Getting Started Manual

will'tek

8300 Griffin Fast Measurement Receiver

boosting wireless efficiency

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Ordering information This guide is issued as part of the **8300 Series Griffin**. The ordering number for a published guide is M 295 005. The ordering number for the product depends on the exact model as follows:

Table 1 8300 Series Griffin models

Model	Order number
8301 Griffin Fast Measurement Receiver (800 to 1000 MHz)	M 100 501
8302 Griffin Fast Measurement Receiver (1700 to 2000 MHz)	M 100 502

EMC Directive Compliance

This product was tested and conforms to the EMC Directive, 89/336/EEC for electromagnetic compatibility. A copy of the Declaration of Conformity is provided with this manual.

Low-Voltage Directive Compliance

This product was tested and conforms to the Low Voltage Directive, 73/23/EEC as amended by 93/68/EEC. Conformity with this directive is based upon compliance with the harmonized safety standard, EN60950. A copy of the Declaration of Conformity is provided with this manual.

Table of Contents

About This Guide

This section contains the following basic information:

Purpose and scope

The purpose of this guide is to help you successfully use the 8300 Series Griffin features and capabilities. This guide includes task-based instructions that describe how to install, configure, use, and troubleshoot the 8300 Series Griffin. Additionally, this guide provides a description of Willtek's warranty and repair services.

Assumptions

This guide is intended for novice users who want to use the 8300 Series Griffin effectively and efficiently. We are assuming that you are familiar with basic telecommunication concepts and terminology.

Related information

Use this guide in conjunction with the following information:

Willtek 8300 Griffin Fast Measurement Receiver, user's guide, order number M 290 005

Technical assistance

If you need assistance or have questions related to the use of this product call Willtek's technical support. You can also contact Willtek by e-mail at customer.support@willtek.com.

Table 1 Technical support contacts

Region	Phone number	Fax number
Europe, Middle East, Asia, Africa	+49 (0)89 99641 311	+49 (0)89 99641 440
Americas	+1 973 386 9696	+1 973 386 9191
China	+86 21 5836 6669	+86 21 5835 5238

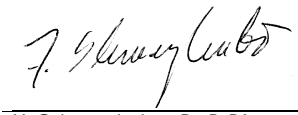
Safety Issues

This chapter provides the safety notes for the 8300 Series Griffin. Topics discussed in this chapter include the following:

Safety notes

Operating environment	It is inadvisable to leave the receiver exposed to direct strong sunlight or low temperatures for long periods before making measurements. The receiver temperature may exceed the allowable range, causing the measurement accuracy to be impaired.
Using cables	Safety is guaranteed only when using the Willtek-provided cables delivered with the Griffin.
Loading the battery	Although the Griffin is designed for both indoor and outdoor usage, the batteries must be charged only in an indoor environment for safety reasons. Please take note of the description and symbols on the charger.

Declaration of EU conformity

Manufacturer	Willtek Communications GmbH Gutenbergstr. 2 – 4 85737 Ismaning Germany
Product designation	Willtek 8300 Griffin Fast Measurement Receiver
	The designated products conform to the following European directives:
Low-voltage directive	**73/23/EEC**, has been superseded by the directive **93/68/EEC**
EMC directive	**89/336/EEC**
	The conformity of these products to the above directives is demonstrated by application of the following standards:
EMC	**EN 300339:1998**
Safety	**EN 60950:2001**
Ismaning, December 11, 2002	 H. Schwarzhuber, R&D Director
	This declaration is not a guarantee of features. Pay attention to the safety instructions in the product documentation.

Overview

1

This chapter provides a general description of the 8300 Series Griffin. Topics discussed in this chapter include the following:

About the 8300 Series Griffin

Willtek's Griffin Fast Measurement Receiver is the ideal choice for quickly and accurately performing a wide range of measurement functions in the RF channel. Using the latest RF and logic technologies, Griffin is the most effective measuring receiver available for planning and optimizing cellular networks.

Griffin features a specially designed synthesizer that is capable of surveying up to 1,000 channels per second. This makes every drive test on RF propagation and RF coverage more productive as multiple channels and networks can be surveyed at the same time.

The measurement speed of Griffin allows to drive with 100 km/h or 60 mph surveying seven transmitters and still comply with the Lee criteria for RF propagation.

The receiver is portable, robust and battery-powered, ensuring that it is ready for use in any environment. It can be supported by Willtek 8010 Hindsite™ software running on a Windows-based notebook.

