. Individual topic pages may be printed off if you wish using the Print icon at the upper right of each topic page.

The knowledgebase is organised as a series of topics and subtopics grouped into a hierarchy of broad top-level categories. These categories form the skeleton of the Table of Contents which can be viewed to the left. The top-level categories are always visible within the table of contents and clicking on the arrow icon to the left of a top-level category will simply show or hide the set of topics associated with that category.

To view the contents of a topic simply click on its entry in the table of contents and the topic content will appear in the main pane to the right.

Top-level categories also have content (click on the category text itself and not on the icon arrow to its left). Sometimes this will be just a short introduction to that category, while other categories may contain more important guidance describing how help for that particular category is organised..

> ✱ **The table of contents (ToC) will, by default, always be visible to the left.** You can opt to hide the ToC by clicking on the vertical tab – look for the '**<**' symbol – that should be visible at the top right of the table of contents (on PC screens – tablet/phone screens will vary). Once hidden, a new vertical tab should appear, this time to the upper left of the main topic content pane and clicking this left-hand tab should restore the ToC. This is quick and easy to show and it's well worth trying this show/hide feature – it will make reading the KB distinctly easier on any narrow browser screen. *(If for any reason the table of contents fails to show up again then please just refresh the page in the browser – this should force the menu to reload.)*

You can move around within the table of contents at will. There are often internal links within a topic content to another topic. Clicking this internal link will take you directly to the new topic and will move the highlighter in the table of contents to its correct new position.

Vue vs VP2 stations

This knowledgebase covers the two main ranges of Davis weather station – the Vue and VP2 models. (The new Davis Enviromonitor range, introduced in 2017, is not included here.) Vue and VP2 models are

obviously rather different designs catering for distinct markets and applications, but troubleshooting advice is broadly similar for both station types and essentially identical in some areas like Weatherlink logger issues. So the KB does not contain separate Vue and VP2 sections but advice about the two station types is instead intermingled within the same troubleshooting sections with specific notes about each type, where relevant. There is the occasional subtopic on one model type or the other such as the [description of the Vue ISS](#) where this is helpful for clarity.

Search

If you cannot find what you're after from simply browsing the knowledgebase then please don't ignore the Search option in the main title bar at the top – these may often be able to reveal words or phrases that are buried within the content of individual topics. If you try to search for a term that you think should be searchable but fail then please let us know using the Comments option at the bottom of each topic page.

Public vs private knowledgebases

> ✳ This knowledgebase will, in future, be available in two versions: public and private. The private version will contain significantly more detail on various fault issues and remedies but is available only to our own customers. Other users may request access on a paid-for basis. This split has not yet been implemented.

Other points

Can we encourage you to use the Yes/No voting buttons and Comments/Feedback option at the foot of each page – this will help us to refine the knowledgebase further over time.

Davis Support resources

This knowledgebase is intended to be a self-sufficient troubleshooting guide for modern Davis stations. But there are various additional resources available both from Davis and more generally on the web which offer more technical detail on certain specific topics. Listed below are the Davis Support resources, while some links to third-party websites dealing with particular topics can be found on the External Links page.

> ❗ **Davis website update:** Be aware that Davis released a total update to their website in June 2016, with a completely new navigation structure. As a result, some of the links to Davis resources in this KB may no longer work. To the best of our knowledge, all cited resources are still available and in many cases there should be a redirect link to take you to the right place. But some commonsense may also be needed to work through the new navigation structure to find a particular resource. We will aim to update the various KB links asap but this may take a while to complete fully. *NB The old Davis website is still currently available if you change ''www' in any old Davis URL to "www2".*

Instruction manuals

First and foremost, please take the time to read the instruction manuals that are supplied with each new Davis product **before** you contact support with a question. These are well-written and contain all of the basic information that you need to understand how to install and use your weather station. Don't overlook the small 'Quick Reference Guide' which is an excellent aide-memoire for operating the console buttons and functions. If you've mislaid any of the original manuals then please see:

Davis PDF manuals: Copies of all Davis manuals are available for free download from the support section of the Davis website. You simply need to choose which product category you're searching for and then pick the appropriate manual from the list. The indexing isn't great, but with a little exploration and perseverance you should be able to track down the exact manual that you're after.

Weatherlink software support

As with most software, comprehensive instructions and information for using the Weatherlink program is provided by the Help menu which is available from within the program once it has been installed. It is well worth taking the time to review the very detailed information that is available within the Help system – there are very few Weatherlink questions that are not answered here, but do use the Index and Search functions to help locate answers to specific questions. Don't forget that in addition to full descriptions of all of the menu options there are also important sections on 'Technical Reference' and 'Data Calculation' which

answer many of the more detailed technical questions on how individual weather parameters are defined and calculated.

Davis support website

The support website will be found at: www.davisnet.com/weather-monitoring/#resources and contains several categories of support resource for reading/viewing and for download. The main and more useful categories are linked below:

Application Notes

www.davisnet.com/support/weather/support_docs.asp?dtype=3

Application notes provide additional background and supplementary information on a range of topics. Some notes such as AN28 'Derived Variables in Davis Weather Products' (which explains in detail how the various derived variables displayed by Davis stations are calculated) are a goldmine of information about specific topics, while others relate to much narrower topics. Several of the notes are at least a few years' old now but still contain relevant information.

Video Instructions

www.davisnet.com/resources/weather-monitoring/#video

There are two videos currently on the Davis site, both relating to maintenance on the VP2 ISS, one covering replacement of the temperature/humidity sensor and the other replacement of the wireless transmitter board. Both procedures are pretty straightforward but it can be very useful to watch someone else doing it first and to pick up one or two practical tips. The videos don't quite have Hollywood production values but are still worthwhile to view. It may often be better to download each video and then view rather than trying to stream them.

Curiously, there are also some additional Davis videos that are well worth a look, but which are not currently (April 2016) listed on the Davis video support page, including:

- Installing a Vantage Vue station

- Backing up Weatherlink data

- Upgrading the WeatherlinkIP firmware

These are all viewable via the links given above on the Davis channel on Youtube.

Software Downloads

www.davisnet.com/support/weather/downloads/index.asp

The link above provides software downloads in four distinct categories – you will need to look carefully for the particular download that you're seeking. Be especially careful that any firmware download is for the specific console that you have – do not confuse cabled and wireless models, they have different firmware and be sure to read any notes alongside the download before proceeding – some downloads apply only to console types of a particular age or version.

Please be aware all Weatherlink software downloads are **only** for updating an existing software installation (ie one made from the original CD). There are no free software downloads available for the full Weatherlink version. If the original CD has been lost then regrettably a new CD will need to be purchased.

In addition to the above, which covers all the main downloads that should be needed, there is a supplementary download area at:

toolbox.davisnet.com/downloads/

This contains a few extra utilities and drivers to cover old or otherwise unusual configurations and utilities to help with troubleshooting.

Specification and data sheets

Full accuracy, mechanical etc specifications are available for all Davis products in specifiaction documents and data sheets available at:

www.davisnet.com/support/weather/support_docs.asp?dtype=2

Contacting UK support

Getting help

Please remember that there is troubleshooting help included towards the end of the manual for every Davis weather station. We strongly encourage you to review this troubleshooting information and to carry out any checks that are suggested there before seeking further help. But if you cannot resolve the problem then please read on:

If you're a customer of Prodata Weather Systems

First, PLEASE look for an answer in this knowledgebase to start with. There may well be a simple answer or fix to your problem that's described here. But if you can't find a solution or if there seems to be a real problem that needs a repair or replacement part then please read on:

Please contact us **immediately** on receipt in the unlikely event that any items appear to be missing or faulty out of the box. Otherwise:

If you have an in-warranty Vantage Vue station more than 4 weeks old:

Please contact the Davis UK Service Centre in Portsmouth for support by phone on 023 9262 3808. When the service centre is busy you may need to leave a voicemail and they will call you back.

For all other in-warranty support requests

> **!** Please log a new support request with us by clicking on this link: <u>Open a new Support Ticket</u> and fill out the form with as much detail as possible. It is only necessary to create a new ticket when you have a new issue. If you have a support issue that is ongoing and the ticket has not yet been closed then please continue with the email exchange that has already been started.

Please only make support requests online as detailed above. This helps us considerably to provide a good, prompt support service because it provides an automatic and trackable record of the details of your support request.

Important: Please supply details of your system on the form – ideally the date and invoice number of your purchase – together with a short but clear description of the apparent problem and the name & address (including company details where relevant) under which it was bought. If you no longer have the invoice details then we need to know the Manufacturing Code (Mfg Code) for your system, similar to a serial number. Another topic describes [how to find the Mfg Code](#).

Regrettably we can only help our own customers with in-warranty support issues (unless you're seeking paid support or wish to buy Davis spares – we do carry have a wide range of Davis spares and accessories for sale, which are available to all EU-based users.);

For all out-of-warranty service requests

Please contact us by email as above to purchase spares or for an estimate for a repair.

Returns to Prodata

If – and please only if – you've already contacted us about a problem **and we've agreed** that you should return a part to us at Prodata for investigation/repair then please proceed as follows:

- Pack it carefully to survive rough handling in transit and include no more parts than are requested. For example, for anemometer repairs it is not usually necessary to include the wind cups which are more easily damaged in transit;
- Be sure to **include your name and address** (most important – you'd be surprised by how often people forget this!) AND a brief description of the problem AND a note of the purchase date (if still thought to be under warranty);
- Send it by a signed-for service to ensure that the package can be tracked, eg in the UK
  Address it to our sales office in Littleport at the address below. NB The official Davis warranty is an RTB (return-to-base) warranty.As such, the customer is responsible for the cost of returns for service.

Address for returns

> Prodata Weather Systems
> Unit 7, Espace North Building
> 181 Wisbech Road
> Littleport, Ely, Cambs CB6 1RA
> United Kingdom

If you bought your weather station elsewhere

If you purchased a system from a different UK dealer then please contact them for in-warranty support.

For international users the support & service arrangements will vary according to the country in which you purchased your Davis system.

Please remember that dealers can typically only support the version of the Davis station designed for sale in their country. So, for example, only OV-specification wireless parts are readily available in the UK and EU; the equivalent US wireless specification parts are simply not stocked;

Common issues and fixes

Remember that the instruction manuals for all consoles and sensor transmitters contain troubleshooting information for common problems (usually towards the end of each manual). It's always worth consulting these manuals as a first step before searching further on this knowledgebase. If your manuals have become lost or mislaid then PDF copies may be downloaded from the Davis website – see the External links topic.

This page provides shortcuts to topics that describe how to troubleshoot and fix relatively common issues. (Topics with no links indicate that the topic is still in preparation.)

- No logger communications

- Archive download issues

- Low battery warnings

- Wind speed reads zero

Find Product No & Mfg Code

You will often need to know the exact **Product Number** and **Manufacturing Code (Mfg Code)** of a station component to order the correct spare part or to assess compatibility of old and new parts. The Product Number and Mfg Code are two quite separate identifiers and you will often need to know both – the Product Number is a part number while the Mfg Code is a serial number, which helps to determine the age and version of the part.

Both Product Number and Mfg Code will be found on the label attached to every Davis main component. The weather station components are broadly of three types:

- Sensor transmitters
- Display console units
- Weatherlink data loggers

Every Davis station has an ISS (Integrated Sensor Suite) as its main **sensor transmitter**, but some stations will have additional transmitters such as anemometer and soil moisture transmitters. Labels for the sensor transmitters will be found in one of two places:

- For Vue ISS units the label is on the underside of the ISS;
- For all other sensor transmitters the label will be found on the internal transmitter board cover, which should be obvious once the transmitter's outer door is open. For VP2 ISS units the outer cover needs to be slid up to reveal the label. All other supplementary transmitters will have a hinged door and again the label can be seen once the door is open.

The label for **consoles** is simply on the back of the console (or on its underside for the Envoy console).

The label for **loggers** is on the side of the logger that faces into the console when installed.If you need to read a logger label then the logger must be removed from the console (the console must be powered fully off when doing so and also when reinstalling the logger). (Note that the Mfg Code label for WeatherlinkIP loggers is **not** the label with DID and Key details attached to the network connector.)

Product Number

The product number is the main Davis catalogue reference number, eg 6152UK for a wireless VP2 station or 6250UK for the Vue or 6332 for the anemometer transmitter. There are two important points to note on the product number:

First, the same ISS and console units may show as two different product numbers depending on whether they were bought as part of a complete station or as a separate item. The product number will show as the *complete station* number (eg 6152UK or 6250UK) on both ISS and console if originally bought as such. If bought as separate items then the console and ISS will show as, for example (but obviously depending on the exact part), 6312UK and 6322OV respectively. There is no functional difference between eg a 6152UK console and a 6312UK console, the label is simply indicating whether the part was originally part of a complete station or not.

Second, it is important that the complete product number (including letters at the end) is noted. A 6312 console is different from a 6312UK console and the two cannot necessarily substitute for one another.

Note: Only main components have a label showing a product number. Smaller sensor parts and sub-assemblies will all have Davis numbers, but the spare parts list is needed to identify these. It's often the case that a part built around a small PCB board will be seen to have part and version numbers on the board, but these are typically the part numbers of the bare unpopulated PCB board itself and are of no use in identifying the part as a whole. Don't be misled by these PCB numbers.

Manufacturing Code

The Manufacturing Code (or Mfg Code) is a unique identifier for each main component of the weather station and is essentially the same as a serial number for that unit. The Mfg code contains the date of manufacture of each unit together with some additional information that denotes, for example, the version of that particular part. (Davis models are typically produced over a period of several years, but individual parts are often released in a new improved version and for compatibility and replacement purposes it can be important to know the version currently installed.)

Two different formats for the Mfg Code have been used over the years ('A' denotes a letter, 'd' a date digit and 'x' a digit):

- Older format is AdddddddAxx (eg **E130710F89**)
- Current format is AAdddddddxxx (eg **MC130311013**)

But the meaning of the fields is essentially identical, despite the slight change in order:

- The first letter is the major revision level
- The second letter is nowadays the minor revision level (perhaps other uses in past years)
- The next sequence of 5 or 6 digits encodes the date of manufacture as YYMMDD – 6 digits is the standard now but prior to 2011, 5 digits was used as in YMMDD.
- The final digits simply indicate which number within the production batch was allocated to that unit, eg 013 might indicate unit 13 out of a batch of eg 200 (or whatever the batch size was on that day)

Thus unit E130710F89 was major revision E, minor revision F, manufactured on 10th July 2013 and unit 89 in the batch.

NB In general, ISS and console in a complete station will tend to have identical Mfg Codes. But occasionally this rule is broken during production and for 100% accuracy it's a good idea to check codes for **both** ISS and console. (Of course, if the transmitter board or console have ever been replaced at any time then the numbers can be completely different.)

Service life of Vue & VP2 stations

Introduction

We're often asked to comment on two related questions: What is the expected service life of a new Davis weather station and when is it time to consider replacing an elderly Davis station with a new one? This topic addresses both questions.

Expected service life

Inevitably this depends on circumstances to some extent. Sensors at coastal locations and sited so close to the sea that there's a significant concentration of salt spray in the air will unavoidably age more quickly than those sited inland. And anemometers at exposed hill-top sites with frequent high winds will see more wear than those in more sheltered locations. Maintenance such as regular cleaning of eg the rain gauge and prompt attention to low batteries (to prevent leakage from dead batteries) will also help prolong service life. But insofar as any estimate of average life is possible then here are some background & guidelines:

- The warranty period for Davis stations bought from ourselves is 2 years (recently increased from one year). This covers faults that might reasonably be attributable to manufacturing defects (and obviously not to eg accidental or lightning damage, which may be insurable separately under your own domestic or commercial insurance policies);
- A reasonable expectation is that the station might, on average, operate without repairs for about a five-year period. This is not a guarantee – as with all manufactured products, the occasional unit may have a problem within this period; it is simply a statement of typical operating experience;
- In general terms, it's usually found that the station components housed indoors in a warm, dry environment can last many years but the outside sensors, especially anemometer and temperature/ humidity sensor, will often require or benefit from replacement during the second 5 years (ie the 5-10 year period) of a station's life;

Overall therefore one might reasonably expect that a new station might have an operating life of up to 10 years, provided repairs are carried out as necessary, especially during the second half of this total period. There's no sudden deterioration at the 10-year point, indeed we know of quite a number of Davis stations that are still operating successfully at 15 years and more. But at 10 years and older, the technology and specification of a station also becomes progressively more dated, in addition to general ageing of the station.

Remember also that it may be increasingly difficult to source certain spares as the station ages further. Although Davis model designations such as Vue or VP2 have a long production life, the designs regularly evolve and, for example, few of the spares for original Vue ISS models are identical to the latest parts. Davis do have a policy of maintaining a supply of spares for 5 years after production of a given model ends and, in practice, the majority of spares continue to be available for a long time thereafter. But there are sometimes reasons why there is only a finite factory reserve of a given spare (such as the temperature/humidity sensor on an original Vantage Pro model) and once this is exhausted then the spare can become very difficult to source.

When to replace a Davis station

Most Davis stations will give long and valued service, but there will come a point where a replacing the station either completely or in part needs to be considered. This may be because the user prefers to switch to a complete new station with updated specification and technology, and new features. Or, given that the console and logger typically have a longer service life than the outside sensors, it may be that a new ISS unit alone (which is readily available for most Davis stations) might be the most cost-effective solution. Overall there are three further reasons why a full or partial replacement station might need to be considered:

- The supply of a specific spare might have been exhausted;
- Cost considerations;
- Compatibility issues;

The issue of **spares availability** has been discussed at the end of the previous section above. It is, fortunately, only rarely a problem, but when this issue does crop up it may be very tricky to work around, short of replacing larger parts of the station.

The **cost aspect** arises because, as with most manufactured products, the cost of supplying individual spare components is high relative to buying them in a complete finished assembly such as the full ISS (which also includes a new anemometer for VP2 models). It's certainly the case that if only a single component needs replacing then it's cost-effective to replace just that component. But for an ISS that's perhaps 7-8 years old (and, as above, it's usually the ISS or other sensors that this applies to, rather than the usually long-lived console or logger) then inevitably all of the sensor elements will be ageing together. The anemometer bearings will have recorded many millions of cup and vane rotations, the reed switch in the rain gauge may be approaching its service life and so on, and the ISS after many years outside in all weathers will probably no longer look in mint condition cosmetically.

It can, however, be a false economy to replace two or three different spare parts on an ageing ISS (eg the temperature/humidity sensor may need changing now, perhaps a new anemometer might be needed next year, and so on) because the total cost will exceed that of buying the complete new ISS. It is very much the

user's choice as to whether they replace individual sensor parts as required – provided the spares remain available then there's no reason why this approach cannot continue indefinitely – or decide that a complete new ISS might be a more cost-effective option in the long run. In general, we would suggest that for sensor replacements on an ISS that's 6-8 years or more old then it's well worth considering whether or not a new ISS, or indeed a complete new station, might not be a better option.

Compatibility issues must be considered carefully. Although Davis typically keep particular models in production for many years, there can be important changes of specification during that time and newly purchased parts simply may not be compatible with older stations. It's always a good idea to talk to an experienced dealer before buying a new part just to double-check this aspect. Some examples of major compatibility issues include:

- Temperature/humidity sensors on 2004/5 era VP2 stations are no longer available and cannot be substituted by the more recent type;
- There is the 'green dot' logger issue, which prevents older Weatherlink loggers being used with console manufactured over the past 2-3 years – see the green dot topic for further information;
- Original Vantage Pro (VP1) wireless and cabled parts are incompatible with the equivalent VP2 parts. (VP1 stations have now been out of production for over 10 years and the great majority of VP1 components are no longer available. See the VP1 topic for more details.);

External links

Lexingtonwx anemometer guide A detailed repair guide to the Davis 6410 anemometer as used in the VP1 and VP2 stations. Note that this guide has not been updated to cover the version of 6410 anemometer manufactured since 2013, which uses a solid-state magnetic switch in place of the original reed switch and is of a different detailed construction; but the broad principles of operation should still apply.

Davis logger API Full details of the programming interface for the Davis Weatherlink loggers (and applicable to all Vue, VP1 and VP2 stations) is available in a document called the 'Serial Tech Ref' or Communications Reference, which is downloadable from the link shown. Note that the interface has many available commands and is binary in nature (ie weather data as simple text strings is *not* available from most of the loggers). But once the binary format of the data output is understood, communications can be set up from newly coded programs using only a very few of the available commands.

Davis Message Protocol 'Hacking' Various (largely successful) attempts have been made by interested amateurs to reverse engineer the communications protocol used to transfer message packets between ISS and console. (ie as distinct from the API between logger and computer, which is fully and publicly disclosed in the preceding topic; whereas Davis have never publicly commented on the ISS/console protocol at all.) Several users have collaborated to build up the overall picture and the link given will provide a way into this topic for anyone who is curious.

Glossary

Glossary/Abbreviations

Enviromonitor: This is a completely new range of Davis environmental monitoring equipment launched during 2017 and which is not specifically covered in this KB (although some of the sensor troubleshooting information here may be relevant). Enviromonitor is actually an existing Davis branding that was previously used in the early 2000's for a special 'advanced' version of the Weather Monitor II generation of stations. The old and new (2017) ranges are totally different – don't confuse old and new Enviromonitor systems.

ISS Integrated Sensor Suite: This is the Davis term for the main sensor assembly and sensor interface module (SIM board) which sits outside in the weather and actually generates the raw weather readings. On a standard Vue or VP2 system, the weather station will consist of two components: the ISS and the display console. On a VP2 system the anemometer is also included when a new ISS, which is available as a separate spare, is purchased.

Meteobridge: Specialist devices from Smartbedded UG for processing data from Davis weather stations (and also from other makes). Meteobridge Red devices can receive data direct from Davis Vantage sensor transmitters without requiring a Davis console receiver.

RSSI Received Signal Strength Indication: This is a measure of the strength of the wireless signal as received at the Vue and VP2 consoles from different transmitter types.

SIM board This is the Sensor Interface Module – the circuit board that is a key part of the ISS. Each of the individual outside sensors plugs into the SIM board, whose circuitry processes the raw readings and transmits the data in packets back to the console by cable or by wireless according to the type of station.

VP1 The abbreviation commonly given to the original Vantage Pro weather station manufactured by Davis from 2000-2004. The VP1 was never known as such during its lifetime, being referred to as simply a VP station, but with the advent of the new generation of VP2 stations there was a need to distinguish old and new versions, hence VP1 and VP2. Note that most of the parts of VP1 and VP2 stations are not compatible with one another (because the communications protocol is incompatible), although a few of the basic sensors such as anemometer and rain gauge are interchangeable.

VP2 The current generation of Davis Vantage Pro 2 weather stations.

WL A Davis Weatherlink product. In fact, 'Weatherlink' is the name used by Davis to refer to all of: the Weatherlink logger, the Weatherlink software and the Weatherlink pack, which always includes both logger and a 'free' copy of the WL software.

WLIP The 6555 WeatherlinkIP logger.

WMII The Davis Weather Monitor II stations, which were the mainstream Davis stations before the VP1 stations were launched and whose manufacture ended about 2005.

WWIII The Davis Weather Wizard III stations, which were a more limited companion product to the WMII stations and of the same era.

Vue and VP2 consoles

This category mainly covers issues related to the Vue and VP2 consoles. But it also includes topics where both console and ISS may be involved, eg wireless range.

Note that issues to do with the **Weatherlink logger** are covered in the separate logger category – please look there for problems with software configuration, data downloads etc.

The notes here also assume that the user has a copy of the relevant console manual to hand and that instructions for making and checking the various console settings are already understood. PDF copies of the manuals are available for download from the support section of the Davis website.

Rebooting the console

Console/logger faults can often be fixed simply by resetting or rebooting the console. It is always worth trying a reboot as a first step if you're having problems with unexpected or apparently faulty console behaviour. If there is any possibility that the logger could have become loose (eg as a result of undue tension on the logger cable) then please also check the 'Loose logger' subtopic below.

The Vue and VP2 consoles do not have a formal reset switch. Instead, rebooting is achieved simply by powering down the console completely and then repowering it. Powering down means removing **all** sources of power, ie **both** mains **and** battery power (removing one battery is sufficient to remove battery power). Power should be off for at least 10-20 seconds (or longer if you wish) to ensure that all internal circuitry is fully powered down. Then simply reapply mains and/or battery power.

The console will beep as it powers up again. It's good practice to count the number of beeps and check that the total is correct, as in:

- Vue console – 3 beeps (or 4 with logger installed);
- VP2 console – 2 beeps (or 3 with logger installed);
- Envoy console – 1 beep (or 2 with logger installed);

> **!** Vue and VP2 consoles will power up in Setup mode and will **not** show data readings until they have exited Setup and resumed 'Current Weather' mode. Give the Done button a **sustained** press in order to exit Setup immediately.

VP2 consoles with recent firmware and all Vue consoles will exit Setup automatically after about 10 minutes, but VP2 consoles with older firmware will not exit Setup automatically at all. If you see a VP2 console simply saying 'Receiving from' on the ticker line at the bottom of the display then it is still in Setup mode and the Done button needs to be given a **long** press.

> **✱ IMPORTANT** Settings and previously logged data will **not** be lost while the console is powered off. However, the console clock will stop for as long as the console is off and may need to be updated. And no new data readings will have been received from the sensors for as long as the console was off.

Loose logger?

Under some circumstances (but typically because of a pulling cable), the logger can become loose on its pins and this is a classic cause of intermittent or erratic logging. If you suspect this sort of issue then it is always worth checking that the logger is tightly home on its pins, **but do so only when the console is fully powered off**. The logger usually needs a good firm push to ensure that it is fully home. New users can sometimes be too timid with the amount of pressure applied, but (i) do make sure that the logger is correctly lined up on its pins before applying pressure; and (ii) don't use a totally disproportionate amount of force.

The logger relies on there being a slight degree of splay on the pins in order to hold it tightly in place. In rare cases, the pins may be too parallel with one another and the logger will then not be tightly retained. In practice, the simplest solution in such cases is to apply a small rectangle of sticky-backed foam to the inside surface of the battery compartment cover, just to apply extra pressure on the logger – this fix works well and is typically a better alternative than sending the console back to the service centre for 'repair'.

Console seems dead or unresponsive

Symptom: No text or icons *at all* are visible on the LCD screen. (Readings *partially* missing is a different fault)

Cause: Power failure

The console can be powered by either or both of the standard 5v AC mains adapter or 3 'C' cells. Check both sources of power before concluding that the console is dead.

If the console works on batteries but not AC mains then the mains adapter is probably defective.

If the console works on AC mains but not on batteries then double-check that the batteries are all inserted with the correct polarity and, if possible (eg with a multimeter), that all cells still have some charge – minimum 1.2-1.3v each.

Additional notes

If the console does not work on battery power then check that all batteries seem reasonably tightly in place and that the spring or other part in the battery holder has not become dislodged.

If the console has been stored for any length of time with old batteries left inside then these may have leaked and damaged the battery holder.

Cause: Logger failure

If the console has a logger installed then power down the console, remove the logger and power up the console again. If this restores the display then it's likely that the logger is damaged and may need replacing. (However, do be sure to try reseating the existing logger and check that it is fully home before concluding that a new logger is needed.)

Cause: Internal ribbon cable

Note: This issue requires opening the console case. Only continue if you're comfortable doing so, otherwise consider returning the console to an authorised Davis repair centre.

Open the console case (with the console power off, of course) by removing the 3 screws and gently prise apart the two halves of the case. You will see a ribbon cable that joins the main circuit board to the display

board. Ensure that this cable is properly in place. There are a couple of tiny catches either side of each end of this cable that click back and forth to lock the cable in place. It's not unknown for one cable end to have worked loose, especially if the console might have been jarred or dropped at any stage; this will always cause apparent display problems. Once you've learned the simple trick of how the latches operate then it's pretty simple to check that the cable is making good contact and properly locked in place at each end.

Symptom: All or most characters on the display are lit but will not clear or respond to button presses

Very occasionally, the display will lock up when the console is first powered up or eg if there might have been a spike on the AC mains supply. This is an issue that seems to occur more with cabled consoles than the wireless version but can in principle happen to either. The fix is simple: just power down the console (including removing one battery, if fitted), wait a few moments and then power up the console again. Most times this will cure the problem. (For further details of repowering the console, see the [rebooting the console](#) topic.)

NB For other symptoms associated with a misbehaving display then consult your support contact – there are other rare faults which there's not space to detail here.

Console 'Low battery' warnings

Low battery warnings can appear on the console display or in software. There are two types of battery warning:

- **Transmitter** low battery
- **Console** low battery

> ✳ It is important to recognise which type of warning is showing.

A low battery warning for a transmitter will show (on the console display – software reports may vary) with a message similar to 'Low battery on Station #1'. 'Station' here actually refers to a transmitter and the digit after the # sign will refer to the channel on which the transmitter is set to transmit – this should help in multi-transmitter set-ups to identify which individual transmitter is reporting the low battery warning.

> ✳ This section deals only with **console** low battery warnings. Please see the equivalent ISS section for details on transmitter/station low battery warnings.

Console 'Low battery' warnings

You can of course run a console only from its AC mains adapter and with no batteries loaded. Under these circumstances you will see a console low battery warning – there's no workaround for this (other than to fit batteries) and the warning should simply be ignored.

It is recommended always to fit batteries even if you're using the mains adapter as the primary power source. This will remove the low battery warning and also obviously act as a battery backup in the event of a mains outage.

> ❗ NB We recommend that systems using the WeatherlinkIP logger always be run from mains adapters only – the batteries cannot deliver sufficient power to sustain the IP logger for more than a short period of time.

Batteries will not run down significantly while the mains adapter is in use and therefore backup batteries can be left in place for extended periods without concern. It is *not* recommended to use rechargeable batteries – the voltage profile of these cells is significantly lower than eg alkaline primary cells.

When there is a genuine console low battery warning then replace the batteries as soon as possible ('C' cells for VP2 and Vue console, 'AA' type for Envoy consoles). If dead batteries are left in place for too long they run the risk of leaking and potentially **will** damage the circuitry around the battery compartment – in bad cases, a new console may be the only remedy.

Outside data missing

Symptoms: Readings from some or all of the **outside** sensors are missing, but the console display still works in general and inside readings such as temperature. humidity, pressure, time/date etc are all still present. (If **both** inside **and** outside readings are missing then see the topic titled [Console seems dead or unresponsive](#).)

On a cabled station, or on a wireless station with just a single wireless transmitter (e.g. just the standard ISS), **all** of the *outside* data is missing. On a wireless station with two or more transmitters then **all** data from **one** transmitter is missing.

However, if only one sensor reading is missing (and with other sensors attached to the same transmitter reporting normally) then this is of course likely to be a sensor fault rather than a transmitter fault and troubleshooting should continue with the [Sensors topic](#). (If there is only one sensor attached to a given transmitter such as a 6372 Temperature Station then it may not be obvious whether this is a sensor or transmitter fault and both options will need to be investigated.)

Overall, this topic is concerned with troubleshooting apparent transmitter and console faults rather than individual sensor faults (which are dealt with elsewhere).

Troubleshooting

Cabled stations

It is rare for cabled stations to develop communication problems between SIM board and console, but if a fault does occur it will usually have one of three causes, for which quick checks are as follows:

- *Cable fault:* Check the cable and connections between ISS and console for integrity;

- *SIM board locked up*: Turn the console off for 5-10 minutes and then reboot. See [Rebooting the console](#) for more details;

- *Misconfigured data channels*: Check that the console data channel is still correctly configured;

✱ **Diagnostic screens:** Note that the cabled consoles retain the same reception diagnostic screens as the wireless models and accessed as described in the [Wireless Reception Monitoring](#) topic. This feature is rarely needed with cabled consoles because 'reception'

> should always be at 100%. But if intermittent ISS reception is suspected due either to a cable fault or eg to interference then it may be useful to check that reception is indeed 100% or that corrupt data packets are not being received.

See below for more detailed comments on each of these possibilities:

Cable fault: The ISS-to-console cable, especially if it has been extended, can be vulnerable to damage over time so a through check of cable integrity should be made. Any joints in the cable need inspecting carefully, as also should the RJ11 plugs at either end of the cable in case one of the four conductors is no longer tightly crimped into its plug. If there's any residual doubt about the cable then it's always worth testing with a substitute cable, but preferably a genuine Davis extension cable. (The Davis cables are wired straight-through and while a US-style telephone extension cable may look similar, in practice these are usually crossed over and will not work with a cabled VP2 station.)

SIM board locked up: It is possible for the cabled ISS SIM board to become locked up so that it becomes unresponsive and will not transmit data. This typically happens as a result of an electrical surge, eg a nearby lightning strike, but has been known to happen very occasionally for other reasons. This can be tested for by unplugging the console cable, initially for eg 5-10 minutes and then retrying the connection. If this is unsuccessful then try again for a period of an hour or two and if still unsuccessful then for a still longer period, eg overnight or 24 hours. SIM boards have been known to come back to life after quite extended periods of outage and thereafter to continue to operate correctly for extended periods once they have revived after being powered down for a long period.

Misconfigured data channels: Cabled VP2 consoles still retain the underlying functionality of the wireless consoles which allows different transmitter types to be set for any of the eight wireless channels. This is despite the fact that a cabled console can only receive the ISS transmitter type and only on channel #1. It is therefore possible for the cabled console to be configured so as to be set to receive some other transmitter type on #1 or for other channels (ie #2 to #8) to be activated. (This could happen by accident if for example an uninformed user has been playing with the console settings.) While this cause of missing outside data is very rare on a cabled console it's always worth doing the simple check that #1 is set to ON ISS and all other channels (ie #2 to #8) are all set to OFF. See the topic [Setting and checking data channels](#) for further details.

Wireless station with wireless repeater(s)

If the station has one or more repeaters in use then the first step is to investigate whether a repeater has stopped retransmitting. See the [repeaters topic](#) for further advice. Resume troubleshooting here only if you're sure that the repeater(s) are functioning normally.

Wireless stations (General)

New stations:

If the console appears not to be receiving **outside** data in a brand new installation (and assuming of course that the transmitter battery has been correctly installed and that the console is within wireless range of the transmitter) then one important initial check is that the transmitter channels have been correctly configured. See the topic [Setting and checking data channels](#) for further details.

Existing stations

Data loss may be intermittent or constant, but in either case the first step is always to check the transmitter battery. Battery life is typically 18-24 months, but can be longer or shorter depending on circumstances. With a new loss-of-signal problem it's always worth replacing the battery as an initial check – this will often resolve the problem. See the [Station – low battery warnings](#) topic for further information about the battery and how it works. If the battery has already been recently replaced then double-check that it was inserted with the correct polarity. It's also not unknown for even new batteries to be faulty, although this is rare. Check also that the battery is tightly in place and that the terminal connections have not become dirty or corroded.

Intermittent loss of data is often a sign that the transmitter battery is low – usually this will be accompanied by a warning of 'Low battery on station X' visible on the console ticker. Typically the loss of signal from a fading battery will occur overnight when there is no compensating power from the solar panel. Intermittent data loss at other times, especially well into daylight hours, may well have other causes, for example:

- If there could be another Davis wireless transmitter operating in the same area and on the same channel (typically the default channel #1) then mutual interference can occur, one symptom being intermittent loss of data. If this is suspected as a possible cause then it will be worth setting the ISS and console to a different channel to check whether the problem disappears. NB If you have multiple transmitters, especially having just replaced an old one, or have other transmitters that are not yet set up but which have batteries installed or are simply exposed to daylight then do check that these aren't the cause of the problem if they may be transmitting data on the same channel as the one in use;

- If the wireless range being used is close to the maximum such that the signal strength is marginal then changes in weather conditions (fog or rain) or e.g. seasonal growth of vegetation in the signal path can cause the signal strength to drop below an acceptable level leading to loss of readings. It's worth checking the received signal strength (RSSI) under such circumstances. Parking of large vehicles directly in the straight-line signal path can also have a similar effect.

On wireless Vue and VP2 stations,with **constant** loss of data persisting over many hours or days, the fault is likely to be in the SIM board on the ISS and troubleshooting that has reached this stage should continue with the **SIM board faults** topic.

Pressure reading problems

General

> ✳ The barometric pressure sensor is located in the console and pressure issues are therefore discussed in this console section.

Readings of barometric pressure are typically accurate for extended periods and are rarely the source of any problems. But there are a couple of general points to make about pressure readings:

The pressure sensor is located on the main **console** circuit board for both Vue and VP2 stations – on the basis that air pressure is equal inside and outside any building (unless it's hermetically sealed!) and so it's simpler and more reliable to sense pressure at the console. Any pressure issue is therefore a console issue and nothing to do with the ISS or any other external transmitter.

