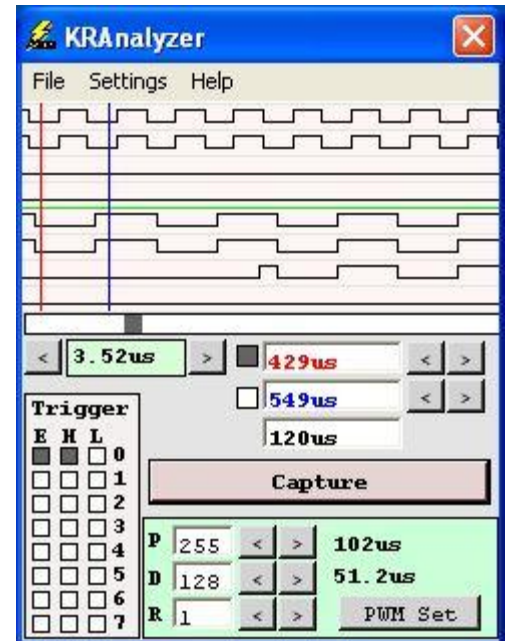
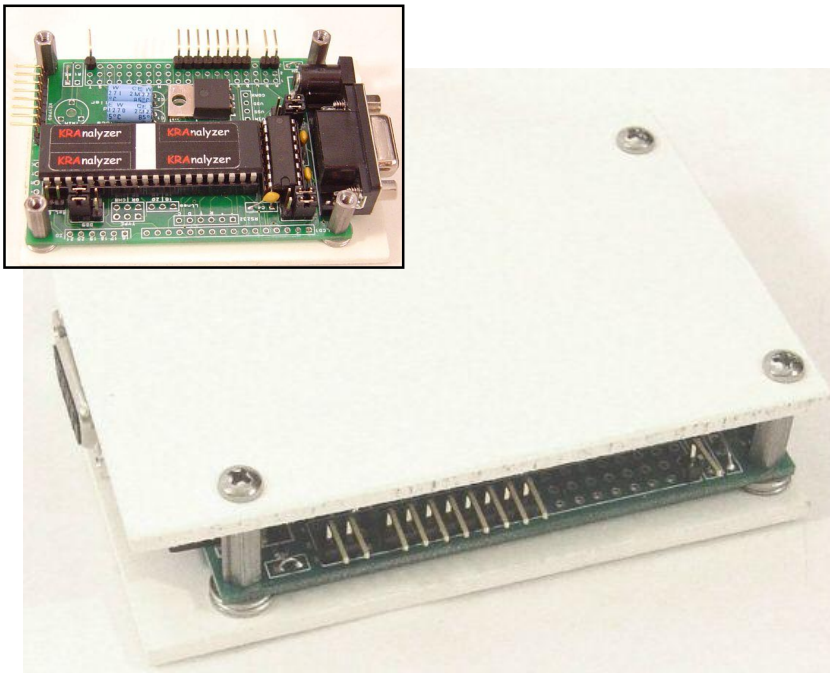


KRAnalyzer



I cant count how many times I have been asked about using Zeus to display logic data from the KRAnalyzer.

Well I figured that this application would be a good example of many of the inner workings of the Zeus Language.

In order to complete this project you will need Zeus Pro or Pocket Zeus. The program makes full use of bitmap manipulation which only these versions have.

You will also need a Dios Chip or a KRAnalyzer chip. We are offering the KRAnalyzer chip for those who don't want to go through the effort of programming the chip.

What is the KRAnalyzer

The KRAnalyzer is a 8 channel logic analyzer that will allow you to collect logic information from your digital circuits. It has single level trigger and other features that will allow you to look at the logic waveforms of various signals.

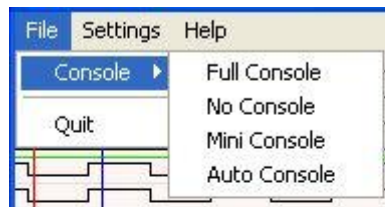
Program Operation

The operation of the Desktop and Pocket PC versions are nearly identical. The Pocket PC version takes a bit longer to draw the wave form but other than that they are the same.

