Instruction Manual

IRS LabKit G1
Article No. 602.777
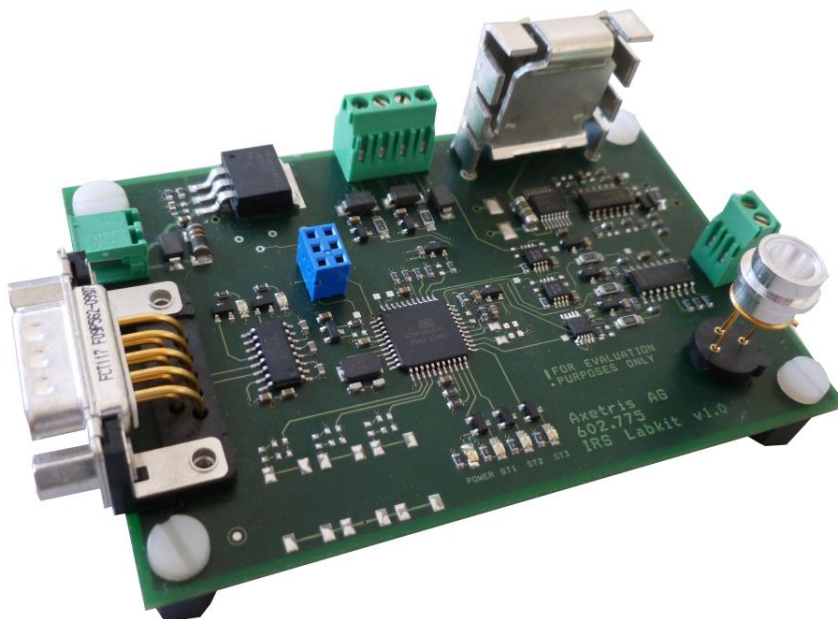
Releases/Change journal

Version	Date	Sign	Change / Status
A	17.12.2012	EKO	• New document
B	20.12.2017	EKO	• Adaption for the EMIRS50 compatibility

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1   Introduction

The Axetris IRS LabKit is designed to facilitate the evaluation of the best IR Source configuration and its optimal operation in conjunction with the used detector type and characteristic. LabKit's are intended for Axetris IR Source evaluation only and should not be used for commercial applications. The IRS LabKit supports the **EMIRS200 and EMIRS50 IR Source family** for a wide range of their possible usage.
IRS LabKit is delivered with a RS232 interface board to connect directly to a PC alternatively USB converter allows using the USB interface. The Graphical User Interface (GUI) allows digital communication to control the device and receive and record measurement data.

All the IR Sources are based on the Axetris proprietary MEMS technology. The anemometric Axetris IRS Sources are based on platinum technology, and offers exceptional performance in terms of emissivity, modulation depth and wide wavelength range and life time.

The goal of this document is to describe in detail the installation and all features contained in the IRS LabKits, permitting the user to quickly connect the device to its command unit system, establishing a safe and reliable communication for the success of the application.
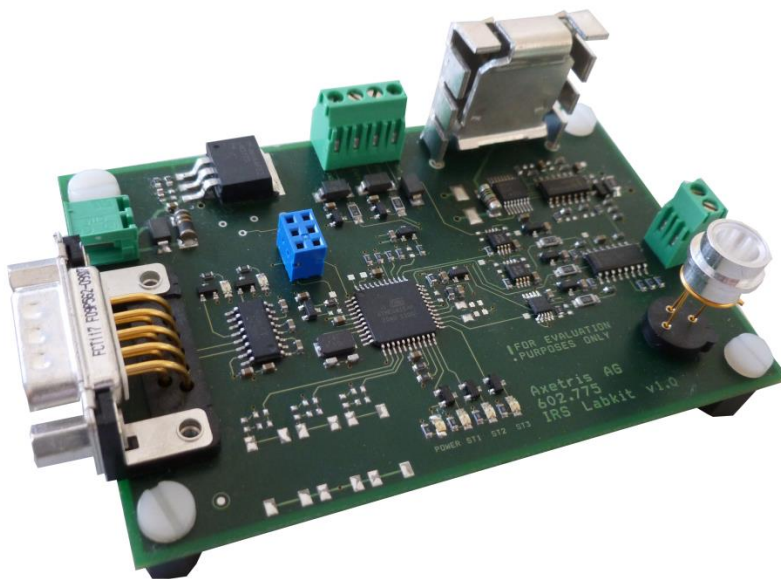
Figure 1 IRS LabKit Driver Board