Features and capabilities

Rapidly scan and sample high rates (1,000 channels and 100,000 readings per second)

Accurately measure across nine modes and a wide dynamic range

Test anywhere with a lightweight, portable and robust test device

Verify RF propagation/RF coverage and detect interference

Cover far distances and short ranges to base stations with wide dynamic range

Physical description

The 8300 Series Griffin consists of the measurement receiver, an optional up or down converter, and the Griffin Front Panel Software to operate the instrument from a PC.

For full specifications, please refer to the data sheet of the 8300 Series Griffin and the data sheets for the optional converters.

The following devices are in the scope of delivery:

Table 2 Standard delivery parts

Quantity	Product designation	Ordering code
1	Willtek 8301 Griffin Fast Measurement Receiver	M 100 501
	– or –	
	Willtek 8302 Griffin Fast Measurement Receiver	M 100 502
1	Telescopic antenna	M 249 038

Table 2 Standard delivery parts

Quantity	Product designation	Ordering code
1	Carrying case for Griffin	M 300 828
1	Vehicle power cable	M 384 905
1	Griffin Front Panel Software	M 897 164
1	Power supply	M 204 092
4	Batteries	M 205 008
1	Manual pack Griffin (including this getting started manual)	M 297 021

Options

Table 3 Options, accessories and upgrade possibilities

Product designation	Ordering code
8381 Griffin UMTS Down Converter for 8301, 2000 to 2200 MHz	M 248 650
8382 Griffin Up-Converter for 8301, 300 to 500 MHz	M 248 648
20 W CW Signal Generator battery-powered (ST24SV) UMTS Downlink	M 100 707

More options and accessories like distance transducer, transmitter, GPS receiver, and antennas are available on request.

Installation

2

This chapter describes how to set up the 8300 Series Griffin. The topics discussed in this chapter are as follows:

Hardware and software requirements

The user interface of the 8300 Series Griffin (Griffin Front Panel Software) comes as a software for PCs. To install and run Griffin Front Panel Software, you will need a Pentium-driven PC with the Microsoft Windows operating system (version 95 or higher).

Installing the software

Before you start

The Griffin Front Panel Software will run on most PCs using a Pentium processor running Microsoft Windows 95 or later versions of Microsoft Windows. The only real essentials are a serial port (COM1, 2, 3 or 4) and sufficient space on the hard disk (10 megabytes). For best performance use a PC with a clock speed of at least 400 MHz and fitted with at least 64 megabytes of RAM.

Your software license allows you to install the Front Panel Software on as many PCs as you wish.

Updating existing files

During the installation process some files will be copied to your Windows folder. These are files that can be shared by many applications and there might be versions of the files already in your Windows folder. If the version on the installation disk is newer than the existing version then the existing file is replaced by the newer one. This is perfectly normal and is the Microsoft-recommended procedure.

Installing in Microsoft Windows

1 Insert the CD.

2 Close all applications to avoid any conflicts with files in use during the installation process.

3 On the Start Menu choose Run then click on Browse. Browse on the CD until you find setup.exe. Click to select the file then click on Open to finish browsing.

4 Click on OK to start the installation process.

The remainder of the installation process is automatic.

If installing from floppy disks, insert disks as requested.

Operation

3

This chapter describes the functionality of the instrument. Topics discussed in this chapter are as follows:

Connecting to the Griffin

Antenna input

The antenna should be chosen to suit the frequency band of the Griffin in use (800 to 1000 MHz or 1700 to 2000 MHz). It can be connected directly to the RF input connector or via a length of low-loss cable. The input is a conventional 50 W N-type.

A telescopic antenna is supplied with the Griffin. It is suitable for general surveying, but, for precision measurements, an antenna with a known antenna factor should be used.

RS-232

Connect the Griffin to the COM port on the PC with the null modem cable supplied. The connectors are the same at both ends of the cable so it can be fitted either way around.

You can use a longer or shorter lead if necessary. It should have a 9-way D-type socket at each end and be wired:

- Pin 2 to Pin 3
- Pin 3 to Pin 2
- Pin 5 to Pin 5
- Shield to Pin 5 at each end.

Power connector

DC power supply You can connect the Griffin to the cigar socket of a motor car directly with the lead supplied. The DC input is designed for a nominal 12 V supply. Do not connect it to a vehicle using a 24 V supply.

You can use other sources of DC power such as a laboratory power supply. Refer to the notes on the power supply for the voltage and current requirements.

Mains supply The Griffin is supplied with a universal mains power supply that needs no switch settings to be used on any common mains supply. It has exchangeable adaptors to allow it to plug into a variety of mains outlets.

Choose the right adaptor for your region and slide it onto the mains supply, then plug the supply into a mains outlet.

To protect yourself from an electric shock, NEVER plug an adaptor into a mains outlet before it is securely fitted to the power supply.