Second, air pressure obviously varies with height/altitude and it's the convention in weather reporting to adjust reported pressure to sea level (the value that's referred to in aviation as QNH or QFF – see below for more detail) so that pressure values can sensibly be compared across large areas irrespective of the measurement altitude. So for any pressure reading made other than at sea level a calculation needs to be made to correct the reading to sea level. The console has no independent way of knowing its altitude and so, in practice, the procedure for **setting up pressure readings at a new location** is as follows:

1. Check that the height/altitude value in the console settings is correct. Remember that this needs to be the elevation of the console, not the ISS. Changing this height value will not alter the current pressure reading but will slightly alter the correction applied as the pressure subsequently changes higher or lower for any console sited significantly above sea level.

2. Find a **reliable** current reading for sea-level pressure (QNH) on the Internet for a nearby location such as an airfield and then follow the instructions in the console manual for entering a calibration pressure reading to the console. (In the UK, www.xcweather.co.uk/ is a good source, but there are many others around the world.)

Pressure-related issues

Faulty sensor readings

Although rare, very occasionally the pressure readings may give problems. Symptoms can range through complete loss of a pressure reading (eg the pressure display dashed out); a reading so high or low that it is obviously spurious; failure to update readings; and so on. And sometimes a failing pressure sensor may give intermittently good and bad readings.

The first troubleshooting step is to double-check that the height/elevation and pressure offset settings have not been inadvertently mis-set. As a check, try clearing any pressure offset (see the 'Clearing Weather Variables' section in the console manual) and also reset the elevation to some basic value like 10 feet or metres (depending on the units in use). Don't set a negative or zero elevation, nor a very high value – only a simple value like 10 will provide a reliable check on pressure sensor operation. The correct elevation can be reset once any problem has been investigated (but don't forget!).

It is then always worth fully rebooting the console to clear any potentially corrupted values in the console memory. Remember that it may take a minute or two for the correct pressure reading to reappear.

Any apparent pressure fault that can't be corrected by recalibration or can't be attributed to a height/ correction issue is likely to be a sensor fault. The bad news is that the sensor is soldered on to the main console circuit board and typically requires a new circuit board to be fitted, the cost and inconvenience of which may not be much less than sourcing a new console, especially for a Vue (assuming that the unit is out of warranty). A suspected faulty sensor needs discussing with your local Davis dealer or service centre.

Deviations from expected sea-level (QNH/QFF) readings

The intrinsic accuracy of the barometric pressure readings for both Vue and VP2 stations is quoted as ±1mb or ±0.03"Hg and, once calibrated, most units will track other high-quality pressure readings in the locality pretty well and to within this nominal accuracy. There may be some long-term drift, in which case an occasional recalibration against a reference reading should fix any slight problem.

However, stations that are located at significant altitude (eg 1000-2000ft and above) may experience more frequent discrepancies against reference readings. This is not necessarily caused by any fault with the console but can arise because of the way that corrections are made from the measured local pressure back down to sea level. (The more elevated the location, the greater any sea-level correction will be, which is why this issue is usually only noticeable at stations located at significant altitude.)

The basic issue is that an assumption has to made about the composition (temperature, humidity, gradient etc – all factors affecting the correction calculation for the pressure) of the air column between the point of

measurement and a notional point at sea level below. The nature of the this air column can never be known in detail and there is more than one way that the column can be assumed to behave, with various approximations being involved. Inevitably then, different approaches will give different values for sea level pressure and it may well be that the Davis console is using a different correction method from a reference source. This is not the place for a detailed discussion of the various correction methods (which are obviously very important in aviation for accurate altitude readings) but in brief the two main options are:

QNH: Pressure is reduced to sea level assuming the temperature profile of the International Standard Atmosphere. This gives an approximation to what is often referred to as the altimeter pressure;

QFF:Pressure is reduced to sea level taking the current measured temperature (and, potentially, humidity) at the station and assuming an isothermal atmosphere (sometimes referred to as the US NOAA method);

So, for example, discrepancies can arise if the Davis console is reporting QFF pressure while a reference source is citing QNH.

> ✳ **Important:** The VP2 console is only able to report an estimate of QFF pressure. But the Vue console offers the option of NOAA (QFF) or 'Altimeter' (QNH) settings at Screen 11 of the console settings.

Wireless troubleshooting

Overview

For Davis wireless stations, good performance of the data link between sensor transmitters and the console is obviously vital to receiving consistently good data readings at the console. In general, the Davis wireless technology works very well and provides data of superior quality to most other shorter range wireless stations.

But if console readings on a wireless station start to misbehave, e.g. the readings go missing or become intermittent or are obviously in error, then there are a range of possible causes of which a faulty wireless link is obviously one candidate. Here's a short guide to narrowing down the possibilities:

- If the loss of readings relates to a **single sensor only** (air temperature, wind speed, rainfall etc) then the fault almost certainly relates to the sensor itself and not to a wireless issue. A wireless transmitter or propagation fault will always affect **all** readings being sent from that transmitter – it isn't technically possible for only one sensor's data not to be transmitted correctly while other sensors remain unaffected. Of course, if a transmitter is sending data only from a single sensor such as wind or temperature then it's impossible to be sure whether it's the sensor or transmitter at fault, but the commonest scenario will be with ISS transmissions and here the distinction should be obvious. And, to be clear, even for single-sensor faults it is possible, though very rare, for a fault to develop on the transmitter board circuitry that interfaces with the individual sensor – this is effectively still a sensor fault rather than a wireless one, though the fix will usually involve needing to replace the complete transmitter board.

- If a wireless transmitter issue is suspected then the first step is **always to check the transmitter battery status**. There should always have been a ['Station low battery' warning](#) prior to actual loss of transmission but this may have been overlooked. Note that a good new transmitter battery should always last at least 6 months even if the solar panel has been disconnected and more typically 18-24 months with a well-exposed solar panel. If the transmitter battery life is consistently (and often progressively) shorter than its expected life then a supercapacitor ('supercap') fault is likely – again see the '[Station low battery](#)' topic in the ISS section.

- If the transmitter battery seems OK then a further check that's always worthwhile is to confirm that the "[console channel settings](#)": have not been changed inadvertently. Though this is an uncommon cause of wireless problems it takes only a minute to check.

- If you are experiencing odd symptoms of poor reception (especially intermittent loss of reception that it not only happening overnight) then, at least for test purposes, it can be worth switching the transmitter to another channel, remembering of course that both transmitter and console must match in the channels that they're configured to use. If someone within eg 500m or so of you (while 250-300m is the standard range for reliable reception, signals can often be picked up at greater distances of out to eg 500-600m) has also started up a Davis wireless transmitter using the same channel as you – most often the default channel #1 of course – then there certainly can be missing or unexpected readings as a result of interference between the two systems.

- **Wireless components from different regions cannot be intermixed**: Wireless components (transmitters, consoles etc) from different world regions are set to operate on different wireless frequencies to comply with the wireless regulations in their home territory. The two main regions are North America and the Rest of the World (designated OV = OVerseas), though there are also a few territories such as Australia and New Zealand that also have their own regulations.A transmitter and console/receiver from different territories will never work together and it's pointless even to try. A component's intended region can usually be found from the last two letters (if present) of the [Product Number](). If the product number says simply eg 6152, ie with no trailing letters, then this will be a North America unit. But the presence of trailing letters as in eg 6152UK or 6152EU or 6332OV all indicate the standard rest-of-world frequencies. (The UK/EU designations just indicate the type of mains adapter supplied with the station and these are all of standard OV wireless frequency.) Be very wary of buying components from another territory to use with an existing station – the price may seem enticing but it's money wasted if the new component cannot work with your existing station.

- Finally, if none of the above seems likely as a possible cause then it's prudent to review the wireless reception quality, as described below.

Checking wireless reception quality

First, a brief recap of the general characteristics of the Davis wireless technology: The standard range for the wireless signal is 250-300m line of sight (using the standard built-in whip antennas on ISS and console). Range can obviously be increased by use of repeaters, and especially with the long-range repeaters;the standard repeater behaves exactly like a standard transmitter (ie a 7627 repeater can double effective range to 500-600m if placed roughly midway in the signal path), while range with the LR repeater will depend on the antennas fitted. Remember also that the signal essentially travels only in a straight line between transmitter and console and it's this straight-line signal path that's important when assessing reception quality. For example, if this line can be arranged to pass through an ordinary window (which is relatively transparent to the signal) then the best reception quality can be obtained.

But if used towards the maximum open air range of ~250-300m or especially if the signal is required to pass through multiple thick walls (remembering also that the signal cannot penetrate sheet metal or similar materials such as reinforced concrete) then missing or inconsistent readings may well be seen on the console display. Quite often it can be the **combination** of moderately long range (eg 100-200m) with intervening walls or other barriers that will significantly impair the signal. Note that if a significant percentage of the signal is being lost into the ground then effective range will be reduced, It's always worth siting both transmitter and console at least a few feet above ground level (while still respecting the recommendations for sensor exposure) to minimise this effect – this can be especially important if the ground is higher between the console and transmitter positions.

Remember that the standard whip antennas on console and ISS need to be parallel to one another for optimum reception. Typically this will be with both antennas vertical. But if, for example, the ISS were to be above the console then reception would be better with both antennas horizontal.

There are of course 8 wireless channels available for use with all Davis transmitters, with channel #1 always being the factory default. Transmitters and console must have matching settings for data to be correctly received at the console. Each active transmitter must always be using a different channel number to other transmitters on the same site. And in the console settings, all channels not actively being used should be set to OFF.

Beyond all the configuration checks outlined above, the Davis wireless system does provide an objective numerical way of assessing reception quality using the wireless diagnostic screens – see the Wireless Reception Monitoring topic.

Wireless Reception Monitoring

Wireless reception monitoring

All Vantage consoles (Vue, VP2 and Envoy) provide a way of inspecting the reception quality of data arriving at the console from the outside sensors, but the information available varies from model to model as follows:

- Vue and **Wireless** VP2 standard consoles provide two screens, called Wireless Diagnostic Screens that can be called up on the main console display and that show key performance measures for data reception;
- **Cabled** VP2 models also possess similar screens, although they are less commonly needed in the case of the cabled units – cabled reception will typically either be consistently 100% or there will be a fault with the cable or transmitter board which will usually be evident anyway from loss of all sensor readings;
- **Envoy** consoles obviously have no console screen on which the reception stats can be shown. So for Envoy models, the only option for monitoring reception quality is to run the Weatherlink software and look at the Reports | Console diagnostics menu option. Third-party software may or may not provide comparable reception stats – if good stats are not available and a reception problem is suspected then it may be advisable to install Weatherlink for testing purposes, if nothing more. (NB This same Console Diagnostics option in WL is of course available for all Vantage consoles whether standard or Envoy, but for standard display consoles the diagnostic screens provide more comprehensive reception quality data, whereas for Envoy units inspection via software reports is the only option.);
- The **Envoy8X** is a special case, which requires looking at data in the Reception table of its SQL database;

Wireless channels: With standard station set-ups, whether Vue or VP2, only one wireless channel (usually #1) will be in use and assessing reception quality should be straightforward. But if the set-up uses two or more transmitters then each will of course be set to a different channel. It's then important to check reception quality separately for each channel, as described below – if the transmitters are in different locations then reception performance will be different for each transmitter.

Repeaters: If wireless repeaters are in use then reception stats at the console will only reflect the last leg of transmission from the last repeater to the console. But there is also a way of checking reception quality of the penultimate repeater leg – see below.

Wireless Diagnostic Screens

> ✳ The notes below may seem a little complex, but the key points are straightforward: The % packet reception for both Vue and VP2 systems should preferably be in the 95-100% range, though it doesn't matter if 100% is not consistently reached. And RSSI should be no weaker than -85dBm on Vue stations and 30 on VP2 stations to sustain good reception.

First Diagnostic Screen

On Vue and standard VP2 display consoles the **first** wireless diagnostic screen is called up by pressing Temp and Hum keys simultaneously, as shown right which reflects the display as seen on the VP2 console (the Vue version looks a little different but is essentially similar).
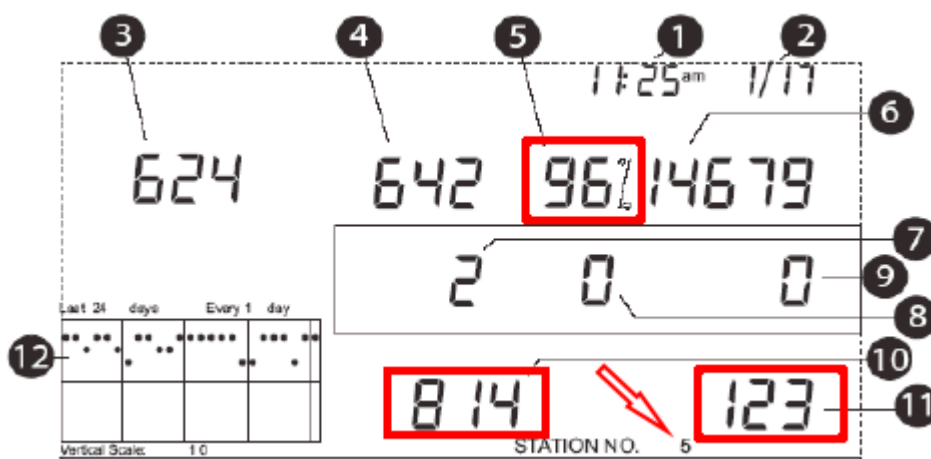
This display can be confusing because it displays quite a number of different parameters and statistics all relating to reception quality. The display is explained in detail in the Troubleshooting & Maintenance section towards the end of each console manual, where the first diagnostics screen is officially called the 'Statistical Diagnostic Screen'.

However, there are in fact only two parameters visible on this screen that are really important. The **first important parameter** is the % figure in the main top row labelled as parameter 5, ie the figure showing as 96% in this example. This reveals how many data packets sent by the sensor transmitter are being correctly received at the console. The console knows how many packets of each type should be transmitted in each time interval and hence can calculate the % that were actually received. Ideally of course this figure should be 100%, but it's commonplace to see figures of 98 or 99% even in systems that are working well. (The **other** important parameter is the channel number (arrowed) – see below for further details.)

Indeed, figures that are in the mid 90's are usually entirely satisfactory, albeit indicating some slight impairment in signal quality reaching the console. And even figures in the 60's or 70's % can give console readings that can be quite acceptable, although here there are more obvious signs of a weakening signal. But figures well into the 90's should be routinely attainable for most Davis systems and figures below 90%

are definitely suggestive of marginal general reception or potentially of loss of reception for part of each day. Let's explain this latter comment:

In the normal course of events, the console resets its reception statistics to zero as part of its routine midnight housekeeping each night. So whenever you look at this first diagnostic screen, you're seeing the **cumulative** statistics accrued since midnight on the previous night, which may include periods of good reception and of poor reception lumped together. A common example of this effect is when the transmitter battery is dead or if there's a developing supercap fault. During the early hours of the morning reception, the reception % may then temporarily fall to zero until shortly after dawn when the solar panel begins again to be able to supply power to the transmitter and the % per hour picks up again.

So some care is needed in interpreting the % reception figure for values below e.g. the mid 90's – remember to factor in the time of day at which you're making the observation and perhaps check in again later in the day to see if the % has picked up again during the daylight hours.

Resetting the reception parameters manually

Note that it is possible to zero the stats manually at any time during the day simply by selecting the Clear function – on the VP2 console press **and release** the 2nd button and then press **and hold in for several seconds** the Hi/Low button. (The Vue console is similar.) You will see the display flash two or three times, after which all statistical parameters should clear down to zero – this process is not complete until you can see all zeroes. The stats will then start to accumulate again. Be sure to allow at least 5 or 10 minutes before taking a reading again – there may be short-term fluctuations in reception that could interfere with measuring a meaningful value and in any event you need to allow a minimum number of packets to be received before the statistics start to become properly valid again. This process can be repeated several times during a day if required so as to sample shorter term reception trends during the day. But all stats will then re-zero as usual at midnight.

Monitoring within-day reception automatically

While the manual resetting of reception stats offers one way of taking snapshots of reception quality during each day, there are also two distinct approaches for monitoring with-in day reception stats automatically.

One option is to use the small graph at the bottom left of the screen. This graph should be accessible using the same key presses as other console graphs (see console manual for details) and should allow movement from one data point to another with a readout available of each individual dot on the graph.

The second and more powerful option, but only available if you're using compatible software such as Weatherlink, is to make use of the fact that the ISS reception % is actually saved for each archive data interval. It's therefore readily possible to use the Plot mode of Weatherlink and to call up a graph of ISS

reception with time in the usual way (ISS reception is one of the selectable graph parameters). Unfortunately only the reception of wind packets is saved – this is a good measure of ISS reception but cannot provide reception data for other transmitter types.

Channel selection

The **second important** parameter is the wireless channel being monitored. In the example schematic above this is channel #5, is the small digit being pointed to by the red arrow. It's really important to appreciate that the statistical values only relate to the specific channel currently being displayed. And, in multi-transmitter configurations, to get the full picture for wireless reception, you must look at each channel separately – it's perfectly possible of course to be receiving good reception from one transmitter but poor reception from another. Displaying stats for different channels is very easy – simply use the left and right cursor keys which will move the display between all of the **active** channels that are currently in use. (Inactive channels are simply skipped over, i.e. are not available for selection.)

Second Diagnostic Screen

The second diagnostic screen (called 'Reception Diagnostic Screen' by Davis) can be accessed from the first by pressing the Chill button (press and release the 2nd button, then press Wind). Thereafter each press of the Chill function toggles between the first and second diagnostic screens.
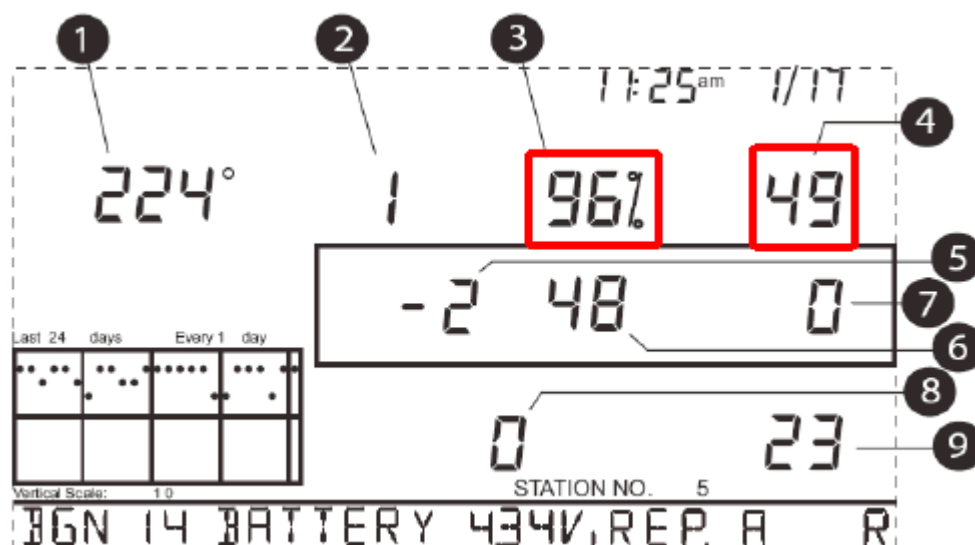
This second diagnostic screen looks quite similar to the first and indeed a number of the parameters are the same, though others are different. There are three parameters on this second screen to highlight:

- Parameter 4, **the value at the top right of the display**, is the signal strength or RSSI ('received signal strength indication'), showing 49 in this example;
- Parameter 3 is the % good packets exactly as in the first screen;
- And the channel indication digit is also exactly as in the first screen;

It's the RSSI that is the only additional parameter of prime interest here – why the RSSI value is so useful is described below. But first let's just note a few important points in reading this value:

1. The RSSI value updates as each new data packet is received. This means that when looking at wind packets for instance (the commonest form of data packet), a new value will register roughly every 2.5 seconds. Values will vary somewhat from packet to packet and so it's worth watching this parameter for a minute or two to get a sense of the average value for each channel. Because the value updates so frequently with a new value there is never any need to clear this second diagnostic screen, as was described for the first screen.

2. In multi-transmitter set-ups it is important to look at the RSSI value separately for each transmitter channel – the values may be very different. Different channels are selected using the cursor left/right keys exactly as in the first diagnostic screen.

3. RSSI values are not stored anywhere in the standard Davis stations or software and so the **only** way of monitoring RSSI for each transmitter is to check this second diagnostic screen manually. (NB However, in Meteobridge Red systems RSSI values **are** stored and can even be retrieved on a packet-type basis.)

NB There is a note on the types of different types of data packet at the end of this page.

Interpreting the RSSI value

The Received Signal Strength Indication (RSSI) is a numerical measure of how strong (or weak) the transmitter signal arriving at the console might be. Clearly, if the signal is too weak then satisfactory reception will never be achieved. The RSSI provides an objective number which can be used to judge just how weak a given signal is.

Ultimately of course it is the % packets received error-free that determines whether reception is satisfactory, but if RSSI is too low then good reception can never occur. So when investigating issues of poor wireless reception it is very helpful to have values for **both** the % and RSSI parameters for each transmitter in the system.

The dBm scale: In wireless technology, the signal strength can vary enormously so it is necessary to have a measurement scale that can cope with both large power values and absolutely tiny values also. The unit used is dBm, which is the power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW) and this unit provides a logarithmic scale. (See en.wikipedia.org/wiki/DBm for further details.) In short a value of 0dBm = 1mW; -40dBm = 100nW; and -100dBm = 0.1pW. This definition is simply provided for those who might be interested – it's not necessary to understand the detail in order to make practical use of the RSSI values.

But there is regrettably one further complication: In their wisdom, Davis decided to use different RSSI scales for Vue and VP2; both stations are actually measuring the same underlying parameter but in slightly different ways. The Vue is more faithful to the underlying RSSI scale, while the VP2 uses a transformed scale, which is a little easier to understand.

The Vue uses the native dBm scale; the Davis wireless signal is very low power and hence starts off with a maximum (strongest RSSI) value of -40dBm which then decreases logarithmically to a minimum (very weak) RSSI value of -100dBm. **In practice, the minimum desirable RSSI value for a Vue is -85dBm.** Any value smaller than this (ie a larger negative number) is likely to be too weak to allow consistently reliable reception.

For the VP2 stations this same dBm scale is converted to a 0-60 scale, where 60 represents the strongest signal and 0 is a very weak signal. This scale is simpler to use but is also more removed from the reality of the underlying signal strength. On the VP2 scale, a value of 59 actually represent the maximum possible signal strength, while **the minimum for consistently reliable reception is RSSI = 30**. (Values in the high 20's may allow adequate reception, but there is then no margin for temporarily adverse conditions like heavy rain or low transmitter battery and are therefore best avoided if at all possible. Similarly, -85dBm is a better minimum target for Vue systems than e.g. -88dBm.)

VP2 RSSI values may be calculated from Vue values using the formula:

VP2 = [(Vue + 100) / 1.5] + 20

Thus: Vue = -85dBm gives (-85+100)/1.5 + 20 = 15/1.5 + 20 = 10 + 20 = 30 on the VP2 scale

Wireless protocol and data packet types

Davis has in fact published relatively little information on the exact packet format and protocol used by the wireless link between sensor transmitters (eg the ISS) and console, but this has not prevented some interested users from reverse engineering the protocol; indeed the detailed community knowledge has now reached the point where third-party receivers for the wireless data can be successfully designed and used. Some parts of the short notes below are therefore largely based on this community information rather than anything sourced from Davis and are very much open to updating and correction.

The Davis wireless technology works by transmitting discrete 16-byte packets of data (6-byte payload plus 2-byte CRC checksum plus 8 bytes of transmission overhead) at 19.2kb at intervals of every few seconds. This transmission time per packet corresponds to only ~7 msecs and hence the transmitter can be powered off in between transmissions, helping considerably to minimise power consumption at the transmitter.

Davis wireless uses FHSS spread spectrum techniques whereby the transmitter is continuously switching (or 'hopping') to a new frequency within a specified frequency band primarily to improve resistance to interference. The US band is relatively wide allowing a large number of different frequencies to be used, but the Overseas OV/EU band is much narrower with only a few discrete frequencies available. The Australian band is different again. The wireless diagnostic screens (see above) are relatively complex because they also include parameters that describe the progress of the hopping pattern, though there's rarely any need for the user to check any of these extra parameters, even when troubleshooting.

The eight Vantage wireless channels are actually time-based (relative to a common synchronisation time) rather than using different frequencies. Thus packets containing wind data (the most frequent type) are transmitted every 2.5625 seconds on channel #1 and with each additional channel cumulatively delayed by a further 0.0625 seconds from the #1 timings. Hence channel #8 transmits to a ~3.0 sec cycle time.

The structure of the data packets at the bit/byte level has not been publicly documented anywhere in full detail and is somewhat complicated. But the net result is that different sensors and transmitter types cause the transmission of distinct payload structures, with the timing of different data content believed to be roughly as follows:

- Wind speed/direction data – every channel cycle (~2.5 secs);
- Temperature data – every 4 cycles (~10 secs);
- Rain data – every 8 cycles (~20 secs);
- Humidity data – every 20 cycles (~50 secs);
- Solar data – every 20 cycles (~50 secs);
- UV data – every 20 cycles (~50 secs);
- Leaf wetness data – every 24 cycles (~60 secs);
- Soil Moisture data – every 32 cycles (~80 secs);

A starting point for further information would be the [DeKay decode of the packet structure](#).

Setting and checking data channels

Background

All modern Davis stations (Vue and both cabled and wireless VP2) use the same basic protocol for transmitting data from sensor transmitters to console receivers.This protocol uses a set of eight data channels, which are actually time-based rather than frequency-based, to allow the consoles to receive data from a maximum of eight different sensor transmitters (although the Vue and cabled VP2 consoles can only receive from the ISS transmitter plus, optionally, for the Vue only, an anemometer transmitter channel).

The console must be configured to receive data on the same channel and from the same transmitter type as the transmitter is actually set to. If console and transmitter are not correctly paired then data from that transmitter will not be decoded and it will appear that readings from that particular transmitter are missing. In addition to correct pairing of transmitter and console channels, there are four other important rules:

- Any channel that is not actively in use by a particular transmitter must be set to OFF at the console. Failure to observe this rule can result in loss of readings from an otherwise correctly-configured transmitter because the console may be looking for the same data on two competing channels;

- The correct transmitter **type** must be set at the console, in addition to the correct transmitter channel;

- If data from a particular transmitter is being received via a repeater then the console must be correctly configured to receive that particular channel from a repeater rather than direct from the sensor transmitter;

- The general rules as to which combinations of transmitter type can be received by which console type must be observed at all times. Thus a cabled VP2 can only receive data from a single ISS transmitter and only on channel #1; a Vue console can only receive data from one single ISS plus, optionally, one anemometer transmitter; no console, other than an Envoy8X unit, can receive data from more than one ISS or anemometer; etc;

In general, setting up all standard Davis weather stations should be very straightforward. All stations are factory-configured to operate on channel #1 out of the box (indeed the cabled VP2 console can **only** operate on #1) and should simply work immediately. However, if you wish to switch a Vue or wireless VP2 to use a different channel or have a more complex multi-transmitter set-up with a wireless VP2 then it is clearly important to configure the channel settings correctly at the console.

And for any issue involving an otherwise unexplained loss of readings from a particular transmitter, it is always worth double-checking the channel settings. The setting can have become mis-configured as a result, for example, of some inadvertent button-presses at the console or, rarely, because of some external event, eg a mains spike. Correcting the configuration will typically solve the problem.

Setting and checking the data channels

There are actually two approaches to setting/checking the data channels – either directly on the display console or via the Weatherlink software. With an Envoy console, software is the only option of course. Third-party software will often not provide access to the relevant settings – the Davis Weatherlink software is the more reliable tool to use.

It is actually relatively simple to set the data channels on the display console, but it's a topic that users occasionally struggle with. Instructions are provided in detail in the console manuals (see the section 'Screen 2: Configuring Transmitter IDs — Wireless Only' in the Setup section on p10 of the current VP2 manual and the corresponding section 'Screen 6: Configuring Transmitter IDs' on p9 of the Vue manual). It is worth finding and reading through this short topic in detail – the instructions are clearly set down but must be read carefully.

If you have a Weatherlink data logger and are running the Weatherlink software then you can control all of the console channel settings from the 'Set Transceiver' menu option on the Setup menu of Weatherlink. This dialogue should be fairly self-explanatory and there is the Help within Weatherlink if needed.

The comments below cover checking channel settings via the display console:

Checking the transmitter channel(s)

First, be sure that you *know* which channel each of your transmitters is operating on. On a cabled VP2 station the only option is #1. And with a new Vue or wireless VP2 station then #1 should be the default setting. This can be checked for the Vue by counting the number of LED flashes after a press on the ISS pushbutton (see p6 of the Vue ISS manual) or on the wireless VP2 by observing the DIP switch positions on the ISS transmitter board (see p12 of the VP2 ISS manual).

If you are experiencing reception problems then it's always worth double-checking that the expected channel settings are correct. On a wireless VP2 ISS, you can try flicking an individual DIP switch back and forth just in case a particle of eg grit is preventing full contact, but obviously the DIP switch must be returned to its correct position.

Checking the display console channel(s)

These are some brief summary instructions. Consult the console manuals for more details. Changing and checking the channel settings is easier than some new users imagine but does need to be done with a little care and logical thought.

1. Enter setup mode on the console (Vue: 2nd then Setup keys; VP2: Done+Cursor – keys together);
2. Move to the 'Configuring Transmitter IDs' screen: Look for the 'Receiving From' message on the screen – press and release the Done button until you see this message. Then press the Done button one more time.
3. What you'll see now differs a little between Vue and VP2 consoles. A Vue will say 'STA 1' followed by a name such as 'Vue ISS' or possibly 'OFF'. A VP2 will say simply ON (or OFF) again followed by a name such as 'ISS' in brackets; above the message a small digit '1' should be visible on the VP2. In both cases, the '1' indicates that this is the channel #1 setting. An 'OFF' message denotes that the channel is not active. The name that follows the ON or STA 1 message is the station type that the channel is currently set to receive. For a simple system this will usually be just 'ISS' but there are a number of other options (WIND, TEMP, SOIL etc) depending on the station model.
4. You can turn that channel ON (active) or OFF (inactive) by using the cursor +/- keys to toggle the setting. The message you see should change accordingly.
5. You can change the transmitter type that the console should expect to receive on that channel by pressing the GRAPH key which should run through the sequence of types available on that console with each press of the key. A simple system should just be left as 'ISS'.
6. *Repeaters*: If your system uses one or more wireless repeaters then you will need to configure the channel accordingly by cycling through the repeater options with repeated presses of the Chill (2nd then WIND) button. **Do not use** this function unless needed. If you ever see the term 'Repeater' or 'RPTR' in a channel setting message when you're not intending to use a repeater then this is a mis-configuration that needs correcting. Complex repeater configurations need very careful reading of the repeater instructions,
7. Pressing the right-arrow cursor key will now take you to channel #2 (ie STA 2 on the Vue model) where all of the instructions above can now be used to configure that channel. And so on through the other channels #3 to #8 and back round again to channel #1. The left-arrow key can equally be used to move back through the channel sequence.
8. All channels not required should be set to OFF. On a simple system with just the ISS as the only sensor transmitter then this will mean that all seven other channels should be set to OFF. In the case of reception issues it is always worth checking that all unused channels are actually OFF otherwise interference with reception on the main active channel(s) can result.
9. When all channel settings have been successfully made and checked then Setup mode can be exited with a long press on the Done button. Leaving Setup mode causes the console to search afresh for

the transmitter signals and it may take 2-3 minutes, occasionally even longer, before all readings are being updated on the display.

Updating console firmware

VP2 and Vue Console Firmware

Vantage Console Firmware

The Vantage Pro 2 and Vue consoles are designed with upgradeable firmware (firmware being akin to software built in to the console that controls all aspects of its features and operation). Why should upgradeable firmware be necessary? There are a number of reasons, including:

- To allow new console features to be added;
- To accommodate new VP accessory components (eg wireless repeaters), sensors and stations;
- In response to user feedback, which has, for example, prompted changes to the way in which certain wind speed values are displayed;
- In response to external events, eg changes in the details of the formula NOAA uses to calculate wind chill values or changes in the daylight saving time calendar in the US;
- To correct any bugs and errors. The firmware is a complex piece of coding and inevitably minor errors can creep in, which are sometimes not spotted by anyone for weeks or months after release.

> **!** **Important**: There are different versions of console firmware designed for the particular type of console that you have. For example, VP2 console firmware is distinct from VP1 firmware; VP2 wireless consoles have different firmware from VP2 cabled consoles; and Envoy consoles are different from standard consoles. And Vue console firmware is of course different again. There is also an important distinction – explained in more detail below – between original 2004/5 release firmware versions and those intended for 'Direct PC Install'. It is essential only to load a firmware update of the correct type for your console. Loading an incorrect firmware version is likely to cause your console to stop working.

Each firmware update revision was originally denoted by its release date alone, though the version number is more important nowadays. The current revision is v3.15 (released March 27, 2014) for the standard VP2 wireless console, although cabled and envoy consoles may differ in version number. It is also sometimes the case that a later firmware revision is loaded in new production consoles but has not been released as an update version for existing consoles. (NB The definitive place to look for the latest firmware versions is on the Davis website – we'll try to keep the information here up-to-date, but please let us know if we've missed a recent update.)

The firmware version currently installed on your VP2 or Vue console can be seen on the ticker display of the standard console by pressing the Done and cursor '+' keys at the same time. (Envoy consoles must be checked via the Weatherlink software.) Note that up until the firmware version of April 10 2006, the version was referred to by date only. But from the next revision – v1.6 of December 1 2006 – a version number was also introduced alongside the date. NB Be aware that for older versions, the date seems often to have been the compile date rather than the release date – for some versions there was a significant gap between the nominal date and the version's actual availability, presumably to allow for beta testing.)

The rest of this page focuses on firmware for the VP2 range. Details of firmware for the Vue station are yet to be added.

Would I benefit from a firmware upgrade?

In general, for most users, there will be no pressing need to upgrade at all. As is often the case with firmware updates for all sorts of digital devices, for the great majority of console functions you may notice no difference whatsoever. Certainly there will often be no good reason to upgrade regularly to the latest firmware version just because it's available. The maxim of 'if it ain't broke, don't fix it' very much applies here.

However the detailed list further below records the firmware changes that have been made for VP2 consoles since Nov 13th 2004 and you can obviously check through this list and decide whether there is anything of relevance to you personally. But broadly, there might be five circumstances in which to consider an upgrade:

- If you have one of the earlier VP2 consoles then the cumulative firmware changes may be enough for you to consider upgrading, although the chances are still that you'll notice little difference;
- If you are especially concerned about one of the issues addressed by an upgrade, such as the barometer spiking in the Nov 2005 versions or the revised Daylight Savings Time schedule (US only);
- There are certain newer units, such as the VP2 wireless repeaters, for which a recent firmware revision is essential;
- If you would like to add the capability to update your console firmware Direct From Your PC (see below for details);
- Reasons of software compatibility, where a firmware update has changed the format, even very slightly, in which data is passed to a PC via the Weatherlink data logger then some software packages may require a newer firmware revision in order to function correctly. For example, the introduction of the LOOP2 packet format might be one such reason.

How do I upgrade the firmware?

> **!** Don't automatically assume that you will be able to update the console firmware to the latest version or even at all. The updating method changed in Nov 2005 and it's effectively impracticable to update original consoles with earlier firmware. And consoles made prior to April 2006 (check the Mfg Code) cannot be updated to firmware versions later than v1.90 because of console hardware incompatibilities.

PC/Windows users

Originally there was only one way to upgrade VP2 console firmware – using the special 6311VP2 Updater unit. (Note that this is a different part from the previous 6311 updater for the VP1 – unless an updater explicitly says '6311 VP2' on its label, it's not suitable for use with VP2 stations.) This updater is a small separate hardware unit that can be loaded with a firmware revision and used to update the console.

However starting from the Nov 2005 firmware versions, the option to update firmware direct from your PC (via your existing Weatherlink data logger connection) was introduced. This approach uses the 'Direct from PC' firmware versions.

If you have a console with firmware dated Nov 2005 or later then you may well be able to update the firmware yourself. (NB The Nov 2005 firmware had to be loaded from an updater configured in a certain way in order to activate the 'Direct from PC' updating feature. If an older updater was used then the firmware would still function perfectly well but the 'Direct from PC' feature would not be available. In this case a 6311VP2 updater unit would still be required to perform an update. Note also that the 'Direct from PC' update feature is not available for VP1 consoles.)

If you do have current firmware that supports the 'Direct from PC' feature (ie Nov 2005 or later – and all numbered eg v1.8 firmware versions in principle support Direct from PC updates) then later firmware updates may be downloaded from the Davis support website. Take great care to download only the correct firmware version for your console, being careful also to choose only the 'Direct from PC' firmware version. Performing an update in this way should be quite straightforward, but choosing the wrong version to install may cause major problems.

