Command Reference Guide

will'tek

8300 Series Griffin Fast Measurement Receiver

Command reference guide
Firmware version 1.12

boosting wireless efficiency

WARRANTY

HARDWARE: Willtek Communications warrants its hardware products to be free from defects in workmanship and materials, under normal use and service, for one year from the date of purchase from Willtek or its authorized agent. Willtek certifies that all instruments are tested and inspected to comply with the published specifications originating from the company.

If a product does not operate as warranted during the warranty period, Willtek shall, at its option, repair the defective product or part (except batteries), deliver an equivalent product or part to replace the defective item, or refund the purchase price paid for the defective product. Transportation of the defective product or part to the factory or service centre is to be prepaid by the customer. All products that are replaced will become the property of Willtek. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

SOFTWARE: Willtek warrants that the software programs licensed from it will perform in substantial conformance to the program specifications for a period of one year from the date of purchase from Willtek or its authorized agent. Willtek warrants the magnetic media containing software against failure during the warranty period. Sole obligation hereunder shall be (at Willtek discretion) to refund the purchase price paid for any defective software products, or to replace any defective media with software which substantially conforms to applicable published specifications. Willtek makes no warranty that its software products will work in combination with any hardware or applications software products provided by third parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected. Willtek will make reasonable efforts to provide compatibility, except where the noncompatibility is caused by a defect in the third party's product.

All information in this manual is given in good faith. However, Willtek Communications shall not be liable for any loss or damage whatsoever arising from the use of this manual, the product described in it or any errors or omissions in either.

Willtek Communications GmbH
Gutenbergstr. 2 – 4
85737 Ismaning
Germany

Tel: +49 (0)89 99641 0
Fax: +49 (0)89 99641 440
eMail: info@willtek.com

CONTENTS

INTRODUCTION

Thank you for choosing Willtek Communications and allowing us to support your measurement needs.

The Griffin range of receivers from Willtek Communications are rugged, portable instruments designed for high-performance and ease of use. The receivers use a PC to provide the all of the usual receiver controls as well as a range of advanced display formats. These are provided by a software package, known as the Griffin Front Panel Software, which must be loaded onto a PC before you can use the Griffin.

Thanks again for choosing Willtek Communications products. We think that you will find your Griffin a pleasure to use and an exciting addition to your portfolio of instruments.

ABOUT THIS MANUAL

This manual covers the protocol operating between the 8301/8302 Griffin hardware and the Griffin Front Panel Software.

A companion document covering the operation of the receiver and the Griffin Front Panel Software is available from Willtek as document number M 290 005.

The 8301/8302 Griffin receiver is conceived as having a 'soft' front panel supplied by software on a PC. Accordingly the link between the 8301/8302 Griffin and the PC is, effectively, internal to the receiver. It has been designed for efficiency in that application rather for ease of use by third parties. To use the link you must be willing and able to understand the Engineering issues involved and to tackle the problems that will arise. Willtek will provide support where you believe that the Griffin is not behaving in accordance with this manual, but Willtek is not able to offer support in other circumstances.

Contacting Willtek

If you have any problems using the receiver you can contact Willtek either directly or via one of our representatives and we will do our best to help you. Our address and contact details are:

Willtek Communications
Gutenbergstr. 2 – 4
85737 Ismaning
Germany

Phone: +49 (0)89 99641 311
Fax: +49 (0)89 99641 440
Email: customer.support@willtek.com
www.willtek.com

Troubleshooting

Before you call Willtek, be sure to check the Willtek web site for a solution to your problem.

COMMAND SPECIFICATIONS

OPERATING COMMANDS

Command Formats

Commands and parameters will be sent as upper or lower case ASCII character strings structured as follows:

XXX=P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, Pn....<CR>

Where **XXX** is the command which is separated from its parameters by an = sign and **P1...Pn** are parameters. The parameters are separated by commas and the command string is terminated by a carriage return.

There can be more than one command on a line, each terminated by a semicolon character.

A parameter can be enclosed in quotes ". The part in quotes will not be converted to uppercase characters and any semicolons included between the quotes will be ignored.

The type of parameter will vary with the specific commands.

The formats of the commands and their responses are always in ASCII whether the data is being reported in ASCII or binary mode.

There is no protection against a parameter being too long and, if one is used, it will stop the Griffin.

Timing

When the Griffin is outputting data over the RS-232 link at high baud rates it cannot also accept commands at high baud rates. It is recommended that the individual characters of the commands are sent to the Griffin one at a time with a short gap between them. This is only really necessary for those commands that are used whilst the Griffin is outputting data such as DSI and TSS but will not adversely affect others.

Responses to Commands

Responses will be ACK or NAK (Acknowledge or Negative Acknowledge) ACK is sent as the letter A and NAK as the letter N.

ACK

When an ACK is returned the general format is

kAaaa<cr>

Where the aaa is replaced by the three-character command code and may, with some commands, be followed by additional characters. The whole ACK is terminated by a carriage-return.

NAK

When a NAK is returned the general format is

kNaaaxx<cr>.

Where N is the character for NAK, aaa is replaced by the three-character command code that is being NAKed, and xx is a two-digit reason code.

kNAKXXX06<cr> will be returned if an RS-232 parity error or over-run error is detected in the characters that make up the command and its parameters.

A NAK followed by the first three characters will also be sent in response to an unrecognized command or a command with invalid or the wrong number of parameters.

If the Griffin receives a command line that does not start with a valid three-character command code followed by an equals character (=) or a carriage-return, it will be NAK'ed. The precise format of the Nak response will depend on the line received. In general the format will be kNxxxxx04<cr>, where the xxxxx is replaced by the characters received. For example the incorrect command FRED<cr> would receive the response kNFRED04<cr>. If the incorrect line has one character or no character followed by a <cr> the response is kNx<cr>04<cr>.

The reason codes are as follows:

Code	Meaning
01	First parameter invalid
02	Command no longer used
03	Out of sequence command
04	Unrecognized command
05	Wrong number of parameters
06	Parity error – no longer used
07	Over-run error – no longer used
08	Invalid frequency band
09	Second parameter invalid
10	Third parameter invalid
11	Fourth parameter invalid
12	Fifth parameter invalid
13	RSC_FAILURE
14	FLASH tables corrupted. This is used to block operation of the Griffin with corrupt tables, which would lead to incorrect results.
15-19	Not used
20	General failure response
21	*FAIL_STE_SEQUENCE
22	*FAIL_STE_IMPOSSIBLE
23	*FAIL_DCT_INVALIDTABLE
24	*FAIL_DCT_NOTFINISHED
25	*FAIL_FLASH_COMP
26	*FAIL_FLASH_CHKSUM

Code	Meaning
27	*FAIL_FLASH_FAKE
28-30	Not used
31	Autocorrect: Wrong frequencies
32	Autocorrect: Could not find a clear RF frequency
33	Autocorrect: Failure measuring 200kHz IF filter
34	Autocorrect: Failure measuring 15kHz IF filter
35	Autocorrect: Failure measuring IF amplifier
36	Autocorrect: Failure measuring first IF filter
37	Autocorrect: Failure measuring attenuators

Error Numbers

Error 14 is used to NAK some commands if the flash tables are corrupted. This is used to block operation of the Griffin with corrupt tables which would lead to incorrect results.