First lets take a look at the menus. Note that the Pocket PC menus are located at the bottom and the Desktop menus are at the top of the form.

Console Menu

All Zeus Programs have these menu options by default unless the application designer has chosen to remove them with the '**Console 6**' command.



The console is where the application designer may or may not provide additional program information that is displayed as the program runs. In the case of KRAnalyzer it displays status information as it captures and collects data from the KRAnalyzer chip.

In addition run time errors may also be displayed to the console.

Full Console

This option replaces the graphics form with a text based console. While in this mode you can not use the graphics form.

No Console

This turns off the console display. The console is still collecting data but it will not display it unless you manually select one of the other modes.

Mini Console

This Places a very small console field at the bottom of the screen. On the Desktop this works ok but on the Pocket PC you loose some form functionality while it is in view.

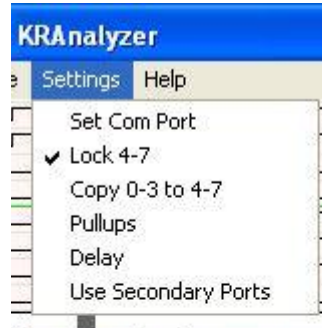
Auto Console

This is the default console mode. If data is sent to the console it will popup automatically in mini

mode and stay until you change the mode.

Program Settings

The program settings lets us change things like com port and various features of the KRAalyzer chip.



Set Com Port

By default the program will automatically use com port 1 when the program is started the first time. This menu option allows you to change this. Once changed the port number is saved to a file called ports and will be loaded each time you start the program.

Lock 4-7

When checked this option will lockout channels 4-7. When you capture data from the analyzer chip the data on channels 4-7 will be ignored and will not update the display. This has two purposes.

1. It speeds up the drawing time which is important on the Pocket PC.
2. It is possible to copy data from channels 0-3 to the space occupied by channels 4-7. This allows you to take one measurement then compare it to others.

Copy 0-3 to 4-7

This allow you to copy the captured data on channels 0-3 to the space occupied by channels 4-7. Note that this option will also lock out the channels 4-7.

Pullups

The primary ports (0-7) have the ability to pull them high with internal weak pullup resistors. This menu option lets you toggle this option on and off.

Delay

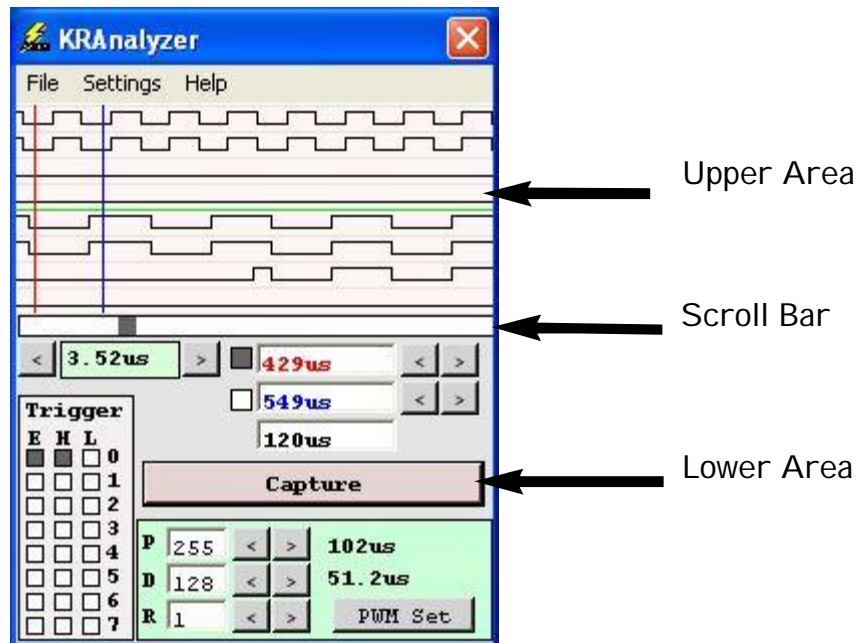
There are times when the data you want to measure is located some time after the trigger signal. This option allows you to set a delay in microseconds upto 64000us.