However, if your current firmware is older or you still need to use an updater unit then regrettably you're going to find this difficult because the updaters are no longer available either to buy or to hire. (Any VP2 console that still hasn't been updated will now be at least 11 years old now and support for such units has now lapsed.) And indeed the firmware versions for updating via an updater unit are no longer publicly available. The best we can suggest is to look on eg eBay and then, if successful, to contact Davis for a copy of the relevant firmware.

Mac and other non-Windows users

The Direct-from-PC method of updating console firmware can only be used from Windows PCs. There is no comparable mechanism for users of other operating systems, who will need to borrow use of a Windows PC in order to perform the firmware update..

Firmware revision details

Officially documented

> ❗ The listing below covers only those firmware updates that are available for download from the Davis support site. It is not uncommon for the latest updates to appear only in newly manufactured consoles to start with and it may take some months before these are available as downloads to update existing consoles. In other words, the latest console versions may well have a later firmware version than is listed below.

Below is a copy of the firmware release notes for the main Vantage Pro Console taken from the PDF document issued by Davis. (There's a brief section on significant undocumented changes at the foot of the official listings below.) Note that the Envoy console requires different firmware code and may be at a different revision number/date. Use only the correct firmware code for your console type – the main console should not be updated with Envoy code or vice versa.

Version 3.15 (March 27, 2014)

Minor improvements in firmware efficiency.

Version 3.12 (Feb 8, 2013)

Fixed a bug in 3.00 that did not allow the ET alarm to be cleared.
Eliminates occasional WeatherLink communication issue when console is busy receiving a radio packet.

Version 3.00

Console timesout of the "Receiving From" setup screen after 15 min using batteries and 30 min using AC power.
Previous versions of firmware allowed a negative ET, now it will clip hourly ET values at 0.
Added leading zero to temp readings between -1.0 and 1.0.
Improved temp and hum index calculations.
Low humidity readings now clipped at 1% and will not show 0%.

✳ There was a jump in VP2 firmware version numbers from v1.90 to v3.00 for undisclosed reasons.

Version 1.90 (Feb 18, 2010)

CWOP uploads will now contain 2 min average wind speed, 10 min wind gust and direction of gust, last 15 minutes of rain, last 1 hour of rain and Altimeter. Must also have WeatherLink software v5.9.0 or later to use this feature.
Fixed clearing of yearly ET history data.
Fixed a bug that caused the barometer value to have a large error after updating to firmware version 1.82.
Fixed a bug that when changing units in software caused the console to not reflect the change immediately.
Fixed graph so that zooming to a different span always starts at the first point.
Fixed display of historical yearly rain totals over 813 mm for 0.2 mm rain collectors (highs, lows and graphs).
You can now only get to the Receive Diagnostics Screen from the Current Screen.

Version 1.82 (December 30, 2008) – Wireless Version

Version 1.82 (December 30, 2008) – Cabled Version

Corrected Issues:
Changed "ALL CLEAR" function so that it does not clear any user-set calibration numbers.
Improved wind speed translation algorithm for increased accuracy.
Improved data logging of high wind speed measurements in environments that get poor reception.
Fixed a communication problem where the console output an extra "\n\r" if it received binary data containing a 10 (x0A) or a 13 (x0D). Note: This issue only affects third-party software developers.

Version 1.80 (July 14, 2008)- Wireless Version

Version 1.80 (July 14, 2008)- Cabled Version

Corrected Issues:
Modified wind measurements to accommodate a new version of wind cups.
Fixed a bug dealing with the digital barometer measurements taken at high temperatures.

Version 1.75 (February 12, 2008)- Wireless Version

Version 1.75 (February 12, 2008)- Cabled Version

Corrected Issues:
Fixed a bug that causes the console to display incorrect yearly rain values when the unit of measure for rain is set to millimeters.

Version 1.73 (November 2, 2007)- Wireless Version

Version 1.73 (November 2, 2007)- Cabled Version

Corrected Issues:
Fixed a bug that gave the High Rain Rate an incorrect time stamp.
Fixed a bug that caused an inaccurate barometric reading at high elevation.
Extended the amount of time the lamp stays on from 10 seconds to 15 seconds. If a key is pressed within 15 seconds, the lamp stays on for an additional 60 seconds instead of 20 seconds.

Version 1.7 (June 6, 2007) – Wireless Version

Version 1.7 (June 6, 2007) – Cabled Version

Corrected Issues:
Fixed a bug that caused the barometric data to spike after a firmware upgrade had occurred.
The 2ND key function is now enabled longer after being pressed. The timeout period for pressing the 2ND key and then pressing another 2ND key function was previously 4 seconds but is now 8 seconds.
Wireless Version Only – Fixed an issue in handling temperature data when an extra temperature station signal is lost.

Version 1.6 (December 1, 2006) – Wireless Version

Version 1.6 (January 8, 2007) – Cabled Version

Corrected Issues:
Changed the firmware version information displayed in the ticker tape from revision date to a revision version number.
Fixed a bug that caused the hourly digital barometric data to spike.
Changed the daylight savings bit in the EEPROM to report whether Daylight Savings time is on or off when the Automatic mode in the Daylight Savings Setup screen is selected on the console.

April 10, 2006

Corrected Issues
Wireless Version Only – Fixed issue with temperature reading not dashing out when the console has lost connection with a Temperature/Humidity station.

November 28, 2005 – Wireless Version

November 30, 2005 – Cabled Version

Added
Added the capability to load future firmware directly from a computer to the console through the data logger without use of a Vantage Pro2 Updater. Note: This capability requires an updater with the latest updater Firmware (dated October 5, 2005). To make sure that your updater is equipped with correct firmware, consult the firmware sticker on the updater for the date. If the updater has an older version of updater firmware, see "Contacting Davis Technical Support" on page 11 for more information.
Included the new Daylight Savings Time change that becomes effective in 2007. Currently, Daylight Savings Time starts on the first Sunday in April and stops on the last Sunday in October. With the new change effective in 2007, Daylight Savings Time starts the second Sunday in March and ends the first Sunday in November.
Corrected Issues:
Wireless Version Only – Modified the keystroke combination for displaying repeater information in Setup Screen 2 of the Setup Mode from pressing WIND to pressing 2ND and WIND. Previously, the keystroke combination for displaying repeater information in Setup Screen 2 required pressing only WIND. The change in keystroke combination makes it harder to turn on the repeater function by accident.
Wireless Version Only – Improved the radio's gain and made gain an automatic feature. Previously, radio gain was controlled by turning gain on and off in the Diagnostic Screens. The Gain Setting that displayed in the banner of the Diagnostic Screens is replaced with "Background Noise Level," which is used to determine if the console should turn the gain on and off.
Wireless Version Only – Fixed issue with the temperature reading not dashing out when the console has lost connection with a Temperature/Humidity station.
Cabled Version Only – The default year was changed to display 2005.

May 27, 2005

Added
Wireless Version Only – Added functionality to support use of Vantage Pro2 Wireless Repeaters (# 7626, 7627) and Long- Range Wireless Repeaters (# 7653, 7654) previously not available.
Corrected Issues
Wireless Version Only – Fixed issue with console not entering sleep mode when the console could not acquire the assigned station signal from an assigned repeater but could hear the station signal itself.

May 13, 2005

Corrected Issues

Updated the Heat Index formula used in the console to utilize the same formula used in the WeatherLink software.

Modified Wind Chill calculations between 40ºF (4.4ºC) and 93ºF (33.9ºC), giving more intuitive readings for temperatures above the upper limit of the official wind chill formula (40ºF). The result of this modification is lower wind chill values in the above temperature range than using the official formula.

Changed wind component of the THSW Index to reflect changes made to Heat Index and Wind Chill formulas described above.

Improved forecasting techniques by applying the California Inland criteria to the Mediterranean Sea region, which was considered as Latitude South of 45ºN and North of 30ºN; Longitude East of 10ºW and West of 45ºE.

Changed reporting of Due North from 0º to 360º to comply with the National Weather Service reporting standards.

Revised wind direction formula to improve accuracy of readings.

Fixed error regarding the console not reporting a low battery warning for Leaf % Soil Moisture/Temperature stations.

Wireless Version Only – Replaced the unused LOOP packet LEAF 4 field with a low repeater battery status since the Envoy does not support the monitoring of four leaf sensors.

Wireless Versions Only – The way the low battery status is reset in Weather Envoy and displayed WeatherLink now takes place at midnight. The Low Battery status for a station is not cleared once a station's battery is replaced. Previously, once a station's battery was replaced, the Low Battery warning would clear. In this version of the firmware, the Low Battery warning does not clear, even after a station's battery has been replaced until mid- night. During the day, the station runs off solar power and takes a battery reading which can be higher than the reading it takes during the night with- out solar power. The Envoy keeps the low battery warning until midnight or when the console enters Setup Mode.

January 4, 2005

Corrected Issues

Fixed a graph point that would not flash

Wireless Version Only – The default year was changed to display 2005.

Wireless Version Only – Raised the low console battery threshold to 3.5 volts.

December 21, 2004

Corrected Issues

Wireless Version Only – Internal watchdog timer now set for 10 minutes instead of 10 hours.

December 16, 2004

Corrected Issues
Wireless Only – Fixed issue that would not allow the Envoy to receive a station set on Transmitter ID I.
Wireless Only – Retransmit function corrected.

December 10, 2004

Initial Vantage Pro2 Cabled Envoy Firmware Release.

November 13, 2004

Initial Vantage Pro2 Wireless Envoy Firmware Release with new radio protocol support.

Undocumented firmware changes

There are apparently one or two changes in VP2 console firmware that don't seem to have been officially documented. Please let us know if you spot any more or have any further information on these.

The VP2 barometer update frequency used to be every 15 minutes – as specified eg in the sensor detail table right at the back of the Davis 2006 main catalogue. But in the same table in the 2007 and subsequent catalogues, the pressure entry has been amended to an update frequency of every minute. This change can presumably only have been made in console firmware but there's no mention of it in the official firmware revision log as shown above. Possibly the change was introduced in the Nov 2005 firmware revisions;

Vue and VP2 ISS/Sensors

This section covers troubleshooting issues with Vue and VP2 ISS units and with other sensors and sensor transmitters.

> ✱ However, notes on understanding the Davis wireless protocol and related recommendations & troubleshooting advice will be found in the Wireless troubleshooting section in the set of console-related topics.

VP2 ISS units are straightforward to understand in that each of the individual sensors is a standalone part and with the SIM/transmitter board easily visible once the SIM compartment cover is slid up. But the inner workings of the Vue ISS are less obvious hence the Vue ISS is described briefly in its own topic.

> ✱ **Barometric pressure issues:** The pressure sensor is located in the Vue and VP2 consoles and not in the ISS and so the pressure topic will be found in the console section.

6357 Vue ISS

As an all-in-one design, all the sensor and SIM/transmitter components of the Vue ISS are contained within the one single ISS assembly. How the components interact is a little less obvious than with the VP2 model and so is outlined briefly here.

The general principles of troubleshooting sensor or transmitter issues are similar across all Davis wireless models and as described in the separate sensor-specific topics. But this section supplies some brief context where reference to the Vue ISS hardware is required.

Although the appearance of the Vue ISS is little changed since its introduction in 2009, there have actually been two major changes to the ISS internals since then, plus a number of minor revisions. The revision level is shown in the first letter of the [Manufacturing Code](#).

Revisions A-F inclusive (also all referred to by Davis as v1.00) retained the main original design in which the sensor elements and main SIM board were all separate components which attached to the SIM board via a Pogo pin interface and could be replaced individually.

Revision G (v1.05) then saw a very significant change dispensing with the Pogo pin interface and moving to a fully hard-wired harness, with most components (other than the solar panel) permanently attached to the SIM board.

There was then a jump in numbering to **Revision M** (v1.10) which introduced a number of other enhancements (such as the replacement of reed switches in the rain and wind speed sensors by solid state components). Revision M also incorporated some significant improvements to the design of the lower half of the ISS case. Some months after Rev M appeared a further change was made by including the solar panel as part of the hard-wired harness.

Note: Throughout all of these ISS revisions, the Vue wireless protocol has remained completely unchanged. So it's perfectly OK to use one of the latest Vue ISS units with an original revision console/logger unit.

Practical consequences

As a result of these various changes in specification over recent years there are two important practical consequences:

- Individual electronic components can only be replaced on the original v1.00 layout (revisions A-F). But, in general, any significant electronic fault on rev G and later Vue units, whether in SIM board or sensors, requires replacement of the complete wiring harness;

- Because of the multiple design changes, it is vital to quote the Manufacturing Code (or at least the revision letter) when requesting spare parts. An incorrect part will almost certainly not fit your Vue. And it may be necessary if, for example, you have a rev M ISS to open up the ISS case to check whether the solar panel is part of the harness or not; fortunately this is easy to do simply by undoing the four screws located in the ISS base (but be aware that these screws have quite long threads).

> ✱ The need to replace the complete wiring harness on rev G and later models applies only to **electronic** faults. Various mechanical parts such as replacement tipping-spoon assemblies, wind speed and direction cartridges, debris screens and various other casing parts are still readily available as spares.

Note: Davis have set the price of replacement wiring harnesses for Rev G and later models quite high and not too far below the cost of a complete new ISS. For this reason, it may often be simpler and quicker to replace the complete ISS if an electronic fault develops on one of these Vue models. Similarly, even if you do have a pre-G model, this will now have seen several years of service and may be nearing the end of its useful life. So it may well be more cost-effective overall to consider replacing the complete ISS for these older models also.

VP2 & Vue Station 'Low battery' warnings

Overview

This topic refers only to low battery warnings from Vue and VP2 **wireless transmitters** (or what are reported as messages similar to 'Low battery on station #1'). A station low battery warning is obviously only ever seen with wireless stations and not with cabled units, which have no transmitter battery. The clue is in the word '**station**' that appears in the warning message. **Console** low battery warnings are dealt with in the console section.

These warnings will be seen in the message or ticker area of the VP2 and Vue console display, but analogous warnings can also be seen if you're running the Weatherlink software and look in the Alarm and Battery Status option available on the main Window menu.

Wireless repeater units will report similar low battery warnings, in which case the message in the console ticker will be eg 'Low battery on repeater A'

Background

> ✳ **Wireless transmitter battery:** The most obvious cause of a low battery warning is of course that the transmitter battery needs replacing! The battery required is a CR123 (sometimes labelled CR123/A) type which is a lithium battery of a small cylindrical torch-cell type often used in digital cameras and other digital devices. It should be fairly readily available from most battery outlets, including e.g. larger supermarkets, Boots, camera shops and the like. It's is also readily available from online shops, but do buy from reputable sources and not e.g. eBay where low quality copies may be sold. Note that this is **not** a rechargeable battery; rechargeable CR123 cells can be found but should not be used – they have a different voltage characteristic and in any event the Davis transmitter circuitry cannot recharge them.

All modern Davis wireless transmitters (ISS; Supplementary wireless transmitters such as the Anemometer Transmitter; and wireless repeater units) are powered in a similar fashion: The circuitry typically has three three sources of power: a small solar panel; a 'supercapacitor' ('supercap') component; and a backup lithium battery. (NB The 6372 and 6382 Supplementary Temp and Temp/Hum stations have no solar panel as standard, although one may optionally be fitted.) These three power sources work together in harness as follows:

When the sun is shining brightly then the solar panel provides power for the circuitry. Any surplus power is used to charge up the supercapacitor, which, as a 10 Farad component, can hold a considerable amount of charge for its size.

As night falls, the solar panel can no longer provide any power and the circuitry switches to use the supercap as its primary power source. The supercap can hold enough charge after a bright day in summer time (long days and short nights) to power the transmitter for the whole of the night-time. But for much of the year, the supercap will be exhausted after a few hours of operation and the circuitry will then switch automatically to use the backup battery as the power source. At dawn, the solar panel will start to function again and will take over from the battery.

The transmitter circuitry is very efficient and the back-up battery will last a considerable period. Indeed even without solar panel input (eg as in the 6372/6382 transmitters) the battery can last 6-9 months. The role of the solar panel is effectively to extend this battery life still further, typically to 18-24 months. But nonetheless the battery will of course eventually expire and need replacing, which is clearly when the Station 'Low battery' warnings are designed to show and alert the user to the need to change the battery in the relevant transmitter. In normal operation there is usually no need to panic when the station low battery warning appears – typically the unit will not stop transmitting overnight for at least 1-2 weeks.

In stations with just a single transmitter then obviously there can only be one **transmitter** battery that needs changing. In multi-transmitter configurations then care must be taken to read the 'Low battery on station #1' message accurately. The digit after the # sign will indicate which channel number is flagging up the low battery condition and hence the fading transmitter can be identified.

Troubleshooting transmitter battery issues

✱ **Note: Once triggered, a low battery warning does not reset automatically until midnight. So even if you've inserted a brand new battery, the warning may not disappear until the next day – this is perfectly normal.** Occasionally the first midnight reset doesn't work and it may take 2-3 days before the warning disappears – provided the outside data is being received normally this is not a cause for concern.

✱ On VP2 stations, ensure that DIP switch #4 on the SIM board is in the OFF position. The ON position should be used only for troubleshooting wireless reception issues. If switch #4 is inadvertently left on when not required this will steadily drain the battery and hence cause early but genuine low battery warnings. This issue does not arise with Vue stations (unless the channel selection/check button is somehow stuck at the in position.)

Low battery warnings can be **genuine** (ie the battery really is running low) or **spurious** (the battery is actually fine, but a false warning has been triggered). It is important to distinguish between these two possibilities – a spurious warning is a minor nuisance but the station will continue to operate perfectly well. Even genuine low battery warnings typically happen well before the battery is actually exhausted and so there is no need to panic if a warning is noticed – you will usually have a week or two in which to swap out the old battery with a new one (but obviously do not wait too long!).

The reason that spurious warnings might happen is as follows: Data packets are transmitted continuously by the ISS every 2.5 seconds or so and any data packet can contain a low battery warning flag. Once even a single such warning packet has been received then the console may display the low station battery warning until midnight of that day, when an automatic reset should occur. So if there's a voltage misread in any one of the ~34,000 data packets transmitted daily then the console low battery warning may remain activated after the trigger packet has been received until midnight of that day.

If a transmitter is left too long after a genuine warning without changing the battery then you will notice the sensor data from that transmitter dropping out **overnight**. (During daylight hours, unless the light levels are very low, the solar panel will provide sufficient power to maintain data transmissions.) For many users, the main ISS will be their only sensor transmitter and so the chief symptom will be that all outside data goes missing at some point overnight, but with inside data and pressure readings still being recorded OK. But if you have eg an anemometer transmitter or other supplementary transmitters then it will be data from that specific transmitter that is not being received overnight.

If you start to see repeated low battery warnings with a short battery life (weeks to a few months) **and** you conclude that the warnings are genuine (data starts to go missing if you don't change the transmitter battery) then you probably have a supercap problem – see the [supercap faults](#) topic.

> ✳ **Note:** it is also always worth double-checking that the battery is firmly in place and that the battery contacts are not dirty or corroded – this is uncommon, especially if the unit has always had its battery in place, but can be more prevalent with older stations, particularly Vue models, or if used in a more corrosive environment, eg at a coastal location.

Vantage Vue station low battery warnings

The voltage monitoring circuit on Vue transmitters seems somehow to be set too sensitive on some Vue stations and may have a tendency to generate spurious station low battery warnings. Of course you need to satisfy yourself that the warnings are spurious and not genuine, as outlined above. But if the battery is relatively new and ISS readings show no sign of dropping out overnight, even after eg 3-4 weeks, then the warnings probably are spurious.

If you have an older Vue console which is still running the original firmware then one solution that might help is to download and install firmware v3.00 from the [Davis website](#) . NB But do not download firmware later than v3.00 (eg v4.18) unless you have a console of MB or later hardware revision. v3.00 firmware requires that the console receive multiple low battery flags before it activates the console display warning and this largely, although not entirely, alleviates the problem.

On a few Vue systems the low battery warning can remain persistently though spuriously activated even if a newer firmware version is installed. Once you've concluded that the warnings really are spurious then on such systems there is regrettably little more that can be done, short of replacing the Vue ISS wiring harness (and thus effectively fitting a new voltage monitoring circuit). If the station is continuing to run perfectly well then these low battery warnings are best ignored – the continuing warnings are certainly an annoyance but nothing more. The transmitter battery can be replaced at eg annual or 18-month intervals to keep the transmitter running normally.

Wind issues

Overview

This topic covers issues and faults with readings of wind speed or wind direction. These are often also referred to as anemometer issues. (In a narrow definition an anemometer measures only wind speed and not wind direction, but in common usage an anemometer is the sensor that measures both speed and direction parameters.)

The appearance of wind sensors on Vue and VP2 models is obviously fairly different with the Vue's all-in-one sensor design contrasting with the separate anemometer of the VP2 station. At a technical level, however, the sensing of wind speed and direction is broadly similar on both Vue and VP2 and much the same troubleshooting approach applies to both models, with specific comments on differences in fixing wind issues included below where appropriate.

There are actually three types of VP2-type anemometers that have been used in Davis stations:

- The original 6410 VP1/VP2 unit that was used for many years from about 2000-2013 with only minor changes during that time;
- The revised 6410 anemometer introduced in 2013 (though not necessarily widely supplied until 2014) and incorporating a replaceable speed bearing and solid-state speed sensor;
- The 7911 anemometer that was used for the WMII and Wizard III stations;

Troubleshooting for all of these three anemometer types is much the same, but technical differences and how to tell the difference between them is described on the separate anemometer hardware page.

Note: If wind data is being received from a 6332 Anemometer Transmitter rather than direct from the ISS then the possibility of a transmitter issue rather than any anemometer fault should be borne in mind.

Wind issues

General troubleshooting

Issues and fault with readings of wind speed and direction tend to fall into one of three categories, each of which is discussed in more detail below:

- Zero wind speed readings

- Wind speed lower than expected
- Wind direction issues

> ✳ It is always best to diagnose wind issues from readings on the **console display** (but clearly not possible with an Envoy console). Readings from software logs can be misleading, eg a unit with a broken speed sensor will also show no direction (ie the 'dashed-out' symbol) in the software log on the basis that zero wind speed must automatically mean calm conditions with no valid wind direction. But if the wind direction is changing on the console display and even if there are fewer wind arrows than usual then it is likely that wind direction is being reported correctly and the only issue is with wind speed.

Wind speed & direction update every 2.5 seconds on all Davis stations and therefore watching the console display for 2-3 minutes should quickly clarify the symptoms; obviously this is easier on a breezy day than a relatively calm one!

> ✳ **Visual check:** It is essential also to make a visual check of the anemometer or Vue ISS, especially if a speed failure follows strong winds. Check that wind cups and vane both appear fully intact and correctly positioned, with the mast/pole properly in place and all components squarely positioned. For less accessible units inspection with binoculars can be useful.

Wind speed and wind direction are measured by separate sensors and it is very rare for **both** speed and direction to fail **simultaneously** – usually the fault is with one or the other of speed or direction. There are only two scenarios where both speed and direction are likely to go faulty together:

- With VP2 systems where the anemometer cable has been cut or damaged.
- With stations using the 6332 Anemometer Transmitter where the unit has stopped transmitting for some reason;

So if speed and direction readings have **both** failed (and excluding scenarios such as a recent nearby lightning strike or use of the Anemometer Transmitter) then the anemometer cable needs careful inspection to identify the cause of the problem.If the anemometer cable includes a joint or extension then this is very likely to be the problem. The further troubleshooting notes below assume that the issue is only one of speed **or** direction and not both readings.

> ❗ **Cable damage:** The anemometer cable has 4 internal wires or conductors. Damage to any one of these conductors can be sufficient to knock out speed, direction or both readings. The cable **and its plug** need really **thorough and careful inspection** – occasionally even

> quite minor damage that is inconspicuous to a casual glance may have penetrated the outer insulation and affected one of the conductors inside. Unless the damage is obvious at a distance there is usually no alternative to demounting the anemometer and cable completely for a meticulous examination of the cable, bending it back and forth as you go, including where the cable enters the plug, to reveal any potential minor nicks. Cable runs along the ground should be avoided – these are vulnerable to eg mechanical damage and rodent bites. If such cable runs are unavoidable then the cable should be run in simple conduit such as water hose or cheap electrical conduit.

Zero wind speed

Note: On older 6410 (VP2) and 7911 (VP1 and WMII/WWIII) anemometers it is not uncommon for the wind speed to fail **intermittently** as an early symptom. This is usually a sign that the reed switch used as a sensor in these older units is starting to fail. A sharp tap to the anemometer body above the cups will sometimes restore correct operation and if this works then it tends to confirm a reed switch issue, but which will need addressing sooner or later. But another possible cause of intermittent speed readings is a damaged cable with the speed conductor making intermittent contact.

Simple causes: There are certain easily-remedied causes of low or zero wind speed, as follows:

- If a visual check shows missing or damaged wind cups then these are readily available as spares;
- On older pre-revision 6410 (VP2) anemometers it was possible for the cups to slip down their shaft and then break magnetic contact with the speed switch. The remedy is simply to loosen the cups, push firmly up on the shaft and re-tighten securely;
- Don't underestimate how strong even a small spider's web can be around the cups, which obviously do need to be able to spin freely;
- While the drip rings above the cups help make the anemometer fairly resistant to winter icing, there will come a point in severe conditions where the cups will stop due to ice accretion – there's no remedy for this other than thawing the ice;
- The cups do need to be able to rotate freely when spun by hand. If much resistance is felt then the bearing is likely to be worn or rusty. Bearings can be replaced (see wind speed cartridges in the spares list) on Vue and revised-pattern 6410 anemometers, but older 6410 units are not repairable commercially and need replacing completely;
- The speed signal is carried by a single wire in the VP2 anemometer cable. If this particular wire is nicked or damaged then the result can be intermittent or zero wind speed;

Speed switch failure: If the simpler causes above have all been checked and ruled out then the only other likely cause of zero wind speed readings is that the speed switch has failed. Regrettably this usually requires buying a new anemometer or Vue harness/ISS, although in older Vue models (rev A-F) the wind

reed switch was mounted on the temp/hum PCBA (part 7345.283) and could be replaced separately at about half of the cost of a new harness/ISS.

The reed switch in pre-revision 6410 and 7911 anemometer can in principle be replaced with a new reed switch component, but it is quite an intricate operation to complete successfully and is not recommended for anyone who is not a skilled technician. (And for the same reason it is also no longer practicable or cost-effective for service centres to do this job commercially.) For anyone who is interested in doing it themselves, details are given in wxtech's [online anemometer guide](#), but be aware that this guide does not appear to have been updated for a few years and some details are out of date, eg the wind cups are now a single-piece moulding and not comprised of individual cups. Also, the revised 6410 anemometer with its different design, separate bearing and solid-state speed sensor is not described.

Additional note: The [wireless diagnostic screens](#) nominally provide some information about how often the anemometer speed switch contacts are seen open and closed. Use of this information is explained a little more in the console manuals. But, to be honest, we've never found this to be of much extra help in troubleshooting wind issues.

Low wind speed readings

It is not uncommon for users to think that their anemometer is under-reading. There are a couple of genuine anemometer issues that could lead to low speed readings, most obviously a stiff bearing on the wind cups shaft, which can be remedied as described in the section above, or a failing reed switch which is missing some revolutions of the wind cups.

But much more likely is that the user is failing to appreciate the importance of anemometer height and exposure in recording higher wind speeds. If all of the potential causes of zero wind speed listed above can be ruled out then it is highly probable that the recorded wind speeds are essentially correct but anemometer exposure is suboptimal. This is not the place for a primer on optimum anemometer positioning, but one key point is that wind speeds increase strongly with height. The official height for measuring wind speed is 10m (33ft) and this is the height probably used at official stations such as airfields. So comparison of a privately-located anemometer at maybe 2-3m (say 6-10ft) height with an official one at 10m will always show significantly lower readings. Official readings are also typically made in wide open spaces such as airfields where there are few barriers to the full force of the wind. Private locations, by contrast, usually have other houses and buildings nearby, with bushes, hedges, trees etc around, all features combining to materially reduce the local wind speed.

If you wish to measure maximum wind speeds then you must get the anemometer up high and do so in as open a space as is available.

High wind speed spikes

There is an uncommon issue where intermittent spikes of anomalously high wind speeds can be seen. This can have any of three causes:

- Moisture getting into the SIM board socket into which the anemometer cable is plugged and as detailed under the SIM board faults topic;
- A failing reed switch in pre-revision 6410 and 7911 anemometers, where the reed switch starts to bounce repeatedly rather than close cleanly. The result is that the SIM board sees many contact closures per cups revolution, which gets interpreted as a high wind speed;
- On **cabled** VP2 stations, especially those connected to a PC with earth/ground issues where a ground loop is the culprit. If the spikes disappear when the PC is temporarily disconnected then this is the likely cause;

Wind direction issues

In general, it's rare for the wind direction reading to give problems. But occasionally a couple of issues may be seen:

- On VP2 systems, cable damage involving the direction conductor will cause the direction to show North, either constantly or, with intermittent wire contact, from time to time;
- Any other direction issue usually involves a faulty direction potentiometer in the VP2 anemometer. There is typically no fix for this other than a new anemometer;

Note: If wind data is being received via a wireless repeater then a constant wind direction in the range 030-050 can be caused by the test DIP switch #4 on the repeater being inadvertently left in the ON position. (This causes the wind rose on the console display to show the wireless signal strength at the repeater, rather than the wind direction!)

Anemometer hardware

This page describes the various anemometers in use with Davis stations and details some of their elements.

Vantage Vue

The Vue ISS is clearly an all-in-one sensor design with the cups above the main body of the ISS and the wind direction vane below.

The cups (7342.178) and vane (7345.297) are both readily available as spare parts. Note that both cups and vane are unique to Vue station and are **not** interchangeable with the corresponding 7911/6410 VP2 anemometer parts.

The design of the Vue ISS has evolved over the years as outlined in the Vue ISS topic and some wind components are version-specific. Please refer to that topic for more details.

6357 Vue ISS

The design of the shafts and bearings for both speed and direction sensors allows for these components to be replaced separately if, for example, the speed bearing starts to wear and becomes stiffer to turn. The relevant spare parts are known as 'cartridges'. The wind **speed** cartridge is the same across all Vue versions and is part 7345.271. The design of the wind **direction** cartridge has evolved as the ISS case design has changed and is version specific, with the relevant parts being 7345.274 (rev A-G) and 7345.395 (rev M onwards).

The speed sensor in versions A-F was a reed switch fitted on the separate temp/hum sensor board. In rev G this board was no longer separate but made part of the hard-wired sensor harness and in rev M onwards the reed switch was replaced by a solid-state speed sensor. This latter part should rarely give problems but if it should go faulty then the only fix is a new harness or ISS, as discussed under the Vue ISS topic.

The actual sensor for wind direction is a Hall Effect magnetic component, and has been fitted ever since the Vue was launched. This component rarely gives problems, but if it does go faulty then a new main PCBA (rev A-G) or wiring harness (rev M onwards) is required.

All other Davis anemometers

Overview

All Davis stations other than the Vue have used a separate anemometer. These include the Vantage Pro 2 (VP2) model as well as the older VP1 and Weather Monitor II & Wizard III stations, which have all used variations on the same basic anemometer design. (NB There was a further anemometer variant sold with the EZ-Mount versions of the WMII and Wizard III stations for a few years after launch in 2000 and which had a 90° curved arm, but again the only material difference is in the shape of the arm.)

All of these anemometer versions use essentially the same sensing mechanism with a 20K potentiometer for sensing wind direction and a magnetic sensor (previously a reed switch but now a sold-state sensor) for counting revolutions of the wind cups in a standard 2.25 second gating window. There is a good write-up

Current 6410 anemometer

online of many of the technical details, including a wiring diagram, of the previous version of the Davis 6410 anemometer which can be seen at: www.lexingtonwx.com/anemometer/ which is well worth reading for anyone who wishes to try repairing one of these anemometers themselves. But do be aware that this doesn't cover the current version of the anemometer.

VP2-type anemometers are **all** supplied with 12m cable attached which is soldered inside the anemometer body and therefore cannot easily be shortened or detached. The only way of shortening is for the user to cut off the unwanted distal length of cable and to crimp a new RJ11 plug on the new cable end. All VP2-type anemometers (ie 7911 and 6410) bought as spares are supplied fully complete, ie including cable, pole-mount bracket (not shown in these pictures), vane, cups etc.

Anemometer versions

The detailed design of the anemometer has evolved over the years and there have been three main versions thus far:

- The original 6410 VP1/VP2 unit that was used for many years from about 2000-2013 with only minor changes during that time;
- The revised 6410 anemometer (see image above right) introduced in about 2013 and incorporating a replaceable speed bearing and solid-state speed sensor;
- The older 7911 anemometer that was used for the WMII and Wizard III stations and on which the 6410 was based;
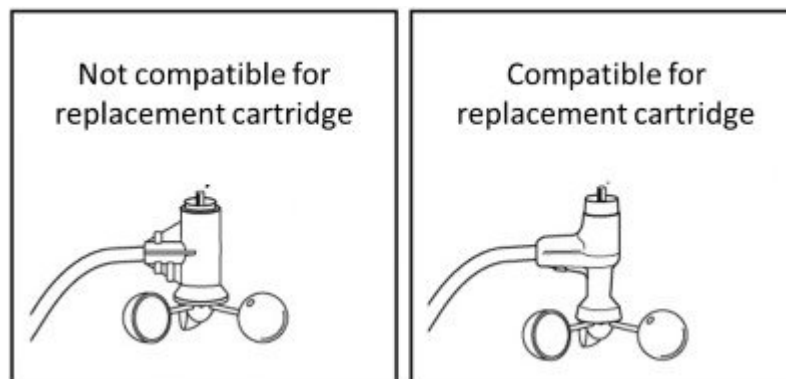
Although the 7911 anemometer always retained its separate numbering, there were only minor differences between the 7911 and 6410 anemometers and, for example, the 6410 unit is fully plug-compatible with the older WMII and WWIII stations. While the 7911 unit is still listed, there is usually no good reason not to fit a 6410 anemometer instead if a 7911 needs replacing. (Also, the original and revised versions of the 6410 unit are fully interchangeable with one another as complete anemometers, though individual spares such as wind cups are not necessarily intermixable.)

Later 7911 anemometer

In practical terms, there are only two aspects to the anemometer design that need comment: First, the most obvious visual difference between versions is in the shape of the anemometer arm. The 7911 unit started off with a completely straight arm, which later was given a slight upward offset. This upward arm angle is much more pronounced in the 6410 unit, which is less attractive as a perch for birds. Both 7911 and 6410 anemometers are supplied complete with a support bracket for pole-mounting into which the arm fits. The different brackets for 7911 and 6410 are obviously tailored to the different arm angles.

Second, and as noted above, the latest (post-2013) anemometer version introduces a replaceable speed bearing as part of what's known as the 'Wind speed bearing cartridge', available separately as part 7345.953. **Note that this is only possible with the revised design** and so it's important to be able to distinguish between versions, as per the graphic shown on the right. Look carefully and you'll notice that

Old vs new 6410 anemometer body design

the moulding immediately above the cups is significantly different between old and new. And whereas the old version was effectively a single body component, the new version has the body in two parts with the lower wind cartridge part being securely held in place with a single screw located immediately below where the arm enters the anemometer body.

Around 2013 the older all-black wind vane was replaced with a new brass-tipped version. And if you have this brass-tipped vane then it's also likely that you have the newer anemometer version overall. But the two changes weren't synchronised and so it's important to check the body shape as well to tell which version you have.

The solid state speed sensor should hopefully greatly reduce the incidence of reed switch failure that was a common issue with the original 6410 design (though we obviously won't get hard evidence of improved

reliability until the design has been widely used in the field for 5 years or more). However, greater switch reliability may now put more emphasis on the speed bearing, which of course does have to make many millions of revolutions during its service life. So having the speed bearing replaceable at reasonable cost does bode well for the overall life expectancy of a new 6410 anemometer. One other advantage of the separate bearing is that design improvements can continue to be made to the bearing cartridge, which can then be applied retrospectively to existing compatible anemometers at relatively low cost.

Wind cups

Recent Vue & VP2 anemometer versions

For VP2-type anemometers sourced since about 2003/4 the only replacement wind cups likely to be relevant is part 7905L – the large cups with horizontal magnet. For the revised (as from about 2013) 6410 anemometer, the magnet was moved into the wind speed cartridge and so in principle the cups no longer need their built-in magnet. However, no new spare cups without magnet appears to have been released by Davis and so 7905L seems to remain as the standard cups part, whether the magnet is needed or not.

The 7905L cups obviously need to be set as 'large' wherever there is a choice on the console settings for wind speed.

Vue cups, although quite similar in 7905L, these have no magnet and remain a distinct part as 7342.178. These Vue cups are not interchangeable with the 6410 anemometer.

Older anemometer types

Anemometers bought before about 2003/4 (and maybe at least a year or two subsequently, if old stock remained in the supply chain) have more cups variation as detailed below. In practice, an anemometer that is now 12 years or more old really needs replacing completely – anemometers do have only a finite service life. So the information below is essentially academic and here for reference only.