- Simple Graphical User Interface (GUI) based on LabVIEW software
- Set and update all drive parameters live from GUI
- Live diagram plots for data display and record
- Visualized drive mode guidance
- Export of bitmap and Excel data
- Direct connection to a PC with RS232 protocol and USB
- TO socket and connector for external IR source connection
- I/O analog interface for detector synchronization and signal evaluation

2 Overview of IRS LabKit

In the following pages, the IRS LabKit is introduced.
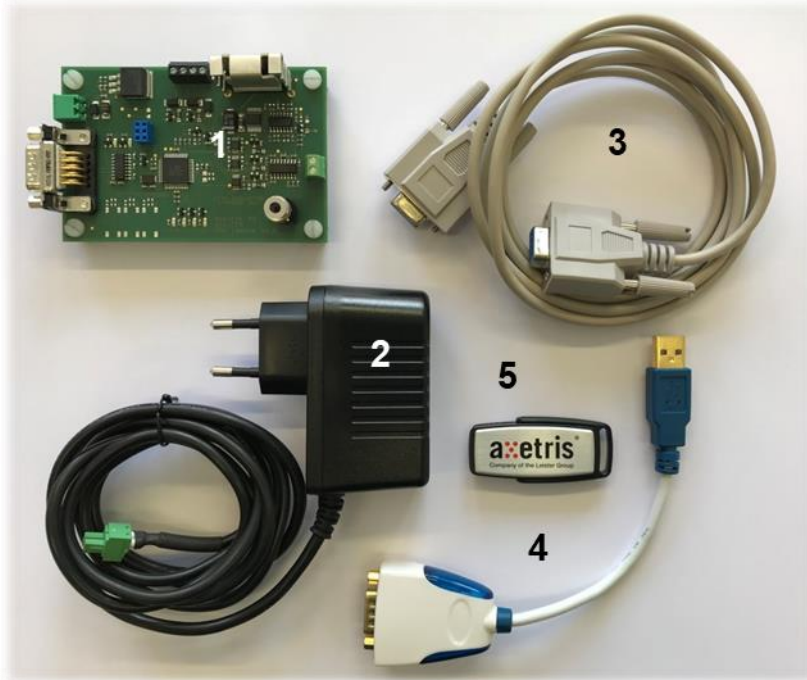
Figure 2 BOM IRS LabKit

Part ID	Identifier	Description
1	PCB IRS LabKit G1	IRS LabKit G1driver board
2	Power Supply 24V, 330mA	AC/DC Adapter 90-264VAC to 24VDC
3	Serial data cable DB9F-DB9F	RS-232 Cable female-female D-Sub 9 poles cable (crossed)
4	USB-RS232 Serial Converter	USB to RS-232 converter (FTDI)
5	USB Stick 4GB	Axetris USB Stick, Installation of IRS LabKit GUI and LabVIEW- LabVIEW VISA runtime

⚠ **The correct communication can only be guaranteed with the delivered USB converter.**

3 Hardware installation guide

The electronic parts are ESD (electro-static discharge) sensitive. Therefore please handle all the parts carefully and according the ESD guidelines.
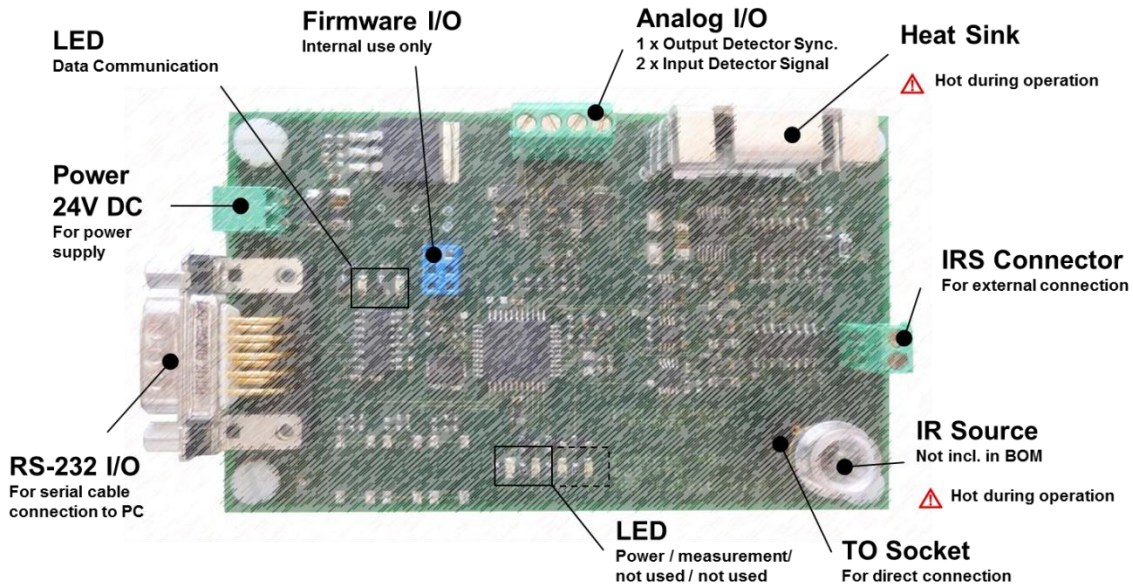