Use Secondary Ports

By default the ports 0-7 are used by the KRAalyzer chip. The code also supports a secondary set of ports as well. When this option is selected ports 22-29 are used instead. Note that the internal pullups do not work on the secondary ports.

Main Display

Lets take a look at the main display area.



The main form is divided into two areas. The upper area above the scroll bar is used to display your logic waveforms. The lower area below the scroll bar is used to set various option as well as start the actual waveform capture.

WaveForm Display (Upper Area)

This is where we display the captured wave form data. The actual capture resolution is 768 units but only 240 are displayed on the screen. By using the scroll bar you can move the display area.

The waveform display area is divided into two parts by a thin green line. The 4 traces above this line are ports 0-3 (primary) or 22-25 (secondary). The 4 traces below the line are ports 4-7 (primary) or 26-29 (secondary).

Note that the lower 4 traces can be locked out. When they are locked out they will no longer be updated. This allows you to capture data from these ports then disable the display so that you can do comparisons. As an option you may also copy the waveform data from the top 4 traces to the lower 4 trace locations.

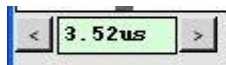
You will also notice two vertical lines. These are reference points that can be used to help you compare the various wave forms. One reference point is red and the other is blue. These correspond to two displays in the lower area. (More on this later) You can move the reference points one at a time by clicking on the waveform display area. Notice that only one reference point

moves. The point that moves is determined by the which reference point check box has been selected.

Control Area (Lower Area)

This area of the display lets us control various aspects of our waveform capture.

Capture Unit Selection



This is where you select the unit of resolution for each of the 768 capture points. There are 9 resolutions to choose from.

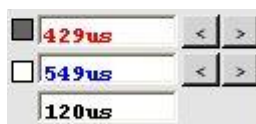
- 1.7us per unit for a total capture of 1305us
- 3.52us per unit for a total capture of 2703us
- 5.76us per unit for a total capture of 4423us
- 8.1us per unit for a total capture of 6220us
- 11.43us per unit for a total capture of 8778us
- 20.4us per unit for a total capture of 15667.us
- 37.43us per unit for a total capture of 28746us
- 76.53us per unit for a total capture of 58775us
- 137.7us per unit for a total capture of 105753us

The accuracy of the capture is based on the actual unit of the capture which is 1-2 units of accuracy with 1 unit of accuracy being typical.

So at 1.7us resolution you will get an accuracy of +-3.4us and +-1.7us typical.

You will notice that sometimes the Capture Unit is displayed in red. This means that the unit displayed does not match the captured data resolution so the reference point data will be inaccurate.

Reference Points

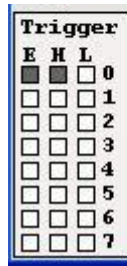


As mentioned above there are two reference points located on the waveform display. One is red and the other is blue. The relative position from the beginning of the wave form is displayed here in the appropriate color. You will notice a small selection box next to each display. This selection box dictates which reference point is moved when you click on the waveform display.

In addition you may move the points independently by clicking the small arrow buttons next to each display.

There is a third display in black. This is the difference between the two points.

Trigger Control



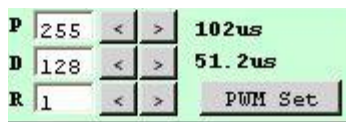
The KRAalyzer has two types of trigger. The Edge trigger and the Word trigger. You may have only one edge trigger assigned. You can select H for High to Low transition or L for Low to High transition. If neither H or L is selected for an Edge trigger Low to High transition is assumed.

What is a Edge trigger?

When an Edge trigger is enabled the KRAalyzer will monitor that port exclusively until the type of transition selected is encountered. Then the wave form will be captured normally. So if you have a edge trigger setup with High to Low transition the KRAalyzer chip will wait until it sees a High to Low transition on the port selected before it starts the capture.

If no Edge trigger is selected but you have selected various High and Low triggers this creates what we call a word trigger. The KRAalyzer will wait until all the selected ports are in the states indicated before a capture proceeds. The ports that don't have any selection are considered don't care.