Large and small: Wind cups for VP2-type anemometers have been available in two cup sizes – small and large. The 7911 (WMII-type) units were originally small cups only (in ca 2000 and before). But for many years now both anemometer types have been sold only with large cups (though small cups are still available as spares) and large is the only size that is likely to be relevant to the great majority of users. Large cups start spinning at lower wind speeds than the smaller version and for general use there is no need ever to think of using small cups. Even for anemometers originally supplied with small cups, the large cups are the best replacement.

The only circumstance in which small cups were suggested was in localities where **extremely** high winds (eg hurricane force – 100mph and above) may be encountered because smaller cups may perform a little

better under these extreme conditions, presumably because of their lower wind resistance, though this isn't stated explicitly anywhere. The downside of small cups is obviously their more limited performance at more moderate wind speeds.

Construction: for some years' now, both small and large cups have been of a single all-in-one moulding. Previously, the large cups were each moulded separately and clicked in to the hub assembly. But this older design is more prone to wind damage and there is no reason not to replace the old version with the newer all-in-one moulding.

Magnet orientation: In 2003, Davis changed the orientation of the magnet in the wind cups in the interests of greater accuracy and reliability. (The magnet in the cups passing a reed switch in the anemometer body was the mechanism by which revolutions of the cups were counted, though a slightly different method is used in the revised 6410 version – see below).

The magnet is visible on the underside of the cups In the original version, the magnet was oriented vertically (ie parallel to the spindle on which the cups sit) and the magnet is only visible end-on as a bright dot. In the post-2003 version the orientation became horizontal and the magnet can be clearly seen as a small rod.

Fitting new cups with the wrong orientation will not work reliably. If the anemometer body needs cups with a vertical magnet then this is the type that must be fitted and vice versa. Look at the existing cups before ordering a new set of cups.

As a result of using both large & small cups and vertical & horizontal magnets, three distinct types of spare cups have been available:

- Large cups: 7905L (horizontal) and 7903L (vertical);
- Small cups: 7903S (vertical); (To our knowledge, there has never been a 7905S part);

In practice, only 7905L is likely to be commonly needed.

Console cup size setting: TBA

Repairing 6410-type anemometers

Just to reiterate: while a few components such as wind vane and wind cups can be replaced on the Davis anemometers and cable damage is usually repairable, loss of wind speed or direction usually means a new anemometer unless you're prepared to entertain DIY repairs. The one exception to this is that any issues with the wind speed bearing on post-2013 units can usually be fixed with a new wind speed bearing cartridge.

But, in general, other than using these readily-available spare parts, providing diagnosis, repair, post-repair checks, warranty, shipping etc for faulty anemometers is just not commercially viable for dealers. For users who do wish to try their hand at repairs themselves, here are some additional resources:

- The write-up of the previous version of the Davis 6410 anemometer referred to above at: www.lexingtonwx.com/anemometer/ is a good starting point. But do remember that this doesn't currently cover the revised (post-2013) version of the anemometer and important details may differ, including eg the colour coding of the wiring.

- For specific pictorial instructions in replacing the reed switch in older anemometer versions take a look also at: www.cjoint.com/15ma/ECAj5A762FD_changement_ils.pdf

- Text instructions for disassembling the revised 6410 version and replacing the direction potentiometer, courtesy of Tony Pennell;

Temperature/Humidity Sensors

This topic covers Temperature/Humidity (T/H) sensors used in VP2 stations manufactured since 2006 and is relevant also to Vue stations. [Please see the topic Older Davis Stations for T/H issues relating to Monitor II, Original Vantage Pro (VP1) and VP2 stations manufactured prior to 2006.]

While the general description, symptoms and troubleshooting procedures are similar are similar for T/H sensors between VP2 and Vue stations, replacement parts are of course different for the two station types. Please refer to the relevant page for details of how to replace the sensor.

This section includes the following pages:

- T/H Sensor – General: An introduction to the T/H sensor elements used in the Davis Vantage stations

T/H Sensor – General

General Description

> ✳ During 2016 and with the introduction of 'AS' revision VP2 models, Davis switched to using the Sensirion SHT31 T/H sensor. This marks a step-change from the SHT1x range of digital T/H sensors used for the preceding 10 years (2006-2015). When reading the notes below it is important to be aware of the revision version of your VP2 station. If you're unsure which version you have then please decode the Mfg Code for your ISS.

While not officially disclosed, it is widely understood that Davis has always used the Sensirion make of T/H sensors in all Vue and VP2 models from 2006 on. From 2006 to 2015 the Sensirion SHT-1x series range of temperature/humidity (T/H) sensor elements was used in all VP2 weather stations (and also in the Vue model). This is an integrated digital sensor that delivers its data on an interface similar (but not identical) to the I2C protocol and called Sensibus, although this has never been officially confirmed by Davis. From 2016 on, in VP2 'AS' revisions and later, the T/H sensor was changed to the new Sensirion SHT31 sensor . Differences between the SHT1x and SHT31 ranges are detailed below. There has been no announcement from Davis of a change away from SHT11 sensors in the Vue models and we assume that this older sensor is still used in the Vue, probably as another distinguishing feature between Vue and VP2.
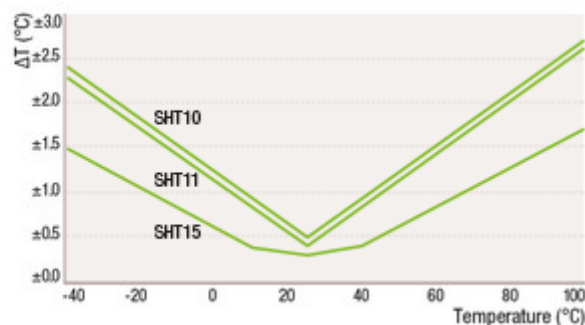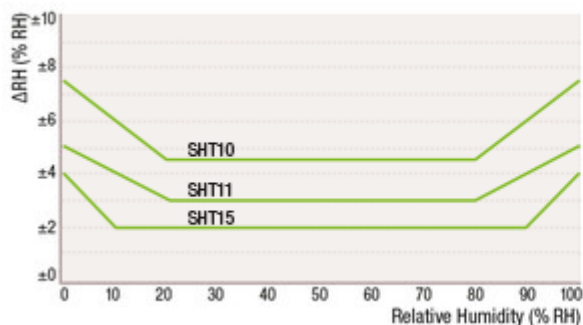
For both SHT1x and SHT31 sensors, the Sensirion sensor element is mounted on Davis's own small PCB assembly using surface mount methodology and the T/H chip is therefore not suitable for user replacement by traditional hand-soldering techniques. Exposed tracks and connections on the PCBA are thoroughly protected from moisture ingress by epoxy-type coating.

Sensirion SHT1x sensor elements

There are three types of SHT-1x sensor element made by Sensirion, SHT-10, SHT-11 and SHT-15 which are identical in general design, but with progressively better accuracy specifications. All three sensors share the same overall characteristics, with an operating temperature range of -40°C to (nominally!) +100°C and relative humidity (RH) covering the full range of 0-100% RH. See accuracy profiles for temperature (right) and RH (left) in the graphs below.

This sensor family is designed with an optimum temperature accuracy at 25°C and accuracy steadily decreases away from this central design temperature. In other words, the accuracy specification typically quoted will only be fully valid at 25°C and accuracy **will** be lower away from the design temperature. Also, with this profile, it is inevitable that potential inaccuracy will be somewhat greater at low temperatures (eg -20°C), which are relatively commonplace in winter, than at the maximum temperature reached across most of the world (eg 45°C).

Humidity accuracy has its own characteristic profile: Maximum RH accuracy is attained across a central band of RH values spanning roughly 20-80% RH. Accuracy then decreases markedly towards 0% and towards 100% RH. Since fog and heavy rainfall are obviously associated with high RH values, it's worth noting that humidity in the range 95-100% is a tricky region to measure accurately and potential errors will always be higher here. It is not uncommon to find that 98% or 99% is the highest RH value that a station will display (unless a console offset is deliberately entered).

Sensirion SHT31 sensor element

The SHT31 sensors used in VP2 stations of AS revision and later look very similar to the SHT1x family and are mounted on a small Davis PCB assembly in an identical manner.

Accuracy
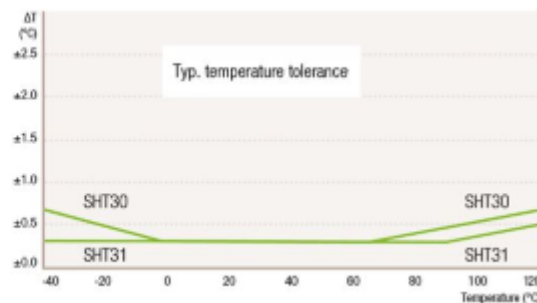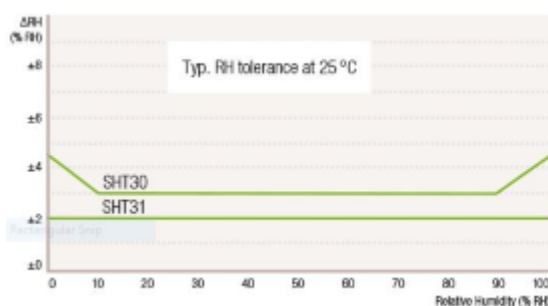
characteristics for a typical SHT31 sensor are shown to the right. (NB The SHT30 sensor is not used by Davis). The notable further improvements in accuracy over even SHT15 should be clear to see. The main benefit is that optimum accuracy is now maintained for a much wider spread of temperature and humidity, especially so for temperature, and so intrinsic temperature readings should be significantly more accurate, even well away from the nominal calibration temperature of 25C.

Davis T/H sensor PCB assemblies for VP2 stations

There are now three distinct replacement T/H sensors that are available from Davis and compatible with all VP2 stations made since 2006, subject to appropriate temperature offsets being used. (The situation with Vue stations is different: For Vue stations prior to revision M, a single replacement T/H PCB assembly is all that's available. For revision M and later, a complete harness change is required if the T/H sensor becomes faulty.)

SHT11: The previous standard VP2 T/H sensor is **part 7346.166** which has now reached revision J. This part is thought to use the middle-ranking SHT-11 part (SHT-10 being unused by Davis), which is specified as having a typical temperature accuracy of ±0.4°C (at 25°C) and for humidity of ±3% over 20-80% RH, rising to 5% at 0 and 100% RH. The Vantage Vue is also thought to use this same SHT-11 sensor element.

SHT15: In 2015, Davis introduced **part 7346.174** which uses the enhanced SHT15 T/H sensor. This option has two main benefits:

- In addition to lowering the typical temperature accuracy at 25°C to ±0.3°C, the SHT-15 has an altogether shallower temperature/accuracy profile, which offers a roughly doubled temperature accuracy at eg -10°C and 40°C;
- The baseline RH range of the SHT-15 is ±2% over 10-90% RH and maximum error at 100% RH is reduced to 4%.

This 7346.174 sensor is a direct drop-in replacement for the older 7346.166 part and may be used with no change in temperature offset being necessary. Note however that 7346.174 has only been made in limited quantities and may become increasingly difficult to source.

SHT31: The newly released SHT31 sensor is built into Davis **part 7346.070**. This is plug-compatible with the 7346.166 sensor and can be used with any VP2 station from 2006 on. **However**: The temperature calibration of the SHT31 sensor is slightly different from the previous sensor and if the 7346.070 sensor is used with a VP2 station prior to the AS revision then the temperature will read 0.5C high and therefore a temperature offset of -0.5C needs to be entered into the console in this scenario. (And conversely if eg an older 7346.166 sensor is used with a VP2 station of AS revision or later then the temperature will read 0.5C too low and an offset of +0.5C needs to be entered.)

The design of the VP2 ISS circuit board was updated slightly with the AS revision. Provided the SHT31 sensor is used with an AS revision SIM board (part 7345.952 for the main ISS board) then the calibration difference is allowed for and **no offset is needed**.In other words, provided that an AS (or later) T/H sensor is paired with an AS SIM board then no calibration change is needed. It is only when mixing older and newer T/H sensors and SIM board that this calibration issue will arise.

Rain gauge faults

Apparent inaccurate readings

The commonest support issue with rain gauges is suspected inaccurate readings. **In many cases the rain gauge is actually not at fault at all**, rather it's that the user does not appreciate the local variability of rainfall or the importance of correct exposure and of regular cleaning or does not recognise the limitations of all tipping bucket rain gauges. (Rainfall is probably the most tricky of the main weather parameters to measure automatically to good accuracy.) However, if the gauge is failing to register rainfall at all or is *dramatically* over-estimating rainfall then see the separate Fixing Rain Gauge Faults topic.

This is not the place for a detailed description of how to measure rainfall accurately, but a few key points would include:

- The gauge must be clean and level to measure accurately;
- The gauge must be well-exposed to the sky **with no nearby buildings, trees, fences etc**. It's often impossible to satisfy this requirement fully in a typical domestic situation, but the aim will be to achieve the best exposure possible in the circumstances and to remember that even residual objects in the vicinity of the gauge will potentially have some impact on recorded rainfall;
- Rain gauges should ideally be mounted close to ground level (or protected by a wind break wall if mounted on a flat roof) – siting the gauge at any significant height will expose the gauge to wind effects and hence typically cause significant under-recording of rainfall. (This is unavoidable to an extent with an all-in-one design like the Vantage Vue where some compromise between wind and rain measurements will always have to be made);
- Rainfall totals can vary widely over a short distance, especially during storms or showery weather – the total from another gauge even a mile or less away can provide a very misleading comparison. Checks against a reference gauge should ideally be made with the funnel openings at exactly the same height and with the funnels very close if not touching. Even separating the gauges by eg 50-100m can lead to significant differences in recorded rainfall;
- Rainfall rates can vary considerably with different types of rainfall event, ranging from very light drizzle to torrential downpours and automatic gauges can have problems with under-recording at either end of the rainfall rate scale. In very light rain/drizzle, there can be evaporation of partially filled buckets, while extremely heavy rain eg during a thunderstorm can overwhelm the gauge to an extent because of out-splash from the cone and missed collection while the buckets are in the process of tipping;
- The minimum amount of rain that can be measured is 0.2mm or 0.01" (depending on type). Even 0.1mm rain is sufficient to wet pavements and to be felt as fine drizzle, but will typically not register on

the gauge. Conversely, a heavy morning dew can often lead to collection of 0.2mm water in the gauge, occasionally more; this is a natural phenomenon and is usually legitimately included within rainfall totals;

- You need a significant amount of rainfall (eg 5mm or preferably substantially more) when comparing readings from two gauges. A check with 1-2mm rainfall or less is fraught with problems;
- Measuring the liquid equivalent of snow may be problematic – this is unavoidable short of installing a rain gauge heater (which is available as a spare part for the VP2 gauge but does need access to an AC mains power supply). For small amounts of snow, eg up to 5-10cm, the snow will accumulate in the funnel and will be measured when the thaw comes – rainfall equivalent amounts will be roughly correct, but timing of the precipitation obviously will not be. For larger snowfalls then the excess snow will obviously tend to overtop the funnel and, inevitably, will escape measurement.

If you still suspect a rain gauge problem

Rain gauge maintenance – the importance of cleaning

Assuming that the gauge was installed in a good level plane and has not been disturbed, then cleaning is the only routine maintenance needed for the rain gauge. But cleaning as often as necessary is vital for rainfall accuracy.

In particular, check that the funnel and debris screen are clean and that the central hole is fully clear and unobstructed – depending on local circumstances this check may need to be made relatively often. The updated cone with provision for inserting bird spikes can sometimes help considerably – the new style cone is available as a spare part, complete with spikes, to fit existing VP2 gauges.

Check also that the buckets are clean and can tip without impediment – it's not uncommon for spider webs, for example, to impair tipping and potentially to prevent tipping altogether – even a strand or two of spider silk is surprisingly strong. Judicious use of insecticides may be helpful in preventing recurrent problems with webs, insect nests etc.

NB Oiling the tipping mechanism is rarely necessary and can actually hinder accuracy by attracting pollen and other particulate matter.

Check operation manually

A simple procedure for checking operation manually is described in the [Fixing Rain Gauge Faults](#) topic.

Check console and software rainfall increment settings

If the readings are consistently out by 20-25% (relative to a check gauge) then check that the wrong calibration setting has not been used, eg the gauge increment may be 0.2mm (metric calibration) while the console setting is 0.01" (US units) or vice versa. (All Davis stations supplied in the UK market for the past several years have all had metric 0.2mm calibration, but you may have an older station with 0.01" increment.) The calibration setting can usually be found on a small round label either on the outside of the cone when new, or on the base of the gauge inside the rain cone, but of course may have been lost with the passage of time.

Note that the correct calibration setting must be made in **both** console **and** in software – this setting is usually not passed from console to software and so needs to be correct in both places. (This factor may be an obvious reason why totals may differ consistently between console and software.)

Calibration checks

The best way of checking the calibration of a rain gauge is to set up a decent quality manual gauge **very close by to the Davis gauge and with its opening at the same height** – proximity and height are very important to a reliable comparison. Cheap gauges eg as sold in garden centres are unlikely to be accurate enough for anything other than a very rough and ready check. Prodata sells an inexpensive quality plastic gauge known as a CoCoRaHS gauge that is an internationally-recognised standard. Even manual gauges need careful use – read and empty the gauge regularly to avoid losses due to evaporation. And run calibration trials over several significant rainfall periods – one brief shower is obviously unlikely to provide a good check.

Check that any comparison is made on data that covers precisely the same time period. For example, the Davis consoles reset the Daily Rainfall reading to zero at midnight every night whereas the traditional observation day for manual readings (which is still widely used in eg the UK) runs from 09-09 hours. As a result, if a heavy rainfall event spans the midnight period, then the nominal daily totals for the two sets of data can be very different even if both gauges were perfectly accurate. Significant differences in monthly totals can also be seen for similar reasons if a heavy rainfall event happens to continue across a month-end;

An alternative calibration check is to run a 'drip test'. This involves allowing a known volume of water to drip slowly into the funnel and then observing the rainfall total on the console. It turns out that if 544ml (18.39 ounces US) of water are dripped **slowly** – eg over a period of 30-60 minutes – and completely through the gauge, a reading of 1.00" or 25.4mm should result. (Practical details: Outside of a lab, it does take a little ingenuity to think how best to drip this volume of water. One suggestion is to use a clean plastic drinks bottle with a hole made in the bottom by a needle or tack. It may be more convenient to weigh the volume of

water than to measure its volume by assuming that 1ml = 1g. You may obviously need to try one or two test runs to get the drip rate right.

If, having read all of the information on this page and having carried the tests suggested, you're still convinced that your gauge would benefit from recalibration then it is possible to adjust the calibration by means of the stops underneath each end of the Vantage Pro 2 rain gauge buckets. We strongly suggest that you **only** change the calibration in this way **as a last resort**. Users often move the stops prematurely, only to discover that there was a different explanation altogether for their presumed rainfall inaccuracy. But, by then, it's too late. The original factory setting of the stops has been lost and it's very difficult to return exactly to the original settings. If, nonetheless, you still wish to press ahead with changing the height of the stops, there are two key facts to be aware of:

- Each counterclockwise movement of the stops by one flat of the hexagon raises the stop and hence increases the rainfall recorded by the gauge by approximately 1% (per flat). So one complete revolution of the stop would cause roughly a 6% increase in recorded rainfall. (Raising the stop – ie a movement in the +ve counterclockwise direction – decreases the weight of rain needed to cause a tip of the buckets and hence a given rainfall amount generates more bucket tips and thus a higher rainfall reading);
- Each of the two stops must be adjusted by an equal amount (and obviously in the same direction);

If you do go ahead and change the stop height significantly then you may well wish to rerun the drip test after making the adjustments to the two stops so as to check the new calibration.

Fixing Rain Gauge Faults

Zero rainfall being registered (may be only intermittent)

VP2 stations

If this is a new installation, ensure that the plastic tie that prevents the buckets from tipping in transit has been removed. Ensure that the rain-gauge funnel is correctly installed such that:

- The funnel is correctly located in its groove and is locked into place with the central hole correctly positioned over the bucket mechanism;
- The funnel is level (check with a short spirit level across the top of the funnel)
- The debris screen and (recent VP2 models) bird spikes are in place;

For existing installation the first check is always to ensure that the central hole has not become blocked. If it is blocked then obviously remove the funnel and clean it thoroughly.

And, as with all rain gauges, keeping the gauge and mechanism clean is important. It is perfectly possible for a spider web to be spun around the buckets and so prevent them from tipping and hence registering rainfall. So ensure that the bucket mechanism and the area around it is kept clean.

Checking operation manually

If none of the above helps to resolve the problem then remove the funnel and try tipping the buckets slowly by hand. As the buckets pass the midway position then those with good hearing should be able to hear a faint click as the reed switch closes. Leave a few seconds between each tip. Check visually also that the buckets are swinging in the expected vertical plane; it's not unknown for the spindle to become slightly unseated at one end and if this happens then the magnet at the bottom of the bucket assembly may be passing over the reed switch at an angle rather than horizontally and therefore not registering correctly. If necessary, the two vertical arms that hold the spindle can be prised very *carefully* apart until just enough room is created to allow the spindle end to slip back into place.

The total rainfall that you have generated manually should then register on the console display. For example, five tips of the 0.2mm metric gauge should cause 1mm total rainfall to register. Be aware that there will be a slight delay between the manual tips and updating of the display – wait for 30-60 seconds before looking for the total to appear.

This test is obviously best done on an otherwise dry day when the daily rainfall total starts off at zero. This will make it easier to clear the artificial rainfall that the tipping test causes (see console manual for details of how to do this). Obviously, this test is only possible when you're sure that there is good reception of other weather parameters like wind and temperature at the console. Also the test is only possible when using the standard display console – with Envoy consoles, checking for the test rainfall will clearly need to be done via software readings.

Vue stations

The principle of the VP2 comments above all apply but obviously the Vue rain gauge mechanism is mechanically rather different, being a tipping spoon in an accessory part that can easily be removed for checking and cleaning.

So, if it's a new Vue system then check that you did actually install the tipping spoon part as per the instructions. And tipping the spoon by hand is achieved by poking a long thin stick (or eg thin kebab skewer) down through the central hole of the funnel above.

Excessive rainfall readings

'Excessive' in this context means over-reading by e.g. 50% or a still larger proportion, which will usually indicate some fault with the rain gauge. Over-reading by a smaller proportion will more often be caused by a calibration error – see the main 'Rain gauge faults' topic.

VP2 stations

There are typically two possible causes of serious over-reading with VP2 stations – moisture in the ISS SIM socket or a faulty reed switch. The cause will rarely be in the SIM circuit board or console or software – none of these other possibilities can be ruled out absolutely, but troubleshooting should always centre on the rain gauge itself and its connection to the SIM board in the first instance.

ISS SIM socket: If moisture has somehow seeped into the socket where the short cable from the rain gauge plugs in then this can simulate the effect of frequent closures of the reed switch that normally registers a tip of the rain gauge buckets and hence cause a large rainfall total to be recorded. The check required is the obvious one – remove the SIM board cover (preferably when it's not raining of course), unplug the rain gauge cable and check visually for moisture droplets. Then allow the moisture to dry out – usually quicker if the plug remains out temporarily.

The commonest cause of this problem is obviously if the front cover to the SIM compartment has not been replaced correctly and is allowing the rubber seal to leak somewhere – the cover should of course be on

squarely and latched fully home – but there can be other causes such as a twisted front cover or a missing or degraded foam plug that normally closes the cable access port. Unsurprisingly, this sort of fault is most likely to be seen under conditions of very heavy rain, especially if combined with strong winds to force errant raindrops through a gap in the seal.

Faulty reed switch: Once the reed switch under the tipping bucket mechanism starts to wear seriously then the contacts can bounce and so each tip of the buckets can register as multiple tips so considerably increasing the rainfall registered. This isn't an easy fault to diagnose and is relatively uncommon, but can sometimes be picked by slow manual tips of the buckets where a larger rainfall total than that expected from a specific number of tips may be seen. (Remember that the final total does take some seconds to register on the console – it is not instantaneous). The fix is to replace the reed switch – this is one repair that can be performed by the user if they have competent electronic soldering skills. But otherwise the rain gauge base, complete with tipping bucket mechanism, may need replacing.

Vue stations

To be added;

SIM board faults

Wireless SIM board faults

General troubleshooting

This topic is mostly here as a pointer to comments that are described in more detail under other troubleshooting topics. The ISS SIM board is obviously the commonest type of SIM board, but the principles below apply to all types of wireless transmitter boards. Wireless SIM board issues usually fall into one of two categories:

- Loss of readings from **all** sensors connected to that transmitter;

- Recurring low battery warnings;

If readings from only a single sensor look incorrect then the fault is almost certainly with the sensor rather than the SIM board and so troubleshooting comments for that particular sensor need reviewing. Be aware, however, that some readings simply fail to update (ie the last reading received persists on the display) rather than reading zero or dashed out. So a careful check that all readings are updating as expected is required to be sure of the nature of any potential issue.

If **all** sensor readings from a given transmitter are missing or not updating then this could be caused by a weak or missing signal (in which case see the Wireless troubleshooting topic) or, sometimes, by a supercap fault.

The Low battery warning topic is obviously the place to look for advice on dealing with station low battery warnings and supercap faults are again one possible cause of issues.

VP2 SIM boards

In general, most issues encountered with wireless SIM boards are covered by the troubleshooting topics referenced above. The only hardware repairs that can readily be made to a SIM board are replacing the supercap or cleaning the battery contacts. If these repairs aren't relevant then the only other option is usually to replace the board with a new one – no other component-level repairs are usually practicable.

✳ When replacing a VP2 SIM board with new, be sure to check the transmitter revision level. The calibration settings for the T/H sensor changed from revision AS on and it's important to replace like with like **OR** to make a compensating temperature offset in the console settings. The VP2 SIM part number is 7345.978 for pre-AS stations and 7345.952 for AS revision on. **Note that these part numbers are for OV parts as used eg in the UK and EU. Part numbers for the US and a few other territories WILL be different.** This calibration change is explained in more detail in the SHT31 section of the T/H sensor topic.

✳ A new wireless **ISS** SIM board is always supplied mounted on its white backplate and with the antenna in place. Exactly the same basic SIM board is also used in 6372/6382 Temp/Hum stations and in the 6332 Anemometer transmitter, but in this case the backplate is not needed, so the bare SIM board (but still including attached antenna) is available as a separate part 7346.057 (pre-AS) or 7346.069 (AS on) for OV models. The ISS board may be removed from its backplate if required by releasing the 4 screws and then levering out the white U-shaped bracket that holds the antenna tight against its rubber seal and which is simply a push-fit. NB The 6345 multi-sensor transmitter has a completely different transmitter board.

There are a couple of other minor board-related issues that it's relevant to include here:

Water ingress

Rain/moisture penetration on to the SIM circuit board can occasionally be a problem. This is usually caused by the front cover not being replaced squarely (or not fully latched home) or the foam plug in the rear access port is missing or has seriously deteriorated with age. Identifying and fixing the source of moisture will usually cure the problem.

The SIM board is actually well-protected against moisture with a conformal coating, but water droplets can cause erroneous readings if they reach the inside of the sensor sockets and start shorting across two or more of the contacts inside the socket. Symptoms will obviously depend on which socket is affected but, for example, moisture in the wind sensor socket can cause persistent and spuriously high wind speed readings or very high rainfall readings if in the rain socket. If this issue is suspected then unplug the relevant plug and look carefully for any small water droplets, which can be dabbed dry with a tissue and the plug left out for a few hours to allow complete drying out. The source of the water ingress obviously needs to be identified and remedied as well. (NB The gold contacts inside each socket are protected during manufacturing with a waxy water-repellent material – this is deliberate and not dirt or corrosion as is often mistakenly thought, but moisture ingress can sometimes be enough to overcome this protection.)

Sensor cable sockets

Moisture in the sensor sockets is covered above, but the plug/socket connection can, very occasionally, give trouble in other ways. If data
from a single sensor only, eg wind or rain, is giving problems then it's always worth double-checking the plug/socket connection. Occasionally the plug may not have clicked fully home or a piece of grit or dirt may have lodged between a pair of contacts, so just unplug the cable, check visually and replug, ensuring that the plug positively clicks home. (But note that the anti-moisture coating within the socket is not dirt but there by design and should not interfere with good contact being made.) If a sensor fault persists and cannot be traced to a fault in the sensor itself or the cable then check also that the plug is correctly crimped on to the cable. Bend the cable back firmly (but without using excessive force) where it enters the plug and check in good light that none of the individual conductors seems loose. If any defect is seen then the plug will need to be recrimped on to the cable.

ISS solar panel discoloration

On wireless VP2 stations, the solar panel on the sliding white SIM compartment cover can deteriorate cosmetically with age. This is rarely a major problem in that even a badly discoloured panel still seems to work adequately, though battery life may be somewhat reduced. We have heard of people being able to clean up the outer surface of the panel (which is where the problem arises) using a standard liquid mildly-abrasive household cleaner. Alternatively, new panels can be purchased as part 7345.114.

Vue stations

The general principles of troubleshooting for low battery warnings or lost wireless signal for Vue stations are exactly as described in the General Troubleshooting section above.

However, the physical SIM design and access of Vue stations are obviously quite different to VP2 models. Also, the Vue ISS hardware has been through multiple revisions over recent years and it is important when thinking of ordering spares to know exactly which Vue revision you have. If there is a persistent SIM or sensor issue on a Vue and the unit is out of warranty then the simplest solution is often to buy a complete new ISS unit – the price will often not be much more than buying the relevant spares. See the Vue ISS topic for further discussion and advice on this point.

Cabled SIM board faults

It is very rare for cabled SIM boards to give problems – these boards are relatively simple and do not have either a battery or the supercap component that is a common cause of recurrent low battery warnings on the wireless models. And provided the cable from ISS to console has not been damaged (which is obviously something to investigate if data is lost from a cabled VP2) then none of the data loss issues will be seen that are possible with the wireless models.

There is, however, a rare issue where a cabled SIM board can appear to lock up and stop sending data. Troubleshooting this issue is described in the ['Outside data missing' topic](#) in the consoles section.

Supercap faults

VP Transmitter Error Due To Supercap Fault

Background

The supercap fault/issue is a transmitter fault, primarily found on older VP2 systems (but see VP1 note below), whose commonest symptom is poor ISS/transmitter battery life. This can be as short as a few days but can also range up to several months, especially in the early stages of this fault, but well short of the typical transmitter battery life of 18 months or so. Accompanying symptoms can also include loss of wireless reception overnight only or, occasionally, complete loss of reception even with a new battery fitted.

(NB A supercap fault is not the only cause of short battery life, which can also happen as a result of a simple defective battery or forgetting to reconnect the plug from the solar panel when the SIM compartment cover has been removed or, simply, poor exposure of the solar panel. So all these possibilities are worth excluding before deciding that the supercap is at fault – the first troubleshooting step for supercap-like symptoms is always to fit a new battery and to check whether the solar panel is definitely plugged in. If you're sure that the solar panel plug was in place, then (i) check that there are no loose connections on the solar panel itself; and (ii) unplug the solar panel for a couple of days of testing – there is a rare fault where the panel can develop low resistance and can also therefore run down the battery.)

Supercap faults have been most commonly reported for the ISS SIM board, but the supercap is fitted to all VP2 wireless transmitter boards, including supplementary stations (ie 6332/6345/6372/6382) and repeaters, as well as the ISS itself. So it is in principle possible to encounter the supercap issue on any VP2 transmitter.

The supercap (or 'supercapacitor' more accurately) is a prominent component on the SIM circuit board (see image below) whose role is to act as a short-term – eg overnight – store of electrical power for the wireless transmitter. The VP transmitter boards actually have three distinct sources of power: the solar panel, the supercap and the lithium battery. The battery is non-rechargeable and so any surplus power from the solar panel during daylight hours is used to charge up the supercap, which then acts as the first reserve of power for the transmitter overnight. Only when the supercap is depleted does the circuit switch to use the battery as a power source.

The supercap is, in one sense, nothing more than a standard capacitor in that it simply stores electrical charge. What's 'super' about it is that, as a fairly high-tech component, it manages to cram what traditionally would be a huge capacitance into a relatively small component. Older users with some knowledge of

electronics might be surprised to learn that the supercap used in the VP2 systems has a rating of 10F (that's Farads, not micro- or milli-, but whole Farads), which is of course how it manages to power the VP2 transmitter unaided for a period of a few hours.

It's not clear exactly what goes wrong when the supercap starts to fail, but it appears that a low resistance path to DC current develops across the supercap and this is able to discharge the lithium battery leading to short battery life. The fault seems to be progressive, ie steadily worsening over time and giving ever shorter battery life.

Incidence of the VP2 supercap fault

The cause of the problem is not that supercaps are inherently short-lived – they should have a useful life of 10-20 years – but that they are less robust to mechanical handling than most traditional components. In particular, they seem very sensitive to undue leverage on the supercap leads, which can cause the beginnings of internal damage. What seems to have happened is that the stuffing (to use a technical term!) of the wireless SIM circuit boards during manufacture – which would presumably have been done by a contractor and not directly by Davis – did not take sufficient account of the particular need for care in handling the supercaps and some latent damage may have been caused.

One of the quirks of the supercap fault is that the fault only progresses and starts to have noticeable effects after the board has been in use for some time – often as long as 1-2 years, sometimes longer still. There is no way that standard production testing would have revealed anything wrong with the boards. So it was only in 2007/8 that people became more aware of the supercap as an issue, despite the fact that the seeds of the fault were typically sown during early 2005.

Once Davis became aware of the issue, steps were taken progressively to modify the board assembly process in various ways over the next several months, including, most recently, glueing the supercap to the circuit board to minimise the possibility of any vibration damage. So VP2 stations made from later 2006 on, and especially those made after July/August 2007, should be much less likely to develop this fault, although it's obviously impossible to rule that the very occasional VP2 station of any age could suffer a supercap failure. But because of the long incubation period, it's likely that unmodified stations of 2005-6 vintage will continue to present with new instances of the supercap fault.

Diagnosing the supercap fault

If you suspect a supercap fault based on the symptoms described above, then you will probably be able to make a definitive diagnosis by a careful visual inspection of the transmitter's SIM circuit board. To do this, you will need to remove the inner cover from the circuit board – this is the cover held in place by 4 screws and with the device details printed on the label on the cover. Removing the 4 screws will allow the board to become loose, but it should still be retained in situ by the wireless antenna. Look closely at the area outlined in red on the image to right. This long cylindrical component (black in this image but exact colour may vary) to the right of this area is the supercap.

Inspect the supercap leads – these should look clean and bright and untarnished. But if you can see some exudate (gunky, sometimes crystalline-looking material) apparently oozing from the supercap body out on to one of the leads (usually the anode in fact) then this is a clear sign that the supercap is in trouble. See the second image below for a close-up of how a faulty supercap can appear, though the signs aren't always quite as clear-cut as this.

VP2 SIM Transmitter Board

DIY supercap repairs

The supercap fault is one of the few component-level issues on a VP2 system that it's possible to correct simply by replacing the offending component. Generally, this would be done either at Davis (US) or by your local Davis service centre. But it is a repair that it's also possible to do yourself, assuming that you have some experience of working with circuit boards and appropriate soldering skills. There are two key points to be aware of:

The necessary 10F supercap replacement is not widely available and you might have trouble tracking it down from most electronics suppliers. However, it is an official Davis spare part (7370.093) and might also be available from certain specialist suppliers. We can supply the part in Europe – contact us for details;

You need to be especially careful when handling the supercap. In particular, never bend the leads from the point at which they join the supercap body. Instead, make bends in the leads away from the supercap body and using two sets of miniature pliers – one holding the lead between the bend and the supercap body and the other holding the free end of the lead and used to actually make the bend. Failure to observe this precaution will cause the same cycle of latent damage to the supercap followed by progressive failure over time that led to the original problem with the supercap in the first place;

VP1 supercap faults

To be added;

UV sensor

General comments

The UV sensor aims to measure the intensity of the ultraviolet part of the sun's spectrum (as opposed to the 'solar' sensor which measures the visible and near IR part of the spectrum).

UV readings are also expressed in a different format from the 'solar' sensor readings: For the solar sensor, straightforward irradiance values in units of W/sqm are recorded. But the prime practical reason for monitoring UV levels is to guide human skin exposure, preventing sunburn and possible skin cancer risks.Therefore UV readings are expressed on a UV Index scale of 0-16 which weights the intensity by the wavelengths of the UV light most likely to cause skin damage. This seems to be explained reasonably well on the [relevant Wikipedia page](#), where one index unit corresponds to an irradiance value of about 25W/sqm. Maximum midsummer UVI readings in the UK rarely exceed 7-8,although substantially higher readings are commonly registered at lower latitudes than the UK.

[Davis Application Note #6](#) also provides further information on interpreting UV readings.