Figure 3 IRS LabKit Driver Board

3.1 Hardware installation

For the connection and power-up of the IRS driver board (Figure 3), no specific sequence needs to be considered.

Recommendation:

A. Connect RS-323 interface cable to the IRS LabKit driver board and to the PC
Optionally when using USB port please install the USB converter cable
B. Optionally wire-up analog output signal with the external electronic (synchronization)
C. Plug-In (TO socket) or wire-up (IRS connector) Axetris IR Source
D. Install and connect power supply

Remark:

The GUI SW is continuously measuring whether an intact IR Source is present or not. In case no intact IR Source can be detected the electronic will not start or stop driving the source (see status info GUI). For a restart either the *'Start'* or the *'Update'* button must be pressed again.

4   Software

The LabKit SW includes IRS LabKit GUI for communication to use IRS LabKit driver board, LabVIEW runtime engine and LabVIEW VISA runtime. Optionally the driver for the USB converter can be manually installed (for Windows 7 not required).

The main functions of the GUI are:
- Driving the IR Source EMIRS200 and EMIRS50 family with the selected parameters
- Receive and record electrical characteristic data of IR Source

4.1   PC requirements

The minimum recommended PC requirements are: Windows 7, minimum Pentium 4 / 2 GH z / 2 GB RAM.

4.2   Software installation

A.   Insert the USB Stick into USB slot (Hub)

B.   When hard drive has been mounted open the folder of the mounted USB disc

C.   Double click executable file 'Setup.exe' and follow the installation wizard

D.   Adapt the installation path if required for the IRS LabKit GUI and the LabVIEW SW and press continue

E.   Accept the license agreement of the LabVIEW SW package

F.   Double check the SW elements what are going to be installed and press continue

G.   SW Installation is finalized close wizard (in case the LabVIEW runtime engine component had to be installed the operating system must restarted)
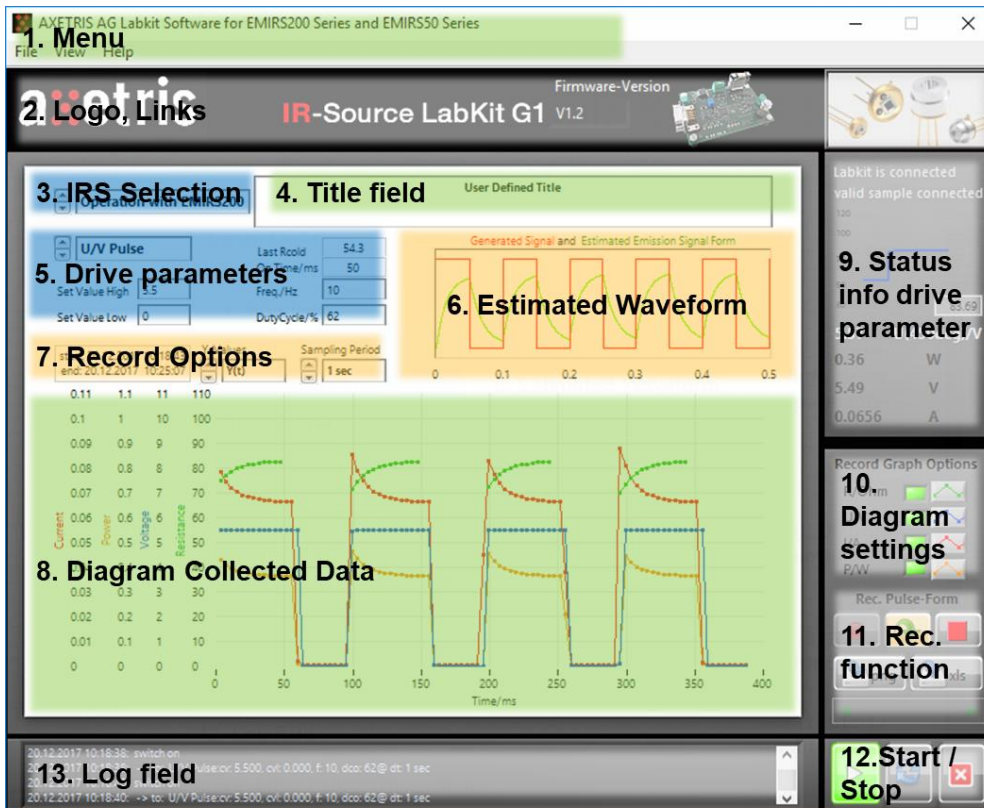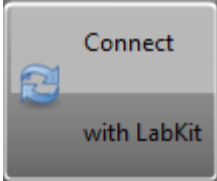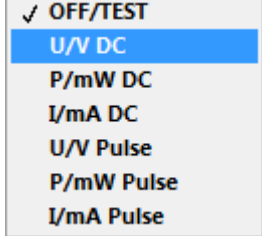
5   Graphical User Interface (GUI)

