

RFbeam XC_Scope User Manual

Introduction

This manual explains the installation procedure and the features of the RFbeam XC_Scope Software. The Software is a graphical user interface for the RFbeam K-XC1 distance measurement system, which takes directly access to the measurement system over the serial communication port of the K-XC1.

Installation & Startup

1. Disconnect any K-XC1 from your computer
2. Start the setup.exe to install the RFbeam XC_Scope
3. After the installation, the driver for the K-XC1 will install automatically
4. Connect the K-XC1 over USB with your computer and power it up
5. Start the RFbeam XC_Scope
6. The software starts, searches the K-XC1 and connects to the K-XC1
7. You can now see the K-XC1 information at the left bottom of the software

Overview

Below is an overview of the graphical user interface from the XC_Scope:

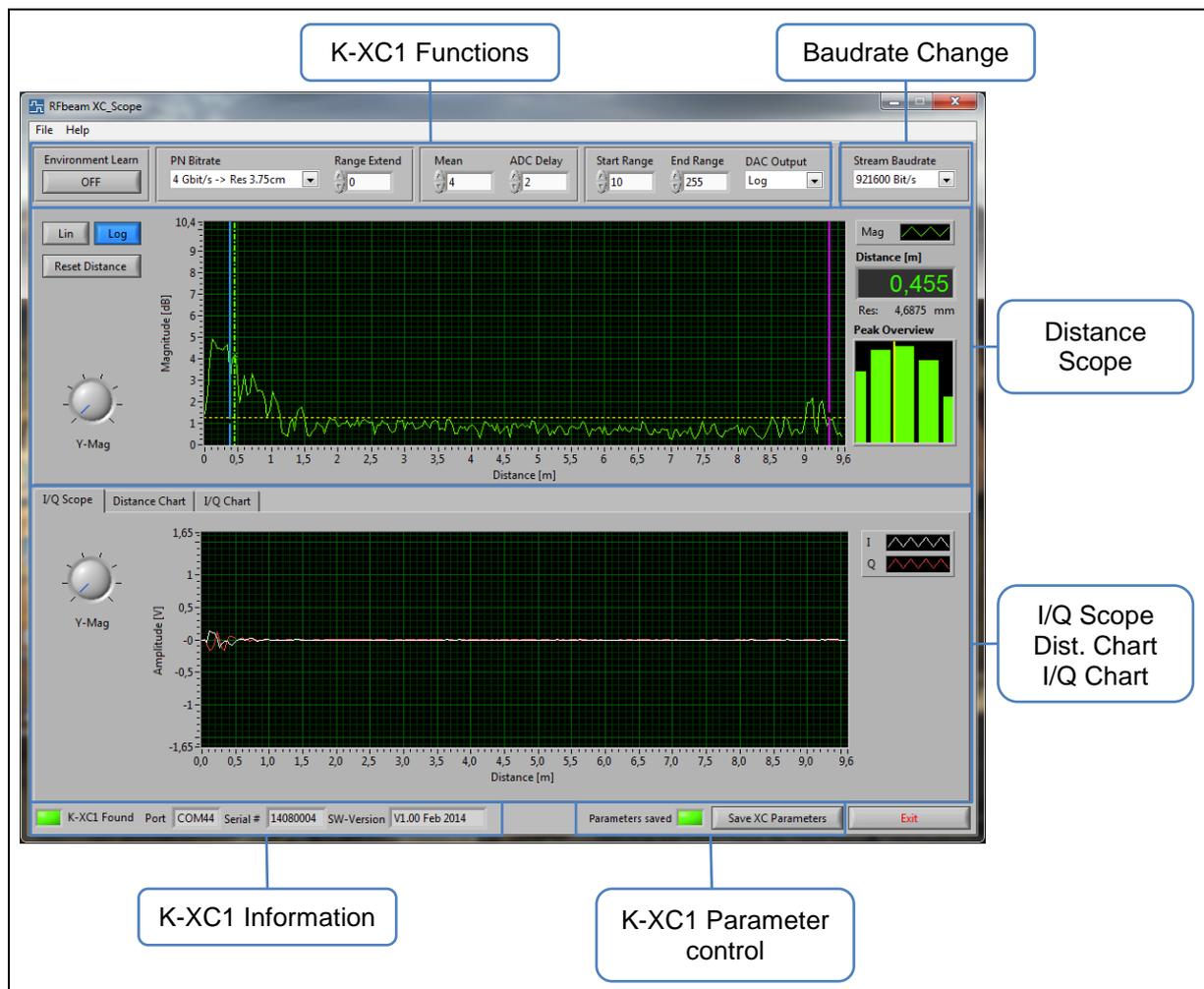


Figure 1: XC_Scope Overview

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Features

K-XC1 Functions

The following table shows and explains the K-XC1 functions that are configurable using XC_Scope:

Function	Values	Description
Environment Learn	On or Off	Learns the actual environment and blind it out in the distance scope.
PN Bitrate	1 Gbit/s -> Res 15.00cm	Sets the PN Bitrate to 1Gbit/s Resolution is 15.00cm per bin
	2 Gbit/s -> Res 7.50cm	Sets the PN Bitrate to 2Gbit/s Resolution is 7.50cm per bin
	3 Gbit/s -> Res 5.00cm	Sets the PN Bitrate to 3Gbit/s Resolution is 5.00cm per bin
	4 Gbit/s -> Res 3.75cm	Sets the PN Bitrate to 4Gbit/s Resolution is 3.75cm per bin
Range Extend	0 .. 3	Extends the range with the factor 2^{value}
Mean	1 .. 99	Calculates the mean with the value number of samples in the K-XC1
ADC Delay	0 .. 9	Increases the accuracy of amplitude measurement while taking a longer measurement time
Start Range	0 .. 255	Sets the start range for the DAC output
End Range	0 .. 255	Sets the end range for the DAC output
DAC Output	None	No signal at the DAC output
	Distance	Analog Output of the measured distance which is over the Trigger Level (Trigger Level is described in the terminal function description of the K-XC1)
	I	Sends the I channel information
	Q	Sends the Q channel information
	Mag	Sends the magnitude information
	Log	Sends the logarithmic magnitude information
	Dig	Changes the function of the X104 connector to digital mode. In digital mode the communication interface is available on the connector X104. (See K-XC1 Datasheet for further information)

Table 1: K-XC1 Functions

Parameter change

If you change a parameter, the K-XC1 parameter control indicates that the parameters are not saved. You can save the parameters to the K-XC1 by pressing the "Save XC Parameters" Button or the program asks you if you want to save them when you close XC_Scope.

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Baudrate Change

With the baud rate change list box it is possible to change the baud rate of the communication between the computer and the K-XC1. Normally it is recommended to use the highest baud rate. If the used computer is too slow use a slower baud rate for correct communication.

Distance Scope

The distance scope shows mainly the measured distance information from the K-XC1 and gives different features to measure peaks in the measure range.

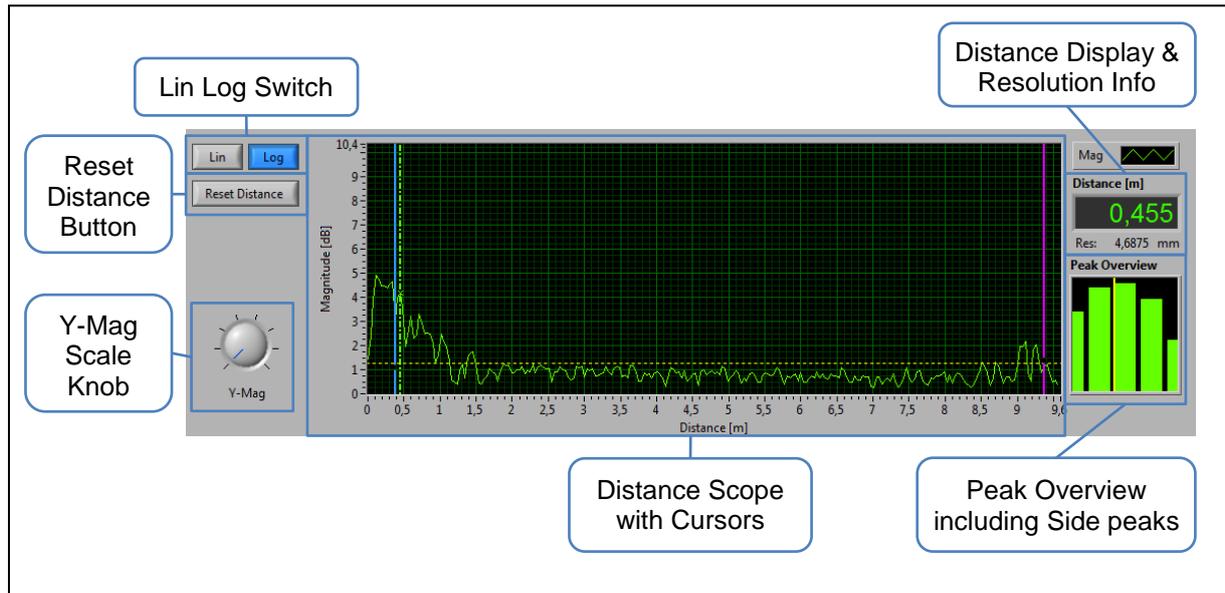


Figure 2: Distance Scope

The following table shows and explains the display scope functions:

Function	Description
Lin Log Switch	Changes the Magnitude between linear and logarithmic
Reset Distance Button	Sets the distance display to zero according to the actual detected peak in the distance scope
Y-Mag Scale Knob	Scales the Y-Axis of the distance scope
Distance Scope with cursors	Scope that displays the distance information measured by the K-XC1. It detects automatically the highest peak between the three cursors (blue, yellow, pink)
Distance Display & Resolution information	Shows the distance given by the detected peak. With a PN Bitrate of 4 Gbit/s the SW interpolates automatically an 8 times higher resolution than the 3.75cm given from the K-XC1. The interpolation algorithm is explained in the chapter <i>Fine Resolution Interpolation</i>
Peak Overview	Shows a zoomed overview of the detected peak and his side bins including a yellow cursor which shows the fine resolution distance calculated by the interpolation algorithm

Table 2: Distance Scope functions

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Fine Resolution Interpolation

It is possible to enhance the resolution of a K-XC1 with a weighting of the peaks left and right from the main peak. This peaks going up and down according to the position of the measured object between two main bins. Below is a graphic which describes this behaviour:

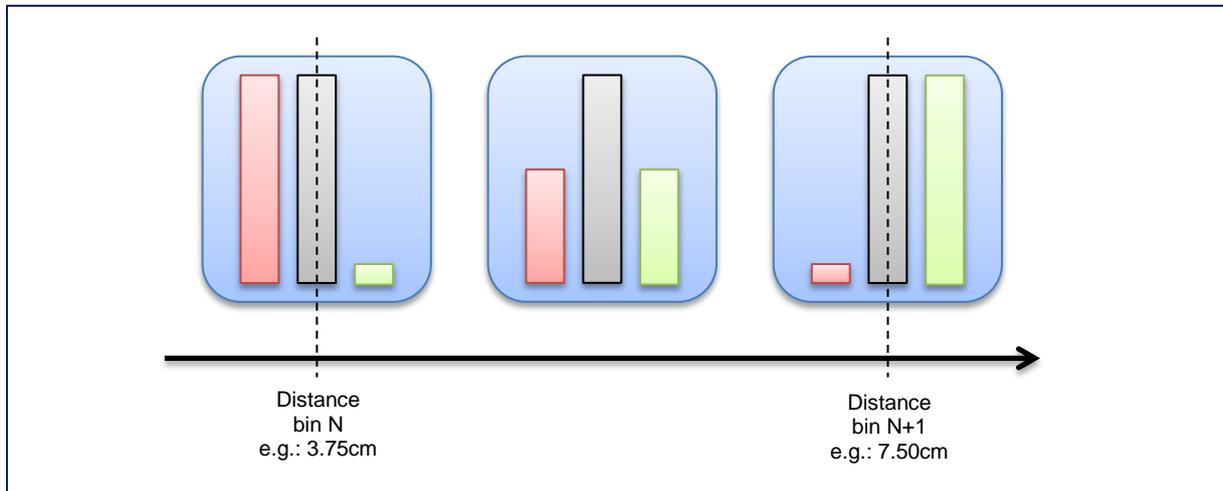


Figure 3: Relation between main peak and side peak between two bins

The XC_Scope software uses this behaviour to enhance the resolution by a factor of 8. It works with an algorithm that calculates the fine distance out of side peaks. This higher resolution is only available with a PN Bitrate of 4 Gbit/s.

I/Q Scope

The I/Q scope displays the I/Q raw signals out of the K-XC1 over the whole distance measurement range. It is possible to adjust the Y-Axis over the Y-Mag knob.