Signal Generator



The KRAalyzer has a signal generator built-in. This signal is located on port 13. You can select the period (P) and the positive width (high time) of the signal (D).

There are three ranges (R) that you can select as well

Range 0 gets you a period between .2us and 25.5us in .1us units

Range 1 gets you a period between .8us and 102us in .4us units

Range 2 gets you a period between 3.2us and 406us in 1.6us units

The signal will be set to the readings shown when you start a capture or you can hit the PWM Set button to set them immediately.

Start Capture

Capture

This button starts a capture. It will change to a Stop button until the capture is complete. Once the button changes to a Stop button you can abort the capture.

Operation Notes

You may open more than one KRAalyzer application at a time. They can be connected to the same com port but only one can capture at a time. The com connection is not opened until a command is hit and once the capture or command is complete the com port closes.

On the Pocket PC you are kept from having multiple copies of the same applications running so the above does not apply. However you can compile and create two applications with different names and in this case the above does apply.

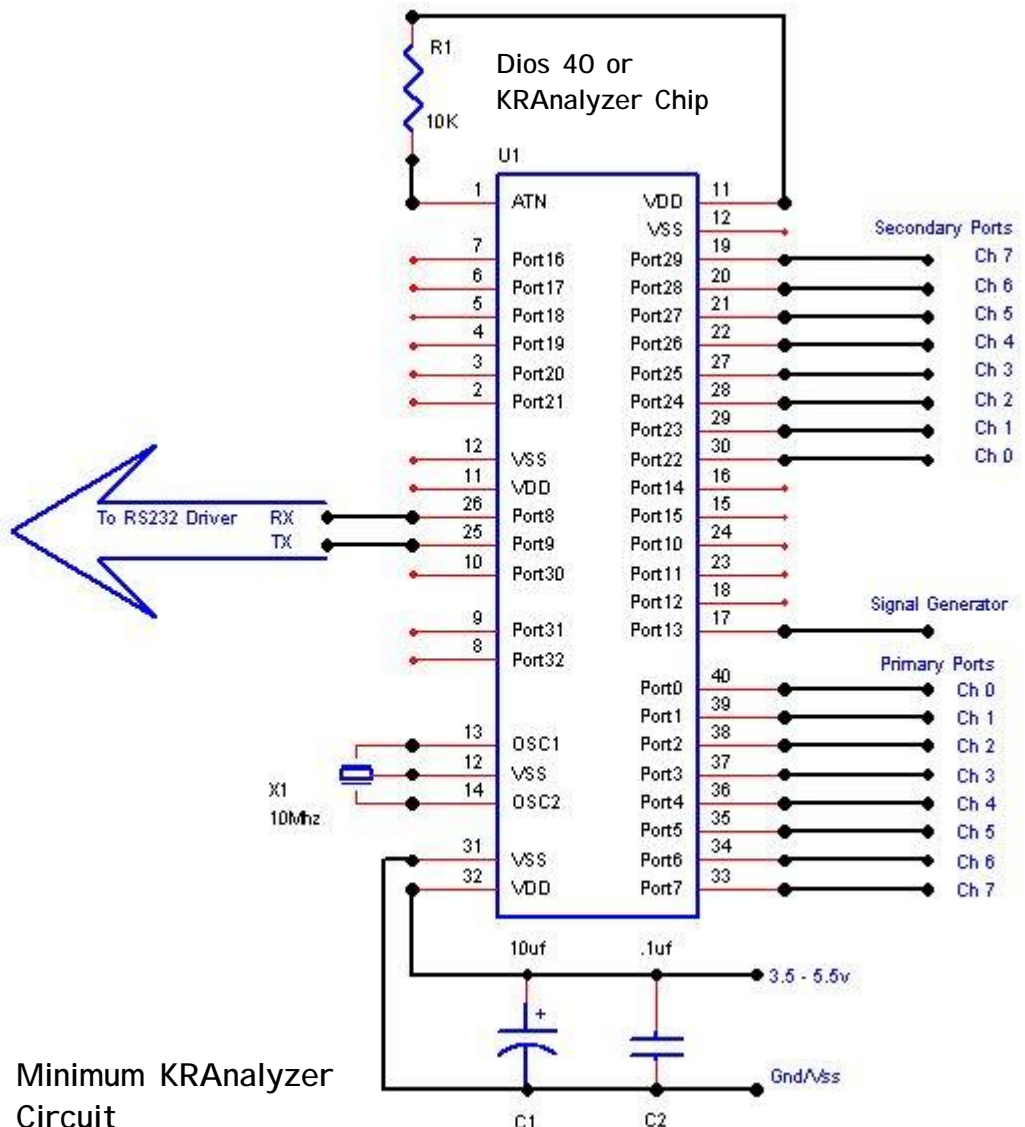
KRAalyzer Chip

You have a couple of choices when it comes to choosing your KRAalyzer chip.

You can use a Dios 40 chip and program it with the KRAalyzer code located on the Kronos Robotics website. Or you can purchase a dedicated KRAalyzer chip. Both work identical, the only difference is that the KRAalyzer chip is plug and play and can not be reprogrammed.

The simplest and minimum hookup is shown to the right. You will still need to build an RS232 driver or use one of our EZ232 boards.

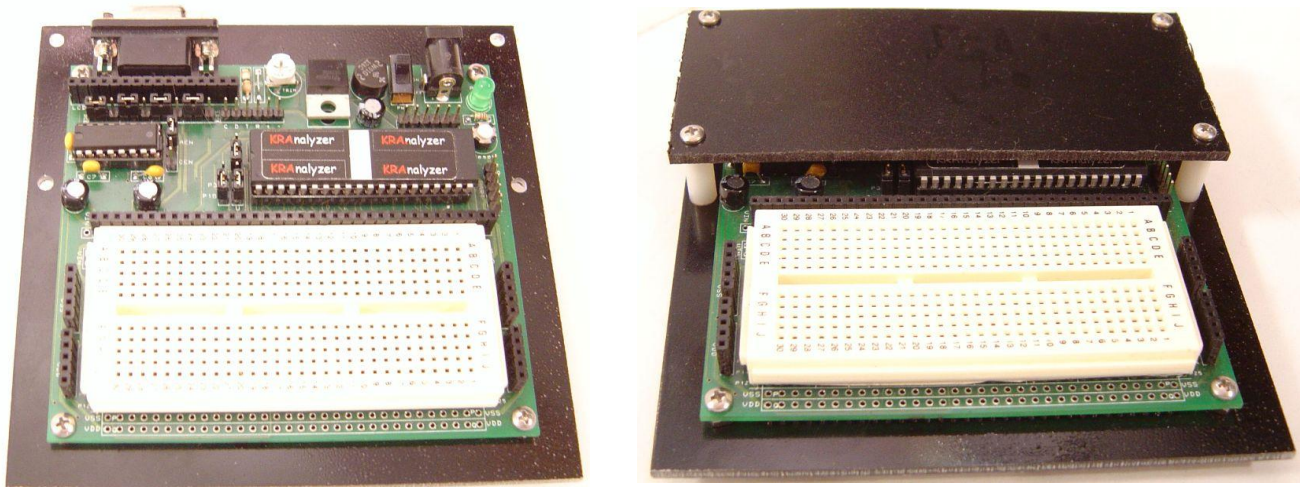
You can also use one or more of our Dios Carriers to create an all in one package.



Minimum KRAalyzer Circuit

The following are a few hookup examples using our various boards.