Items marked with a star * are responses to factory commands and should never be seen in normal use.

No Response

The receiver does not guarantee to respond to a command. There are four main situations where there would be no response to a command.

If the carriage return terminating a command is corrupted (for example by parity errors on an RS-232 link) there would be no immediate response to the command. In this case the corrupted characters would form part of the next command which would receive a NAK with a code of 06.

If the buffer in the receiver is full. In this situation the response to the command would be discarded although the command would have been acted upon. The buffer being full will be communicated to the PC via a 'pz' message, although this is only visible to the PC once the buffer is emptied.

Over Ethernet could be delays and lost packets.

The RS-232 link is halted by an XOFF from the PC.

It is recommended that a timeout is implemented to protect against the situation where an ACK or NAK is not sent by the receiver.

Synchronization on Command Input

The Griffin is only able to handle one command at a time so the PC must not send another command until it receives an ACK or NAK or after a timeout. Most commands respond very quickly, but some, such as the ACU command, can take up to 20 seconds to respond. The response to a command could also be delayed, for example, if the buffer is full the command response will have to work its way through the buffer. At 9600 baud it could take 65 seconds.

Power-Down

When battery-powered, should both batteries in the Griffin run low (about 15 minutes left) it will issue a 'pl' message and then, if they both run out completely it will try to issue a 'pq' message. The 'pq' will not always be output as the battery might fail before it is transmitted.

RS-232 Communications Errors

If the Griffin detects errors on the RS-232 communications link it responds with one of the following messages, and perhaps also an ACK or NAK.

'pcp' for a parity error.

'pco' for an over-run error.

'pcb' for both parity and over-run errors at the same time.

The Griffin will ignore the error and continue to try process the input data.

General Commands

General Reset Request

GRR

This will clear all of the settings programmed into the Griffin by the PC to their power-up state. All settings will have to be resent to the receiver after this command.

Any corrections that have been measured by the ACU command will be retained.

Response ACK (ACK will be on command completion in this instance).

Reset Griffin Totally

RST

This will clear all of the settings in the receiver down to their power-up state and force all of the hardware to be reset. All settings will have to be resent to the receiver after this command. Any corrections measured by the ACU command will be lost and the reference corrections will be used instead.

The response to this command will be the Power-Up Self Test message (pu followed by 12 hex characters). There will never be an ACK, but, if the RST command was not recognized there would be a NAK.

Port Wake Up

PWU

This is a command that can be used to check communications with the receiver. It is not necessary to use it.

Note: In a future release, During the first minute after power-on the receiver 'listens' on both RS-232 and Ethernet. This command can be used to make the receiver select one or the other port.

Response ACK.

Set Baud Rate

SBR=P1, P2

Sets the baud rate on the RS-232 link.

P1 is one of:

57600

38400

28800

14400

19200

9600

4800

2400

P2 is either 'O' for odd parity, 'E' for even parity or 'N' for no parity.

Response ACK (or NAK if either P1 or P2 are invalid).

The ACK or NAK message is sent at the original baud rate and parity. The baud rate and parity will change after the next RST command or a power-down, power-up sequence in the receiver.

If the response is NAK then the baud rate or parity settings will not be changed.

In a new receiver the baud rate will default to 9600 with no parity.

Put Asset Number

PAN=P1, P2

P1 is the Asset Number from 1 to 40 characters.

P2 is the Department Name from 1 to 40 characters.

These are general-purpose strings that can be used for any information but are identified as asset number and department name in the unit Information output by the GUI command. They are stored in the flash memory in the Griffin.

The data must be readable ASCII characters and should avoid punctuation. It will be converted to uppercase unless it is in quotes.

Time

TIM

Polls the time counter in the receiver.

Response kATIMHhHhHhHh where Hh represent eight hex digits representing the approximate number of seconds since the receiver was switched on. This has no direct connection with the time counters used by the triggering and sampling commands.

VER Command

VER

Returns the version number for the comms processor and sampling processor firmware in a human-readable form.

Get Unit Information

GUI

Returns the unit information as stored in the receiver as a total of 1030 characters comprising the 'kAGUI', the 1024 data bytes and the final carriage-return.

Always returns 1024 bytes even if these have not been recorded. Unused bytes will be set to the ASCII space character.

See PUI above.

Response ACK followed by the unit information as 1024 characters terminated by a CR. Never returns NAK.

Download Status Information

DSI<CR>

Response ACK followed by the status information as 16 hexadecimal characters, never NAK.

See later in the document for the full status definition.

Send Synch Message

SSM

Causes the Griffin to send a synchronization message to the PC. See under data link below.

Response is a synchronization message, not an ACK or NAK.

Measuring Commands

Set Noise Filter Bandwidth

SFB=P1

This sets the 3 dB bandwidth of the low pass noise-reduction filter preceding the analogue to digital converter.

P1 can be any one of 200, 400, 800, 1600, 3125, 6250, 12500 and 'out'. This selects the corresponding 3 dB bandwidth in Hz.

Note that using this filter increases the amount of time needed to change from one frequency to another and can change the speed at which over-run messages might appear.

Response ACK or NAK if P1 is invalid.

Auto Correct Unit

ACU

This command generates a correction sequence and writes the new correction values to a temporary buffer inside the receiver. They are then used to correct all subsequent measurements made by the receiver.

Response ACK once the correction measurements have completed successfully or NAK if the measurements fail. The error code with the NAK indicates the reason for the failure. This command can take up to 20 seconds to respond.

The PC should not send any commands whilst the autocorrect is in progress.

A GRR will not erase the autocorrect information but a RST will.

The autocorrect cannot be issued whilst measurements are in progress. An ACU should be issued once the receiver has warmed up and immediately before a set of measurements are made. To obtain the best accuracy, if the receiver temperature changes by more than 10°C from that at which the corrections were measured, the ACU should be repeated.

Do Memory Setup

DMS=P1, P2, P3, P4, P5

This command can be used to set any of the 150 memories.

P1 (Memory Number) range is 1 to 150.