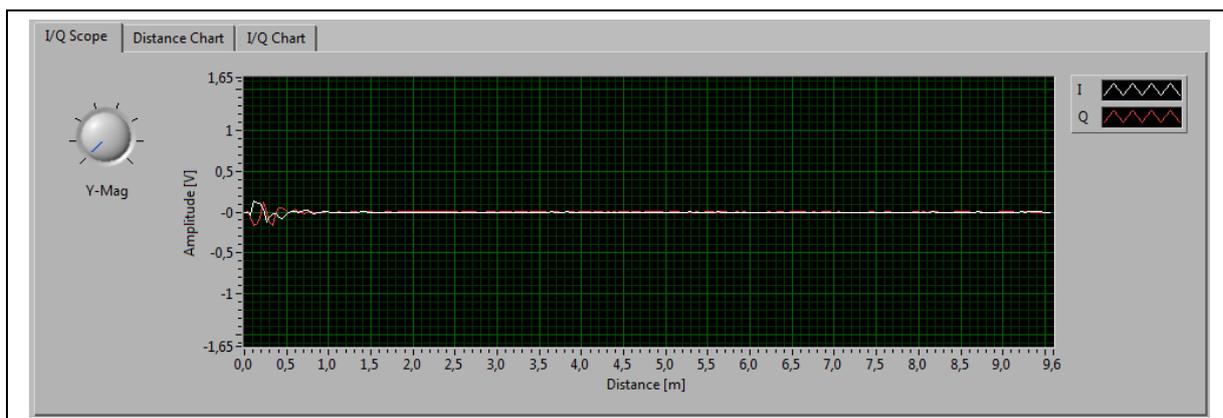


Figure 4: I/Q Scope

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Distance Chart

The distance chart shows the distance information of the detected peak (between the three cursors in the distance scope) over the time. It is possible to observe the distance of an object over the time.

You can adjust the Y-Axis with the Y-Mag knob and the X-Axis with the Sec/Div knob.

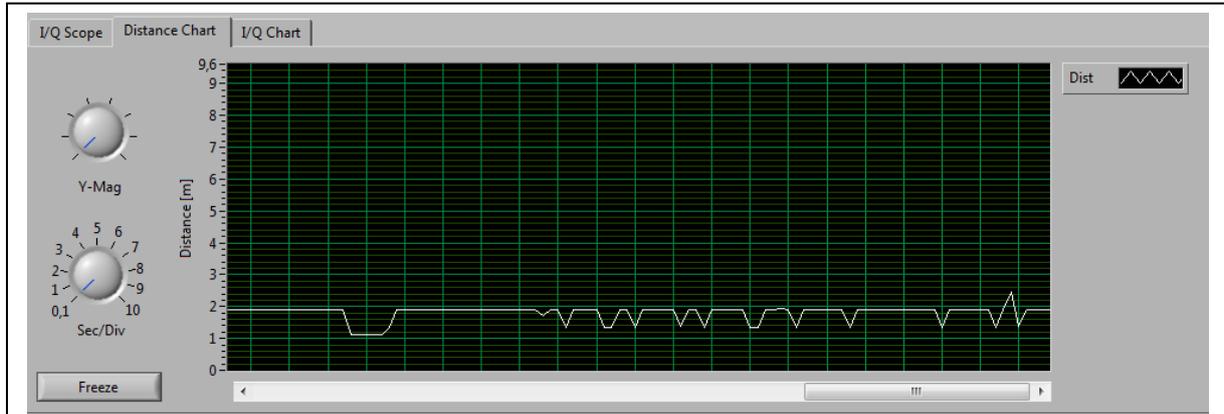


Figure 5: Distance Chart

I/Q Chart

The I/Q chart shows the I/Q raw signal and the magnitude of the detected peak over the time. When the object in the front of the K-XC1 is moving you can see here the doppler signals.

You can adjust the Y-Axis with the Y-Mag knob and the X-Axis with the Sec/Div knob.

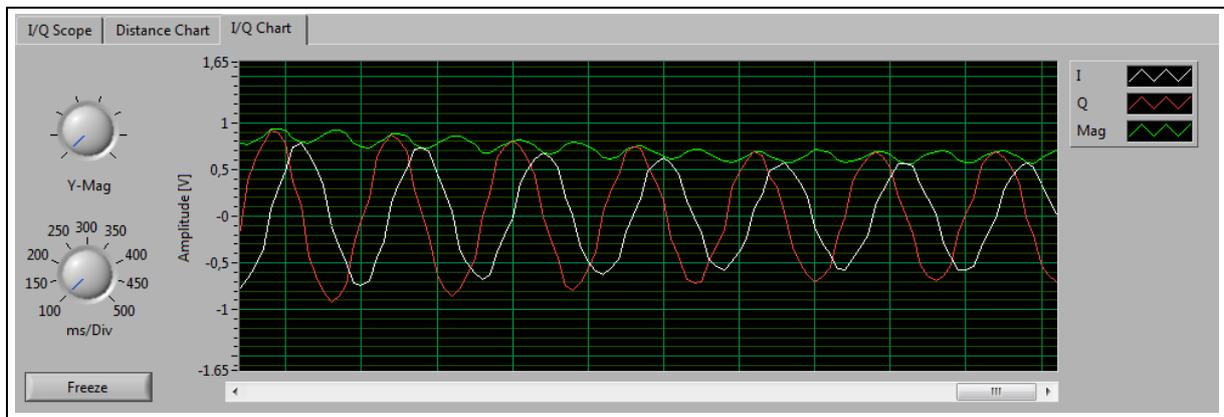


Figure 6: I/Q Chart

Version History

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