UV readings are technically difficult to make – the sensors need extensive individual calibration and the signal is low in amplitude hence causing noisy readings. This has two consequences. First, UV sensors are expensive because of the prolonged production and calibration process. (You may think that the Davis UV sensor is expensive, but sensitive high-end UV sensors are considerably more so.)

The second consequence is that, without moving to a still more sophisticated and costly sensor design, there is unavoidably some noise and short-term fluctuation in the sensor output, even under dark conditions when of course there should be zero UV readings. When the UV sensor was first introduced, Davis was troubled by support calls reporting overnight UV readings of 0.1 or 0.2 UVI, even occasionally higher, which were simply a consequence of noise in the dark current circuitry. The consensus was that these very low but false readings overnight were more of a concern to users than having good sensitivity at low UV levels. So the decision was taken that there would be a threshold in the displayed UV reading of 0.4 and below which any reading would show as zero and this is the solution that remains in place.

The result is of course that wintertime readings in higher latitudes such as the UK will typically show as zero unless the UVI value is above 0.3.

Is my UV sensor working?

In practice, it's a common experience that if you install a UV sensor in wintertime then you may not expect to see a significant UV reading until the sun starts to regain greater power, eg during March. Wintertime UV levels even on sunny days can be surprisingly low and therefore it's very likely if you're concerned about a zero UV reading on a new station that the reading genuinely is <0.4 UVI. Live UV readings for several places in the UK are available on [a page on the DEFRA website](#).

Separating the ISS

Background

The standard VP2 ISS obviously combines the rain gauge, T/H sensor in its radiation shield and transmitter board into a single assembly for easy mounting. This arrangement works well for most users but we do occasionally get asked if it's possible to separate the ISS into its individual components.The answer is yes, but it does involve a couple of spare parts and a little work.

There are usually two reasons cited for separating the ISS:

- Users want to mount the rain gauge elsewhere. Sometime it's simply that there's a preference for measuring rainfall in a slightly different location from temp/hum readings. More often it's a wish to mount the rain gauge closer to or right at ground level, where it will read more accurately because wind effects on rain collection will be minimised. (NB In more temperate climates such as lowland UK where deep snow is rare, ground level is the official height for the base of the gauge. In snowier climates such as the northern US the recommendation is to to have the gauge at 4-5ft (ie as per the VP2 design) presumably to avoid the potentially deep snow at ground level, even if this results in lower rain catch.)

- Users are concerned about the black mass of the rain cone and mounting bracket affecting temperature readings. In practice, this is not a significant issue – there is an air gap between rain gauge and radiation shield, plus a heat shield at the top of the screen to minimise heat conduction and radiation. And, if anything, one might expect the black cone to slightly increase any convective UPdraught past the screen. Moreover, careful measurements have failed to reveal any significant temperature over-reads vs a standard screen in full sun (see Stephen Burt's review). However, some users will still prefer the extra confidence in readings from separating the ISS.

Practical options

Alternatives

Before detailing how to separate the ISS, remember that there are at least three simpler alternatives to operating on the ISS that will address some of the perceived ISS concerns:

- The new Davis aerocone for the rain gauge is designed to minimise wind-induced under-catch. The aerocone is available on its own as a spare part and is suitable for VP2 rain gauges of any age;

- Any Davis standalone rain gauge (eg 7852/7857/6463/6465) can be used as an alternative to the built-in gauge. The 12m cable supplied with these gauges allows the unit to be located some distance from the ISS and its cable simply plugs in in place of the built-in rain gauge. This is often the simplest option for separating the rain gauge, albeit with a somewhat higher price tag.
- A 7747 daytime-only fan (DFARS) is available as an add-on kit for the standard VP2 radiation shield. The fan assistance helps move air through the shield and hence improves T/H accuracy;

Separation

If you still wish to separate the ISS then here's what you need:

- A new rain gauge base/mounting bracket;
- A U-bolt for the new base (if you wish to attach it to a pole);
- An extension cable; often a short 2.4m cable will suffice, but longer (12m etc) extensions are also available;

These items are all available as spares. Instructions for performing the separation (which is really best done indoors on a table/bench top) as follows:

1. The main operation is to move the radiation shield to the new mounting bracket;
2. Unplug at least the T/H sensor from its socket on the SIM board and pass the cable through the cable port at the back of the baseplate;
3. Remove the rain gauge cone and then (carefully!) the three long bolts that hold the shield elements in place. If done carefully on a table top then all the loose shield elements should stay together.
4. Reassemble the shield on the new mounting bracket;
5. (Not essential but recommended): Move the transmitter and backplate to the new bracket. This is for two reasons: first the shield is likely to be higher from the ground than the rain gauge and this will help wireless range; second, it's recommended that the T/H sensor should have only a short cable length to the SIM board – cable length, within reason, on the rain collector is much less important;
6. Fit the extension cable, being sure to fully weather-proof any cable joint;

NB If you have solar and/or UV sensors then these will also need unplugging to start with and (probably – depending on circumstances) moving to the new baseplate. In practice, it is possible with commonsense to combine the steps above in different ways, but the steps detailed above provide broad guidance.

Vantage Connect unit

Vantage Connect is the fully self-contained and solar-powered device that provides a data link from Vue and VP2 ISS units up to the Davis weatherlink.com service via the mobile phone/cellular network. This section is only relevant to Connect owners.

The standard 2G version of Connect is part 6620, while 6622 is the more recent 3G-compatible version. (NB Connect uploads only very modest amounts of data and the speed of 2G is perfectly adequate for weather station applications – indeed the potentially greater range of 2G may be an advantage in some locations.) Connect is available in both wireless and cabled versions (ie connections to the ISS), though wireless is far more common and the usual limitations of cabled VP2 sensor transmitters apply equally to the Connect unit.There are a number of Connect subtypes manufactured, not only to cater for US or OV wireless frequencies, but also for compatibility with local mobile phone networks – it is obviously important to have the correct subtype for your own territory. In the UK and Europe, 6620SOV and 6622SOV are the standard types.

In general, Connect units continue to run autonomously for extended periods of months and years and problems are rare. However, two types of issue may be encountered:

- Initial set-up of a new Connect unit does not run smoothly

- Problems are encountered with an established Connect installation

Set-up issues are discussed below, while the separate Connect upload issues topic describes troubleshooting for established Connect systems.

Initial Set-up issues

> ❗ Almost all problems in initial set-up are caused because the instructions in the Connect manual have not been followed in the correct sequence.

In particular, it is essential to register your new account at weatherlink.com **BEFORE** powering up the Connect unit for the first time. Leave 5-10 minutes after fully completing the registration process before activating Connect.

If you are encountering problems then please run over the following points:

- Fully complete the account registration process;
- Remember that the DID and keycode for the Connect hardware must be correctly entered (NB The DID consists only of the letters A-F and digits – any round character is a zero and not the letter 'O');
- Remember also that a valid data plan Activation Code must also be entered. Every Connect unit needs an annual data plan to be purchased separately – if you have overlooked this step then contact a Davis main dealer to buy the Code. Setting up a new Connect installation cannot proceed until this step has been correctly completed;
- Wait 5-10 minutes and then reboot the Connect unit by pulling the power jack, waiting a few moments and then replacing it firmly. The sequence of LED signals will report on what the Connect unit is doing in establishing communications with the local ISS and with the mobile phone network – see the troubleshooting section of the Connect manual for full details of the LED signals. Note that it may take up to an hour or two (especially for users with the 60-minute data plan) before communications have fully initialised;

Configuring Connect units

Note that all configuration of the Connect unit (setting active wireless channels, repeater usage etc) is done via your online account at weatherlink.com. Any changes that you make to this configuration will need to be propagated back down from weatherlink.com to your Connect unit and this can take time to happen. Many Connect installations listen only to a single ISS on the default wireless channel #1 – this simple configuration should start to work reasonably quickly because it is also the default Connect configuration. But more complex configurations may take longer to initialise correctly.

If the Connect unit is not able to register correctly to the local mobile phone mast then configuration obviously cannot complete because there is no communications link back down from the cell network to the Connect unit – look for a steady blue indication on the lower LED.

It is always worth leaving a new Connect installation for up to 24 hours before concluding that there are some installation issues, just in case there are any delays in communication or initialisation.

Connect upload issues

Data outages during routine Connect operation

Symptoms

Data outages during routine operation will be noticed in one of three ways:

- The two 'Current conditions' webpages at weatherlink.com will stop updating and the status line at the bottom of the main 'My Weather' screen will turn red;

- If you're downloading archive data to a local copy of the Weatherlink program (or any other software) then there's an error message that no new data is available;

- Data updates and/or archive downloads continue as usual, but data from one or more specific sensors is missing;

If the webpage status line is red than this indicates some issue with the Connect unit – see below for the Further Troubleshooting section.

If, however, you're experiencing problems with archive downloads but the 'Current conditions' status line is **not** red then this is more likely an issue to do with data corruption on the local PC – see the Troubleshooting Steps section in [Archive Downloads topic](#).

If data from only one or more specific sensors is missing then this indicates a fault with the relevant sensor transmitter, eg the main ISS, or system configuration. It's very unlikely that this type of issue is caused by the Connect unit itself. Provided data is still flowing in general between Connect and weatherlink.com and pressure & inside temperature readings are still updating as expected then check the sensor transmitter(s).

A Connect system obviously uses the same – usually wireless – ISS and other sensor transmitters as regular VP2 systems and so the same occasional faults can crop up as on any other VP2. The commonest fault will be that the transmitter battery has been exhausted or, less often, that there may be some issue with T/H sensor or anemometer. For more complex Connect installations using multiple sensor transmitters or maybe repeaters then it's always worth double-checking that the eg channel settings have not inadvertently been changed. (Remember that the Connect channel settings are made via your online weatherlink.com account and not directly on the Connect unit itself.)

Note re archive uploads: The archive record upload process is a little different on Connect compared to the WeatherlinkIP logger or the WLv6 subscription in that there seems to be no real distinction between current conditions and archive data. Rather than uploading archive data hourly (as the IP logger and WLv6 subscription do), Connect adds a new archive record to weatherlink.com every time that a Connect upload occurs. This will happen every 5, 15 or 60 minutes, according to the Connect data plan currently in use and this same interval will also be the archive interval seen in the archive data. In other words, the data granularity or archive interval for Connect data is determined solely by the timing of the data plan in use – there is no separate archive interval setting for Connect systems. (NB If cellular connectivity is temporarily lost then the Connect unit should continue to accumulate archive records at the data plan interval and up to the 2560 record limit and will attempt to upload these when network connectivity is re-established.)

Further troubleshooting

This section covers troubleshooting when **no uploads at all** appear to be flowing from Connect to weatherlink.com:

1. **Connect data plan expired:** The commonest cause of upload interruptions is simply that the annual data plan has been allowed to expire without being renewed. Check the expiry date on your weatherlink.com account dashboard – see the My Service Plan section. If your plan has expired then you will need to purchase a new one – in the UK please contact Prodata Support for assistance. Remember also that simply buying a new plan is not enough – you also need to enter the new keycode into your account dashboard and have it accepted. It may take a few hours before the Connect unit has correctly re-registered with the network and resumes normal uploads.

Please note: It is not currently possible to 'pause' or suspend Connect accounts. Once Connect has registered with a network then it is expected that the service will continue uninterrupted until the unit is decommissioned. **If some time elapses before an expired plan is renewed then the new plan will automatically backdate to the previous expiry date and the new expiry date will be 12 months after the old expiry date.** This is no easy way of modifying this behaviour – it is built into the contract with the mobile phone networks.

2. **Connect data plan remains active:** If the Connect data plan is still valid then follow the checks below:

- Physically check the Connect unit to ensure that it is in the expected location and eg has not been stolen;
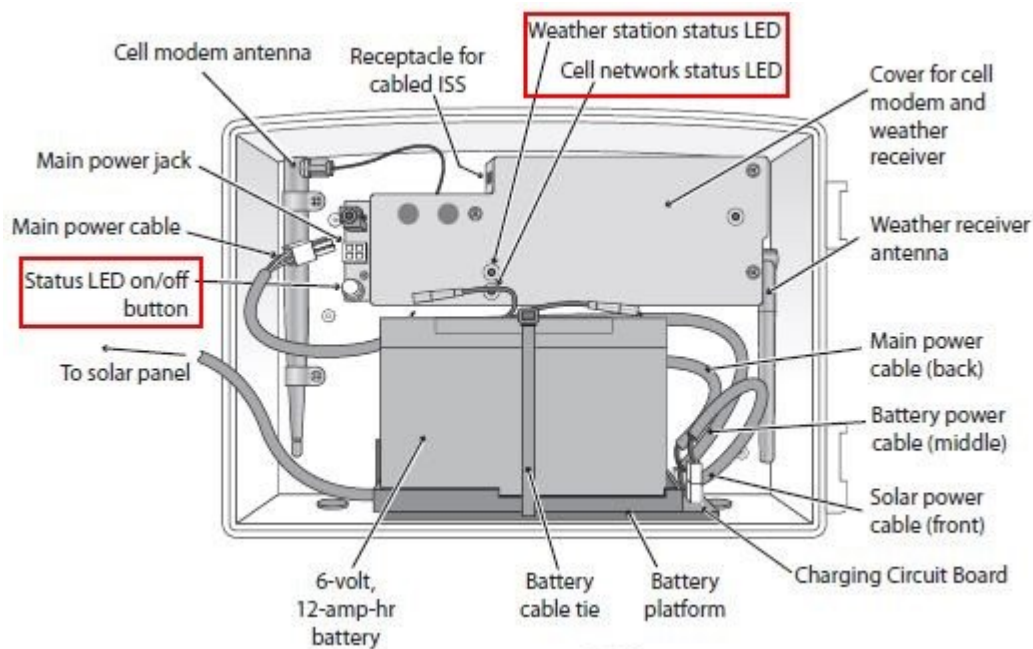
- Open the Connect door and check visually for any anomalies – eg is a battery connection loose?

- Then observe the two LED's in the centre of the unit. The upper LED signals reception of data from sensor transmitters while the lower LED reflects interaction with the mobile phone network. Both LEDs can show a variety of colours and both may be continuously on or off, or flashing slowly or quickly.

If both LEDs remain off then the signalling circuit might be powered down to save power. Firmly press and release the button labelled 'Status LED on/off' in the schematic. It may be necessary to wait at least a minute or two for the circuitry to react fully.

When the LEDs are active and the Connect is in normal operation then the upper LED should show a steady green and the lower LED a steady blue. Any LED pattern that differs from this (after a stablisation period if the button has been pressed) suggests that a fault may be present. A detailed table to interpreting the flash pattern will be found in the troubleshooting section of the Connect manual.

Important: If the Connect door has been opened at all then please insure that it is fully closed with both latches firmly in place before leaving the site, to prevent water ingress.

If a fault is suspected: If the LED pattern is anything other than steady blue/green indications then a fault may be present. As with many electronic devices, it is always worth trying a simple reboot of the Connect unit to see if this cures the issue. (The local cellular network may have had an outage, for example, and a reboot may be required for the Connect to re-register with the network.)

Rebooting is achieved simply by removing the main power jack (see schematic) completely from its socket above the test button, waiting a few moments and then firmly reinserting it. Remember that it may then take some minutes before the Connect unit runs through all its initialisation checks and potentially up to an hour or two (especially on an hourly data plan) before uploads to weatherlink.com are fully operational again.

If rebooting does not clear the problem

A persistent fault is more likely and a discussion with Prodata support will be needed. Please proceed as follows:

- Raise a support ticket as per instructions at www.weatherstations.co.uk/support.htm ;
- On the ticket please include your username at weatherlink.com and, ideally, if you're willing to do so in confidence, the password too (We have no privileged access to your account and can only double-check the account settings etc if we have the password);
- Summarise the fault symptoms **and the LED pattern you've observed**;

We will then review the incident. If we cannot easily diagnose the issue, we will then raise an incident with weatherlink.com – they have access to more detailed systems performance information than we can see and can usually pinpoint the problem. But please be aware of the time difference to California and the fact that there's often a 1-2 day response time to such incidents.

VP2 Supplementary Transmitters

VP2 Supplementary Transmitters

Wireless Repeaters

General background

Davis wireless repeaters can be invaluable for transmitting weather data over longer distances than the ~250m maximum hop-length that direct ISS-to-console transmission can support. Communication of data from ISS to console is possible over distances of up to a few miles with a suitable multi-repeater configuration and where line of sight allows. Repeaters can be used with both Davis VP2 and Vue stations (which use an identical wireless protocol), but there is no support for the older Vantage Pro (VP1) models.

Originally, Davis marketed four distinct repeater models for the VP2 range: standard and long-range (LR) in both AC-powered (7626 and 7653) and solar-powered (7627 and 7654) versions. The AC-powered types had no solar panel on the doors while solar versions use the standard Davis design of solar panel / supercapacitor / backup CR123 lithium battery.

But by 2015 the two AC-powered versions had been discontinued. In practice, it is possible to AC-power the solar-powered models by connecting a standard Davis 6625 5V mains adapter to the small jack that will be found on the repeater circuit board and this is a configuration that should work perfectly well. Given the relatively limited sales of the 6726/7653 AC parts and the ease of powering 7627 and 7654 from AC mains, Davis presumably felt that continuing to offer 7626 and 7653 separately was unnecessary duplication.

The circuit boards on standard and LR repeaters seem to be essentially identical other than one key difference: The standard 7627 repeater has the familiar fixed whip (or dipole as Davis term it) antenna with both receive and retransmit functions being handled by this single antenna. But on the LR 7654 model the antenna connections on the PCBA are taken to two separate connectors to allow connection to separate external receive and retransmit antennas. The greater potential range of the LR version appears to derive totally from the ability to connect antennas with much higher gain than the standard whip provides.

But there's no doubt that introducing repeaters into the configuration can also make it more tricky to troubleshoot apparent reception problems and for this reason it's always prudent not to use more repeaters than necessary in a repeater chain to carry the signal over longer distances. So if one repeater will do the job adequately then stick with one repeater. If the distances or topography are such that two standard 7627 repeaters seem likely to be needed then consider using one 7654 long-range (LR) repeater instead – the cost will be much the same overall and the configuration is likely to be simpler to troubleshoot if there are any problems and also more reliable.

Davis have published an Application Note (No 25) that provides a lot of additional detail about configuring repeater systems and that may well answer many initial support questions – see:

www.davisnet.com/product_documents/weather/app_notes/AN_25-data-repeater-network.pdf

Further troubleshooting

To be added

Weatherlink logger & software

> ❗ **Is this definitely a logger or software issue?** All the topics covered in this section assume that the display on the Vue or VP2 console screen is showing **all** readings correctly – errors are being seen **only** with data passed to the linked computer. If the console screen is not reading correctly then investigate and fix that fault first. (With the Envoy console there is no screen and so troubleshooting can only be carried out via the software connection.)

> ❗ **Weatherlink logger and software help only** Use of the Davis Weatherlink software (for Windows or for Mac), as supplied with each logger pack, is assumed. If you're not using the Weatherlink software then please also see the Third-party software topic for troubleshooting pointers.

Please remember:

The Weatherlink logger itself is a very reliable component. In 99% of cases of logger-related issues, the fault will be found to relate to computer issues or to external problems such as wireless interference or noisy AC mains or, very occasionally, to a loose logger, rather than to any inherent fault with the logger itself.

But logger-related issues can be varied; tracking down the cause of a particular problem may require working patiently and methodically through the fault symptoms and troubleshooting as per the various logger topics here. Try simple measures first, especially rebooting both console & PC.

But if these simple steps are not successful then more detailed troubleshooting will be needed. For communications problems with the USB logger, in particular, a basic understanding of the USB drivers may well prove necessary – please see the [Understanding WL Comms & Issues](#) topic for a primer.

Backing up Weatherlink data

All PC data that is stored in only one place (eg on your main hard drive) is potentially vulnerable to corruption and loss and Weatherlink data is no exception to this general rule. Especially once you have had a Davis station installed and collecting data for a year or two (maybe 10 years plus) then it becomes a valuable resource that it would be a great shame to lose or have damaged. So **backing up your Weatherlink data regularly** is a wise move in keeping the data safe. Simple video instructions for performing Weatherlink data backups are available in a video on the [Davis Youtube channel](#).

Rebooting

With any logger-associated fault, the first remedy to try is simply to reboot the console **and also** the PC. This will often fix simple faults and it's not worth even thinking about investigating other possible causes until both console and PC have been rebooted and tested again. Logged data or settings will **not** be lost simply by rebooting the console.

Common logger-related issues

With the caveats listed above and assuming that simple reboots have not fixed the problem then the following types of problem can occur. Bear in mind that there are several possible combinations of console and logger type. The commonest combination will be a standard console type (ie Vue/VP2/Envoy) with a USB logger and we'll focus mainly on this pairing, but there are other popular logger types such as WeatherlinkIP and the serial logger; and the Envoy8X is a rather different console type with its own WDTU software and features.

- Problems getting started with a new installation
- Specific problems with Windows 10 after Build 10240 in USB mode
- No communication possible with logger
- Errors with archive download
- USB port dropout
- WeatherlinkIP issues
- Console/logger compatibility – the green dot issue
- Weatherlink for Windows software issues
- Weatherlink for Mac software issues
- Support for third-party software

Understanding WL Comms & Issues

Weatherlink components

The Davis Weatherlink software comprises three distinct components:

- The main Weatherlink for Windows program itself;
- Separate software units known as 'drivers' that work within Windows to deliver data to the main Weatherlink (WL) program from whichever PC connection the logger is connected to;
- Any optional expansion modules that may be installed. The module that enables uploads to Weather Underground is the commonest, but the Davis Email/Phone and Agricultural modules are other examples;

The main **Weatherlink for Windows program** is written by Davis themselves. It has absolutely no known Windows compatibility issues whatsoever and is hardly ever the source of communications or other software issues. For this reason, it is rarely necessary or useful to try reinstalling Weatherlink itself. (Running the reinstall routine can however help to reinstall USB drivers, but there are other ways of doing this.) Instead, WL-related problems typically will have one of five causes:

- A simple stall in communications that can be easily fixed by rebooting logger and/or PC;
- Driver problems;
- Electrical interference;
- Corrupted hard disk files;
- Incorrect (eg wrong date-stamp) or corrupt data in the logger itself;

Each of these types of problems is discussed further in the notes here.

Drivers are **not** written by Davis, but by third-party companies, although the driver for the USB logger is distributed on the main WL CD. Communication issues usually only ever arise with the USB driver. (There are also both serial and network drivers active behind the scenes for the serial and IP versions of the logger, but these hardly ever cause problems and so are not discussed further here.)

Expansion modules are also rarely the cause of problems and so are also not discussed further here, other than to note the obvious point that the extra features offered by each supplementary module will not be available until the relevant module has been installed and activated. See the 'Expansion Module' topic in the main Weatherlink online Help for further information.

USB Driver

The USB driver is written by a company called Silicons Labs who manufacture the USB chip used within the logger – the driver is a small specialist piece of code that communicates directly with the USB chip. Both main WL software and the USB driver are supplied together on the WL CD and the installation routine should install both components without problem. But it is important to appreciate that any problems communicating with USB logger are almost always related to the USB driver not being installed or configured correctly and are very unlikely to be directly connected to the main WL program. In other words, **communication problems will typically be a driver issue** and not directly a Weatherlink program problem (which doesn't make them any less frustrating of course, but it's worth knowing where to focus attention in order to try and fix the problem).

If necessary, the driver can be reinstalled or tweaked independently of installing the main WL software. For example, the driver can be downloaded from the Silicon Labs website, the driver package being called 'CP210x USB to UART Bridge VCP Drivers' (CP210x being a reference to the specific USB chip that the USB logger contains). NB Note that the driver documentation is not always fully up to date, for example at the time of writing the driver v6.7 is described as being compatible with Windows up to v8.1, but is in fact also fully compatible with Windows v10.

Important: There are two distinct USB drivers!

New users often fail to appreciate that two distinct USB drivers are provided because the USB logger can actually operate in one of two different communication modes, which are referred to as 'Serial' and 'USB', and each mode uses its own USB driver. Yes, even though it is a USB logger, one of its modes is referred to as 'serial'. More formally the two modes are:

- **Serial** = Virtual Com Port (VCP) mode, which is a mode similar to a traditional RS232 serial connection;
- **USB** = USBXpress (USBX) mode, which is a native USB-based mode;

To be clear, in both modes the physical connection to the PC is via the same USB connector – it is, after all, a USB logger and so can only connect to the PC via a standard USB connection. But the 'serial' or 'USB' mode refers to how the data is handled internally in the PC once it arrives at the USB port.

The logger should always be set to one mode or the other. It should remember which mode it's in even when powered off and should always resume in that same mode. Each mode requires a different driver to be loaded, which should happen automatically at startup when the logger's current mode is detected.

It is important to understand which logger mode to use or which mode is active. Failing to do so is a significant cause of frustration and support calls – please see the [Understanding the USB logger modes](#) topic for further detailed information.

> ❗ The USB logger is supplied with the Serial/VCP mode active and it is recommended that that the logger be left in this mode and not changed to USB mode.

Understanding USB logger modes

Understanding the USB logger modes

> ❗ The USB logger is supplied with the Serial/VCP mode active and it is recommended that that the logger be left in this mode and not changed to USB mode, counter intuitive though this might seem. Therefore the Serial option should be selected in the Communications Port dialogue **and not USB**. There is no disadvantage whatsoever to using Serial/VCP mode and using VCP mode will ensure that the logger can talk to third-party software such as Cumulus, Weather Display etc as well as Weatherlink itself.

The 6510USB logger can be set to use either of its two modes of operation and the logger remembers which mode it has been set to, even when powered off. It is essential that the WL software is set to look for data arriving in the same mode that the logger hardware is actually set to send. These two modes are:

- Virtual Com Port (VCP) mode, which is actually a serial mode;
- USBXpress (USBX) mode, which is a native USB-based mode;

Important: Both VCP and USBX modes follow the same convention as most USB devices in that their drivers are only loaded and active while the logger is plugged into a USB port on the PC. There is no point trying to troubleshoot USB logger communications if the logger is not connected to the PC. Once the drivers for the USB logger have been correctly installed and configured in an initial set-up then whenever the logger is subsequently connected to the same PC a typical USB message will pop up within a few seconds to the effect that the new USB device has been recognised and is ready for use. (The exact wording etc of this message will vary with the Windows version.)

VCP Mode

VCP mode – often referred to as Serial/VCP mode below to underline that it is a serial mode – was the only mode available until the Weatherlink v5.8 software was released and is therefore likely to be the more familiar mode for previous WL users. Serial/VCP mode has no disadvantages and is also the only mode that most third-party Davis-compatible software can use, so it's best to resist the temptation to set the Communications Port type to 'USB' in the dialogue above, intuitive as it might seem to use the USB setting. (Or is it already too late?)

In Serial/VCP mode, a driver utility (which is actually a completely separate program from the WL software) intercepts data arriving from the logger on the PC's USB port, transforms this data and then presents it to the client program (ie the WL software in this instance) as if the data were arriving on a serial port. (The terms 'serial port' and 'Com port' tend to be used interchangeably.) Clearly, this serial port is not a real physical serial port, but instead is a simulated or virtual com port (VCP). In this VCP mode the data looks to the WL program as if it is actually arriving on a com port, albeit a virtual one, and this is why the WL interface option needs to be set to Serial even though the logger type is USB.

It is vital that the VCP cannot be confused with any real com ports that the PC may already possess and so every VCP that the driver creates is given a unique com port number (eg COM5) which will not conflict with any existing com port number. Note that the driver typically generates the comport number for the new VCP automatically and the number chosen will depend on how many physical serial ports are already present on the PC and also on various other factors to do with the PC's hardware configuration. For this reason, it is typically not possible to predict what com port number might be assigned to the WL logger on a given PC. It is usually something fairly sensible like COM3 or COM5, but can very occasionally be an unexpectedly high number like COM13.

Although the assigned com port number is not readily predictable on an individual PC, once a number has been assigned to the USB logger on a particular PC then this number will persist indefinitely, unless there are significant changes to the PC hardware. (This is just as well, else using VCP mode could be troublesome, ie if every time the PC was rebooted the logger was assigned a different port number.)

Because the VCP number is not readily predictable, software needs a way of locating the logger without the user having to try each and every potential com port number manually. Therefore ever since the 6510USB logger was introduced, which coincided roughly with the release of WL v5.6, the 'Communications Port' dialogue on the main Setup menu of WL has had an Autodetect button which, when clicked, runs automatically through all the possible com port numbers on that PC to see if a logger is visible on that com port. (There is another way of establishing the VCP number in use through Windows Control Panel, which is described elsewhere.)

It is worth being aware of a couple of limitations on the VCP number that can be used:

- WL v5.6 could only see ports from COM1 to COM10; v5.7 and subsequent versions can see up to COM18;
- When used under Windows Vista, only ports from COM1 to COM4 may work reliably. This is a driver limitation;

It's hopefully clear from the description above that the VCP driver program plays a central role in how WL's VCP mode works. If the VCP driver is not correctly installed or configured then VCP mode cannot work. To

reiterate, the VCP driver is a completely separate program from the Weatherlink program and it is written not by Davis at all but by the company that manufactures the particular chip in the logger that generates the USB output from the logger. (In the case of the 6510USB logger this chip maker is a company called Silicon Labs.)

Davis do supply a version of the VCP driver on the Weatherlink CD and in recent WL versions this should install automatically with the main WL program install. However, VCP driver installation is not always foolproof, especially with previous WL versions, and problems with getting VCP mode working correctly are often caused by a failure of the VCP driver install. For this reason, it is always worth updating Weatherlink to the latest available version in order to ensure that the most recent driver is installed.

USBXpress Mode

> **!** Most third-party WL-compatible software programs such as Weather Display etc do not currently support use of USBXpress (USBX) mode and attempts to use USBX with non-WL programs can cause serious initial set-up problems. This mode is best reserved solely for use with the Weatherlink software.

USBX mode is a distinct interface mode to VCP and has one potential advantage over VCP in that theoretically it should be simpler to install. (Possibly there may also be better resistance to interference but this has never been confirmed.) The key practical difference is that the interface into the Windows software environment is as a USB-compatible USBXpress port rather than as a COM port. This difference is evident by looking at Windows Device Manager on a PC with a 6510USB logger is connected – whereas a logger in VCP mode shows up in the Ports (COM and LPT) section, a logger in USBX mode appears in the USB Controllers section.

But, whatever the potential advantages of USBX, crucially it provides a different interface type into the WL program and if the logger output mode is USBX then the WL program input mode must also be set to USB. Conversely, if the logger output mode is VCP then the WL program must be set to look for serial data. **Using mismatched logger output and program input modes is guaranteed to cause communication problems.**

It seems that USBX operates in broad terms in an analogous way to VCP in that it installs a device driver to receive the USB data stream from the logger and to present it to the WL program via a USBX interface.The difference is simply that USBX mode requires a USBX driver to be active while VCP mode requires a matching VCP driver.

Checking which logger mode is active

There are three basic ways to try to check which mode the logger is currently set to:

- Select the 'Serial' option in the Communication Port dialogue and click the AutoDetect button. If serial is active then AutoDetect should return a valid Com Port number. If no Com Port is found then USBX mode may be active (or there may be another issue).
- Try running the 'CP210X USB to Serial Converter' utility (see next main section below). If this runs successfully then it may confirm that the logger is already in serial mode or, alternatively, may correctly switch it to serial mode.
- Inspect the ports and USB devices in Windows Device Manager – see next subsection below.

Using Device Manager to confirm the loaded USB driver

Windows Device Manager is accessed by drilling down within Windows Control Panel, but the exact steps will vary with the version of Windows in use, although it should be fairly straightforward to find. If this sounds too unfamiliar then try to get help from someone who might know.

There are three scenarios:

1. If the logger is trying to use Serial/VCP mode then an entry will be visible under the Ports (COM and LPT) sections of the Windows Device Manager, which will look something like this:
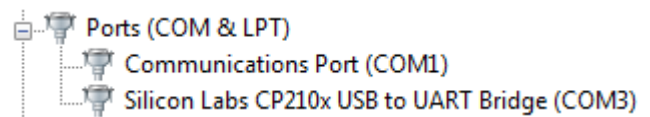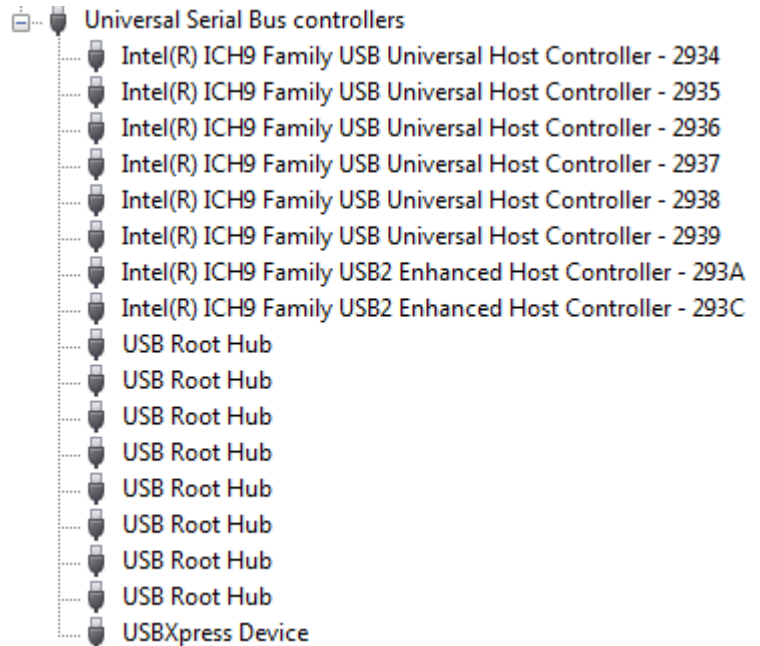

The line beginning 'Silicon Labs' indicates that the logger's Serial/VCP driver is loaded and hence implies that the logger is outputting in this mode. (NB The exact appearance of this Ports section will vary with the PC's hardware specification and with any other VCP drivers that may be loaded. Also, the COM port number – COM3 – will vary with the individual PC, but the port number displayed here is the same port number that the WL program should be using to contact the logger. The program should pick up this port number automatically when the 'Auto Detect' button is clicked, but may be entered manually if required.)

2. If there's no sign of the Silicon Labs entry in the Ports section then look instead at the 'Universal Serial Bus controllers' section of Device Manager, which is typically the last one of all the Device Manager sections. On modern PCs this section will have a lot of different entries, but – again typically right at the bottom – you may be able to see an entry for 'USBXpress Device' as in the example right:

If this USBXpress entry is present then this indicates that the logger is set to use USBX mode and the WL 'Communications Port' type should be set to 'USB'.

```
□... ᵷ Universal Serial Bus controllers
      ᵷ Intel(R) ICH9 Family USB Universal Host Controller - 2934
      ᵷ Intel(R) ICH9 Family USB Universal Host Controller - 2935
      ᵷ Intel(R) ICH9 Family USB Universal Host Controller - 2936
      ᵷ Intel(R) ICH9 Family USB Universal Host Controller - 2937
      ᵷ Intel(R) ICH9 Family USB Universal Host Controller - 2938
      ᵷ Intel(R) ICH9 Family USB Universal Host Controller - 2939
      ᵷ Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293A
      ᵷ Intel(R) ICH9 Family USB2 Enhanced Host Controller - 293C
      ᵷ USB Root Hub
      ᵷ USB Root Hub
      ᵷ USB Root Hub
      ᵷ USB Root Hub
      ᵷ USB Root Hub
      ᵷ USB Root Hub
      ᵷ USB Root Hub
      ᵷ USB Root Hub
      ᵷ USBXpress Device
```

Comment: Generally speaking, once the WL software has been installed and the USB logger connnected, you should be able to see an entry either as in [1] or as in [2] above. Then provided the WL 'Communications Port' type has been selected appropriately, ie Serial for [1] or USB for [2], you should be able to achieve communications with the logger. If not then look at scenario [3] below.

NB It's very unlikely that you will see entries for both [1] and [2] simultaneously. As you switch the logger between VCP and USBX output modes (see below) so the deactivated driver unloads and its entry disappears from Device Manager and the new mode's driver loads automatically and its entry is inserted in the appropriate place in an updated Device Manager view.

Remember: The driver is only loaded (and hence visible within Device Manager) when the USB logger is plugged into the PC. As the logger is plugged and unplugged, so the driver entry will appear and disappear from the Device Manage listing (allow 10-20 seconds for the change to be recognised and the listing updated).

Also, if one or other of the drivers can be seen but has a yellow exclamation mark beside it then it suggests that the driver has been installed correctly but something in that particular PC's configuration is preventing it from functioning normally – perhaps another USB device has been installed on the same PC that uses a similar driver, for instance, or maybe it's a permissions issue.