Internal batteries There is no need to connect an external power supply to the Griffin as you can run it off its internal batteries for up to four hours.

Auxiliary connector

There is no need to connect anything to the Auxiliary connector in most applications. This connector has various signals to give the Griffin flexibility to meet special situations. Please refer to the Connector Details section in the user's guide for pinouts and electrical details.

Some of the functions available with this connector are explained below.

Remote On/Off This line can be used to turn the Griffin on or off remotely. When the line is grounded the Griffin will be on. You should leave the on/off switch on the Griffin in the Off position for the remote control to be able to turn the Griffin off.

This control will work whether the Griffin is powered from the external DC input or the internal batteries. If an external supply is connected to the battery charge pins then any internal batteries fitted will be charged.

Battery Out This line provides power from the internal batteries to supply external accessories.

Detector Output This is an analog output with a voltage proportional to the logarithm of the input signal level.

Sampling Pulse This is an output pulse that is synchronized with the start of a measurement in the Griffin. It can be used to synchronize external instruments to the Griffin. It is driven from an open-collector transistor; to get an output voltage change, the output must be connected to a positive voltage via a resistor. The resistor value must be chosen to keep the maximum current less than 200 mA.

Pulse encoder connector

There is no need to connect anything to this connector in applications where the Griffin is not part of a Willtek survey system.

IF output connectors

There are two IF outputs on the Griffin, one for the in-phase and one for the quadrature components of the IF. You can use these to fit external demodulators to the Griffin. You should not connect anything to these connectors unless they are being used.

External reference connector

The External Reference connector can act as an input or an output. You can use it to synchronize the synthesizers in the Griffin with those in other test equipment. You should not connect anything to this connector unless it is being used.

LED indicators

Front panel

The Griffin has a single red LED on the front panel to show the state of the power supply. When operating from normal supplies, the LED will be on continuously.

When operating from the internal batteries the LED will flash to indicate when the batteries are running low.

It will start to flash slowly when there is less than about 15 minutes power remaining in the batteries. The rate of flashing increases when the batteries have reached their minimum allowed voltage.

Battery panel

The LEDs associated with the two batteries show the status of the batteries.

- Off – No battery connected.
- Green – The battery has some charge in it and could be used. (It needs not be fully charged).
- Red – The battery is in use.
- Orange – The battery is being charged.

When both batteries are very fully charged the LEDs might flash for a period before settling down. This is normal and does not indicate a fault.

Installing and maintaining the batteries

The Griffin is fitted with two batteries each able to run the receiver for about two hours. The receiver continuously checks the voltages on the batteries and the DC input and automatically switches between them. The DC input is used if it is connected. If there is no DC input, the battery with less charge is used first. Once this battery is emptied the Griffin switches to the other battery.

The batteries as shipped by Willtek will normally be very low on charge so you will need to charge them before you can use them.

Since the receiver checks the voltages continuously, you can plug or unplug the DC input or remove or fit batteries with no interruption to the receiver operation. You must be careful, however, when both batteries are running very low as the receiver might not be able to switch to a battery which is nearly empty.

If you need to change the batteries when both are very low then:

- First change the battery which is not in use for one which has plenty of charge.
- Next change the battery which is in use.

Fitting and removing batteries

To fit a battery simply push it into an empty socket until the retaining clip clicks into place.

To remove a battery push the retaining clip sideways to release it and then allow the spring to push the battery end out of its socket. You can then pull the battery completely out.

Charging the batteries

The Griffin is fitted with sophisticated charging circuitry able to recharge both batteries in about four hours. The receiver must be turned on to charge the batteries but need not be connected to anything other than the DC supply.

Charging is indicated by a green LED adjacent to each battery. Once the fast charging has finished the batteries are trickle-charged to maintain them in good condition.

The supply for charging the batteries is provided on pin 6, whilst that for powering the receiver is on pin 5. To allow the internal batteries to be charged both pins must be connected to the DC supply. If you are operating the receiver from an external battery and do not want the internal batteries to be charged simply connect pin 5 to the supply but not pin 6.

Care of the batteries

Each Griffin battery contains five NiMH cells. They are protected against overcurrent and short circuits but it is still advisable to treat them with care.

All rechargeable batteries have a limited lifetime. The life of your Griffin batteries can be enhanced by treating them with care.

Do not

- Expose the batteries to extremes of heat or cold.
- Continue to use a battery once it is fully discharged. The Griffin will give you warnings through the software and by flashing the front panel LED when the batteries are running low. It is up to you to turn it off or change the supply.
- Use a battery for anything other than in a Griffin.
- Short-circuit a battery.