P2 (Frequency) is any valid frequency expressed in decimal, units of MHz resolution. Must be 8 digits – xxxx.xxxx, for example 1853.4567.

P3 (Attenuation) is '0', '10', '20', '30', 'S' or 'A'. S puts the receiver into its most Sensitive mode of 0 dB with extra gain switched in. 'A' allows automatic selection of both attenuation and extra gain.

P4 (Bandwidth) is '200' or '15'.

P5 (Measurement) can be any of the following:

- Min|Mean|Max in any combination, for example, MinMax or MeanMax.
- Lxxxx:yyyy (LCR)
- Histo

Response ACK or NAK if any parameter is invalid.

Notes

The number of samples taken per measurement and the number of measurements made on each frequency (memory) are controlled by setting the counters. The actual measurement made will be the one set in the first memory. The same measurement will be made on all frequencies.

The 13 dB amplifier will be switched in or out automatically whatever the setting of the attenuators.

Measurements will start when the Start Memory Cycling command is issued.

When selecting level crossing rate measurements the four digits xxxx following the L but before the colon is the upper threshold and the four digits following the colon are the lower threshold. They are encoded in cBo. The level is considered to have gone below the threshold when it becomes lower than the lower threshold but has not returned above the threshold until it has become higher than the upper threshold (hysteresis).

Note: Autoranging is not available with LCR measurements as it is necessary to use a fixed attenuator to ensure that the threshold level is within the measuring range of the receiver. The attenuator should be set by reference to the following table.

Attenuator	Maximum	Minimum
S	–43dBm	–123dBm
0	–30dBm	–110dBm
10	–20dBm	–100dBm
20	–10dBm	–90dBm
30	0dBm	–80dBm

Start Memory Cycling

SMC=P1, P2

P1 start memory, and P2 stop memory are in the range 1 to 150.

Responses ACK or NAK if P1 or P2 are invalid, or if memories P1 to P2 are not programmed.

Following an ACK data will start streaming out of the receiver in the format that has been preset until it is stopped by a TSS command.

Starts memory cycling. Runs continuously until stopped.

This command should be preceded by correct settings of the counters.

The command SMC= x, x where the two memories are the same has the effect of fixing the frequency. In this mode autoranging can be active but measurements cannot be made without any gap.

Clear Memories All

CMA

Clears all of the memories.

Response ACK, never NAK.

Do Frequency Scanning

DFS=P1, P2, P3, P4, P5, P6

Sets the receiver to scan on up to 12,000 channels, channels will automatically be allocated a number) from 1 to n for result reporting purposes. Scanning will start when a SSS command is issued.

P1 (Start Frequency) and P2 (Stop frequency) are any valid frequencies expressed in decimal, units of MHz with a resolution of 100 Hz. Must be 8 digits – xxxx.xxxx, for example 1853.4567.

P3 (frequency step) is in any valid frequency expressed in decimal, in units of MHz. Must be 8 digits – xxx.xxxx, for example 001.3456. It must be nonzero and the maximum value is 100.0000 MHz.

P4 (attenuator) is '0', '10', '20', '30' 'S' or 'A'.

P5 (bandwidth) is '200' or '15'.

P6 (measurement) can be any of the following:
- Min|Mean|Max in any combination, for example, MinMax or MeanMax.
- Lxxxx:yyyy
- Histo

Response ACK or NAK if any parameter is not valid.

Note that the 13 dB amplifier will be switched in or out automatically whatever the setting of the attenuators. A allows automatic selection of both attenuation and extra gain.S puts the receiver into its most sensitive mode of 0 dB with extra gain switched in.

The number of samples taken per measurement and the number of measurements made on each frequency are controlled by setting the counters.

When selecting level crossing rate measurements the four digits xxxx following the L but before the colon is the upper threshold and the four digits following the colon are the lower threshold. They are encoded in cBo. The level is considered to have gone below the threshold when it becomes lower than the lower threshold but has not returned above the threshold until it has become higher than the upper threshold (hysteresis).

Note: It is advisable to use fixed attenuator settings rather than autoranging to ensure that the level is within the measuring range of the receiver.

(There is a special measurement of P6 = 'Test' that should only be used by Willtek. It returns the sum of the adc readings with no corrections applied.)

Setting the Start and Stop frequencies to be the same will cause the receiver to remain on the first frequency. In this mode the receiver pauses after each set of measurements to 'change frequency'. Autoranging can be active, but measurements cannot be made continuously as there will be interfrequency pauses.

Start System Scanning

SSS

Response ACK, or NAK if the Do Frequency Scanning command has not been issued first.

Starts a scan after clearing the counters and runs continuously until stopped.

This command should be preceded by correct settings of the counters.

Following the ACK data will start streaming out of the receiver in the format that has been preset until it is stopped by a TSS command.

Terminate System Immediately

TSI

Stops any measurements in progress and empties the data in the buffer.

Response ACK, or NAK if scanning or cycling is not active.

If there is a message being sent to the PC when the Griffin receives this command it will not be completed. The next characters to be sent to the PC will be the ACK for this command. This situation will need special processing in the PC to recognize that the message has not been completed properly.

When a measurement is in progress and this command is issued, the data for any part-completed measurement will be discarded.

Terminate System Scanning

TSS

Stops any measurements in progress and keeps the data in the buffer.

Response ACK, or NAK if scanning or cycling is not active.

Any messages containing data from completed measurements will still be sent to the PC after this command. The ACK for the command will be put into the data queue after any measurement messages that are already in the queue.

When a measurement is in progress and this command is issued, the data for any part-completed measurement will be discarded.

Configuration Commands

Data Reporting Format

DRF=P1, P2, P3

This command sets the format for the data returned. The actual format will depend on the type of measurement being made. See the data formats section below.

P1 (Binary or ASCII) can be either 'B' or 'A' to select data in binary or ASCII formats.

P2 (Coordinate reporting) selects the rate at which coordinates are reported. It can be from zero to three characters. The meanings of each character are as follows:

Character	Inserts the coordinate at
S	The start of a scan or cycle
F	When the frequency is changed
M	When a complete measurement is done.

Thus a P2 of 'SF' would insert the coordinate at the start or every scan and whenever the frequency is changed.

P3 (Attenuator reporting) selects the rate at which the attenuator setting is reported. It can be from zero to three characters. The meanings of each character are as follows:

Bit	Inserts the attenuator at
S	The start of a scan or cycle
F	When the frequency is changed

Thus a P3 of 'F' would insert the attenuator at the whenever the frequency is changed.

Response is ACK or NAK if any parameter is invalid.

Frequency Reference Select

FRS=P1, P1

P1 (Reference Source) is either 'I' to select the built-in reference or 'E' to select the external reference input from the front panel socket.