3. But if neither of the entries in [1] or [2] can be seen, then neither driver has loaded and this will be the reason why logger communications have failed. It's then theoretically a question of whether the relevant driver has never been properly installed (maybe because that step in the WL program installation did not

complete successfully) or perhaps the driver did install but is not functioning or not configured correctly. But in practice what's likely to be needed is a reinstall of the relevant driver.

An an added check on whether or not the relevant driver has been installed, you can look in Windows Control Panel in the Add/Remove software section (or the corresponding place in different Windows versions, eg 'Programs and Features' in Vista). The image below shows a PC where both drivers are present. (Silicon Laboratories being the company that actually writes and supplies the drivers). Be careful just to look at these entries and not to click on them, which will start the process of uninstalling the drivers.

Silicon Laboratories CP210x USB to UART Bridge (Driver Removal)	18/02/2009	3.66 MB
Silicon Laboratories USBXpress Device (Driver Removal)	18/02/2008	

If you can't see an entry for the driver of interest (or have simply decided to reinstall the driver in the hope of fixing a problem) then you need to install it manually. If you have updated your WL installation to eg v6.0.3 (or whatever might be the latest version) as suggested above then this will have created copies of the relevant drivers within the main Weatherlink folder in the C:\Weatherlink area.

For the Serial/VCP driver then you'll need to look in the Support\Drivers subfolder of the main WL folder and the VCP drivers will be found in the 'USB to UART Drivers' subfolder. There may typically be more than one such subfolder visible, corresponding to different driver versions. This can happen because a downloaded Weatherlink update will sometimes also contain a new driver version and this will typically be placed in a new driver subfolder with a different version number. In general, the latest driver version visible is obviously the one to choose if installing manually.

There may also be a still more recent version of the driver available from the originators of the drivers (Silicon Labs in this instance) who update their drivers from time to time to add new features or to fix bugs and make them available from their own SiLabs website. However, Davis only adds the latest driver version to the WL distribution after it's taken time to thoroughly test the new driver with Weatherlink, which can sometimes take a period of months. As a result, a new driver version will typically be available from the SiLabs website before it's approved and distributed by Davis, but there is of course no guarantee that the non-Davis-approved version will work faultlessly with Weatherlink, although it usually will.

To install a new copy of the Serial/VCP driver should simply be a matter of running the driver installation executable (using an account with Admin rights).
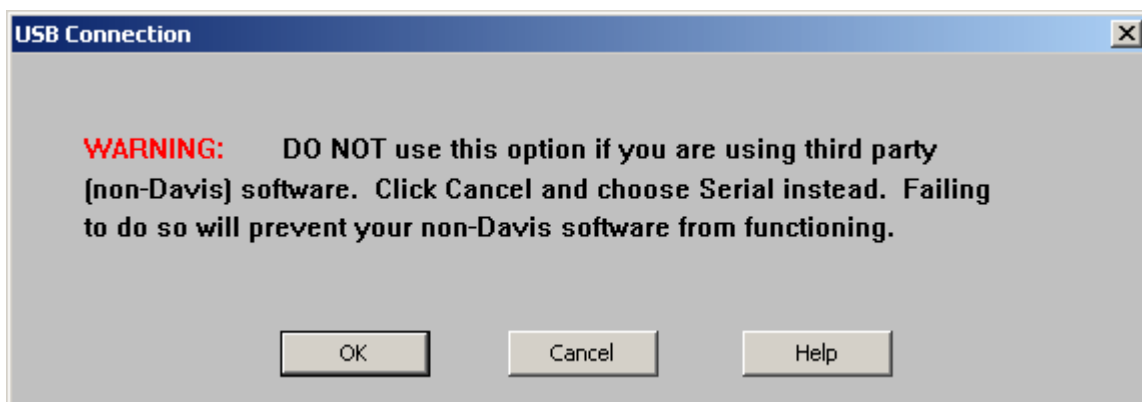
Switching between VCP and USBXpress Modes

The 6510USB is able to have its output mode switched between Serial/VCP and USBX modes by means of commands sent from the PC. The **default** logger output mode is Serial/VCP, ie requiring the VCP driver to

be active on the PC and with data reaching the WL program via a virtual serial port. So when a new 6510USB logger is first connected up, it is Serial/VCP mode that will be active unless the logger is explicitly switched into USBX mode. The logger will always remember the output mode last used and will always resume in that same mode until it is explicitly switched to the alternative mode.

Because Serial/VCP is the default mode for new loggers, if the Communications Port option in the WL Setup menu is set to 'Serial' in a new WL installation – and also assuming that the WL program and VCP driver installed cleanly – then clicking the 'Auto Detect' button in the 'Communications Port' dialogue should automatically be able to find the VCP port number to which the WL logger has been assigned. (If not then a troubleshooting process needs to be initiated.)

However, if the USB option in the 'Communications Port' dialogue is selected then this will begin the process of switching the logger into USBX mode. Only select the USB option if you're clear about the implications of doing so. Serial/VCP mode works perfectly well for most installations and is very much the best and recommended choice for new users of the USB logger.

But if you do proceed and click the USB option the next thing that happens is that a warning dialogue displays that gives you a

USB Connection

WARNING: DO NOT use this option if you are using third party (non-Davis) software. Click Cancel and choose Serial instead. Failing to do so will prevent your non-Davis software from functioning.

OK   Cancel   Help

chance to back out of the USB selection – see right.

If you OK this dialogue (ie rather than using the Cancel button) then the WL program sends a command to the USB logger assigning it a unique ID number that will be used for any subsequent USBX communications. (The implication is that this ID assignment happens only the first time that the USB command is sent and the logger remembers the number thereafter.)

A successful switch into USBX mode is signalled by the dialogue box right. For some reason, this switch into USBX does not always complete successfully (ie the success message above does not appear). It may be necessary to

Serial To USB Mode

Successfully converted the driver from Serial to USB

OK
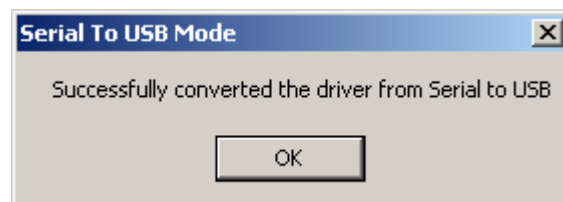
retry the process two or three times. Only when you have seen the success message can you be confident that the logger definitely has been set to USBX mode.

Switching back from USBX to Serial/VCP modes is a slightly more tricky task. In theory you might imagine that selecting Serial rather than USB in the WL 'Communications Port' dialogue ought to be able to send the necessary command to the USB logger to switch back into Serial/VCP mode. But whether or not this ought to work, in practice it doesn't work. The only way of returning to Serial/VCP mode seems to be to use a special separate utility, which is now included by default in the standard WL v5.8.2 and later installations and is called the 'CP210X USB to Serial Converter'. On more recent WL versions this utility will be found as a separate menu option within the main Weatherlink menu item – that's the WL menu on the Windows Start button, not inside the WL program itself. The utility is also available as a standalone download from the Davis support website.

Running this utility should bring up a very simple DOS-type text window, which only requires a single key press to send the necessary command to the logger and which should then report the results. Provided the utility can 'see' the logger it will report that either the logger is already in the Serial/VCP mode or that it has now been converted to that mode. Any other result suggests that there's a more fundamental communications problem, eg a driver not properly installed, a faulty USB port etc.

If you're in any doubt as to whether the logger is in Serial/VCP mode or not (eg there's a possibility that you may have inadvertently set it to USBX mode some time before) then it's worth running this utility, first to confirm that the logger can be seen and second to place the logger unambiguously in Serial/VCP mode.

Setting the communications port

Background

For Weatherlink (WL) program versions from v5.8, four distinct interface options became available by which a PC can receive data from various types of WL logger. The options are:

- Serial
- USB
- Modem
- TCP/IP

WL classes these interface types as 'Communications Ports' (even though a modem isn't a port in the same sense as Serial or USB) with the required interface type being set in the 'Communications' area of the 'Communications Port' dialogue – displayed when the 'Communications Ports' item on the main WL Setup menu is selected.

These four 'port' designations are really just labels for different modes in which data reaches the Weatherlink program itself from the outside world. These labels do not necessarily correspond to the physical interface type of the WL data logger, **the main exception being that the USB logger (6510USB) can be set to send its data so that either Serial or USB 'port' can be used once the data arrives at the WL program**.

But the WL software cannot sense – reliably at least – which data type is being sent and an inadvertent mismatch between logger and program settings will often cause logger communications problems.

Setting up the serial (6510SER) or WeatherlinkIP (6555) types of WL logger is, in general, a straightforward process that rarely causes problems, although there is a short section on the TCP/IP options further below. Also, a modem-based data link is rarely used nowadays and is not described further here.

But the other logger type (6510USB) can be configured to use either serial or USB software interfaces and hence it needs setting-up with more care to avoid an interface mismatch. To understand the differences between serial and USB operation of the USB logger in some detail and for instructions about switching between the two modes please see the USB logger modes topic – you may need to read through these notes carefully to fully understand use of the two modes. But in short we recommend the following:

> **!** The USB logger is supplied with the Serial/VCP mode active and it is recommended that that the logger be left in this mode and not changed to USB mode, counter intuitive though this might seem. Therefore the Serial option should be selected in the Communications Port dialogue and not USB. There is no disadvantage whatsoever to using Serial/VCP mode and using VCP mode will ensure that the logger can talk to third-party software such as Cumulus, Weather Display etc as well as Weatherlink itself.

If the Serial option is indeed selected then you will also need to click the Autodetect button in order that the correct virtual Com Port can be identified. Occasionally Autodetect does not succeed at the first attempt and it may be necessary to try again. If a Com Port still cannot be located then you may need to troubleshoot further as described in the Understanding USB logger modes topic. (NB Remember that the logger and its Com Port can only be seen when the logger is connected via USB and the console is powered on.)

TCP/IP options

To be added

Windows compatibility

General compatibility

The Davis Weatherlink software is compatible with all recent versions of Windows from XP up to and including Windows 8.1 and there are no known compatibility issues at all.

Windows 10 is also fully compatible, but users can occasionally encounter issues in getting Weatherlink to run correctly with a new or recently updated copy of Windows 10. These issues can usually be fixed and are detailed under the separate Windows 10 topic.

Users of serial (RS232) and IP loggers, including those on Windows 10, are also largely immune from compatibility issues but those using the USB logger version need to take a little more care.

USB drivers and apparent compatibility issues

While there are no fundamental compatibility issues with the Weatherlink software itself, there is one type of communications problem with the USB version of the logger that can be **caused by an incompatible USB driver** – this happens if a new version of Windows is no longer fully compatible with an existing USB driver or if a faulty driver has inadvertently been included with an automated Windows update. This issue may appear after Windows has performed one of its regular automatic updates or if transferring Weatherlink to a new PC with the latest version of Windows. (To understand the difference between the main WL software and USB drivers please refer to the Understanding WL Comms & Issues topic.)

This issue of USB driver incompatibility has recently resurfaced with automatic updates to Windows 10 (see below) but can also be seen if a user attempts to use an old version of Weatherlink on a modern version of Windows. If you suspect this issue on a Windows version **prior to Windows 10** then be sure to update Weatherlink to the latest available version (as described in the Migration topic) before concluding that it is indeed a new compatibility issue – the latest WL version will also install the latest available and validated version of the USB driver.

New installations

> ❗ This topic covers problems encountered when setting up a new Davis Weatherlink logger *for the first time*. But the topic may also be relevant if your logger installation was previously working OK but you cannot now reestablish communications following e.g. attempts to move to a new PC OR to update the Windows version OR you have attempted, but unsuccessfully, to update the Weatherlink software. If, however, this is an existing and working installation that has now developed a problem then review the Weatherlink logger main topic for help with specific fault symptoms.

The notes here primarily deal with problems arising with installing the Weatherlink for Windows program for use with USB loggers. Of course there are various other combinations of logger type and computer/operating system that a limited number of users may be running – it may still be useful to review the comments here together with the following pointers:

- Even if you're planning to use other third-party software (e.g. Cumulus or Weather Display) routinely on a Windows PC, it's suggested that you still install the Weatherlink program as a first step – this is the simplest way of checking that the logger is working correctly and gives access to certain settings that other software may not provide;
- Users of Weatherlink for Mac should see the specific Mac topic;
- Users of the WeatherlinkIP logger should first get their logger uploading successfully to the weatherlink.com network (as described in the notes with the logger). If any problems persist then review the WeatherlinkIP topic.

IMPORTANT: In principle, troubleshooting new installations is no different to fixing established configurations that may have developed a problem. But to make it easier for new users, some of the key points to check are summarised on this page. However if the problem remains unresolved then users will need to read through the rest of the more detailed notes that are available under individual logger topics on the main menu here.

Also: The notes here focus on issues to do with faults during the installation process itself or a **complete** inability to establish communications with the logger. If, for example, the problem is only to do with archive downloads (ie real-time data can be seen OK on the Bulletin screen of Weatherlink) then see the archive download errors topic.

As a starting point, it's worth noting that the Davis Weatherlink software is in active use by many thousands of users around the world and on all Windows platforms from Windows XP right up to Windows 10. There

are no known incompatibilities whatsoever between Weatherlink and any relatively recent version of Windows. (NB However if you are using Windows 10 after Build 10240 and attempting to connect in USB mode then you may encounter a temporary bug requiring a USB driver rollback as a fix – please see the Windows compatibility topic. This bug was introduced in a Windows update in Dec 2015 and should be fixed by Microsoft fairly soon.)

Faults with the logger hardware are also extremely rare. If you are experiencing a problem post-installation it is highly likely that some aspect of the installation instructions has been overlooked or perhaps you are using a PC with a very unusual or very locked-down configuration that is preventing Weatherlink from installing correctly, but the notes below should help pinpoint the problem.

Basic checks

If a new installation is not working, the first remedy to try is simply to reboot the console (read the linked topic to be sure you understand the process) and also the PC, which will often fix simple faults.

If this is a problem arising after a move to a new PC or following attempted updates to Windows or Weatherlink then see the Migration and update problems topic.

New Weatherlink installations **must** be run from the CD supplied with every logger and installed from an account with Administrator permissions. The Weatherlink updates that can be downloaded from the Davis support website are just that – updates. They require a pre-existing WL installation on the PC hard drive to update. You cannot create a brand new WL installation from an update download alone.

To start configuring the Weatherlink program, you must obviously be able to launch the program and without it crashing. If you cannot successfully reach this stage then there is some fundamental issue with the installation process which needs sorting out (e.g. is the CD damaged, is the CD drive malfunctioning, is the PC configuration perhaps locked down too tightly, are you trying to install to a location other than C:\Weatherlink etc). If you have any uncommon USB devices attached to the PC then it may be worth trying disconnecting these and trying to launch WL again – it's not impossible that there could be some clash of USB drivers.

If you do encounter apparent problems with Weatherlink crashing them try at least once to reinstall Weatherlink – the installation may be able to complete successfully the second time around. Remember that the Weatherlink program should be installed to the C:\Weatherlink folder – attempting to install in other locations can cause problems. Remember also that the USB cable should **not** be connected during installation – this can interfere with activation of the USB driver until the PC is rebooted. But if problems persist then you will need to contact support.

But unless some specific problem was noted in installing or running Weatherlink, it is rarely helpful to attempt a reinstall – this should be left as a last resort.

The further comments below assume that you can indeed launch the Weatherlink program and that it is not immediately crashing.

The next most likely cause of problems if the USB logger is in use is that the logger mode is not correctly set – see next section.

Communications port and logger mode

Background

When the Weatherlink program runs for the first time it automatically launches what is termed the 'Walkthrough' dialogue. (The walkthrough can also be triggered at any time simply by selecting the Setup|Walkthrough menu option.) The Walkthough ensures that all of the basic Weatherlink settings are configured according to the user's preferences. Many of these settings are indeed just preferences (such as measurement units) or there to ensure conformity with local standards (e.g. timezone) and all of which can amended subsequently by choosing the appropriate menu option (and without running Walkthrough again).

But the **one critical step** is the second one, entitled ' Communications Port'. This launches the larger 'Communications Port' dialogue (see right), which can also be accessed from the Setup|Communications Port menu option. If this option is not correctly set up then you will not be able talk to the logger at all, so accurate configuration is vital.

It is really important to appreciate that the USB logger can run in two distinct modes which are termed 'serial' (or VCP) and USBXpress. (Yes, even though the logger has a USB connection, one of its operational modes is called 'serial'.) Understanding the logger modes is actually quite easy, but does take a number of words to explain – please read the notes below with care.

Software can only talk to the logger if the software also utilises the same communications mode to which the logger is currently set, ie serial or USBXpress. If a software program tries to talk to the logger in the 'wrong' mode then it will not receive a response and it will appear that communications between logger and computer are broken. More details about the two logger modes and specifically about diagnosing the current logger mode will be found in the Understanding USB logger modes topic, but here is a brief summary of how the logger mode is used:

The **USBXpress mode** is called simply 'USB' for short and the **serial** or VCP (Virtual Comm Port) mode is termed 'serial'. In the 'serial' mode the logger behaves as if it were a standard RS232 serial device, despite the physical connection being USB in nature. This means that data is received by PC software as if it were being received on a numbered comm port (COM1, COM2 etc) except of course that the COM port is an imaginary or virtual one rather than a real physical COM port. The key point is that if software is configured to expect data on a serial COM port then the correct COM port number must be set in the software (unless the software is clever enough to auto-detect the logger's COM port number, which can work well but is not always infallible).

In summary, if the logger is set to USB mode then software must also be set to expect data in USB mode. And conversely if serial mode is set on the logger then software must be configured to look for incoming data on a serial port with the correct COM port number. The logger remembers which mode it is set to even when powered off, hence the possibility of a mismatch between logger mode and what the software is expecting, especially if new software is being evaluated.

Three other key points:

- There is no practical difference between USB and serial modes – the two are directly equivalent and one is no faster nor more accurate than the other;
- At present the only software that can use USB mode is the Davis Weatherlink software. If you're planning only to use the Weatherlink software then USB mode is the simplest to set up.(because it can be configured automatically and does not require the user to identify which COM port number to set). But no other software currently seems able to use USB mode and so, **if you're planning to use any other software than Weatherlink be sure to select serial mode and NOT USB mode**.
- The logger mode can be switched from serial to USB or vice versa with appropriate software commands. However, while the switch from serial to USB can be made by any software that implements the appropriate command (which Weatherlink does do), the switch back from USB to serial can only be made by a special utility called 'CP210x USB to serial converter' which is installed along with Weatherlink. (Note that this converter utility is not part of Weatherlink and is not accessible from within the Weatherlink program. Instead, it will be found on the Windows Start Button or (Windows 8) Start Screen.);

In practice

So, one possible cause of a communications failure in new installations (or if new software is being evaluated) is that the logger mode does not match what the software is expecting.

The logger is supplied set to serial mode and so should intrinsically work with all compatible software (provided the 'serial' communication port option has been selected and the correct COM port number has

been set). But if there appear to be communication problems with the logger then it is always worth confirming that the logger is indeed set to the expected mode (ie either serial or USB) as described in detail in the [Understanding USB logger modes](#) topic.

Further checks

Baud rate

Double-check also that the Baud rate on the console is definitely set to 19200. (The Baud rate must be correctly set for all types of data logger, including USB and IP, because the underlying data stream across all types of protocol is always a serial stream.) Exact instructions for checking the Baud rate will vary according to whether you have a Vue or VP2 station, but the basic principle is to enter Setup mode on the console and then the **last** setting in the Setup settings sequence is the Baud rate. (NB The Baud rate setting is **only** visible when the logger is both present and correctly installed in the console.) A shortcut to seeing the Baud rate is to enter Setup mode and then to press the Bar key (which takes you backwards through the setup sequence, as opposed to pressing the Done button briefly which cycles through the settings in the normal forward direction.) Remember to exit Setup mode once the check is done.

Installation Failure

Assuming that installation is being attempted while logged in with an account with Adminstrator permissions, this would suggest that there's something fundamentally wrong or misconfigured with the PC or Windows configuration or that whatever security measures are installed are being overzealous. These possibilities are really beyond the scope of the support notes here (and indeed more an issue for your local PC/Windows support arrangements – it's not something that Davis dealers will usually be able to help with), but reasons could include, for example, a damaged CD or CD drive or an active local security policy that's not allowing WL to install fully or security/anti-malware software that is being similarly too protective – there are all possibilities to check further.

So, if there's any possibility that your security software may be blocking correct installation of Weatherlink then it may well be worth disabling security for a brief period while the WL installation is re-run (and then of course remembering to re-enable the security program).

It's also always worth trying a second attempt at installation if the first attempt fails. Another fall-back plan, where possible, is to try installing Weatherlink on a different PC – if successful, this will at least rule out a damaged CD and might help to highlight what is different about the first PC's configuration.

USB driver not installed or not loading correctly

For the USB logger to work correctly under Windows, it needs a USB 'driver' to be loaded, which reads the data coming into the PC's USB port and presents it to the Weatherlink program via the expected protocol. (Actually, there are two different USB drivers that are used depending on whether the logger is in serial/VCP or USB mode, but for present purposes it's simplest just to think of a single driver utility.)

The driver is actually a completely separate piece of software to the main Weatherlink program and is written by the maker of the USB chip (a company called Silicon Labs) and nothing directly to do with Davis at all. But Davis do distribute the latest tried and tested version of the USB driver as part of the Weatherlink package and arrange for it to be loaded as well as the Weatherlink program.So if you have installed the latest version of the Weatherlink software then this should also install the latest USB driver version, which is a good reason always to install the latest WL update. In particular, new versions of Windows sometimes need new driver versions and so occasionally, if there has been a significant change to Windows, Weatherlink may not work until updated to the latest version.

In rare circumstances, Weatherlink may not be able to install the driver correctly into the Windows environment and you may see an error message relating to a driver failure (in the case of the serial/VCP driver, this message typically includes the name CP210x or similar, which is the part number for the USB chip in the logger). To be clear, this is usually an indication that the Weatherlink program itself has installed correctly but that the program cannot receive data from the USB port because the separate USB driver is not working correctly for some reason.

It is not at all easy to diagnose why the driver may not be operational because this can reflect a deep-seated Windows issue rather any problem with the Weatherlink installation itself. If the driver is loading when the logger is plugged in but is not functional then it may be possible to see the driver listed in Windows Device Manager but with a yellow exclamation mark beside it. (See the Understanding USB logger modes topic for further details.) This may be useful in diagnosing the problem but doesn't help much in resolving it.

If a failure of the USB driver is suspected then there are four approaches to fixing the problem:

- Simply try again to install Weatherlink, double-checking that all of the standard requirements have been met, ie install with the logger **not** connected and from an account with Admin rights, etc etc;
- If you have extra security software running then turn this off just for the duration of the installation – this could be preventing the USB driver from being loaded into its correct Windows location and registering correctly;

- Check that you have no other USB devices installed that might be interfering with the Weatherlink installation – this is fairly unlikely, but not totally out of the question. In extremis, you may need to uninstall any competing software or drivers that you may identify;
- If all other approaches fail then you can try downloading the CP210x driver package as a separate entity direct from the Silicon Labs website and seeing if that will install more completely;

Overall Summary Checklist

Finally, if all of the above together with the detailed notes under related topics still doesn't suggest a solution then please confirm that **all** of the following points have been checked before seeking further support. If you're not sure what any of the points mean then please read the explanatory notes that are available in various places here.

1. Did the Weatherlink installation appear to complete correctly and without errors? If not then see the Installation Failure section above.
2. Does the Weatherlink program definitely start and run without crashing (even if it cannot connect to the logger)?
3. Have both console **and** PC been rebooted, exactly as described in the reboot the console topic?
4. Were the correct number of beeps heard?
5. For USB loggers especially, have you double-checked that the logger mode and the Communications Port setting inside the WL program are not mismatched? See the 'Communications Port & Logger Mode note above if you're unsure about this.
6. If using Serial mode, have you tried (and if necessary retried) clicking the AutoDetect button to identify the correct Com port?
7. Are you using Windows 10? If so, you may be encountering a USB driver issue. Please see the Windows compatibility topic
8. Is the console baud rate definitely set to 19200?
9. Are you sure that Weatherlink was installed from an account with Administrator permissions?
10. Was Weatherlink first installed from an original CD and **definitely** into the C:\Weatherlink folder and not elsewhere?
11. If applicable, has Weatherlink been updated to the latest available version via a download from the Davis website?
12. If it's a USB logger, have you tried using other USB ports on the PC?
13. Have you tried reinstalling the Weatherlink software? (Subject to [1] above, not usually necessary but in extremis…)
14. If possible, have you tried installing Weatherlink to a different PC to check that the original PC's configuration is not somehow blocking correct operation of Weatherlink?

Migration & update problems

This topic deals with various problems where communications to the logger cannot be re-established at all following a change of PC or major updates to the Windows version or when data needs to be transferred from an old PC to a new installation.

The notes below deal with issues where a new Weatherlink installation has not been correctly established on the new PC or Windows environment or in locating and transferring existing data files. But a move to a different PC may occasionally cause some problems in configuring the USB driver correctly on the new PC. In this case, you may also need to review the more general notes on troubleshooting logger communications issues.

Reinstalling the Weatherlink for Windows software

In general, any change of PC or hard drive (or potentially a complete update of the Windows version, although this will not always be necessary) will require that the Weatherlink software be reinstalled from scratch. This means that Weatherlink must be reinstalled initially from an original CD (see below). Trying to copy an old installation across from a backup to a new PC is rarely, if ever, successful – you do typically need to bite the bullet and organise a completely fresh installation.

Understanding Weatherlink versions and updates: Davis issue updates to the Weatherlink version from time to time and, in general, these updates can be downloaded free of charge from the support section of the Davis website at: www.davisnet.com/support/weather/downloads/software_sftwr.asp. At the time of writing (May 2015) the latest version was v6.0.3, but a newer update will doubtless be available before too long.

However, these updates are just that – 'updates'. The updates cannot be used to create a new Weatherlink installation. Instead, Weatherlink must first be installed from an original CD. Once the original version has been successfully installed then the update can be loaded on top of the original version to give a fully functioning copy of the latest version. If you cannot find your original Weatherlink CD then these are available as spares as part 6510X (for the Windows version) at reasonably low cost. (NB Dealers do not get given free copies of the CDs – the CDs have to be bought in just like any other spare part. It is the user's responsibility to keep their original CD copy safely; if it gets lost then a new CD will regrettably need to be bought.)

We do strongly recommend when reinstalling Weatherlink on an existing or new PC that you do update to the latest available version to take advantage of the latest features and driver versions. Reinstallation will

therefore typically happen in two stages: First, an install of the original version from your CD; Second, an update to the latest version via a download.

Weatherlink installation folder: Unless there are very particular reasons for doing otherwise, Weatherlink should always be installed to the C:\Weatherlink folder. This is the default on recent versions of Weatherlink, but versions 5.7 and 5.8 installed to C:\Program Files\Weatherlink. If you are reinstalling one of these older versions from the CD then always check that installation is being directed to C:\Weatherlink and override manually any attempt to do otherwise – there is a step in the installation process that displays the install folder and asks you to accept or change it. (NB Weatherlink will still work OK if it is installed to C:\Program Files\Weatherlink, but the problem is that the monthly data files are then tucked away in an obscure folder location – see below – and may be difficult to track down.)

We do definitely suggest using drive C: for the installation folder. Although there is no obvious reason why eg drives D; or E: (if present on the local PC) might not be usable, there are occasional reports of obscure problems from users who have attempted to do so. It's simplest therefore to avoid any such potential issues and to stick to drive C:. Using other drives as a location for the monthly *data* files (ie as distinct from the main Weatherlink executables folder) seems generally OK, although it is still best to stick to drives on the local PC, ie not network drives. Overall, it is simplest to remain with the suggested default and to keep the station's data folder also within C:\Weatherlink.

Moving Weatherlink data files

The Weatherlink files that contain your complete data archive may be readily moved from one PC or drive to another and so your full weather history can continue to accumulate on a new PC. The process of moving the data is very straightforward but there are one or two potential hitches, especially if you've never run a transfer before, so the notes below should help to achieve a smooth transfer to the new PC.

NB These notes deal only with data files created by Weatherlink v5.2 and later. This version actually dates from about 2002 and so should cover the great majority of transfers. If you do happen to have been using v5.1 or earlier (is there anyone at all left doing so?) then you'll need to review the Weatherlink instructions about Importing Database Files in the online Help. **IMPORTANT** You do NOT need to use Import Database Files on the Weatherlink File menu for files created by v5.2 and later (these data files will have the .wlk suffix) and attempts to do so will result in program errors.

Understanding monthly data file names and location: Weatherlink stores its data in separate monthly data files, named after the year and month number of collection and all ending in the .wlk file suffix (very old versions of Weatherlink used a different suffix, but also used a different data format). Thus a new monthly file for May 2015 was created just after midnight on 1st May and named 2015-05.wlk.

These files are all stored inside the current station folder. When Weatherlink runs for the first time (or if you manually create a new station) it asks you for a station name. The first 8 characters of this name are then used as the station folder name. By default, the station folder is located as a subfolder of the main Weatherlink folder and so, purely as an example and if I had created a station called Station1 on a recent version of Weatherlink, then my May data would be found in the file at C:\Weatherlink\Station1\2015-05.wlk. (NB You can vary the location of the station folder to other folder locations; if you decided not to accept the default location, it's of course then up to you to keep track of the location that you did choose.)

You should be able to see the location of these monthly .wlk files easily using Windows File Explorer (also known as My Computer or simply Windows Explorer in different versions of Windows). If you're not clear how to find and to use File Explorer then you really need to seek help locally from someone who does – this is a problem about how to use Windows and not really a Weatherlink one.

Migrating existing data files to a new PC: NB This relates only to monthly **data** files and assumes that the main Weatherlink program files have been reinstalled on the new PC as described above.

Actually moving the data is a simple two-step process. First, run the Weatherlink program for an initial time. The 'Walkthrough' routine will run automatically and prompt you to create a new station (and hence create a new station folder within C:\Weatherlink, unless you change away from the default location) and to set the correct communications port for your logger. You can either stop the Walkthrough at this point – all of the subsequent settings can be edited later if required – or simply allow it to complete so that all of the standard settings have been given an initial value. Then close the Weatherlink program.

Moving the data files then simply involves copying them from the old station folder location on the old PC to the new station folder location on the new PC. A USB stick will often be the easiest way of transferring the copies between PCs but obviously any valid transfer method can be used. Once the copying is complete then Weatherlink can be restarted and the old data should now be visible eg within Browse mode of Weatherlink.

Data file location on old Weatherlink versions eg v5.7: If Weatherlink was installed to C:\Program Files\ Weatherlink on your old PC then you may have trouble locating the monthly wlk data files because the station subfolder may well not have been placed inside the main Weatherlink folder but elsewhere.

The 'alternative location' is the 'Virtual Store' location within the Windows folder hierarchy and for Weatherlink files should be findable at:

C:\Users\yourusername\AppData\Local\VirtualStore\Program Files\WeatherLink

where 'yourusername' is the user name that you use when you log on to Windows. You will need to drill down within Windows File Explorer along this folder path and to progressively deeper folder levels until you

will hopefully find the relevant Weatherlink folder containing the set of wlk files. This obscure change was actually made for good technical reasons but in the event proved too confusing to users, hence the more recent reversion to using the simple C:\Weatherlink folder.

An alternative approach to search in File Explorer for *.wlk, ensuring that hidden folders are visible (the VirtualStore may be hidden by default and hence its contents won't be scanned in a search).

Windows 10 issues

Windows 10 is a major new Windows release from Microsoft. While Windows 10 offers many benefits, it does now have the potential to be slightly more troublesome in ensuring Weatherlink compatibility. To be clear, Weatherlink (as of v6.0.3) remains fully compatible with Windows 10 but there may occasionally be issues in getting a new or recently updated version of Windows 10 to function correctly with Weatherlink. These issues can usually be fixed but will typically require a one-off adjustment to the Weatherlink installation or configuration.

First steps

If you are experiencing any Windows 10 related issues then the first troubleshooting step is to ensure that you're definitely using the latest version of the Weatherlink program – please see the 'Reinstalling Weatherlink' section of the [Migration and Update Problems](#) topic for further details.

If the problem remains unresolved then please read on:

Windows 10 updates

With Windows 10, Microsoft seem to have introduced a new updating strategy that could, at least in theory, impact on compatibility issues. Automatic updating of Windows has of course been the norm for all recent Windows releases but, in the main, the updates have been either relatively minor, typically security or bug-related, or well signposted as in Service Pack (SP1, SP2 etc) or e.g. v8.0, v8.1 etc releases. But with Windows 10, MS seem to have started to roll out potentially significant changes to the Windows architecture as automatic updates but without really highlighting key features or version numbers of the latest updates.

In future, it looks like it will be more necessary to be aware of the Build Number of the Windows 10 version in use and alert to the possibility that one potential cause of a new USB communication issue could in theory be a recent Windows update. There are various ways of seeing the build number, but perhaps the simplest is to open a command prompt window eg by **right** clicking on the Win10 Start Button and choosing the Command Prompt item. The Build Number should be displayed on the top line of the window, 10.0.10240 for instance on my PC right now, giving a build number of 10240. Another easy option is to press the Windows and 'R' keys together to bring up the 'Run' window and then type in *winver* and OK, which should display the Windows 10 About box.

The bottom line is that it's no longer safe to offer a blanket assurance that Windows 10 is compatible with Weatherlink because in principle an automatic update may be released at some point that does break compatibility. And in fact, after this page was originally written, in Dec 2015 exactly this issue appeared. We

don't yet have an exact build number when this issue was introduced but it is clearly later than 10240. It is relatively minor in that it affects only the USB Xpress driver. We believe that users will be unlucky ever to see this bug nowadays provided their Windows build is fully maintained and up to date. But a couple of potential fixes are described below.

Latest Silabs driver release

Silabs appear to have released an updated driver version (v6.7.3 dated March 3, 2016) that may well fix the USBXpress driver bug in certain versions of Windows 10 and which may be downloaded from: www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx#windows . We don't currently have access to a version of Windows 10 that exhibits this bug and so cannot confirm the bugfix, but very probably it cures the problem. It may well also be that current builds of Windows 10 now contain the updated driver and therefore do not show the bug.

But if you're still seeing the problem then the Rollback fix is described below.

Windows 10 Rollback fix

This fix is necessary because in Dec 2015 SiLabs appear to have released a new USB Xpress driver to Microsoft for inclusion in Windows 10 update that is not working correctly. The Rollback fix reverts the USBX driver to the previous version.

Two general points before describing the Rollback fix for affected PCs:

- The Windows 10 compatibility problem affects only the USB Xpress driver and not the VCP driver. **The simplest fix is therefore just to switch to using the VCP driver** – in other words, to switch to connecting to the logger as a serial device instead of as a USB device. If you don't understand what this means then please refer to the Understanding WL Comms & Issues topic and to the further topics linked to from there that explain how to switch logger modes;
- An updated USB driver is expected to be released by SiLabs fairly quickly. Once this is available and has been included in the Weatherlink and Windows 10 update distributions (and installed of course) then this issue will disappear again. In the interim we also understand that SiLabs are asking Microsoft to remove the faulty USBX driver from Windows 10 update until such time as a working and tested USBX driver is available (which means that the previous working driver will remain active). In principle, however, this same generic type of issue could still reappear at some future date if for example Microsoft opt to change the Windows driver specification further or a faulty driver is released again;

Rollback Fix

This fix can be tried by Windows 10 users seeing a 'Communications error' in Weatherlink when attempting to connect to the USB logger in one of two scenarios: either the connection was working correctly previously but is not now, following eg a Windows update; or the logger is being connected to a PC with a new Windows 10 installation. (NB No versions of Windows prior to v10 are affected by this specific bug)

Applying this fix is fairly straightforward but does require some knowledge of the Windows 'Device Manager' settings manager. As mentioned above, it's also the case that the simplest fix is to move the logger to VCP/serial mode as described elsewhere in these notes. But for anyone keen to continue using USB mode then proceed as follows:
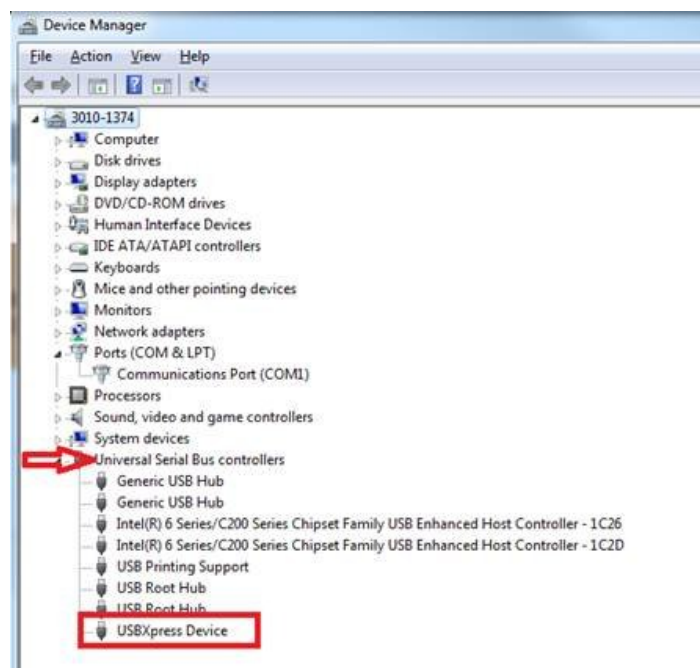
The first step is to confirm that the USB Xpress driver is indeed being used. This will be the case if the USB option is selected in the 'Communications Port' dialogue of Weatherlink, but can be confirmed by looking for a USBXpress entry in the 'Universal Serial Bus Controllers' section of Device Manager, as shown in the picture right. Remember that the driver entry will only show up in Device Manager **when the logger is actually connected via USB to the PC**.