Do

- Run a battery right down and then recharge it. Batteries tend to lose their capacity if not used. Occasional complete discharge and recharge cycles help to maintain them.

- Power the receiver from the mains and leave the batteries in and the receiver turned on overnight. This will charge the batteries fully and then the long period of trickle charging helps to even any differences between the cells in each battery.
- Replace the batteries when they reach the end of their life-time and their capacity falls.
- Store batteries carefully so that they cannot be accidentally short-circuited.
- Dispose of old batteries carefully.

Connecting the 8381 Griffin UMTS Down Converter Option or the 8382 Griffin Up-Converter Option

The 8381 Griffin UMTS Down Converter Option turns the Willtek 8301 Griffin Fast Measurement Receiver into a measuring device for the UMTS band.

The 8382 Griffin Up-Converter Option turns the Willtek 8301 Griffin Fast Measurement Receiver into a measuring device for the 300 to 500 MHz band.

The Griffin with any of the converter options is wider than without the option and has four additional connectors (from top to bottom):

- an N-type antenna connector (RF In),
- an N-type RF connector to connect the converter to the Griffin (RF Out),
- a Lemo-type Auxiliary connector and
- an SMA reference oscillator input (Ext.Ref.).

If you want to use the Griffin in the frequency range from 2000 to 2200 MHz (UMTS Down Converter Option) or in the 300 to 500 MHz range (Up-Converter Option):

1 Ensure that the RF connector of the 8301 Griffin is connected to the RF Out connector of the option module at the right-hand side. Use cable 382 826 (marked yellow).

2 Use cable 384 896 (marked green) to connect the Auxiliary connector on the Griffin front panel to the Auxiliary connector at the module to the right-hand side.

3 The Ext.Ref. output of the Griffin must be connected to the Ext.Ref. input of the option module with cable 382 828.

4 Fix the antenna at the RF In connector of the option module.

5 Follow the instructions in the user's guide to set up the Griffin Front Panel Software.

If you want to use the Griffin in the original frequency range from 800 to 1000 MHz:

1 Ensure that the Antenna connector of the Griffin is disconnected from the respective connector of the option module at the right-hand side.

2 Disconnect the Auxiliary connector on the Griffin front panel from the Auxiliary connector at the option module.

3 Fix the antenna at the antenna connector of the Griffin (on the left-hand side).

4 Follow the instructions in the user's guide to set up the Griffin Front Panel Software for normal band operation (800 to 1000 MHz).

Troubleshooting

4

This chapter describes how to identify and correct problems related to the 8300 Series Griffin. Topics discussed in this chapter are as follows:

Troubleshooting

If you are unable to resolve problems related to the 8300 Series Griffin, refer to "Technical assistance" on page ix.

Solving problems

If you experience difficulties using the 8300 Series Griffin, refer to the related topic. Each topic describes problems and solutions that may be pertinent to your task. If you are unable to resolve your problem, please contact "Technical assistance" on page ix.

Communication problems

If the Status bar never changes to show Griffin Connected there must be a problem with the communications link between the Griffin hardware and the PC running the Griffin Front Panel Software.

The software automatically tries to connect with all of the baud rates that are supported by the Griffin. If it cannot connect then there might be a problem with the physical connection.

Basic checks

First try checking:

- That the Griffin is connected to the correct COM port.
- The cable connecting the Griffin to the PC is secure at both ends.

Try replacing the cable in case it is faulty or testing it as described below.

Testing the Griffin and the cable

One way to check the output from the Griffin and the cable is to connect an oscilloscope to pin 2 (ground to pin 5) of the null modem cable. When you turn the Griffin on it should output a

short message which will be seen on the oscilloscope. This will check the ground and one data line in the cable. To check the other data line reverse the cable and repeat the test.

Testing the PC Port

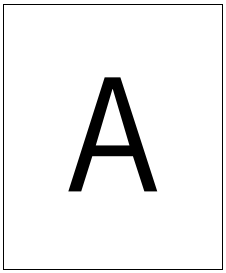
You can use HyperTerminal, which is a communications program supplied with Windows to check the serial port in the PC. HyperTerminal does not support all of the baud rates that the Griffin can use so you might not be able to communicate with the Griffin, but it is worth a try.