P1 (Reference Output) is either 'E' or 'D' to enable or disable the output of the internal reference to the front panel socket.

Selecting external reference and output of the internal reference at the same time is invalid.

This command is not effective until a measurement is started.

When an external reference is in use the frequency correction factor stored within the Griffin is not used.

Response ACK or NAK if P1 or P2 are invalid or "E, E".

Enable IF Outputs

EIO=P1

P1 is either 'E' or 'D' to enable or disable the IF outputs.

Response is ACK or NAK if P1 is invalid.

Receiver Operating Mode

ROM=P1

This command is not effective today and should not be used.

P1 is either 'N' or 'S' to select normal or sleep modes. Power consumption is reduced whilst normal operation is disabled. Must be in normal mode for the receiver to work. It takes ten seconds for the receiver to return to operating state after being in sleep mode.

Response is ACK or NAK if P1 is invalid. The ACK is not delayed until the receiver is ready. The PC must time the ten seconds.

Commands for Counter Control

Introduction

The counters must be set to define the measurement pattern. The commands must be sent to the receiver in the following sequence:

1. Do Frequency Scanning or Do Memory Cycling
2. Set Counters Up
3. Start System Scanning

Zero Coordinate Counter

ZCC

Clears the coordinate counter to zero. This command is intended to be used to calibrate the distance or auxiliary pulse counter inputs. It clears the counter which can later be read with the RCC command so allowing the number of coordinate counts to be calculated.

The Distance or Auxiliary input must be selected with the EIS command and the distance predivider must be set with the CDP command before issuing SDC.

Response ACK, never NAK.

Read Coordinate Counter

RCC

Response kAhHhHhHhH where the hs are the number of pulses on the coordinate counter as 8 hex characters.

Response ACK, never NAK.

Note that any calculations using the results of the RCC command must make allowance for the predivider setting.

External Input Select

EIS=P1

P1 is 'W' or 'A' to select either Wheel encoder input or Auxiliary pulses input. The auxiliary input replaces the distance input to the counters but does not go through the predivider. Hence parameter P2 of the CDP command has no effect when A is selected with this command.

Response ACK or NAK if P1 is invalid.

Clock Divider Preset

CDP=P1, P2

P1 is the divider value for time predivider in range 50 to 65535 in units of 200 ns.

P2 is the divider value for distance predivider in range 1 to 65535.

The Griffin contains two predividers, one for time and one for distance. This command sets the predividers hence setting the resolution of the other counters. Can also be thought of as setting the sampling rate of the ADC.

Set Trigger Counters

STC=P1, P2, P3, P4

P1 is either D or T to select distance or time pulses for the trigger counters.

P2 is the count value for the counter that controls the interval between frequencies.

P3 is the count value for the counter that defines the interval between the last frequency of one scan or cycle and the first frequency of the next scan or cycle.

P4 is either D or T to select distance or time pulses for the coordinate counter.

Both counters have ranges of 0 to 65535.

Setting a value of 0 for either P2 or P3 has the effect of disabling the triggering for that time and the next measurement will start as soon as the receiver has changed frequency following the preceding measurement. Either or both can be set to 0 independently. For example, setting P2=0 and P3=N could be used to do a quick cycle around several memories every 5 m travelled.

When scanning or cycling on only one frequency, P2 and P3 are used alternately. It is recommended that you set these to be the same to achieve equal trigger spacing.

Set Sampling Counters

SSC=P1, P2, P3

P1 is either D or T to select distance or time pulses for the sampling counters. This has the effect of selecting the source for the ADC sampling pulse.

P2 is the count value for the counter that controls the number of measurements made on a frequency. Range 1 to 255.

P3 is the count value for the counter that controls how many samples are used to make a measurement. Range 1 to 65535.

STATUS REPORTS

DSI COMMAND REPORTS

Status reports will be transmitted in response to DSI commands from the controlling PC. Status will be sent as bit fields packed into hexadecimal characters. These will always be sent as ASCII hex as they are the reply to the DSI command.

The format of the reply will be 16 hexadecimal characters following the usual Ack to the DSI command.

Byte 1, first two hex digits

Battery state information.

Bit	Use
0	Battery A state bit 0
1	Bit 1
2	Bit 2
3	Battery A state bit 3
4	Battery B state bit 0
5	Bit 1
6	Bit 2
7	Battery B state bit 3

The battery state runs from 0 to 15 meaning empty to full. This is a linear scale of battery voltage and, since the battery capacity is not linearly related to the voltage, this is not a linear scale of capacity.

Byte 2, hex digits 3 and 4

Status.

Bit	Use
0	Doing a Minimum, Mean, Maximum
1	Doing an LCR/AFD
2	Doing a Histogram
3	TBD
4	Scanning
5	Cycling
6	
7	

Byte 3, hex digits 5 and 6

Communications status

Bit	Use
0	RS-232 buffer space available bit 0
1	Bit 1
2	Bit 2
3	RS-232 buffer space available bit 3
4	Battery A in use
5	Battery A on charge
6	Battery B in use
7	Battery B on charge

The RS-232 buffer space count shows the amount of space left in the RS-232 buffer in units of 1 kbyte. Thus a value of 0 means between 0 and 1024 bytes available, and a value of 15 means between 15 kb and 16 kb available.

This indicates how well the data link is coping with the volume of data being sent.

If neither battery is in use then the receiver is powered from the DC input.

Byte 4, hex digits 7 and 8

Internal temperature.

Bit	Use
0	Temperature lsb
1	
2	
3	
4	
5	
6	Temperature msb
7	Set means over-temperature

The temperature is given in Celsius offset so that 0 is –20. Normal operating range is –10 to +70C (10 to 90 as offset). This can be used to decide if another autocorrect procedure is needed.

Byte 5, hex digits 9 and 10

Front-end overload detector level.

Bit	Use
0	Front end level bit 0
1	
2	
3	
4	
5	Front end level bit 6
6	Over Low threshold if set
7	Over Upper threshold if set

Reports the total RF power in the front-end of the receiver in a logarithmic scale. Scale is TBD.

Byte 6, hex digits 11 and 12

Measuring Status

Bit	**Use**
0	A trigger occurred before the last measurement was completed.
1	A trigger occurred before the RF had settled after changing frequency.
2	A trigger occurred before the internal data buffer was emptied.
3	The next set of measurements was finished before processing of the internal data buffer was completed.
4	At least one sample was under-range during the last measurement.
5	At least one sample was over-range during the last measurement.
6	The front-end overload threshold was exceeded during the last measurement.
7	TBD

These status bits are set to reflect the state after the last set of measurements was completed, not necessarily the current state.