If this USBXpress entry cannot be seen then either the USB port option has not in fact been selected in Weatherlink (i.e. maybe the serial option is actually in use) or the USB Xpress driver is not loading for some other reason – further investigation will be needed.

If the USBXpress entry can be seen then right click on this entry and choose the Properties option to display the USBXpress Device Properties Window.

Click the Driver tab and check the driver's date and version number. If this shows as v6.7.2.0 then this is the faulty USB Xpress driver.

The remedy is to click the 'Roll Back Driver' button which should cause the previous driver version to become active again. Once the version is no longer showing as v6.7.2.0 then it should be possible to connect to the logger via USB mode again. If this doesn't happen immediately then it's possible that the logger's USB cable may need to be disconnected and then reconnected after a few seconds pause.

Use of the previous driver version should be retained after the PC has been rebooted, but it may be prudent to check this to be sure of reliable future operation.
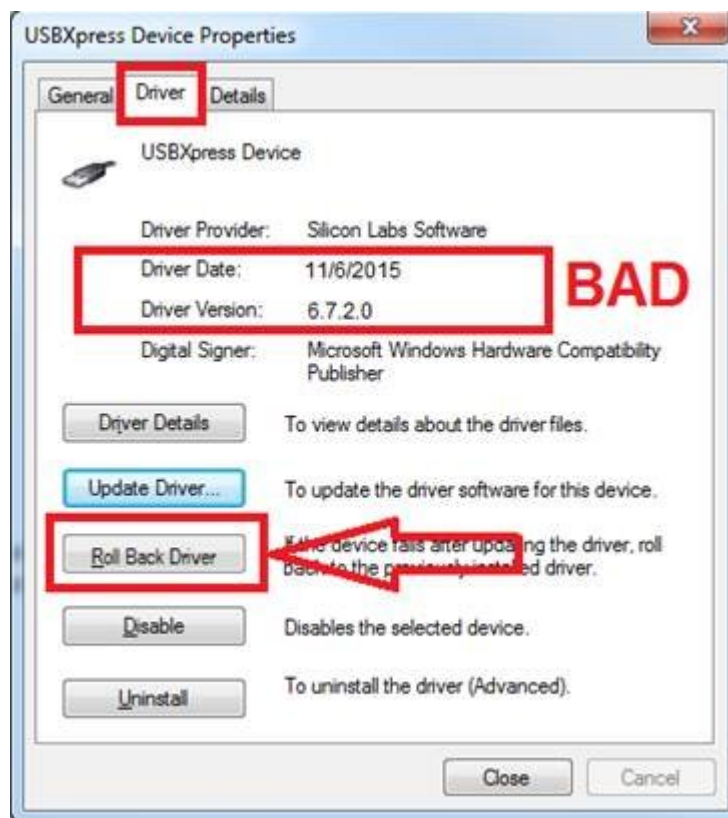
No logger communications

Introduction

> **!** It is assumed that if your Vue or VP2 station includes a display console (ie you are not solely using the Envoy console) then all console readings appear normal. Do not try to troubleshoot logger communications until all console readings are behaving normally.

> **!** This topic covers the scenario where a logger has been working satisfactorily for a shorter or longer period but has then thrown up a problem. If you are having problems getting a **new** logger to communicate for the first time then please see this separate **New Installations** topic (although it's always still worth trying the Basic Troubleshooting steps listed below).

This topic covers the apparently **total** loss of communication between the Weatherlink logger and software running on a PC or Mac. **Partial** loss of communication, ie software can talk to the logger to some extent but, for example, the archive data is no longer downloading successfully, will have different causes to total loss and again is covered in the separate [Archive download errors](#) topic.

Total loss of communications may have a number of causes ranging from trivial to obscure. The notes below do attempt to cover most causes but inevitably some of the more 'difficult' issues need more detailed description.Try the simple solutions first. In many cases the problem will be fixed without needing to delve further into the technicalities of the PC/Mac configuration.

The USB logger is, by a considerable margin, the most widely used logger type and most of content here focuses on the USB type. But the principles will also apply to the Serial logger. The WeatherlinkIP logger has some specific issues of its own and these are dealt with in a separate [WeatherlinkIP topic](#).

The use of the Davis Weatherlink software is assumed, but the general troubleshooting principles described should apply to third-party software also. (Some issues arising with third-party programs may obviously be specific to that program – visit the support forums for the program in question in such cases.)

First steps for troubleshooting logger issues

As with many PC-related issues there are some simple-minded fixes that will often remedy many problems. It is always worth trying these as a first port of call. If one of these fixes works and the problem is just a one-off or only very occasional then it may well not be worth spending time on more extensive troubleshooting.

- Unplug the USB plug from the PC, wait eg 10-20 seconds and then replug. Wait a further 10-20 seconds before retrying the program;

- Close and reopen the program;

- Reboot the PC;

- Reboot the console, checking also that the logger is firmly seated;

If basic troubleshooting fails to help

If none of the four 'First steps' suggested above fully resolves the problem then more detailed troubleshooting is required. Some other fault scenarios include the following:

- One-off total loss of communication – continue with the Comms troubleshooting topic;
- Repeated failure of communications: One of the steps above **temporarily** cures the issue, but the fault tends to recur hours or days later. This is most likely caused by the USB port dropout issue – refer to the USB dropout topic;

Comms troubleshooting

> **❗ IMPORTANT:** This topic covers scenarios where **all** of the following are true:

- The logger is the USB type (though some of the notes below may be useful for other logger types also);
- There is a **complete** loss of communication between logger and computer, ie *both* real-time *and* archive data cannot be accessed. If the problem is *only* with archive data (ie real-time or Bulletin data is OK) then see the Archive Download Errors topic;
- This is **not** a brand new installation – if it is then see the New Installation topic for help;
- All of the 'First steps for troubleshooting logger issues' in the No logger communications' topic have been tried without success. Ensure that the expected number of beeps has been heard when Rebooting the console;
- Obvious checks for cable integrity, loose cable/plug connections etc have already been made;
- This is a one-off issue and not a recurrence of previous similar breaks in communication. If it is a recurrence of a problem that was previously fixed then it might be worth reviewing the notes on USB Dropout and USB interference, which is the most likely cause of recurrent problems;
- If you are using Windows 10 after Build 10240 and attempting to connect in USB mode then you may encounter a temporary bug requiring a USB driver rollback as a fix – please see the Windows compatibility topic.

Check the Error log

Weatherlink maintains a log of all the communications errors that it encounters. This log is held in a text file called download.log which will be found in the main Weatherlink folder (usually C:\Weatherlink). This file will log all sorts of routine messages as well and over time can get very large.It's quite OK to delete this file if it's become too big and the file will then be automatically recreated with any new error messages.

It's always worth checking this communications log to see if it provides any clues to potential communications problems. But do be aware that the log will contain a number of routine messages and that it's common for occasional comms issues to be corrected after an automatic retry, but all such operations are likely to be logged. So the appearance of multiple entries in the comms log doesn't necessarily indicate any lasting problem.

Error messages

Occasionally Weatherlink may return a numbered Windows-type error in a small message-box. This is typically encountered when setting up a new Weatherlink installation and usually indicates that some step of the set-up hasn't been followed correctly or that the PC in use may be very locked down and this potentially have permissions issues.

> ❗ Numeric error messages are often unreliable as to the exact fault. Certainly it's worth noting and reporting any specific error, but it's not uncommon for the underlying problem to be rather different from the text of any reported error.

Error 17 creating directory: This error can be caused if a station is given a name with any spaces included (or indeed any other characters that are not legal for use in a folder name – the station name is used to name the folder in which the station's data is stored). Station names are best kept relatively short and limited to standard letters and digits.

Check baud rate

Check the baud rate setting on the console – it should be 19200 on standard Vue, VP2 and Envoy consoles. See the console manual if you're not sure how to do this. (This is only rarely the cause of any communications problems but it's so simple to check that it's worth doing at an early stage of troubleshooting.)

NB If you can't see the Baud Rate setting within the console settings then the logger is not being recognised. Are you **sure** that you've tried rebooting the console, heard the correct number of beeps on reboot and also checked that the logger is firmly in place?

Check the logger mode

The logger mode can be set to either serial/VCP or USB/USBXpress. Problems can arise with a change of main weather software where, for instance, the logger was previously set to USB mode whereas the new software requires serial/VCP mode or, rarely, some external event like a mains spike can cause an uncommanded change of modes or even seemingly to enter an in-between mode where it is neither fully serial nor USB. In such cases it is worth double-checking that the logger is actually in the expected or required mode and, if necessary, forcing the logger into the required mode to check that it will respond correctly to mode changes.

The subject of logger modes is explained in detail in the Setting the Communications Port topic, but in brief:

- The logger mode can be checked most easily by observing whether the VCP or the USBX driver is loaded using Windows Device Manager;
- The logger can be forced into serial/VCP mode by running the 'CP210X USB to Serial Converter' utility;
- The logger can be forced into USBX mode by selecting USB as the communication port option and OK'ing the warning messages;

Each of these procedures is explained more fully in the Setting the Communications Port topic.

USB Dropout Overview

Note: This issue applies in the main only to the USB version of the Weatherlink data logger (6510USB), although it can occasionally also be encountered with serial port WL loggers connected to a PC's USB port via an external serial-to-USB adapter.

Symptom: The classic symptom here is that the logging system will perform perfectly well for a period, eg just 30 minutes in bad cases, but typically ranging up to many hours or days, but then communications with the WL logger will be lost. Data will then no longer be available to the linked PC, although the console should continue to work as normal. The exact symptoms can vary in severity but in the worst cases a PC crash can be the end result.

Background: This USB dropout issue has been reported in various online weather forums in the past but in reality now affects only a small percentage of users. It tends only to be seen when the the PC is continuously connected to the USB logger and is being used to pass a constant stream of real-time data to the PC. If you only connect a PC to the logger at intervals of every few hours or daily or less often, it's unlikely that you will ever see this problem. Even if you do require a real-time data stream then only an unlucky small minority will ever encounter USB port dropout.

Every time that the Weatherlink (or other) software requests data from the WL logger, a request is passed to the relevant USB port to pass on to the logger. But if the PC's USB port becomes unresponsive (which is what happens during USB dropout) then the request cannot be sent from PC to logger and hence the software flags up a communications breakdown with the logger. Once this happens then the unresponsive port state tends to persist until the port is reset, for example by unplugging the USB cable from the logger and reconnecting it – his action is usually enough in itself to cause the PC's USB driver to reload and hence to reactivate the USB port. Of course, the whole idea of a constant, automated stream of weather data is that it doesn't require manual intervention to operate continuously, 24/7, but if manual unplugging and replugging of the USB connection is enough to restore communications with the logger then that is a good diagnostic sign that the problem you're encountering is indeed one of USB port dropout.

USB dropout tends to have one of two causes:

- The USB port has been deliberately powered down by the PC as part of its power-saving procedures;
- The port has become unresponsive because of interference;

The first of these possibilities – a power-saving issue – is uncommon but it should always be ruled out. Double-check that nowhere in the PC's power-saving settings are the USB ports set to be automatically

powered down at any stage. Sometimes, checking this may require delving quite deeply into the power-saving settings.

However, power-saving is not usually the culprit and interference-related causes are much more likely. See the **USB Interference** topic for further discussion.

USB Interference

Interference and USB connections

Why interference should cause problems with USB connections doesn't seem to be well understood, but it does definitely seem to be the case that USB connections are more sensitive to external interference than, for example, traditional RS232 connections. Whether this is perhaps because of the much higher design speeds of USB connections, lower voltages used or whatever else isn't generally explained, except perhaps in the professional electronics literature. It is known that Davis expended considerable time and effort in extensive investigations of this problem with the USB logger connections, including looking at alternative USB chipsets such as FTDI, but were unable to identify any specific cause or definitive fix other than the general issue of external interference. And it is a fact that taking steps to minimise the effects of external interference often results in mitigation and – if you're lucky – disappearance of the USB dropout issue. So the issue does seem to be strongly linked to local interference even if the precise nature of the link is unclear.

There seem to be two main sources of interference, which will need to be investigated separately: through-air wireless interference and noise or interference propagated through the AC mains (ie via the mains adapter powering the console/logger unit). And there is a range of possible fixes for this interference problem suggested below, the diversity of the suggestions reflecting the rather ill-defined nature of the problem and the difficulty of knowing which one is most likely to work in any given instance. All we can suggest is that you review the various fixes and, if necessary, work through them in turn to see which might be the best option in your specific case, starting obviously with the simpler and cheaper options. The starting point is to review the three simple fixes and see whether any of these helps, before moving on to the other options:

Simple fixes

- If you use the Davis Weatherlink software (as supplied with the USB logger) then ensure that you have updated this to the latest available version (v6.0.3 at the time of writing). The USB driver which is packaged with Weatherlink is updated from time to time with specific fixes to minimise the USB dropout problem. (Users of non-Davis software can also install the latest Weatherlink version even if they don't use it regularly. This will ensure that the latest USB driver is also installed on the PC.)
- Look around the immediate environment of your USB connection and see if there is anything there that could credibly be generating interference, eg cordless or mobile phones, baby alarms, any computers or other devices runing with the covers off, fluorescent lights etc and if possible take steps to move any such items well away from the logger-PC connection – the further the better. Also, route

the USB cable well away from any other cables that could conceivably be carrying or transmitting interference;

- At least as an experiment, try disconnecting the console completely from the mains and running the console on batteries only – the wireless console should run for 6-9 months on batteries alone and the cabled one for 3-4 months. (This test will help rule out interference that is being injected into the console via the AC mains. If this successfully cures the dropout problem then it may be worth considering buying a small PC UPS and plugging the VP2/Vue adapter into that – these units usually have excellent interference suppression.);

Further suggestions

- Choose the best quality USB cable you can find/afford and choose a length no longer than necessary – the shorter the better. Try to avoid passing the USB connection through any intermediate USB hub, especially if it's an unpowered one;
- Ferrite cores are an excellent means of minimising interference pickup by the USB cable itself. You can buy individual cores through which to wind the cable or to clamp over it (one at each end is best) or USB cables can be bought with prefitted ferrite cores, which often look simply like cylindrical bulges near each end of the cable. Sometimes this measure alone – ie fitting a good short new USB cable with a ferrite core at each end is sufficient to cure the dropout problem;
- Try wrapping the complete plug and socket connection between the USB pigtail lead from the logger and the main USB cable with metal foil (eg cooking foil). It has been suggested that this physical connection is not as well screened as it could be and hence provides an easy entry point for interference. Wrapping the joint in foil provides extra screening and is a quick and simple fix to try;

Other solutions

Besides trying to minimise the entry of interference into the VP system, there are other approaches that may be worth trying if the USB port dropout problem persists, for example:

- If you're currently using Serial/VCP mode for the USB logger (ie 'Serial' selected as the Port option in the Weatherlink 'Communications Port' dialogue) then try using the USBXpress option instead – see our Interfaces Overview topic for further details. (Note: This option probably won't work if you're using software other than the Davis Weatherlink program, because other software programs don't yet support USBX mode. Hopefully this situation will improve because Davis have signalled their intention to make USB the default mode of the logger.)
- Try, if possible, connecting the logger to a different PC. Sometimes PCs vary in the degree to which their USB ports are affected by this dropout issue;
- Look at using a USB-to-Ethernet adapter. This is a fundamentally different way of connecting the USB logger to a PC and is only relevant if your PC is already connected to a local network. The idea is that you connect the USB logger to an interface box, which in turn connects into your network. The USB

data then passes to and from the PC over the network rather than over a direct USB cable link and the network routing might well be less susceptible to interference. This is obviously a more costly option, although not hugely so. We've successfully used the Silex SX-2000WG wireless adapter in this role, but there are other cheaper wired-only Silex boxes that might work just as well, in addition to other makes of serial-to-USB adapter;

- See if a cost-effective USB optical isolator might be available. Optical isolators have long been available for eg RS232 connections and can be invaluable in helping prevent the effects of ground loops and interference. Unfortunately, they still seem to be relatively new in the USB field and hence more complex (eg providing isolation for 4 USB ports rather than one port) and more costly than might be acceptable. But this situation is likely to improve and, someday soon, relatively inexpensive single-port USB optical isolators might be marketed. Note that you would need to find an isolator that takes port power from the PC end of the connection – the USB logger cannot provide sufficient power to run the isolator;

Archive download errors

Symptom: Real-time data is passing successfully from logger to computer, but attempts to download archive data are failing, either partially or completely.

Background: Davis loggers can all generate two quite distinct types of data: *real-time* data (sometimes called Loop data) and *archive* data. *Real-time* data is passed to the computer about every 2-3 seconds and is the data source for the Bulletin mode of the Weatherlink software, ie the real-time display that shows, for example, live wind data. *Archive* data is the summary data which the logger generates at preset intervals (typically every 5 to 30 minutes according to the user settings) and which accumulates within the logger until a computer is connected and an archive download is requested.

Archive download issues are seen most often with the Weatherlink software, for the simple reason that most third-party programs use only the real-time data as their primary data feed, although some do also have a 'catch-up' mode which makes use of archive data. (Using only real-time data means of course that the connected computer must be switched on 24/7 if data is not to be lost, which is a significant drawback for many users and is one one the main reasons why the Weatherlink program remains so popular.)

This topic covers **only** errors seen with archive downloads. It assumes that real-time data is being passed successfully to the computer; if this is not the case then go back and review the general [Weatherlink logger](#) topic,. The troubleshooting notes below assume that you know what the terms 'archive database' and 'Browse mode' mean in the context of the Weatherlink program. If not then please refresh your memory from the Help within the Weatherlink software.

Types of archive download error:

There are, broadly, three main types of error that can be encountered with archive downloads:

- **'No new data to download'**: Attempts to download archive data always give this same error message;

> ! The logger will always report that there is no new archive data to download if insufficient time has been allowed for the first new record to be saved. So if testing the logger with the interval set e.g. to 30 minutes but without waiting at least 30 mins before downloading then the WL program will be perfectly correct in reporting that no new archive data is available.

- **Incomplete or repetitive downloads**: Downloads start OK but do not complete successfully. Sometimes the program will repeatedly report that it's downloading the same (or similar) large number of records, but new data never appears in the archive database;

- **Errors in downloaded data:** Downloads **do** complete successfully, but problems with the downloaded data subsequently become apparent. For example: attempts to use the Plot module cause the Weatherlink program to crash; or whole blocks of data in the newly-downloaded records appear to be missing when viewed in Browse mode, typically the date/time values may be present but the rest of the record is not showing. (NB Note the reference to whole lines or blocks of data being missing. If only data that depends on one sensor such as the temperature sensor is missing then this is almost certainly a sensor fault and not a download issue.);

For all of these types of error, troubleshooting should proceed along the same course: First, check that there is not some simple and easily-remedied cause; Second, if there's still a problem then more in-depth troubleshooting is needed. Please see the **Simple causes** and **Detailed troubleshooting** subtopics, respectively.

Simple causes of archive errors

Cause 1. Logger not fully initialised

Origin: The logger was installed with the console powered up or for some other reason has not initialised fully or its configuration has become corrupted.

The only reliable way of fitting any type of WL logger into its console socket is to fully power off the console prior to logger installation. Additionally, the serial data logger (6510SER) does not always take kindly to the serial cable to the PC being connected or disconnected while the system is powered up and this in itself can cause problems with PC-logger communications. (It is recommended that the PC serial cable is only to be connected to the PC when either the PC or the console is powered off (ideally both should be off). The USB logger (6510USB) – like most USB devices – is more foregiving in this respect and the USB cable connection can generally be made and broken at will.

Resolution: The logger must be reinitialised by **Rebooting the console**. While the console is powered off, be sure to check that the logger is firmly in place. Remember that rebooting the console will **not**, of itself, cause any console settings or previously logged data to be lost.

Cause 2: Date/Time not synchronised

Origin: The date and time are not sufficiently synchronised between console and PC. Date/time does not need to be exactly synchronised, but if settings in the console and PC drift too far apart then the PC can be fooled into thinking that there is no new archive data to download when new data is requested from the logger.

Resolution: Resolution is simply a matter of resynchronising the date/time settings. This is easiest to do by using the 'Set Time and Date' menu option from the main 'Setup' menu of the Weatherlink program. This menu calls up a dialogue box that shows both console and PC Date/time settings side by side. Detailed steps are:

1. Check the current date and time from a reliable independent source;
2. Call up the Set Time and Date' menu option from within the WL program;
3. If the date and time settings on console and PC do not agree with one another or with the actual current date/time then make the appropriate adjustments;
4. Do not forget to check that the year is correctly set on both console and PC. (It's not unknown for console and PC to be synchronised to the second except that they are set to different year values.)

If neither of the two fixes above cures the problem then **Detailed troubleshooting** is going to be required.

Detailed archive troubleshooting

This topic describes detailed causes and troubleshooting for issues and errors associated with the Weatherlink logger archive data and that have not been fixed by the **Simple remedies**.

The root cause of archive download issues that have not responded to simple fixes is usually data corruption either in the logger itself or on the computer hard drive. To troubleshoot such problems involves trying to narrow down exactly where the corrupt data is being stored and clearing, deleting or writing over that data.

A few important initial points: First (and assuming that this is an installation that was previously working successfully, ie that it's not a new installation, an attempted upgrade etc), **reinstalling the Weatherlink software is rarely the answer** to problems that relate only to archive downloads. If all the other possible investigations and fixes have been tried but failed then reinstallation can also be tried of course, but it should be more of a last resort – work first through the other suggestions below and don't waste time trying reinstallation early on.

Second, deleting ('clearing') the logger of all its data is occasionally the only way of fixing archive download issues, but no-one wants to lose data and there are often other solutions that will fix the problem, so once again **clearing the logger should be left as a last resort**.

Third, there's a distinction between download issues that happen just once in a while and those that start to occur more often. For very occasional problems it's usually not worth the time and effort to go further than correcting the immediate error. Very occasional data corruption can occur with any computer-linked system and due to causes as unlikely as cosmic rays – it's entirely possible that a one-off issue might never recur and that the original cause could never be known for sure. But if the problem does start to happen repeatedly then clearly further investigation is merited. See the final section below on 'Recurrent archive download problems'.

Troubleshooting steps

Once again, be sure to try the **Simple remedies** first. But if the archive downloads continue to give trouble then try the following fixes in this order:

1. Inspect the archive database carefully

In Browse mode of Weatherlink (the Notepad-like icon on the toolbar or select Browse from the Window menu or simply Ctrl W) look carefully through the most recent records, especially the very last one. Look

especially at the date/time values and see if you can spot one that's patently in error (eg a date or year value that is still in the future!) or out of sequence. The commonest cause of download problems is that a spurious date/time value has somehow and, typically, recently made its way into the database. But look also for other signs of a malformed record.

When Browse mode is active, you will notice a new Browse menu appear on the main menu bar. This contains an option to delete individual records – if a spurious record is spotted then delete it. (There is also an 'Edit' record option, but this only allows the weather readings to be edited and not the data/time values.)

2. Create a new station

It's not always possible to identify faulty records through using Browse mode. But there is another approach that can be tried. In Weatherlink create a new station (File | New Station) – you do not need to work through the whole of the Walkthrough, but obviously the Communication Port step must be correctly set or the PC and logger will not be able to communicate. The main idea of a new station is just to create a test station that is previously unused and which will therefore not carry over any of the old weather readings. Try downloading the archive into that new station. If this succeeds then it's a good sign that the latest monthly data file in the existing station is corrupt.

> ✳ **Monthly data files:** Weatherlink stores its data on the hard drive in separate monthly data files named as YYYY-MM.wlk, so for example the file for March 2015 is called 2015-03.wlk. A new file is created at midnight on the 1st of each new month. These files are all to be found within the subfolder called after the station name and within the main Weatherlink folder. (NB This is true for all recent Weatherlink versions since v5.7 but older versions may vary.) The complete set of .wlk files can be seen using **Windows** Explorer (not Internet Explorer!) or My Computer or whatever the Windows file manager is called on your current version of Windows. Although the whole set of weather records looks like one continuous listing in Browse mode, the data is actually being pulled in from the separate monthly files. So if you do have an isolated data corruption then the worst case should be that just one monthly data file will be affected and all the other older data should be OK.

If a download into a new test station is fully successful then there are a couple of options for dealing with the existing corrupt data file. If your archive interval is 30 minutes or longer then the logger can hold a complete month's worth data (and more), so you could copy the new wlk file for the current month over the top of the existing file in the old station subfolder (or perhaps just rename the old file to e.g. *2015-03.wlk.old* if you prefer), in which case you should just be able to resume normal operation with the existing file. This may also be possible with shorter archive intervals in the first part of any month, but obviously if the logger no longer contains data for the first days of the month then being able to recreate the whole monthly data file from a new download will not be possible.

So with shorter archive intervals (and especially with the 1-minute interval) it will often be the case that data may be split across two distinct data files for the current month – the potentially corrupt one in the existing folder and the new one in the new station folder. Unfortunately, Weatherlink itself does not provide any tool to merge two such files and to create one single intact file. However, someone has written a utility to do this job which you can find at www.narsters.com/WLKReaderWriter/Default.aspx. Please be aware that we've not ourselves had cause to use this utility in anger and so this is just a pointer rather than a recommendation.

3. Delete Weatherlink configuration files

If attempts to download into a new station folder do not cure the problem then it's possible that the corruption lies in one of the *configuration* files that Weatherlink uses rather than in one of the monthly *data* files. There are two such non-essential config files that WL uses called *DataLists.dat* and *DataSets.dat*, which can both be found within the station subfolder usually located within the main Weatherlink folder. This is not the place to discuss the detailed role of these two config files, you only need to be aware of two main points:

First, these two files don't have a major role to play in running Weatherlink – they're present in the main to support certain supplementary functions, few of which are used routinely. However, WL does read both files and if either has a corrupt setting then this can lead to problems with archive downloads or, more typically, to issues with WL functions which read the archive data immediately after a download such as Stripcharts, Plot and Reporting functions . If you're experiencing a problem with WL crashing shortly after an archive download then deleting these files has a good chance of fixing the fault, though it's also worth trying with other types of download issues that haven't been fixed by other remedies.

The second point is that if either or both of these two files is missing when WL starts up then WL will automatically recreate them using default values, which are normally fine for routine operation of WL. This means that you will not stop WL from working or interfere with its normal operation by deleting one or both of these files.

Fix: So to try this solution you can simply proceed as follows:

1. Close the Weatherlink program;
2. Locate the files *DataLists.dat* and *DataSets.dat* within the WL station subfolder using the Windows file manager such as My Computer;
3. Delete one or both of these files or, if you prefer and wish to be more cautious, simply rename them e.g. by adding a *.old* suffix to the end of the filenames to e.g. *DataLists.dat.old* (which would allow recovery of the original files if required);
4. Restart Weatherlink and retry the download;

4. Clear the logger

In the unlucky event that none of the above suggestions cures the problem then reluctantly the one last ploy that can be tried is to clear the logger.

> ❗ Please remember that once the logger has been cleared there is then no way of ever recovering the deleted data from the logger.

If you do decide to clear the logger then the suggested way of doing so is to use the 'Setup | Set Archive Interval' option from the main Weatherlink menu. This is a 2-step process: you first change the archive interval away from your preferred interval. The software warns you that it is about to clear the archive memory, which you need to OK. When this step is complete you then repeat the process and change the interval *back* to your preferred value.

5. No solution can be found

If even clearing the logger fails to fix the problem then this could be one of the rare instances where the logger has become faulty. Please contact your dealer for support in line with the notes on [support provision](#).

Recurrent archive download problems

If archive download issues start to happen on a recurrent or semi-regular basis then the problem clearly needs further investigation. There are, broadly, four types of cause that can interfere with archive downloads:

- A logger that's loose on its pins or where the USB cable is taut and repeatedly pulling on the logger so as to loosen it;
- Where the console is run using an AC mains adapter, but the mains supply is very noisy;
- Sources of wireless interference near to the console or USB cable;
- Potential hard drive issues on the computer, e.g. a failing drive;

This isn't an exhaustive list but covers the main causes. The loose logger possibility is obviously easy to check out.

A noisy AC mains supply transmits noise and spikes into the console/logger circuitry and hence can cause data corruption. The noise might arise from the AC supply at that location being inherently noisy eg in a commercial premises with heavy machinery around or at the end of a long rural supply line. Or there may be noise-generating equipment such as fluorescent lights plugged into the same electrical ring as the console adapter.

Either way, the simplest check is to completely unplug the AC mains adapter and run the console on internal battery power alone – this should completely isolate the console/logger from the mains supply. With the USB or serial loggers, the console should still run for 6-9 months on a new set of good quality batteries. (NB This won't work for the 6555 IP logger, which does require a mains supply.) If running on batteries alone cures the problem then it might be worth investing in a small but good quality PC UPS supply (which usually provides good noise suppression ans smoothing) and running the mains adapter through that.

For ideas on investigation the wireless interference possibility see the "**USB interference**" topic, which can have the same cause.

If none of the above suggestions helps to cure a recurrent archive problem then the cause could well be at the computer end of the link, with a failing hard drive as a prime candidate. If possible it may be worth installing Weatherlink and trying downloads on a different PC to see if the problem is still present.(Remember that all the archive data remains unchanged on the logger until it is either overwritten or deliberately cleared. So the same data can be downloaded repeatedly to different computers.)

Editing WL archive data files

Weatherlink record editor

The Weatherlink software includes a simple record editing option, but note that this is only for editing or deleting existing single records – new records cannot be created. Editing a record in this context means changing individual data items within one record to a new value.

The Weatherlink record editor is accessed by first entering Browse mode (the notepad-like icon in the toolbar or use the entry in the Window menu (or Ctrl+W as a shortcut). Entering Browse mode adds a new top-level Browse entry to the main menu. The Edit option will then be seen as the 3rd item on this new Browse menu.

Other record editors

Unfortunately, Weatherlink itself does not provide any tool to perform more complex editing functions on a monthly data file or, for example to merge two partial files to create one single intact file (eg where data from a single month may have become split across two separate files). However, a third-party utility is available to do this job which you can find at http://narsters.com/#/WLKReaderWriter . Please be aware that we've not ourselves had cause to test this utility in detail and so please use at your own discretion – this is just a suggestion rather than a recommendation.

Moving Weatherlink data files

Information about moving complete archive files between folders and between PCs will be found within the Migration and update problems topic.

Logger compatibility ('Green Dot')

> **!** This section applies only to loggers in the 65xx series intended for use with the Davis Vantage series of weather stations (VP1, VP2 and Vue). The older generation of 7862 logger for Monitor and Wizard stations was of a completely different design and cannot be used at all with the family of Vantage stations.

In 2012 Davis announced that changes were being made to VP2 and Vue console circuitry and firmware that would require an updated Weatherlink logger for compatible operation. The updated loggers were initially marked with a green dot on the outer packaging of the Weatherlink pack so that dealers could easily distinguish older and newer packs and hence the updated loggers became known as 'green dot' loggers.

Note that the green dot was on the packaging and not on the logger itself; the practice of adding the dot to the pack has also been discontinued for a while now, since old and new types are no longer in the supply chain at the same time. The only way of telling whether a logger is a 'green dot' type or not is to check its Manufacturing Code. (See the [Find the Mfg Code](#) topic for further details.)

All types of Weatherlink loggers have been updated to green dot specification. It's slightly easier to determine whether a logger is green dot or not for serial and USB loggers than for other types – please see the following list, which shows which are green dot types:

- USB: Rev E and later ('E' would be the first letter of the Mfg Code)
- Serial: Rev C and later
- WeatherlinkIP: Manufactured since 8th August 2011 (Mfg Code: x10808 or x110808)
- Streaming loggers (Alarm etc): Rev C and later or manufactured since 8th August 2011 (Mfg Code: x10808 or x110808)

Vue and VP2 consoles for which a green dot logger is **essential** can be identified as follows:

- VP2 consoles: A new style Mfg Code, ie code begins with two consecutive letters, eg 'AA' **or** Rev B and later
- Vue consoles: Rev 'MA' or later

Green dot loggers are fully backwards compatible, ie they can be used on VP1, VP2 and Vue consoles of any age.

But attempts to use a non-green-dot logger on recently manufactured Vue and VP2 consoles will result in an 'Incompatible logger' error and the console will not boot fully until the logger is removed. Regrettably this means that any logger originally bought with a VP1 station or indeed any pre-green-dot Davis Vantage station will not be compatible with a new VP2/Vue station and so anyone seeking to upgrade from an older Davis station to a new VP2 or Vue station would need also to buy a new logger.

The 'green dot' logger issue applies only to consoles and not to the ISS. The data protocol for communication from ISS to console remains unchanged and so it's perfectly possible to use a brand new VP2 ISS with an older console/logger combination.

NB Contrary to speculation in some forum postings, whether or not a console requires a green dot logger is solely a hardware issue – console behaviour cannot be modified by upgrading or attempting to downgrade console firmware.

Weatherlink for Mac

Please note: The Davis 6520 Weatherlink for Mac software does not implement all the features present in the Weatherlink for Windows version. The Windows version outsells the Mac version by a considerable margin and therefore traditionally Davis has focused its development effort on the Windows version.So please do not assume that all features in the Windows version are present in the Mac version – they are not. If some software feature is especially important to you for use with a Mac then this needs to be checked against the Mac feature-list before buying and setting up the Mac version.

> ✳ Because of the very small number of UK users of Weatherlink for Mac, there is less support expertise for the Mac product available here in the UK. The information that we do have is listed below.If this fails to help then we suggest that you contact Davis support in the US (support@davisnet.com or phone +1 510 732 7814) where there should be more specific Mac expertise available.

Weatherlink for Mac v6.0.3

Davis released a new downloadable update for WL for Mac to v6.0.3 in July 2015 which can be found at www.davisnet.com/support/weather/downloads/software_sftwr.asp . This version adds support for subscription-based uploads to weatherlink.com as well as a couple of bugfixes and may also include the latest USB driver. It's recommended that you update to v6.0.3 before trying any further troubleshooting.

Limitations of Weatherlink for Mac

Be aware that while Weatherlink for Mac is good basic software, it lacks a number of features present in Weatherlink for Windows, in particular:

- Cannot log data from solar and UV sensors;
- Cannot log data for soil moisture or leaf wetness sensors;
- Not compatible with add-on modules such as Email/Phone Alert or Ag/Turf Management module;
- Cannot download data from weatherlink.com (ie Web Download mode is not available);

The assumption should be that v6.0.3 is an update only and that a previous version should have been installed from a WL for Mac CD before attempting the update.

Weatherlink for Mac will not run after installation

Apple introduce updates for the OSX operating system at regular intervals and it's not uncommon to find that some aspect of the Weatherlink for Mac configuration needs tweaking before the WL software will run. There are three issues in particular that may cause problems with more recent versions of OSX:

32-bit operation

Weatherlink for Mac must run as a 32-bit program. If your version of OSX is defaulting to running programs in 64-bit mode then when you try to start WL you may see a java.lang.UnsatisfiedLinkError error or some similar Java error. The fix is to set the WL application manually to run in 32-bit mode as follows (you should only need to do this once):

- Look at your Desktop/Finder Screen.
- Open your Applications Folder.
- Open your Macintosh OSX Weatherlink Folder.
- Find, and select (click on once), the weatherlink, or, the weatherlink.app file.
- With weatherlink, or the weatherlink.app file selected, click the 'More Info' button in the preview pane or do a Get Info command (from under the File Menu) – the exact steps will vary with the version of OSX in use, but the objective is to display a dialogue that allows 32-bit operation to be selected.
- Put a check mark in the box marked "Open in 32-bit mode". Then close the More Info/Get Info box.
- Now try to launch the weatherlink application.

Updated USB driver needed

An updated USB driver may be needed for recent versions of OSX to allow communication with the USB logger. If the Weatherlink for Mac program can be launched but there is a communication error to the logger then the chances are that a driver update is needed.