Figure 4 IRS LabKit GUI

Field		Main purpose and functionality of field
1.	Menu	Switching recording mode (single continues) / Link Instruction manual
2.	IRS Selection	Select the type of IR Source
3.	Logo, Links	Link Axetris Webpage and IRS brochure
4.	Title field	Customized and describe measurement
5.	Driving parameter	Select and defining drive parameter
6.	Estimated waveform	Theoretical estimated effect of drive parameter
7.	Record options	Select data axis to be displayed and chose the type of graph
8.	Diagram collected data	Previous of the recorded data
9.	Status info drive parameter	$R_{cold/hot}$ life chart with recommended limitations, effective drive parameter, estimated voltage to achieve 450°C
10.	Diagram settings	Selecting of recorded data and diagram settings
11.	Record function	Start and stop continuous record, single record, reset, export data into Excel and bitmap
12.	Start / Stop	Start / Stop driving IR source, update parameters, disconnect IRS LabKit driver board and close GUI
13.	Log file	Last commands and trouble shooting

6 Quick Start-up

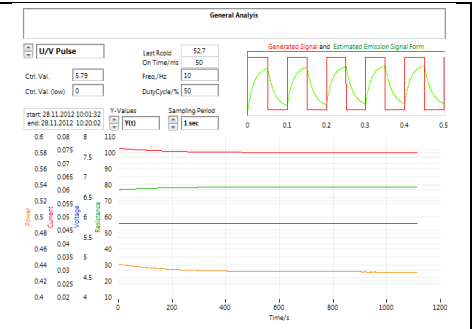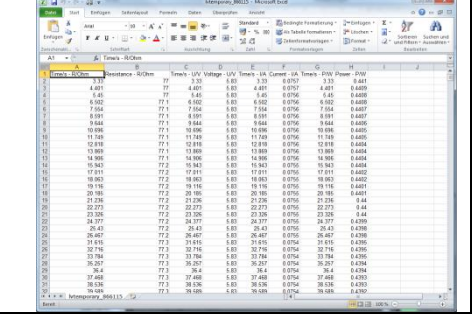|		
A.	Connect IRS LabKit driver board (see capture 3)	
B.	Plug-In or wire-up Axetris IR Source you want to characterize	
C.	Start Axetris IRS LabKit GUI (Start/Program/Axetris/ IRS LabKit)	
D.	Press *'Connect with LabKit'* to connect IRS LabKit driver board (COM port scan search for the HW) Last used COM port is stored	
E.	Select the IR Source type you are using	
F.	Select the required drive mode from pull down menu	
G.	Chose the drive parameters as required (depending on the chosen drive mode only parameters are displayed what are required)	
H.	To operate the IR source press button *'Start / Stop'* To update changed parameters use the *'Update'* button To close and disconnect the IRS LabKit use button *'Close/Disconnect'*	
I.	Select the Record Graph Options as required Press *'Start /Stop'* button for recording data (continues) Press *'Single Record'* for single reading To reset the record data press *'Reset'* button To reset the recorded data use 'Reset record' button	

7 Miscellaneous

7.1 Synchronization for external electronic (detectors) for pulse mode

The IRS LabKit provides a 0 – 5 V analog output synchronization signal what can be used to synchronize the external (detector) electronic. The waveform is triggered from the turn-on/off instant of the drive signal of the IR Source. The influencing parameters are frequency and duty cycle.