If any of bits 0 to 3 are set a problem type 'o' message will have been sent to the PC. The character following the 'o' will have been the same as the character in the status information.

The first two bits are most useful when using distance input. They indicate that triggers are arriving too quickly for the receiver to complete a set of measurements and change frequency. This might result from the vehicle travelling too fast or too slowly to be able to make proper measurements. This would happen with a pattern such as 'measure for 5 metres every 20 seconds' if the vehicle's speed was such that it took over 20 seconds to complete the 5 metres.

Bits 3 and 4 indicate that the receiver cannot process the volume of data in the time available. The solutions are to ask for less data (such as only a mean instead of a min and mean and max) or change the sampling and triggering parameters to give the receiver more time.

The status bits are reset once the next set of measurements is completed.

Byte 7, hex digits 13 and 14

Fault warnings.

Bit	Use
0	Over temperature power-down mode if set
1	5V A supply fault if set
2	5V B supply fault if set
3	5V C supply fault if set
4	
5	TBD
6	TBD
7	TBD

Byte 8, hex digits 15 and 16

Bit	Use
0	Attenuator bit 0
1	Attenuator bit 1
2	Amplifier In or Out
3	TBD

The Attenuator in use bits can be interpreted as a number from 0 to 3 meaning an input attenuation from 0 dB to 30 dB. Note that, if the receiver is auto-ranging rapidly, this will not reflect the actual settings in use.

If the amplifier bit is a 1 then the IF amplifier is in use.

Power-up Self Test

The power-up selftest will run when power is applied to the receiver or whenever the RST command is executed. It will make a series of tests and output the results in a 'pu' message. The receiver will then wait for a command from the PC.

Having successfully passed the PUST the receiver will then wait for a command on either the RS-232 or Ethernet port. If none is received within 60 seconds of power-up it will turn off the unused port dependant on the last Active Port Command that was written to flash memory. The default on initial power up will be RS-232.

Test	Fail Code
Comms processor PROM checksum	0001H
Comms processor working RAM	0002H
Comms processor to sampling processor DP RAM test	0004H
Comms processor internal RAM test	0008H
Big gate array test	0010H
Comms processor Ethernet DP RAM test	0020H
Ethernet chip access test	0040H
Sampling processor PROM checksum	0080H
Sampling processor working RAM	0100H
Sampling processor DP RAM test	0200H
Sampling processor internal RAM test	0400H
Small gate array test	0800H
Main ADC test	1000H
Secondary ADC test	2000H
SCF test	4000H
Unable to communicate with the sampling processor	8000H

Test	Fail Code
Synthesizers failed to lock	0001H
Gain error with 0dB, no amp and 200k IF	0002H
Gain error with 10dB, no amp and 200k IF	0004H
Gain error with 20dB, no amp and 200k IF	0008H
Gain error with 30dB, no amp and 200k IF	0010H
Gain error with 10dB, amp on, 200k IF	0020H
Gain error with 10dB, no amp, 15k IF	0040H
TBD	0080H
RF 5 V	0100H
Logic 5V	0200H
Temperature sensor out of range	0400H
Level sensor out of range	0800H
Counters not counting sensibly	1000H
TBD	2000H
Internal tables in Flash not set	4000H
Internal tables in flash corrupted	8000H

Test	Fail Code
RS-232 test	0001H
RS-232 loopback test	0002H
Ethernet chip loopback test	0004H
	0008H
	0010H
	0020H
	0040H
	0080H
	0100H
	0200H
	0400H
	0800H
	1000H
	2000H
	4000H
	8000H

The six bytes will be bit-packed with the above fail codes to Indicate the fault condition. They will be sent as 12 hexadecimal ASCII characters on the RS-232 link.

The fail code will be sent using the 'problem' type as defined in the data formats with a subtype of 'u'.

The failure message will be:

puHhhhHhhhHhhh where each H or h is a hexadecimal digit. It is preceded and followed by a carriage return.

These will be sent as ASCII hex.

OPERATING LIMITATIONS

The Griffin has various limitations on what it can achieve. These are not enforced within the receiver but must be enforced by the controlling software. The reason that the control is in the PC is because the receiver cannot tell if some combinations of settings will not work as they depend on the speed.

AUTORANGING ON ONE FREQUENCY

If autoranging is required whilst measuring on one frequency this can be achieved by programming a scan with the same start and end frequencies. It is not possible to use a single memory. The receiver will then insert an artificial dead time during which it can autorange. The interval between autoranging can be controlled by setting the number of measurements to be made on each frequency. Thus, for example, setting the number of measurements to 200 will result in the Griffin making an autorange decision every 200 measurements. This means that there might be a short gap in the sampling to allow the RF to settle whilst the receiver is autoranging. The duration of the gap will depend on the IF filter bandwidth and the noise filter bandwidth selected.

If interval between samples is greater than the time the RF takes to settle then there will be no gap in the sampling. When the sampling is controlled by time then it is possible to predict whether there will be sufficient time. When the sampling is controlled by distance then the time available will depend on the speed of the vehicle and cannot be predicted accurately.

DATA LINK BANDWIDTHS

The bandwidth of the data link from the Griffin to the PC can vary widely. If the link cannot carry the volume of data that the Griffin is producing then eventually the process will fail.

The Griffin can be programmed to collect data at a constant rate or in bursts. To allow the rate of the bursts to be greater than the average rate of the data link, the Griffin has a large internal buffer of 64k characters. This will fill up whilst measuring during a burst and will empty in the period between bursts of data gathering. If the mean rate of collecting data is greater than the mean rate of the data link then this buffer will eventually fill up. When this happens a 'Problem' message is generated by the Griffin. Whole messages of data will be discarded inside the receiver, but the data gathering process will continue. Although some data will be lost, some will be gathered.

The amount that the buffer has filled can be tested at any time via the DSI command. This indicates the maximum amount of the buffer that has been used since the current measurements were started.

DATA CONTENT

There are controls available in the Griffin to tune the amount of information sent to the PC. In general it is advisable to limit the amount of information to that which is necessary to make best use of the data bandwidth available as well as minimising the volume of data to store on the PC.

Coordinates

The coordinates can be reported with three rates:

- When a scan or cycle is started.
- When the frequency is changed.
- When a new measurement is started.

Any combination of the three is allowed.

This feature is most useful when the trigger counter uses a different source to the coordinate counter (time or distance). When they use the same source then the coordinate of any measurement can be calculated and a single coordinate at the start of a scan or cycle will suffice.

In many instances the most useful setting is when the frequency is changed as then each set of measurements is tagged with a coordinate.

The coordinate uses eight characters or four bytes so can affect significantly the volume of data to be reported.