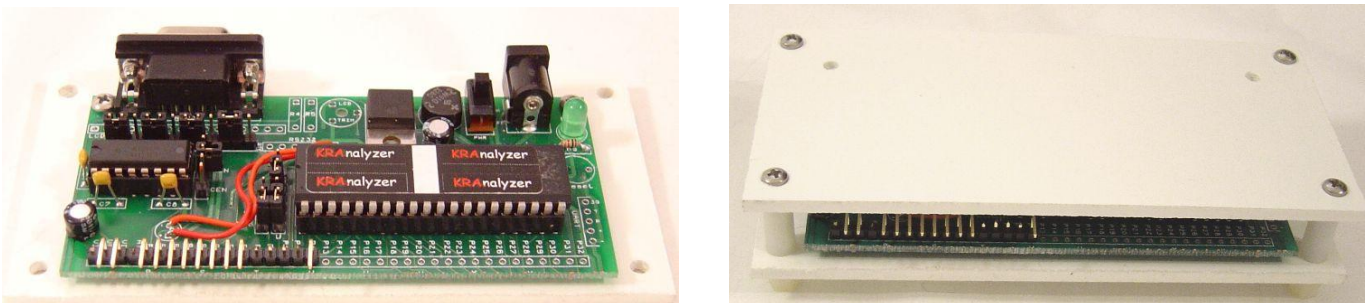
Dios Workboard Deluxe



This carrier is a no brainer. It requires no jumpers and supports all connections. It provides a breadboard for circuit hookup and prototyping. The connector can be configured as a DTE or DCE so it can be hooked up to a Pocket PC provided you can get hold of a male to mail gender changer.

This board can also be purchased with minimal componets as the Dios Workboard Basic or as just a PCB.

Modified Dios Workboard PCB

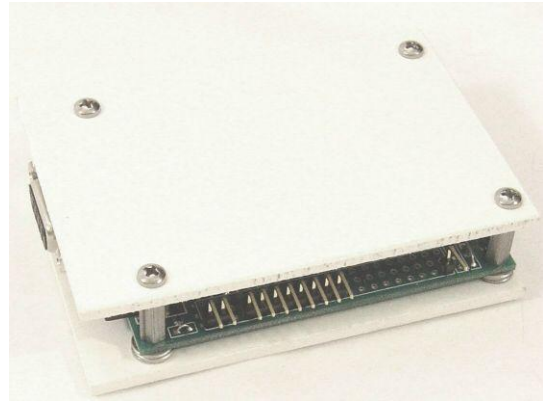
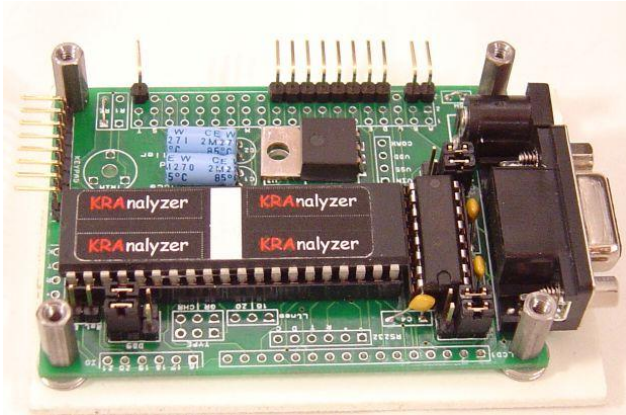


The only problem with the Workboard Deluxe is that it is pretty large. Here in this configuration I cut the board just above the prototype area. You need to provide 3 jumpers in order for this board to work.

- A jumper from C3 - to RS232 Connector -
- A jumper from C3 + to RS232 Jumper +
- A jumper from Pin 17 on the 40 pin chip to Port 13 on main header connector.

The downside to this configuration is that you don't have access to the secondary ports unless you want to jumper them as well.

The Smallest Option



Here we use the Dios Universal Carrier PCB. It provides the most compact package yet at 3.5" x 2.5" This one is our personal favorite.

Source Code

We are providing a download called KRAnalyzer.zip. This zip file contains the following files:

KRAnalyzer_DT.exe Compiled Desktop application
KRAnalyzer_PPc.exe Compiled Pocket PC application
KRAnalyzer.txt Zeus KRAnalyzer Source
DiosAnalyzer.txt Dios Analyser chip source
DiosAnalyzer.lib Protected library needed by DiosAnalyzer.txt to compile
help\KRAnalyzer.pdf This document.
help\KRAnalyzer.htm Help htm file
help\jpg files Help graphic images

Zeus has a unique ability to display a menu item called instructions under the help menu.

On the Pocket PC if the program detects a XXX.htm file. XXX is the name of the application minus the _DT or PPc extensions. This htm file must be located in a help directory located just under the applications directory.

On the Desktop the XXX.htm file as well as the XXX.pdf and even the XXX.hlp are supported. If any of these are found in the help directory the instructions option will be presented.