There are two sources of this driver, the Davis support website and then the website of the manufacturers of the USB chip inside the logger, which is SiLabs. The version available from Davis will have been checked by Davis for correct operation with Weatherlink, but the most recent driver versions will naturally be available from SiLabs. We suggest that you first try the version from Davis; and then if this fails to work try the SiLabs website. Download links are as follows:

- Davis – toolbox.davisnet.com/downloads/ (Drivers section)

- SiLabs – www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx (Be sure to select the Mac OSX version for download)

NB On the SiLabs site the driver is referred to as: 'CP210x USB to UART Bridge VCP Driver'

WL for Mac with OS X version Yosemite 10.10.3 and later

WL for Mac is apparently written in Java; and Java programs require that a *compatible* version of the Java language runtime is already installed. The latest version of Java is automatically installed along with versions and updates of Mac OS X. One potential cause of problems with Java programs like WL for Mac is therefore that a new Mac computer or an existing one on which OS X has been updated is offering a Java version that is no longer compatible with WL. Specifically, WL requires v6 of Java SE and will not run with v7 which will have been installed as part of Yosemite and later OS X versions

Fortunately, the Java Legacy v6 can be installed alongside the newer Java v7, as explained by [this Apple KB topic](#) . Downloading and installing v6 will often fix the problem on newer Mac OS X installations

Summary

For the record, WL for Mac should definitely run correctly under eg Yosemite, El Capitan, Sierra, High Sierra & later OS X versions if the OSX environment is correctly configured. But the fix may require looking at any of the three issues listed above and, in some cases, potentially all three may need attention.

WeatherlinkIP issues

✳ This topic relates *only* to the 6555 WeatherlinkIP (WLIP) logger product, ie the logger with the Ethernet interface that connects into a network rather than cabling directly to a PC. The various issues covered below relate specifically to the WLIP logger and will not be relevant to e.g. the USB or serial loggers.

Important: Every WeatherlinkIP logger has two unique values associated with it – a DID and a Keycode value, which will be found on a small label on the side of the logger's RJ45 socket (and not on the logger itself). The DID is a Device ID and is actually identical to the logger's network MAC address consisting of a 6-byte sequence of 12 hexadecimal characters usually formatted as 6 colon-separated pairs, eg 00:1D:0A:00:02:3B.It can be useful to have a note of this DID value for checking purposes because it will crop in various places for example when finding out the logger's IP address.

The Keycode value provides an essential initial verification when eg setting up an account at weatherlink.com, but otherwise is not used.

Uploads to weatherlink.com are failing to occur

❗ Only technicians at Davis support have the ability to look in detail inside an account at weatherlink.com. Prodata support does not have the access permissions to do so. If there is an issue that cannot be resolved with the help provided here then it may be necessary to email Davis support directly on support@weatherlink.com – please remember time differences and that it may sometimes take 2-3 days for a response. Prodata support can only check account settings and test downloads if you provide us with the account name and password.

1. General points: In all cases of failed uploads there are always three points to check first:

• [Reboot the console](): If there has been a power or network outage then the WLIP logger may need to reinitialise, which can only be done by power-cycling the console. Always try a console reboot as a first step and always check that the number of beeps is correct;

• Check that the mains adapter is connected, powered-up and working. The WLIP has a high power requirement because of its need to drive an Ethernet network and internal console batteries typically cannot provide sufficient power to run the IP logger. So, for reliable operation, a WLIP console **must**

be externally-powered, typically by means of the standard AC mains adapter. Using an IP logger is the one configuration where we recommend **not** fitting console batteries because they can lead to unpredictable operation in the event of a power outage. Backup power for the console is better provided by plugging the mains adapter into a small PC UPS unit (eg an APC BE400-UK unit, for UK users). If a fault is suspected and batteries were still fitted then be sure to check operation with batteries removed just in case the mains adapter has developed a fault;

- Check that the green LED is flashing on the WLIP's Ethernet socket. The pattern of flashes is actually not very helpful as a diagnostic, but if the LED is either continuously on or off then something is definitely amiss with the console power or the network connection;

2. Problems getting a brand new logger to perform a first upload

In most cases and provided the set-up instructions are followed carefully, uploads to weatherlink.com should start happening quickly and automatically. If this fails to happen then there will usually be one of two causes:

- The instructions have not been followed in the correct order. The commonest mistake is trying to register a new account at weatherlink.com *before* the WLIP logger has been installed and connected to the network – the correct order is connecting the logger fully first (including a connection out on to the Internet), waiting 5 minutes and only then registering the new account. (The weatherlink.com server needs to have received a discovery packet from the logger before it will allow account registration to complete successfully.) If you have done things in the wrong order then simply reboot the console and waiting a few minutes before trying again to register the new account. Also, be sure that you have entered the DID for the logger correctly – the DID will consist only of digits and the letters A-F; any round character is a zero not the letter 'O'!

- The WLIP logger is not able to send data across the network and Internet to weatherlink.com. There are two potential issues here:
  - **No IP address:** By default, a new IP logger must have received an IP address on the local network from the local DHCP server. On simple home and office networks this will rarely be a problem, but on larger managed networks you may need to check with your network administrators. (There are potential workarounds if a DHCP server is not available.) The simplest way of testing for an IP address is to install the copy of the Weatherlink for Windows software supplied with every logger on a PC connected to the same network and same subnet as the logger. Then in the Setup | Communications Port dialogue, select TCP/IP and Local Device ID and press the Find button. If the new logger can be found then a small message showing the logger DID and IP address will appear; obviously if there is an error message at this stage then for some reason or other the logger has not correctly picked up an IP address. NB In the uncommon scenario where there might be two or more IP loggers in use on the same

network then you may need to press the Find button repeatedly until you see a message relating to the specific logger DID that you're testing for. There are other methods of checking for an IP address such as running an IP scanner like AngryIP or searching through all the devices currently showing as registered to the local router, but using the Weatherlink software will typically be the simplest approach.

○ **Firewall issues:** Data from the logger is not being allowed out on to the Internet and therefore cannot reach weatherlink.com. Usually this will be because a firewall is blocking data from the logger, but please note that the logger can **only** send data out on port 80 (ie it cannot be reprogrammed to use a different port number) and cannot use proxy servers to access the Internet. If you can receive data from the logger in the Weatherlink software on a PC running locally but uploads to weatherlink.com are failing then the chances are that this is a firewall problem and something that can only be resolved by discussions with your own network administrators. In essence, the IP address of the logger **must** be able to see a path out on to the Internet to reach the weatherlink.com server via port 80. (NB The public IP address of the weatherlink.com server cannot be assumed to be fixed and so it's not prudent to design a firewall rule around allowing data to reach this specific IP address. Rather, any rule needs to allow outbound data from the IP address of the WLIP logger to reach the Internet in general.)

3. Uploads to weatherlink.com were working previously but have now stopped

Review the following points:

- Be sure to check the three General points above (see point [1] at the beginning of this main topic);

- The IP address assigned to the logger may have changed (not because of the logger itself triggering any change, but because the router or server controlling the local network has – for whatever reason – decided to update the assignment of IP addresses to its network devices). If the WLIP logger connects to the Internet via a firewall then the fact that the IP address has changed will often require a change to the firewall rule relating to the WLIP logger. So an important troubleshooting step is to double-check that the logger's IP address has not changed.

- Firmware may require updating:From May 2015, upgrades to the weatherlink.com service may have broken compatibility with WLIP devices still running old firmware (specifically v1.0.7 and older) will require updating to the latest version, currently v1.1.1. Instructions for checking and updating the firmware will be found under the WLIP configuration topic.There is also a Davis video that describes how to update the IP logger firmware and that is viewable on Youtube.

4. Current data uploads successfully but archive uploads do not appear to be working

Review the following points:

- Be sure to check the three General points above (see point [1] at the beginning of this main topic);

- The date/time of the console in which the IP logger is fitted may be too far out. Check the date/time settings, including the year setting, and adjust if necessary.

- There could be an issue with the local copy of the Weatherlink program into which the archive data is being downloaded. Review the general Archive download errors topic.

A network connection to other local software has stopped working

The IP logger is typically used to upload to the Davis weatherlink.com service. But if you are also using the IP logger to connect to provide a weather data feed to other local software but are encountering problems with this then the first check is always to see if uploads to weatherlink.com are still proceeding normally (assuming that these have not been disabled in the WLIP web interface).

If the wl.com uploads are **not** working correctly then troubleshoot as per the previous section (3) above. If the wl.com uploads are OK then almost certainly the logger is working correctly but something has happened to the configuration of the local software.

Obviously, if wl.com uploads have been disabled then the wl.com check will not be available. In this case, please review the WeatherlinkIP configuration by local software topic. This explains various ways of checking the IP address of the logger and testing whether the logger can be contacted locally. In particular, it is important to confirm that the IP address of the logger has not been changed by the local router and that the logger's web interface can be reached via its IP address.

NB (Not applicable to the WLIP logger because it is not a subscription product): For subscription products that upload to weatherlink.com (ie the Weatherlink v6 software uploads and Connect options) then an obvious reason for uploads ceasing is that the current subscription has expired. This can be checked by logging on to your upload account at weatherlink.com and reviewing the account details.

WeatherlinkIP configuration by local software

✳ This topic covers options for setting and checking the configuration of a WeatherlinkIP logger from *local* software. It does not duplicate the detailed instructions for setting up and editing a new account on the weatherlink.com service, which can be found in the 'Weatherlink – Getting Started' booklet included with each new logger.

General points

The WLIP does not necessarily *need* any local configuration at all – in many cases it should only be necessary to connect the logger to an Internet-enabled network connection and to register and update the logger's account at weatherlink.com. But if any problems are encountered then some checks from local software can be helpful for troubleshooting.

But if you do wish to use some of the diagnostic steps outlined below, you will need to be running a Windows PC. The WLIP firmware updater is only currently available as a Windows utility and only Weatherlink for Windows (ie and not Weatherlink for Mac) supports the IP logger.

Please remember that communications from local software to a WLIP logger must typically happen with the PC running the software connected to the same subnet of the same network as the logger. This will almost always be the case anyway for small and domestic networks, but networks in larger organisations may need checking more carefully. And note also that the WLIP logger is intended as a network device and **not** for connecting directly to a PC – communications occurs via the local network, not via a wired connection direct from logger to PC.

Weatherlink for Windows software

The Communications Port dialogue in Weatherlink for Windows (see right for example – and accessed from the main WL Setup menu) provides tools for checking and configuring the WLIP logger.

To set communications for the WLIP logger, select the TCP/IP option at the top as the Communications option.This will enable the TCP/IP panel midway down the dialogue.

Do **not** attempt to change the TCP port away from its default value of 22222 (unless you have some very unusual and specific reason for doing so) – there is hardly ever any need to change this value.

For local diagnostic purposes you will usually want to select the 'Local Device ID' option (even if the normal TCP/IP mode might be 'Web Download' for instance). The textbox to the right will often be blank at this stage, although it should fill in with the logger's DID value (its MAC address in other words) if a logger is found.

Click the Find button.
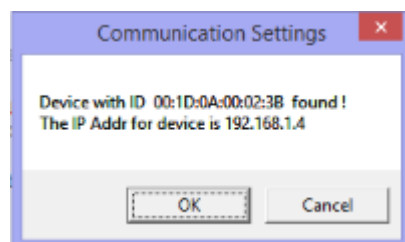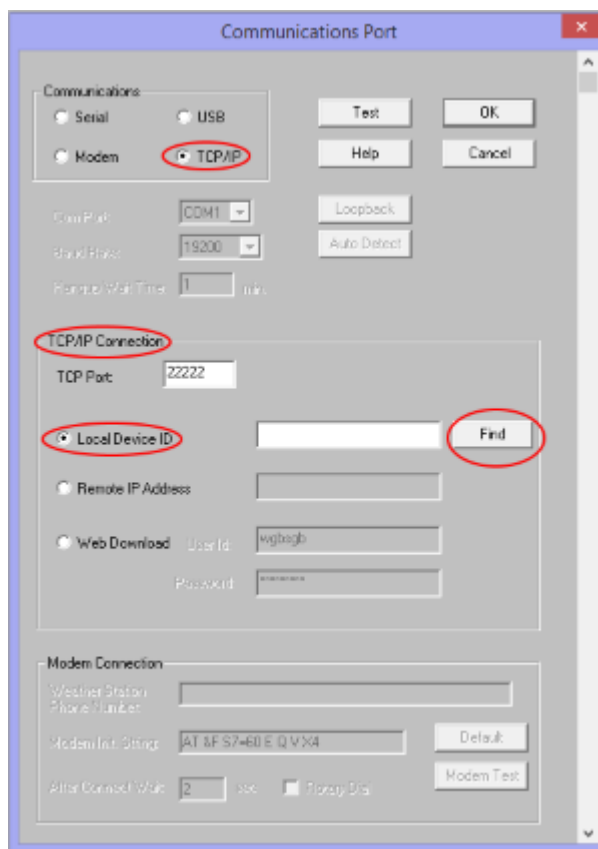
Weatherlink will search the local network and if a WLIP logger can be found then a small message will pop up as shown left, displaying the IP address of the logger, along with its DID/MAC address. Make a careful note of the IP address for future reference. If, however, you see an error message to the effect that no logger can be found then there's clearly a problem with the logger not being functional for some reason and that will have to be followed up.

If WLIP uploads to weatherlink.com are not working but you **can** find the logger with a valid IP address as outlined above then it's worth checking whether the local Weatherlink software can receive data direct from the logger across the local network. We would suggest working as follows:

- Create a new test station in Weatherlink. (Even if you already have a station set up to receive data eg by Web Download, it may well be worth setting up a new station simply to avoid test data potentially getting mixed up with existing data. But remember to switch the station back to your normal station once testing is complete.)

- Configure the new test station to use the 'Local Device ID' setting in the Communications Port dialogue, as above;

- Try running the Bulletin screen (which often takes a couple of minutes to initialise with a WLIP logger) and downloading a block of archive data;

If both Bulletin and archive data are flowing normally then any problems with uploads to weatherlink.com are almost certainly being caused not by the logger but by a failure of the data to flow out on to the Internet at the router – typically this will be a firewall issue that will need sorting out by your local network support.

NB In the uncommon scenario that two or more WLIP loggers are connected to the same network, you will need to repeat the process of pressing the Find button and checking any reported IP against its DID until you find the particular logger of interest.

If you do routinely use the Web Download option, remember to reselect this in the Communications Port dialogue and check that the account credentials are still correct before concluding this troubleshooting process.

Finding the IP address for the WLIP logger

There are actually a number of different ways to establish the IP address of a WLIP logger:

- Use the Weatherlink for Windows software as outlined in the section above;

- Run the WLIP firmware updater (see below);

- Inspect the DHCP table in your router settings, which (depending on the router model) may allow you to see the assigned IP address directly. Look for an entry termed something like 'View attached devices';

- Run a simple network scanner such as AngryIP;

Updating the WLIP firmware

Updates to the WLIP firmware are released from time to time. The current version (May 2015) is v1.1.1.

Often the updates are relatively minor and there's not automatically a need to update just because a new version is available. But updates are sometimes important, for example as from May 2015 uploads to weatherlink.com from firmware older than v1.0.8 will stop working and, in general, it does no harm to check the Davis website for updates at regular intervals.The changelog on the Davis website (see link below) usually gives an indication of the significance of each update.

Your IP logger's curernt firmware version can be found in one of three ways:

- (Simplest): Log on to your WLIP logger account at weatherlink.com and look at the 'My Account' tab. In the 'My Device' section towards the bottom you'll find the current 'Firmware Version' line;

- Look at your IP logger's web interface (see next subtopic further below)

- Run the firmware updater (see following notes);

The latest firmware for the WLIP logger can always be downloaded from the support section of the Davis website and specifically from the Weatherlink section at www.davisnet.com/support/weather/downloads/software_frmwr.asp. The download is in the form of an exe file that can be run directly on Windows systems once downloaded.

Running the updater

Running the updater displays the simple dialogue shown right. The updater runs in two stages. First, as it opens, it will automatically look for an IP logger on the local network and, if one is found, the DID and IP address will be displayed. If there are two or more local WLIP loggers then click the Find button until the particular logger of interest (as verified via its DID) is displayed. (IP loggers on remote systems, ie not on the local network, can also be updated. In this case, select the Remote IP Address option, enter the public IP address of the remote logger and press Find to verify that the logger can be seen.)
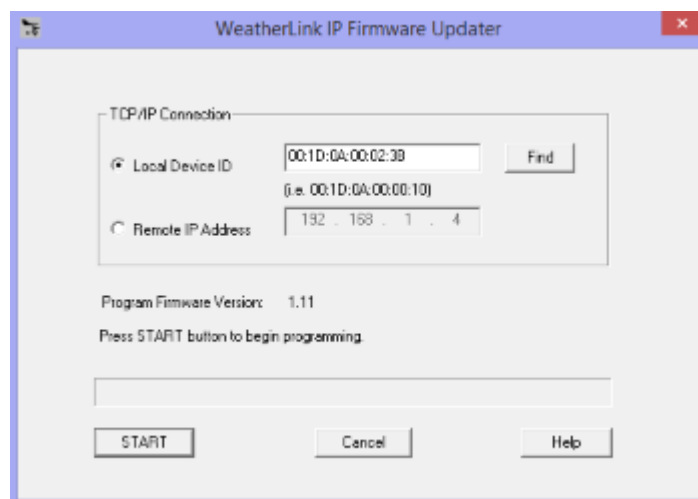
For the second stage, click the Start button.The Firmware Information dialogue box will appear advising you of your current Firmware version. You can choose to proceed with the update or cancel out of the firmware updater. If you do proceed then the latest firmware will download to the logger over the course of a minute or so – as with any firmware update, **do not interrupt this download until it has completed**. When complete you should see a dialogue message advising of a successful update. In the unlikely event that the update was not successful then it may well be worth trying a second time. (NB Once the update has started it will proceed even if the existing firmware version is identical to the 'new' version, but this shouldn't be a problem – it will simply result in a new copy of the same firmware being loaded into the logger.)

The WLIP logger should then restart automatically with the new firmware now active.

For those preferring to view a video, instructions for performing the firmware update are also available on a [Youtube video](#) on the Davis channel..

Viewing the WLIP web interface

It is sometimes overlooked that the WLIP logger does have its own very basic web interface (see right).

You **must** know the IP address of the WLIP logger before this web interface can be called up. (See section above for finding the IP address.) Once known, this IP address can simply be entered into the address bar of any standard web browser (Internet Explorer, Chrome etc) as, for example, http://192.168.1.7 (but obviously replacing the IP address with your own value). This should cause the web interface to be displayed, although it may take some seconds before the logger responds and occasionally it may require one or two further attempts to display the interface.

The purpose of the interface is to provide a means of making very basic changes to the logger's configuration, but it also reports the details of the logger's current configuration, e.g. the current firmware version is shown highlighted at the top.

In practice, most users will hardly, if ever, need to change these settings and our strong advice is **not** even to try playing with the settings – with the wrong values it is easily possible to stop the logger communication at all on the network and the logger is then potentially useless for ever. You have been warned!

But for the rare occasions when some change to the settings may be required, there are two main settings to consider:

- Switching the logger from automatic assignment of IP address (DHCP) to manual assignment. Note that all values in the various network settings will need to be 100% correct before the settings are saved;

- Turning off the automatic uploads to weatherlink.com – see the checkbox to the right of the configuration screen. This setting may occasionally be preferred for maximum reliability if the prime use of the WLIP logger is to feed data across the local network to a computer for local processing and uploads to weatherlink.com are of no interest.

Third-party software

Many users have adopted third-party software such as Cumulus or Weather Display. It is not possible here to provide detailed troubleshooting for anything other than the logger itself and for the Davis Weatherlink software. Each of the third-party programs should have its own support forum and users should look there for support with their specific programs.

For 'difficult' problems it may be necessary to try talking to the logger using the Weatherlink program (ie even if this is not used routinely) because Weatherlink provides access to some settings and checks that most other programs do not implement.

Support forums

Internet support forums will be found at the following web addresses (remember that you will usually need to register as a new user at each forum before you can post your own question):

General

The best general weather web forum is the US-based WXforum. This has many sub-forums each covering specific topics like makes/models of weather station and individual software programs.

Software-specific

- Cumulus – sandaysoft.com/forum/

- Weather Display – www.weather-watch.com/smf/

- MeteoBridge and related products – forum.meteohub.de

WDTU (Envoy8X)

Overview

WDTU is the Weather Data Transfer Utility, which is the Davis Windows software used (only) with the Envoy8X console models. The standard Weatherlink software is totally unsuited to cope with all the extra sensor data that the Envoy8X can potentially see and therefore Davis had to create WDTU to allow for the logging of all sensor data that an Envoy8X unit could conceivably receive.

To be clear, an Envoy8X still needs a standard 6510 USB or serial data logger fitted (as do all standard Envoy units of course) in order to provide an interface to the PC running WDTU. And note that the 6555 WeatherlinkIP logger is not suitable for use with the Envoy8X – again, all the extra sensor data available via an Envoy8X could overwhelm the IP logger.

WDTU is a fundamentally different type of software to the main Weatherlink program in that it provides no built-in features for presenting the data in graphical form (ie as charts or the real-time gauges of the WL Bulletin mode) or for summarising data e.g. as monthly/yearly NOAA reports. Instead WDTU provides only two main features:

- Comprehensive logging of data into an SQL-type database;
- Export of data into either Weatherlink (with limits on allowed sensor combinations as dictated by WL) or Excel for further processing and analysis;

The SQL database manager can be selected from a choice of MS Access or MySQL or MS SQL Server. Of these only an Access database can created directly by WDTU. Use of either MySQL or MS SQL Server requires that the database manager be sourced separately and installed by the user.

The nature of WDTU is weighted more towards providing a comprehensive log or archive of all the sensor data that the Davis wireless protocol could conceivably allow to be collected rather than being a source of real-time data. In practice, it can get reasonably close to logging real-time data with e.g. per-minute updates (or even down to time intervals of 10 seconds) but this is not really its design intent or forte and would result in considerable amounts of largely redundant data being stored.

For processing data or presenting it graphically, other than by export to Excel or by working with subsets of data exported to Weatherlink, then users will need to write or commission additional programs that will e.g. automatically query the SQL database at scheduled intervals and then carry out whatever data analysis or charting activity might be required. This is not necessarily difficult to design in principle but would obviously

require a careful specification of exactly what functionality is required and then the necessary programming skills to create such an add-on program. To a substantial extent, such analysis/charting processes could be carried out in Excel, although some detailed skill in using Excel is likely to be needed for anything more than a simple analysis and the results are perhaps unlikely to be as satisfactory as with a bespoke program.

Troubleshooting tips

This is not the place for detailed advice on how to set up and use WDTU or whichever of the SQL database managers has been selected to partner WDTU – it is assumed that the relevant Help files and documents have been carefully checked and understood. However, the following are some additional pointers on aspects of using WDTU that are not covered by the primary Help:

Logger communications

WDTU requires that the connection from a USB logger be via a Virtual Comm Port (VCP) and not via USBXpress. If you're not sure of the difference then review the [Understanding USB logger modes](#) topic.

Windows compatibility

WDTU is compatible with all recent versions of Windows, including Windows 10. In the case of any unexpected problems, for example following a Windows upgrade, it is a good idea – as ever – to check whether a newer version of WDTU may have been posted by Davis as a free download. Very occasionally a change to the Windows driver model may require an updated USB driver.

Note also that it is always advisable to launch WDTU with the 'Run as Administrator' option selected. This flag can be set always to apply in the Advanced Settings of any WDTU Windows shortcut you may be using to launch WDTU. Alternatively, you can **right** click on the shortcut and select the 'Run as Administrator' option from the dropdown menu. (This is probably needed because with each new version of Windows Microsoft seem to be tightening up the security required for communication between programs – 'Run as Administrator' overrides some of these security hurdles and allows data to pass between WDTU itself and whichever SQL database manager is in use. If this option is not used then seemingly unrelated error messages may be seen.)

Older Davis stations

This topic covers issues with older Davis stations, primarily original Vantage Pro (what are now referred to as VP1 stations to distinguish them from the current VP2 models) and the prior generation of Weather Monitor II and Weather Wizard III stations. There is also a note on the initial VP2 stations of 2004 and 2005 vintage.

All of these models are likely to be *at least* ten years old now and so relatively few will be in active operation still. So here are just a few notes on these older stations, covered in the subheads below:

Initial VP2 models (2004 and 2005 manufacture)

The VP2 model was first released in late 2004 and was subject to an important revision in 2006 when digital T/H sensors were introduced (and certain console hardware changes were made). The [main VP2 T/H topic](#) has details about the specification and replacement of the digital T/H sensors.

But digital T/H sensors **cannot** be used on most pre-2006 VP2 models (identifiable bythe Mfg Code starting A4 or A5), which were fitted with the older analogue T/H sensor assemblies. Davis do have a policy of maintaining a supply of spare parts for at least 5 years after a part/model is superseded and this policy was certainly adhered to for the analogue sensors. But the supply of these sensors eventually became completely exhausted and no new parts could be manufactured. So regrettably anyone with a VP2 station of 2004/5 vintage will be unable to source a new sensor (other than eg from eBay). The only answer is to buy a complete new SIM board and modern digital T/H sensor, which will of course be mutually compatible. This isn't necessarily the wisest course of action since the cost of SIM board plus T/H sensor is significant. It is arguably more cost-effective to buy a complete new ISS rather than to fit new parts to an ISS which is 11-12 years old and which will almost certainly have other components approaching the end of their service life.

Note: Some VP2 systems produced towards the end of 2005 are in fact compatible with digital T/H sensors, despite the official changeover date being 1/1/2006. Apparently these can be identified by a small round sticker on one of the SIM board chips bearing a hand-written 'v1.6' – probably denoting the ISS firmware revision.

Compatibility of VP1 and VP2 models

VP1 and VP2 stations use a significantly different data protocol from each other to communicate between sensor transmitter (ISS) and console and as a result **it is not possible to intermix VP1 and VP2 consoles and sensor transmitters**. In other words you cannot use a VP1 console with a VP2 ISS or vice versa. This

is true of both cabled and wireless models (because the cabled models still used a similar data protocol to the wireless models).

Weatherlink data loggers originally bought for a VP1 station cannot be used with a **new** VP2 station. This is not related to VP1/VP2 differences, but to the fact that VP2 stations manufactured since early 2013 require a logger with an updated specification – see the logger compatibility topic for further details.(VP1 loggers can be used successfully with pre-2013 VP2 consoles, but this situation typically won't be relevant to VP1 users looking to upgrade to a new VP2 station). However, new Weatherlink loggers can be used with a VP1 station without problems. NB Data loggers for the older Weather Monitor II and Wizard III stations were of a completely different design and cannot be used with either VP1 or VP2 stations.

New parts for VP1 and older stations

Brand new mains station components (eg console and ISS units) are simply no longer available from dealers – in the main, stocks were exhausted several years ago, although it may still be worth asking a larger and well-established dealer because they may still have the odd component as part of their residual stock. Occasionally components may still turn up on eBay and similar sites, but will typically be in used condition and therefore of unknown reliability. Some replacement spare parts and repairs to units may still be available – see below for details.

Replacement sensors for VP1 and older stations

The one sensor that you'll find it virtually impossible to source new now is the temperature/humidity sensor for VP1 and older stations. (VP1 and WMII parts were distinct parts but share the problem of unavailability.) Manufacture of these parts ended several years ago and stocks at Davis and at dealers have long since been exhausted. Note that it is still possible to replace the temp/hum sensor with a simple temperature sensor, which is still available – obviously the humidity and dew point readings will be lost, but it may be a way of prolonging the life of an elderly system.

Other standard sensors (except for the pressure sensor, which is on the console main board) are still readily available. The 6410 VP2 anemometer is fully compatible with VP1 and older stations. A defective rain gauge can be repaired either by replacing the reed switch or by substituting a separate 7852 standalone rain gauge (or its new equivalent, the 7857 pole-mounting rain gauge). And the VP2 6450 solar and 6490UV sensors are both fully compatible with the VP1 station.

Replacement transmitter parts for VP1 and older stations

Replacement transmitter boards may still be available in principle, but they will be relatively costly and dealers may be reluctant to source them in practice. Few dealers will maintain stocks nowadays because of

absolutely minimal demand and sourcing a replacement board up the supply chain may be a long and fraught process.

Console repairs for VP1 and older stations

The situation here is similar to that for replacement transmitter parts – it's not impossible that parts may be available or that repairs could be done, but the uncertainty and cost and time taken in sourcing parts might make attempting the repair seriously unattractive. If such a repair is needed then the likely conclusion is that the station is beyond practical or economic repair.

MeteoBridge & related products

Meteo products

MeteoBridge is a tiny, self-contained computer able to process data from any of the Davis stations using a data feed from one of the Weatherlink loggers. MeteoBridge is a product of **Smartbedded** and is one of the family of software and hardware products whose names all start with 'Meteo' and which also include MeteoStick, MeteoHub and MeteoPlug.

This knowledgebase topic covers just two of the products: MeteoBridge and MeteoStick, which is dealt with as a separate subtopic. Refer to the main Smartbedded site for any issues relating to MeteoHub or MeteoPlug.

MeteoBridge

Primary support for MeteoBridge is provided by the creator of the MB software in two main ways:

- Detailed instructions for setting up and using MeteoBridge can be found at the MeteoBridge home page;
- Any further questions can be asked on the MeteoBridge forum . The author is usually able to answer questions there within a day or so;

All support requests for MeteoBridge should be directed to one of the two resources noted above, But some further notes on MeteoBridge are included below covering some issues that can crop up when setting up an MB unit for the first time. But you must refer to the wiki notes for information about how to configure uploads to weather networks, how to use Push Services etc.

Important: MeteoBridge is actually a software product but is sold by Prodata already programmed on to a tiny host computer (a TP-Link MR-3020) and so is supplied as a turnkey product. You do NOT need to flash the firmware – this step of flashing and licensing the program has already been done and paid for – and you are ready to proceed with setting up the the MB unit to talk to your own local network and then to configure the unit to upload to the weather servers and networks of your choice.

MeteoBridge Setup

MeteoBridge FAQs

MeteoBridge support

Primary support for MeteoBridge is provided by the creator of the MB software in two main ways:

- Detailed instructions for setting up and using MeteoBridge can be found at the [MeteoBridge home page](#);
- Any further questions can be asked on the [MeteoBridge forum](#) . The author is usually able to answer questions there within a day or so;

All support requests for MeteoBridge should be directed to one of the two resources noted above, But some further notes on MeteoBridge are included below covering some issues that can crop up when setting up an MB unit for the first time. But you will need to refer to the wiki notes for more advanced information about how to configure uploads to weather networks, how to use Push Services etc.

If you're having problems getting a brand new MeteoBridge unit **supplied by us** to work correctly then please review the support resources provided here in the first place. If you cannot resolve these problems then please contact us.

Understanding MeteoBridge

✳ MeteoBridge is actually a software product but is sold by Prodata already programmed on to a tiny host computer (a TP-Link MR-3020) and so is supplied as a turnkey product. You do NOT need to flash the firmware again – this step of flashing and licensing the program has already been done and paid for – and you are ready to proceed with setting up the the MB unit to talk to your own local network and then to configure the unit to upload to the weather servers and networks of your choice.

Using the MeteoBridge WiFi network connection

The simplest way of using MeteoBridge is via a **cabled** connection direct to a router or network access point. But if you do wish to use a WiFi connection then please read on. Setting up the WiFi connection should need to be done only once (unless of course your local WiFi parameters change) but must be done very carefully so please take your time over this step.

IMPORTANT: MeteoBridge must be connected via a cabled connection to a network for initial configuration. **WiFi will not work out of the box** and until it has been configured manually via a cabled connection. This requires connecting to the web interface of the MB unit from another computer on the network, as described in the MB documentation at www.meteobridge.com/wiki/index.php/Getting_Started and in the 'First Login' section. (**Flashing the firmware is NOT required** – this has already been done for you.)

On the **Setup Network** tab of the MB web interface, the Wifi network option can be selected and the WiFi parameters for your particular local network can be entered. As with all WiFi networks, these parameters must be entered fully and with 100% accuracy. Errors in entering these parameters is the commonest reason for the WiFi access not working so please take great care with this step. **Remember also to save the new parameters you have entered.**

To activate WiFi mode, the MB unit must be fully rebooted. The simplest option when you have finished entering all the WiFi configuration parameters is to press the **Save and Apply and Reboot** button on the 'Setup Network' tab. If you forget to both save and to reboot then your settings cannot become active and your WiFi connection will not work.

Be aware that the MB unit cannot work on both cabled and WiFi connections at the same time. So if you're switching to WiFi operation then disconnect the cabled connection when rebooting the unit.

When the unit has rebooted it may then take up to eg 5 minutes to establish the WiFi connection and to reconfigure itself. If you cannot in fact re-establish a connection to the web interface of the MB unit then the chances are that an error has been made entering the WiFi parameters. To recover from this situation you will need to return the MB unit to default settings (see this topic in the MB forum FAQ) and try to reconnect to it via a cabled connection before trying again to enter the correct WiFi parameters.

Updating MeteoBridge

The MeteoBridge software is designed such that each time its host device reboots then the unit will download a fresh copy of the latest version of MeteoBridge. (MeteoBridge is designed to run continuously 24/7 and so rebooting only happens occasionally after e.g. a power outage or deliberate manual rebooting.) Therefore, all that is required to update an MB unit is to power it down fully, wait a short while and then repower the unit.The MB unit will download fresh software, reconfigure itself and then restart automatically. This process takes a couple of minutes to happen, but once completed MB will be up and running again using the latest software and processing weather data as per its previous configuration.

MeteoStick

Updating MeteoStick firmware

The latest MS firmware is currently v2.2 (as of May 2015).

MeteoStick is a relatively mature product and it will rarely be necessary to update the firmware on a MS unit. In general, if a new feature is added to MS, it will be to allow operation in new territories or to provide compatibility with newly-launched weather station models. Typically, MS will already be fully compatible with your existing system (or you would not have bought it in the first place) and so updating the firmware is unlikely to be needed.

However, if you do wish to update the MS firmware then the procedure is as follows:

If you are running MS in combination with either a MeteoBridge hardware unit or a computer running the MeteoHub software then either of these platforms provides a simple feature for updating the firmware. All that is required is to issue the following command from a PC on the same network as the MeteoBridge or MeteoHub unit:

http://IP-of-your-MB-or-MH/cgi-bin/stickupdate.cgi

(Where 'IP-of-your-MB-or-MH' is not meant to be entered literally but to be replaced by the IP address of your MB or MH unit so *for example* the command could become **http://192.168.1.55/cgi-bin/stickupdate.cgi** but obviously with the 192.168.1.55 being replaced by the MB/MH IP address on your particular network.)

The 'stickupdate.cgi' script will then download the latest available MS firmware and upload it into the MS unit.

If you don't use MB or MH, but have the MS unit connected directly to a computer running your own program to consume the MS data then updating the firmware is still possible but is a more involved process. The firmware itself can be downloaded as the file www.smartbedded.com/files/meteostick.hex. The firmware can be installed in the MS unit by using the Linux avrdude toolset or equivalent Windows tools that can upload arduino binaries. If you're unsure about the exact procedure here, it's probably best to ask on on the MeteoStick forum at: http://forum.meteohub.de/viewforum.php?f=59 .

Meteobridge Pro Red

> ✳ This topic deals specifically with the Pro Red version of Meteobridge. For more general information about contacting Smartbedded and about the standard Meteobridge unit, please see the introductory Meteobridge topic.

MeteoBridge support

Primary support for MeteoBridge is provided by the creator of the MB software in two main ways:

- Detailed instructions for setting up and using MeteoBridge can be found in the wiki at the MeteoBridge home page . Please be sure to look specifically at the MB Pro sections of the wiki;
- Any further questions can be asked on the MeteoBridge forum . The author is usually able to answer questions there within a day or so;

All support requests for MeteoBridge should be directed to one of the two resources noted above, But some further notes on MeteoBridge will soon be included below covering some issues that can crop up when setting up an MB unit for the first time. But you will need to refer to the wiki notes for more advanced information about how to configure uploads to weather networks, how to use Push Services etc.

If you're having problems getting a brand new MeteoBridge unit supplied by us to work correctly then please review the support resources provided here in the first place. If you cannot resolve these problems then please contact us.

Allowing remote access to an MB Pro unit

If there is an unusual issue that cannot easily be fixed via email contact then Meteobridge support may request remote access to your MB Pro unit. Please refer to the Remote Access topic in the Meteobridge forums for details of how this can be set up. But in brief the steps are:

1. Locate the Security area on the System tab of the MB Pro web interface;

2. Ensure that the checkbox against the setting that says 'Allow login from the Internet via this URL' is ticked;

3. Click on the 'This URL' link and copy/note the link that is returned. This will look something like: https://admin.meteobridge.com/77c3a8df2b04c89d4d74a043268d54a8 ;

4. Send a copy of this link and the password for your MB Pro unit to Meteobridge support on request;

5. This option need only remain ticked for as long as troubleshooting is actively under way;