Attenuator

The attenuator setting can be reported with two rates:

- When a scan or cycle is started.
- When the frequency is changed.

Any combination of the two is allowed.

In most instances there is no need to report the attenuator setting at all as the Griffin does all of the necessary corrections before reporting a measured power. The main reason for reporting the attenuator is to allow a user to make a judgement about the possible impacts of high-level interferers when a particular measurement was made.

The attenuator report uses only one character so does not affect the volume of data to be reported significantly.

DATA FORMAT

Binary or ASCII.

MEASUREMENT REPORTING RATE

The maximum rate that the Griffin can process measurements to report to the PC depends on the measurement chosen.

Minimum/Mean/Maximum or LCR

The maximum rate is 1000 per second, (less if limited by the data link bandwidth). Note that this is a measurement rate rather than a frequency-changing rate. Thus, for example, the Griffin can be programmed to do two mean measurements on each frequency. In this case the two measurements would take 2 ms to process so the Griffin would be able to scan or cycle around 500 frequencies per second. Another example, the Griffin can be programmed to do a min, mean and max on one frequency. This is three measurements and so can be repeated 333 times per second.

Histograms

The maximum rate is 5 complete histograms per second, (less if limited by the data link bandwidth).

Frequency Changing Rate

Depends on IF filter and noise filter bandwidth and measurement time.

Scanning Quickly

The recommended way of setting the Griffin to scan as fast as possible in time is to set the time predivider for a sampling frequency of 100 kHz and to set the sampling counter to give the shortest possible interval between measurements. This interval depends on the IF bandwidth and the Noise Filter bandwidth. Select a measurement mode of Mean with only one sample.

If the settings used result in the Griffin being triggered to take a new measurement before the RF circuits have settled onto the new frequency a 'problem' message will be sent to the PC.

Sampling Rate

The maximum sampling rate available depends on the measurement and the frequency changing mode selected.

OPERATING DISCUSSION

AUTORANGING

The Griffin uses slightly different algorithms to autorange when it is in scanning or cycling modes.

Scanning

In scanning the Griffin accumulates data for the whole of a scan and then decides on the most suitable settings for a subsequent scan. Since the Griffin needs some time to make the decision, there is always a lag of one whole scan in changing the settings. Thus, if a large signal is applied to the Griffin two scans can be seen with an attenuation of 10 dB, two with 20 dB before it settles down to scanning with 30 dB.

Cycling

Two or More Memories

When cycling each memory can specify a different attenuator setting or autorange. The Griffin will gather the data, make the autorange decision and then store the results into the memory until the next time that memory is used. Thus, if a large signal is suddenly applied to the Griffin in the middle of a cycle around ten memories, some of the memories can be seen on different attenuations for the next couple of cycles until they all settle down to 30 dB.

Single Memory

When cycling on only one memory the Griffin behaves as if it is cycling between two identical memories for the purposes of autoranging. There is a lag of one whole cycle in changing the settings. Thus, if a large signal is suddenly applied to the Griffin, two measurements are reported with an attenuation of 10 dB, two with 20 dB before it settles down to cycling with 30 dB.

RESULTS DATA LINK

This section specifies the data link, data formats and results formats. The goal is to make it possible to report every reading taken at a 1kHz rate to the PC.

The two data links are RS-232 and Ethernet. With RS-232 it needs a careful choice of formats to transfer 1000 readings per second to the PC.

LAYERING

The communication uses a three-layer structure:

- Message
- Blocking (dividing large messages into Ethernet blocks)
- Data Link (RS-232 or Ethernet with error detection etc.)

ATTACHING COORDINATES

The Griffin provides high flexibility in the way coordinates are attached to the data items. There are three levels that can be selected. This allows to trade resolution for data rate when using RS-232 and to adjust the precision with which the data is located in time/distance.

The three resolutions are:

1. One coordinate at the start of a cycle round memories or start of a frequency scan.
2. One coordinate when the frequency is changed. (Thus, if the Gather Data process involves repeated measurements, all of these will be attached to the one coordinate.)
3. One count with every complete MmM, LCR or histogram measurement.

These are independent, thus any combination of 1, 2 and 3 can be used.

These are controlled via the DRF command.

There is a special message to send the coordinate at the start of a cycle/scan as in (1). The others are sent within measurement result messages.

Attaching Attenuator Setting

The PC cannot deduce the setting used for any particular measurement as it might be set based on broadband input power level rather than on on-channel measured level. To allow the attenuation to be visible the Griffin reports the attenuator setting in various messages as selected by the user. In addition, it would be included in the start of scan and start of cycle ones.

The two resolutions are:

1. At the start of a cycle round memories or start of a frequency scan.
2. When the frequency is changed. (Thus, if the Gather Data process involves repeated measurements, all of these will be covered by one setting.)

There is a special message to send the attenuator at the start of a cycle/scan as in (1). The others are sent within measurement result messages.

Atten values are 0, 1, 2, 3 meaning 0 to 30 dB respectively.

Measured dB Value

The results are encoded in offset-dB values to reduce the number of characters to send. Taking –174.0 dBm as the lowest value this would be encoded as 0. Values above this encode as the number of centi-bels above –174. Thus –80.0 dBm becomes (–80.0 + 174.0) x 10 = 940 cBo, where cBo stands for centi-bels offset.

The range of the receiver is 490 cBo (–125 dBm) to 1740 cBo (0 dBm). This range can be contained in 11 bits. In ASCII mode this is represented as three hex digits and in binary mode as two bytes (16 bits), with the top 4 bits the same as bit 11 (all one or all zero).

The top bit (bit 11) is considered as a sign bit so negative numbers can be sent.

To indicate invalid readings the Griffin sends a negative number.

A value of –1 means under-range, –2 means over-range, -4 means receiver front-end overload. Any combination of these values might be seen as, for example during a mean measurement, it is possible for some samples to be over-range, some under-range and the receiver to be overloaded.

Message Layer

There are several types of message to send.

In the following formats an item in lines |such| is optional. An item in braces <> or in curly brackets {} is repeated.

Note that the commas are not included in the data; they are solely for layout in this document.

The same type values are to be used in ASCII and binary formats.

Histogram

h |coordinateA| |Atten| |coordinateB| Overload FirstBincBo 82<value>

Type is lowercase h.

The 'Overload' flag is a single character to indicate if an overload occurred during the histogram gathering. 1=> overloaded, 0=> not overloaded. The 'FirstBincBo' is the level of the first bin of the histogram in cBo. This will be the lowest level. The format is the same as for a decibel value for the MLCR as below. The level will depend on the receiver settings. The next 80 values are the counts, one per dB above the first. The last two values are the under and over-range counts respectively. Each value is an unsigned 16-bit number.