7.2 Export data

The IRS LabKit GUI offers two types of data exports.

• Safe report as PNG (Bitmap) Purpose: As a summery for a technical report or as basis for technical discussion	
• Export recorded data to Excel Purpose: For specific data evaluations	

7.3 Verifying driver signal pulse form

To verify the driver signal (pulse form) and the characteristic of the IR Source the use of a dedicated oscilloscope is recommended. Because the sampling rate is limited the resolution of the recorded or displayed data (pulse form) could be not accurate enough. This is especially the case when the IR Source is operated at higher frequencies (above 20Hz) and short duty cycle (<50%) in combination.

Remark:

The IRS LabKit driver hardware and GUI functionality is developed for long term measurements and not to analyze pulse form or the start-up characteristic.

8 Specification

8.1 PCB IRS LabKit Specification

- Microcontroller ATmega164P
- A/D controller Texas Instruments ADS1115
- I/O overload protection
- RS 232 I/O EIA Level
- Analog I/O, 0 - 5 V / 4 – 20mA (In;out)
- Driver signal accuracy
  - U output:2 %
  - P/I output 4 %
- Signal recording resolution and accuracy
  - Resolution: U = 0.1mV; I = 0.01mA; P = 0.1mW (theoretical values limited due RS232 –protocol
  - Accuracy: 4%

8.2 Operation Minimum and Maximum Values of IR Source

	EMIRS200	EMIRS50
Drive mode:	P / V/ I	P / V/ I
Voltage:	0V min. - 10V max.	0V min. - 6V max.
Current:	0mA min. - 150mA max.	0mA min. - 150mA max.
Power:	0mW min. - 1200mW max.	0mW min. - 900mW max.
Frequency:	0 (DC), 2… 100Hz	0 (DC), 5… 100Hz
Duty Cycle:	20… 70%	20… 70%

8.3 Operation Typical Values

	EMIRS200	EMIRS50
Voltage:	5.2… 6.5V / for 450mW	2.7… 3.2V / for 187mW
Current:	68… 86mA / for 450mW	58… 78mA / for 187mW
Power :	450mW	187mW
R_{cold}:	35… 55Ohm	22… 36Ohm
R_{hot}:	54… 89Ohm	31… 54Ohm

8.4 Environmental and Operating Conditions

- Dimensions: 110 x 66 x 38mm
- Weight: 52g
- Power: 12VDC, 1A
- Temperature storage temperature should be -10°C to 60°C (non-condensing). Operating temperature 15°C to 40°C
- Humidity   5 to 95 % R.H.
- Environment   The LabKit must be used in clean laboratory environment
- PCB norms   ROHS (2002/96/EC)

8.5 Package Contents

- PCB IRS LabKit G1
- Power Supply Adapter 24V 330mA
- Serial data cable DB9F-DB9F
- USB-RS232 Serial Converter
- Axetris USB Stick 4GB

8.6 Minimum HW Requirements

- Windows 7, minimum Pentium 4 / 2 GHz / 2 GB RAM.
- USB2 port / COM port

9 Caution

9.1 Product damage

Read all instructions carefully before using the IRS LabKit.
The appliance must not be used in damp or moist surroundings.
Use only Axetris IR Sources that are indicated in the instructions.
Failure to comply with these instructions can result in product damage.

9.2 Danger of life

The IR Source must not be used with flammable or explosive gases or mixtures.
Unprofessional handling can cause injury or death. The use of IR Source should only be performed by qualified personnel.
Do not use this product as safety or emergency stop device or in any other application where failure of the product could result in personal injury or death.

10 Important Notice / Disclaimer

The IRS LabKit is only for evaluation purpose and must not be used for commercial applications. The information furnished by Axetris is believed to be correct and accurate. However, Axetris shall not be held liable to recipient of any third party of any damages, including but not limited to personal injury, property damage, loss of profits, loss of use, interrupt of business or indirect, special incidental or consequential damages, of any kind, in connection with or arising out of the furnishing, performance or use of technical data herein. No obligation or liability to recipient or any third party shall arise or flow out of Axetris rendering of technical or other services.

⚠ Important notice

- The generated driver signal may differ slightly from the theoretical defined (square wave signal). Axetris recommends therefore using an oscilloscope especially for high driver frequencies and short duty cycles to verify the signal level and the waveform.
- The displayed and recorded waveform signal can be used only as first estimation. The exact waveform should be checked using an oscilloscope measurement.

Remark:

The IRS LabKit driver board is not EMC certified (compatible).and not designed for harsh EMC environment.

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