PC Oscilloscope Spectrum Analyzer Logic Analyzer DSO-50x12 Series User's Manual

Revision Ⅲ Software Win 7/2000/xp/Vista Version



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Accessories Contents

- The DSO-50x12 Series Aluminum unit.
- Logic Analyzer Pod.
- Two pieces (DSO-50212 Series) or Four pieces (DSO-50412). calibrated 300MHz Probe with (x1, x10). 10pF input Capacitance.
- Housing with twenty piece color wires and easy hook clips.
- USB 2.0 cable.
- Universal Power Supply with DC Adapter 12V/1A (DSO-50212), 12V/2A (DSO-50412).
- DSO-50x12 Series User's Manual.
- Control Software CD.

System Requirements

In order to use the DSO50x12, the following equipment is necessary:

- **Computer System:** Pentium PC system with at least one USB interface (USB 1.1 or 2.0 version).
- Memory: A minimum of 256 MB free RAM. 512 MB or 1GB is better.
- Mass Storage: At least one CD drives and hard disk drives.
- Monitor: Any monitor compatible with the above display adapter.
- Operation System: Windows 2000/XP/VISTA.

Installing Hardware

- Connects USB cable to DSO.
- Setup USB driver from CD.
- Plug in power source from +12V DC Adapter.
- Waiting for control software turn on.

Installing Software

- Insert the distribution CD into drive E: (here E: is CD driver).
- Enter file to run E:\DSO50x12\dso50x12.exe.
- Follow the on screen instructions.

Feature

- Innovative cross triggering: logic analyzer channels can trigger the analog channels and vice versa.
- Long time pre-triggering up to 262143*256 points, about -67M points.
- Fast data capture and screen update rates.
- Hot key function that is convenient to use.
- Deep 512K/2M sample data acquisition buffers on each channel (A1, A2, A3, A4, D0 ~ D11).
- Precision 200MHz Frequency counter, up to 7 digital resolution @ 512K memory for each analog channel.
- Advance Fast Fourier Transformations function to Bandwidth test.
- Support Pulse width and TV(NTSC525, PAL625) Triggering and count.
- Support high speed (up to 50MHz SCL clock) I²C , SPI Triggering.
- Support I²C, SPI, UART, more... serial bus timing encode.
- Convenient Timing state display for logic debug.

Guide to Operations

When making measurements with the Digital Storage Oscilloscope / Logic Analyzer Cards, meaningful data can only be captured with some prior knowledge of the characteristics of the circuit under test.

Before initiating any capture cycles, the DSO must be configured using the control program. See the software section later in the manual for instructions on these procedures.

To connect the DSO to the test circuit, there are two standard BNC probes, one for each Analog input channel, and a series of mini-clips on the Logic Analyzer Pod for the Logic Input channels. The scope probes have removable hook clips on their ends and an attached alligator clip for the signal ground connection. The Logic Analyzer Pod has inputs for 12 channels, D0 channel is the external clock input, and 8 ground points.

For synchronous data captures, external clock sources can be connected to the D0 channel. At times, it may also be necessary to connect the test circuit to the computer system itself. This will eliminate more noise in the test application due to ground level differentials. This is especially true when dealing with high speed timing analysis. Use a heavy gauge wire to make a connection between the test circuit ground and the case of the computer. Each Analog channel probe has a calibration adjustment. It is important that this calibration be made at least twice a year. See Calibration for more information.

When connecting the probes to any signal, make sure that the signal voltage is Within the limits of the DSO. check the technical information section for absolute maximum and recommended maximum input voltages for the probes.

Logic Analyzer Pod Markings: D0 ~ D11 Channel data inputs. GND Signal ground connection.

Main Screen



Horizontal Scroll Bar

This scroll bar is used in conjunction with a selected waveform or cursor. The Horizontal Scroll Bar will move a selected waveform or cursor left or right in the display area.

The Horizontal Scroll Bar works with Display, Analog input channels, Memory, Logic Analyzer channels, V1Bar, V2Bar, and Trigger Bar.

Vertical Scroll Bar

This scroll bar is used in conjunction with a selected waveform or cursor. The Vertical Scroll Bar will move a selected waveform or cursor up or down in the display area. The Vertical Scroll Bar works with Display, Analog input channels, Memory, H1Bar, and H2Bar.