The A coordinate will be inserted in the measurement message when the frequency is changed only if selected by the DRF command. The coordinate is recorded at the start of the first measurement on the frequency.

The B coordinate will be inserted in the measurement message at the start of each measurement only if selected by the DRF command.

MmM

m |coordinateA| Atten| |N{ |coordinateB| 1..3<Value> }

Type is lowercase m.

Where N is in the range 1 to 255. (The N is not returned, it indicates N repetitions of the count.

Each Value is either the max, min, mean in dBo, or special values indicating that the results are not valid. The min, mean and max will always be in that order. Fields not requested will be omitted.

The A coordinate will be inserted in the measurement message when the frequency is changed only if selected by the DRF command. The coordinate is recorded at the start of the first measurement on the frequency.

The B coordinates will be inserted in the measurement message at the start of each measurement only if selected by the DRF command.

LCR

r |coordinateA| |Atten| N{ |coordinateB| Overload LCR AFD}

Type is lowercase r.

The 'overload' flag is a single character to indicate if an overload occurred during the LCR/AFD gathering. 1=> overloaded, 0=> not overloaded.

Where N is in the range 1 to 255. (The N is not returned, it indicates N repetitions of the count.

Each pair of values are the LCR and AFD or special values indicating that the results are not valid.

Note that LCR and AFD are 16-bit unsigned count values. The LCR is the count of the number of times the signal crossed a threshold (given in the command). The AFD is the number of counts during which the signal was below the threshold.

The A coordinate will be inserted in the measurement message when the frequency is changed only if selected by the DRF command. The coordinate is recorded at the start of the first measurement on the frequency.

The B coordinates will be inserted in the measurement message at the start of each measurement only if selected by the DRF command.

Scan or Cycle Start

This message is used to mark the start of a new scan or cycle and can also carry the coordinate or atten setting. It should always be sent, even if there is no coordinate or atten data to be carried.

y |coordinate| |Atten|

Type is lowercase y.

Problem

This message is used to flag any problem to the PC. It should be used to flag 'Over-Run', going too fast etc.

Type Subtype | Other characters defined by each subtype |

Type is lowercase p.

Power-up self test – u

This is the subtype to indicate the results of the power-up self test. The subtype identifier is also lowercase u. This is followed by 12 hexadecimal characters as specified in this document. Exceptionally this message is preceded by a carriage return.

Communications buffer full – z

Communications Buffer Full subtype is lowercase z.

See 'Blocking' below for its use.

Sampling overrun – o

A subtype of o (lowercase letter O) will be used for over-run in the sampling arena. It will be followed by one hexadecimal character. This is a bit field and might contain any combination of bits.

Bit 0 set indicates that a trigger occurred before the last measurement was completed. This can happen if the number of samples is set to be greater than the number of pulses between triggers.

Bit 1 set indicates that the RF had not settled after changing frequency or attenuation before the trigger occurred. This can happen if driving too fast whilst doing distance-triggered measurements.

Bit 2 set indicates that the internal data buffer was not emptied before the next measurement was completed. This can happen if the sampling and triggering settings are such that the receiver is trying to do more than 1000 measurements per second.

Bit 3 set indicates that the internal data buffer was not emptied before the next measurement was completed.

Synthesizers out of lock – s

If the synthesizers fall out of lock a problem message with a subtype of lowercase s will be sent. (This is not implemented today).

Debug Message – m

There are at present some debug messages which come out as 'pm' followed by a string and then a carriage return. Each string is a fixed length of 80 chars followed by a carriage-return.

Debug Message – n

If the firmware attempts to output a string with no characters in it then the message pn is output instead.

Battery warnings – l and q

The Griffin will issue a 'pl' (lowercase L) when both batteries are low on power and a 'pq' when they are both out of power. These messages are only given if battery powered. The pl is issued when there are about 15 minutes of power left.

Over-temperature shutdown – t

If the Griffin internal temperature reaches damaging levels it will turn itself off after issuing a 'pt'.

Echo

This message is used to echo an ACK (perhaps with parameters) or NAK from a command.

k 'N' or 'A' | N<character> |

Type is lowercase k.

When a NAK is returned the 'N' will be followed by the command characters and two decimal digits to identify the problem. The precise number of characters returned depends on the incorrect message.

When an ACK is returned the 'A' will be followed by at least the 3 command characters and, depending on the command, up to 1024 further characters followed by a carriage-return.

ATE Reply

This message is used during testing of the receiver. These are private to Willtek and should not be seen in normal use. It is recommend that this type byte is detected and a suitable error message displayed.

Willtek Notes

There will be various ones distinguished by a second 'subtype' byte.

Type, Subtype, | Other characters defined by each subtype |

Type is lowercase t.

Synch

This message is used to resynchronize the data link. It is simply 20 lowercase x characters. It will be inserted into the data stream in response to a SSM command and after any messages that are already in the internal buffer.

Unable to Send Messages

If the internal buffer in the Griffin becomes full a 'pz' message is inserted into the data stream. It means that one or more messages have been discarded. This message can be repeated many times if the buffer is partially emptied and then refilled.

This message will be seen if the RS-232 data rate chosen is not able to support the volume of data to be sent. Possible solutions include increasing the data rate, using binary mode or to changing the data reporting format to reduce the volume of data.

If the RS-232 data rate chosen is able to support the volume of data this message should only be seen if the PC has suspended output from the Griffin with an XOFF character. It can also be seen if the Ethernet is congested leading to reduced data rates.

ASCII Data Format

The measured data can be represented within any message as ASCII or binary format. (Commands, their ACK/NAK and response excluding measurement results are always returned in ASCII). The PC can choose which format to use via the DRF command. The message formats are the same in either case, but the length of the messages will be greater with ASCII representation.

Suitable Settings

When using the RS-232 data link, the PC should calculate suitable settings for the Griffin to ensure that the data link in use can support the resulting data rate. The number of characters to be transferred will depend on the baud rate, the data format options and the type of measurement required. The settings for the sampling rate, number of samples and trigger intervals must be set suitably.

Type

The type bytes are all single ASCII characters. They will usually be preceded by <cr> from the preceding message. The type characters have been chosen as alphabetic characters after F to distinguish them from measured values, which are all decimal or hexadecimal numeric.

Measured dB Value

Three hexadecimal characters. If the first character is greater than 8, then the measurement was not valid and the third character indicates the reason.

Count value from LCR

This form will be used for the LCR and AFD replies when doing LCR measurements. The format will be four hex digits representing the 16-bit count directly.