- Close the Griffin Front Panel Software.
- Open the HyperTerminal Folder (Start, Programs, Accessories, Communications, HyperTerminal) then click on hyperterm.exe to start HyperTerminal.
- Enter a name for the connection.
- Choose Direct to COMx, where x is the number of the COM port that is connected to the Griffin, in the Connect using section. HyperTerminal will complain if the port is not available. Check that you have closed the Griffin Front Panel Software. If it is closed then either there is no COMx on your PC, or some other program is using it.
- Set the port settings to:
  Bits per second - the baud rate that the Griffin is set to.
  Data bits - 8.
  Parity - None.
  Stop bits - 1.
  Flow control - None.
- Then press OK.
- Try turning the Griffin on and off. If the connection is working you will see the power-up message appear. This should be the pu000000000000. If anything else appears it is likely that the baud rate is wrong. Try changing the baud rate until the message is correct.
  To change the baud rate in HyperTerminal
  - Choose Properties from the File menu, then click on Configure.
  - Make the changes then click on OK.

  - Now save the settings (choose Save from the File menu) then close HyperTerminal. You can choose where to save the file but a convenient place is your desktop.
  - Double-click on the file (or its icon) to reopen HyperTerminal.
- Once you can see the power-up message you can try sending a message to the Griffin to test the other direction of data flow. Type PWU followed by pressing enter (also called carriage return). If everything is working properly the Griffin will respond with 'kAPWU'. Note that you might not see the characters that you type as there is a setting in HyperTerminal that can hide or show them.

If this does not resolve the problem then contact Willtek.

Warranty and Repair



This chapter describes the customer services available through Willtek. Topics discussed in this chapter include the following:

Warranty information

Willtek warrants that all of its products conform to Willtek's published specifications and are free from defects in materials and workmanship for a period of one year from the date of delivery to the original buyer, when used under normal operating conditions and within the service conditions for which they were designed. This warranty is not transferable and does not apply to used or demonstration products.

In case of a warranty claim, Willtek's obligation shall be limited to repairing, or at its option, replacing without charge, any assembly or component (except batteries) which in Willtek's sole opinion proves to be defective within the scope of the warranty. In the event Willtek is not able to modify, repair or replace nonconforming defective parts or components to a condition as warranted within a reasonable time after receipt thereof, the buyer shall receive credit in the amount of the original invoiced price of the product.

It is the buyer's responsibility to notify Willtek in writing of the defect or nonconformity within the warranty period and to return the affected product to Willtek's factory, designated service provider, or authorized service center within thirty (30) days after discovery of such defect or nonconformity. The buyer shall prepay shipping charges and insurance for products returned to Willtek or its designated service provider for warranty service. Willtek or its designated service provider shall pay costs for return of products to the buyer.

Willtek's obligation and the customer's sole remedy under this hardware warranty is limited to the repair or replacement, at Willtek's option, of the defective product. Willtek shall have no obligation to remedy any such defect if it can be shown: (a) that the product was altered, repaired, or reworked by any party other than Willtek without Willtek's written consent; (b) that such defects were the result of customer's improper storage, mishandling, abuse, or misuse of the product; (c) that such defects were the result of customer's use of the product in conjunction with equipment electronically or mechanically incompatible or of an inferior quality; or (d) that the defect was the result of damage by fire, explosion, power failure, or any act of nature.

The warranty described above is the buyer's sole and exclusive remedy and no other warranty, whether written or oral, expressed or implied by statute or course of dealing shall apply. Willtek specifically disclaims the implied warranties of merchantability and fitness for a particular purpose. No statement, representation, agreement, or understanding, oral or written, made by an agent, distributor, or employee of Willtek, which is not contained in the foregoing warranty will be binding upon Willtek, unless made in writing and executed by an authorized representative of Willtek. Under no circumstances shall Willtek be liable for any direct, indirect, special, incidental, or consequential damages, expenses, or losses, including loss of profits, based on contract, tort, or any other legal theory.

Equipment return instructions

Please contact your local service center for Willtek products via telephone or web site for return or reference authorization to accompany your equipment. For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner's name, address, and telephone number.
- Serial number, product type, and model.
- Warranty status. (If you are unsure of the warranty status of your instrument, include a copy of the invoice or delivery note.)
- Detailed description of the problem or service requested.
- Name and telephone number of the person to contact regarding questions about the repair.
- Return authorization (RA) number (US customers), or reference number (European customers).

If possible, return the equipment using the original shipping container and material. Additional Willtek shipping containers are available from Willtek on request. If the original container is not available, the unit should be carefully packed so that it will not be damaged in transit. Willtek is not liable for any damage that may occur during

shipping. The customer should clearly mark the Willtek-issued RA or reference number on the outside of the package and ship it prepaid and insured to Willtek.

Publication History

Revision	Changes
0304-100-A	First revision, for serial number 0205001 and higher.
0710-200-A	Layout changed. Hindsite option removed.

Manual ident no.
M 295 005

Manual version
0710-200-A

English

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