Hardware Specifications

DSO-50212M Series Hardware Specifications

Model	DSO-50212M	Remark
Record Length	2MB / Ch	Points
Sampling Rate	Ch.A1: 1Sa/s to 1Gsa/s Ch.A2: 1Sa/s to 500MSa/s D0 ~ D11:1Sa/s to 500MSa/s	With a 1, 2, 5, sequence. Internal clock
External clock	1KHz to 50MHz (max.)	From Logic Channel D0
Analog Channel	Ch.A1, Ch.A2	8bit resolution
Input Bandwidth	ChA1: 200MHz (-3db) Ch.A2:100MHz (+/-0.5db), 125MHz (-1db)	@BNC connect (Probe 10:1)
Input Impedance	1Mohm // 15pF	
Max. input voltage	50v (100v Transient)	@BNC connect (Probe 1:1)
Input Sensitivity	5mv/div to 2v/div	
Trigger Sensitivity	0.5 div (250MHz)	
Trigger Level	Adjustable 250 level	10 Vertical Divisions
Trigger Type	Slope +/-, Pulse width +/-, TV (NTSC / PAL), Horizontal Synchronous Count Trigger.	Pulse detect < 16ns(min.)
Digital Channel	D0 ~ D11 (12ch)	Logic Pod
Input Bandwidth	150MHz (max.)	
Input Impedance	100K ohm 2pF	
Input Sensitivity	< 500mv	
Channel skew	< 2ns	
Max. Input Voltage	+/- 50v (100v Transient)	
Threshold Voltage	-2v to +6v	by 32mv step
Trigger Qualify	Parallel: 0, 1, X (don't care) settings for al Digital channels I ² C: 0, 1, X (don't care) settings for 4 (bytes+ Ack) long SPI: 0, 1, X (don't care) settings for 36bit long	
Operate	Mouse	
Power Supply	DC Adapter 12\//1A	
PC Interface	USB (Version 1 1/2 0)	
Net Weight	1 2 KGS	
Size (Dimension)	220mm x142mm x 40mm	Aluminum Case
Accessories	Logic Analyzer pod, USB 2.0 cable. Calibrated Probe (1:1, 10:1) x 2 pcs. User's Manual, Software CD. Housing with Color wires & clips x 16 pcs. DC Adapter 12V/1.0A.	

DSO-50412M Hardware Specifications

Model	DSO-50412M	Remark
Record Length	2MB / Ch	Points
Sampling Rate	Ch.A1, Ch.A3: 1Sa/s to 1Gsa/s Ch.A2, Ch.A4: 1Sa/s to 500MSa/s D0 ~ D11:1Sa/s to 500MSa/s	With a 1, 2, 5, sequence. Internal clock
External clock	1 KHz to 50MHz (max.)	From Logic Channel D0
Analog Channel	Ch.A1, Ch.A2, Ch.A3, Ch.A4	8bit resolution
Input Bandwidth	Ch.A1, Ch.A3: 200MHz (-3db) Ch.A2, Ch.A4:100MHz (+/-0.5db),125MHz (-1db)	@BNC connect (Probe 10:1)
Input Impedance	1Mohm // 15pF	
Max. input voltage	50v (100v Transient)	@RNC connect (Probe 1:1)
Input Sensitivity	5mv/div to 2v/div	
Max. input voltage	50v (100v Transient)	
Trigger Level	Adjustable 250 level	10 Vertical Divisions
Trigger Type	Slope +/-, Pulse width +/-, TV (NTSC / PAL), Horizontal Synchronous Count Trigger.	Pulse detect < 16ns(min.)
Digital Channel	D0 ~ D11 (12ch)	Logic Pod
Input Bandwidth	150MHz (max.)	
Input Impedance	100K ohm 2pF	
Input Sensitivity	< 500mv	
Channel skew	< 2ns	
Max. Input Voltage	+/- 50v (100v Transient)	
Threshold Voltage	-2v to +6v	by 32mv step
Trigger Qualify	Parallel: 0, 1, X (don't care) settings for all Digital channels. I ² C: 0, 1, X (don't care) settings for 4 (bytes+ Ack) long. SPI: 0, 1, X (don't care) settings for 36bit long.	
Operate	Mouse	
Power Supply	DC Adapter 12V/1A	
PC Interface	USB (Version 1.1/2.0)	
Net Weight	1.8KGS	
Size (Dimension)	225mm x 135mm x 60mm	Aluminum Case
Accessories	Logic Analyzer pod, USB 2.0 cable. Calibrated Probe (1:1, 10:1) x 4 pcs. User's Manual, Software CD. Housing with Color wires & clips x 16 pcs. DC Adapter 12V/2.0A.	

Hot Key Function

"G"/"g"	GO/Stop
"P"/"p"	Probe
"C"/"c"	Couple
"V"/"v"	V/div
"O"/"o"	Offset
"U"/"u"	Capture
"T"/"t"	TrigCh (Trigger Channel)
"R"/"r"	Rate
"Z"/"z"	Zoom
"D"/"d"	Depth
"Space"	to switch A1,A2,A3,A4,F1 Channel
"Print screen"	Copy screen image to clip board.
Control key	
Ctrl +"G"	Turn On/Off Grid display.
Ctrl +"H"	Turn On/Off H bar display.
Ctrl +"D"	Turn On/Off Dots connect.
Ctrl +"Z"	Turn On/Off Zoom view.
Ctrl +"P"	Perform persist.
Ctrl +"R"	Refresh screen.