Coordinate counter

The coordinate counter is 32 bits and will be sent as 8 hex digits.

Count value from histogram

The format for Histograms is unusual, as it is more efficient to send them with variable widths of data since many values will be small. This means that this is the only message whose length , in ASCII mode, depends on the data values being sent. Each count will be sent as 0 to 4 hexadecimal digits with a trailing comma. Where the histogram bin value is 0 the digit 0 shall be omitted. This may result in two or more commas being adjacent. There will not be a trailing comma following the last count.

Histograms will always have 82 values to send. With 16-bit counters they need to send a maximum of four digits per value. The worst case histogram of 65535 samples would occupy 76 three-digit slots and six four-digit slots. This leads to a total of 333 characters for the 82 bins and their commas.

Problem Messages

As above.

Other values

These include battery state etc. Many of these are described above. They will always be hexadecimal.

Binary Data Format

Messages can be formatted in binary with the following representations for the various messages.

With the exception of echo messages, all are of predictable length in binary format, independent of the values to be returned.

The binary format is almost a direct representation of the ASCII format converted from hex to binary, two digits per byte.

Type

Single byte value; the type bytes are the same as for the ASCII format above.

Sub_Type

Single byte value; the subtype bytes are the same as for the ASCII format above.

Count value from LCR

This form will be used for the LCR and AFD replies when doing LCR measurements. The format will be two bytes representing the 16-bit count directly.

Coordinate counter

This is 32 bits of time or distance count. Send as four bytes.

Measured dB value

Sent as two bytes with the upper 4 bits the same as bit 11. If the value is positive it is a measured cBo value in bits 0 to 10. If the value is negative (bits 11 to 15 all 1) it is an invalid reading. The dB value is in offset centi-bels as defined above.

Count value from histogram

Send as an unsigned 16-bit value in two bytes.

Problem Messages

The same as for ASCII mode.

MESSAGE LAYER

Interleaving Replies

It will be necessary to interleave replies to commands from the PC with data to the PC. For example, the receiver might be doing measurements and the PC might send a query on status. The Griffin must send the reply to the status command between two messages containing data. Each reply to a command will be a message in its own right with its own type and value fields. Thus the interleaving is between messages, not in the middle of one.

Maximum Message Rate

When in fixed frequency mode the PC should not ask the Griffin to respond with more than about 1000 messages per second. This is equivalent to 1000 frequencies per second. It is acceptable to ask for occasional status messages whilst scanning or cycling at 1000 frequencies per second.

Handling in the PC

The PC can handle RS-232 and Ethernet in the same way. It would poll the COM or NET control for data every x seconds. This strategy gives the PC control over the latency of the data.

Synchronization

The PC must synchronize to the data stream by looking for the Type bytes.

With binary data the PC can always deduce the length of the following message since they are all of predetermined length. It can then check that the following byte is also a valid type byte. There will be very few type bytes so there will be a good probability of detecting if synchronization is lost.

With ASCII data the PC can use the <cr> and type bytes.

Should sync be lost the PC can command a sync message from the Griffin which would allow the PC to resynchronize with a high probability. The synch message will be added to the end of the buffer in the Griffin so might be sent after several intervening messages.

Buffer Overflow

If there is any hold-up on the data link layer the output buffer in the Griffin might become full. In this case the data link layer should refuse to accept the next message from the blocking layer.

The blocking layer must ensure that the PC can detect that one or more messages have been lost. This it does by forcing the data link layer to insert a message with a type byte of 'problem' and a subtype of 'Buffer Overrun' ('z').

Data gathering should continue uninterrupted with the data being discarded until the queue clears. At that point the blocking layer should submit the next message to the queue. It should then return to normal output of the data.

Blocking Layer

Messages need to be divided into blocks to match the packet nature of Ethernet. There is no need to divide messages into blocks for the RS-232 link.

At higher levels Ethernet and RS-232 can be regarded as pure streams of data (neither has a block structure visible to higher layers). They are both treated precisely the same. Messages are simply passed out to the blocking layer as complete messages.

To send a message over RS-232 each byte will simply be sent as soon as possible. Note that the link might be suspended by Xon/Xoff or hardware lines.

To send a message over the Ethernet it will be divided into defined block sizes and sent. If a message is less than the defined size then it will be sent as soon as possible.

Whether the message is encoded in ASCII or binary is invisible to the blocking layer.

When using Ethernet the blocking layer could combine two messages into one Ethernet block. This is not necessary, and would only happen if two messages happen to be in the queue when the Ethernet becomes ready for the next block of data. It need not be implemented today.

Data Link Layer

RS-232 Data Link

Baud Rate

To transfer the volumes of data that will be sent to the PC the receiver supports baud rates of up to 57600 baud as follows:

57600

38400

28800

19200

14400

9600

4800

2400

Handshaking

Software handshaking with Xon/Xoff in the direction from the PC to the Griffin only is implemented. The Griffin will send Xon/Xoff as parts of binary format messages so these must not be acted upon in the PC.

Hardware handshaking might be implemented eventually.

Buffering

The Griffin includes a large buffer for the output data queue so that the PC can use software (or perhaps hardware) handshaking to suspend transfer whilst it is busy.

The action that the receiver takes if the queue should overflow is defined above.

Error Detection

Let us keep it simple and use RS-232 character over/under-run as error detection. Parity could be used as an option where maximum data rate is not required.

There will be secondary error detection should the data stream become unsynchronized.

Publication History

Revision	Comment
Issue 2, Sep. 2000	First available edition.
0404-112-A	Transferred to Willtek format.
0710-112-A	Contact details and layout changed.

Manual ident no. M 292 014

Manual version
0710-112-A

English

Willtek Communications GmbH
85737 Ismaning
Germany
Tel: +49 (0) 89 996 41-0
Fax: +49 (0) 89 996 41-440
info@willtek.com

Willtek Communications UK
Cheadle Hulme
United Kingdom
Tel: +44 (0) 161 486 3353
Fax: +44 (0) 161 486 3354
willtek.uk@willtek.com

Willtek Communications SARL
Roissy
France
Tel: +33 (0) 1 72 02 30 30
Fax: +33 (0) 1 49 38 01 06
willtek.fr@willtek.com

Willtek Communications Inc.
Parsippany
USA
Tel: +1 973 386 9696
Fax: +1 973 386 9191
willtek.cala@willtek.com
sales.us@willtek.com

Willtek Communications
Singapore
Asia Pacific
Tel: +65 6827 9670
Fax: +65 6827 9601
willtek.ap@willtek.com

Willtek Communications Ltd.
Shanghai
China
Tel: +86 21 5835 8039
Fax: +86 21 5835 5238
willtek.cn@willtek.com

will'tek