Tool Bar

GO The Go command tells the DSO to start acquiring data when the trigger conditions are satisfied.

Pressed means Start capture, un-pressed means stop capture.

Moves one or more cursors to the display area. These commands are also available by clicking on the toolbar.

- Centers waveform display area around V1Bar.
- Centers waveform display area around V2Bar.
- Centers waveform display area around the Trigger Bar.
- Moves Trigger Bar, V1Bar and V2Bar onto the waveform display area.
- Moves V1Bar onto the waveform display area.
- Moves Trigger Bar onto the waveform display area.
- Moves V2Bar onto the waveform display area.
- Moves H1Bar and H2Bar onto the waveform display area.
- Automatic setup parameters for Trigger Channel.

File Menu

<u>File V</u> iew <u>S</u> etup <u>Logic B</u> ackup				
Load Settings				
Load Data(Binary)				
Load Data Option	▶			
Save <u>S</u> ettings				
Save <u>D</u> ata(Binary)				
Save Channel Data(Text)				
Transfer data to <u>E</u> xcel				
Load Default Settings				
✓ <u>A</u> uto Load Settings				
Print	•			
Exit Ctrl+X				
500				
Load data	This option loads a data file (.dso), with a setting file (.ini) together.			
Load data option	This option select of A1, A2, A3, A4 or D0 ~ D11 channel to be load.			
Save setting	This option saves the current settings to a setting file (.ini).			
Cova data	This option saves a data file (.dso), every time saves all (A1, A2,			
Save data	A3, A4, D0-D11) data depend on Depth setting.			
Treveter dete te Freed	This option will convert data to Microsoft Excel by Decimal,			
I ransfer data to Excel	Hexdecimal, Ascii or unit(v).			
Load setting	This option loads a previously Setting file (.ini).			
Load Default Setting	Reset all parameters to factory defaults.			
Auto Lood Cotting	Turns on or turns off the Autoload option. When this option is on,			
Auto. Load Setting	all settings will be loaded when start the program.			
Print Screen	This option allows you to print Screen (Hard copy).			
Print FFT	This option allows you to print FFT form.			
Print Timing View	This option allows you to print Main Screen Form.			
	Use this command to end your session. You can also use the			
Exit	Close command on the application Control menu.			

View Menu

View	Setup	Logic	Backup	Q	
Sta	tus <u>B</u> ar				
Ch	annel Di:	splay		۲	
Lo;	gic Ch H	eight		۲	
Gn	oup Heig	ht		1	
Tin	ne or <u>S</u> ar	nples		×	🗸 Display Time
✓ <u>G</u> ri	d display	,	Ctrl+G		Dispay Sample:
✓ Hb	ar on/off	•	Ctrl+H		
✓ Do	ts connec	et 🛛	Ctrl+D		
✓ Zoo	om view		Ctrl+Z		
Per	sistance		Ctrl+P		
Ret	fresh scre	een	Ctrl+R		
Zoo	om Align	n from		F	

Status Bar	Show or hide Status Bar.			
Channel display	 When display is checked, the channel will be displayed on the screen. When display is not checked, the channel will not be displayed on the screen. Turning Display off for a channel will speed up the display. However the data is still acquired from that channel unless transfer is turned off. A channel's display can also be set with the buttons on the left edge of the screen. If the channel is on the button will be highlighted. You can also turn on/off transfer of the data for a channel. Note: This command applies to both analog and digital channels. 			
Channel Height	Adjust height of logic channel (D0 ~ D11).			
Time and Samples	For Timing display, display Time like as 123.456ms, or display how many samples.			
Grid	Show or hide grid on analog display.			
Dots connect	 Dots connect off None checking this option will display only the data points of the analog waveform. Logic data is unaffected by this option. This is the second fastest display option. Note that Lines will always be shown when in Sin (X) / X or Filter Interpolation modes. Dots connect on Checking this option will display the lines connecting the data points and the data points of the analog waveform. Logic data is unaffected by this option. This is the slowest display option. Note: The lines and dots can be set to different colors. 			
Zoom view	Compress and display the entire memory on the up screen.			
Persistence	Turns on or turns off Persistence Mode. In this mode, with each acquisition of data, all previous waveform data remains on the display area. This mode is useful for finding waveform anomalies that occur infrequently. Persistence Mode is also useful for evaluating signal			

	jitter. Scroll, zoom, change display width, or any update of the screen will erase all of the old data and will initiate a new Persistence Mode capture.
	To turn Persistence On, select Persistence from the View Menu. To turn Persistence Off, select Persistence again from the View Menu. Note: scroll, zoom, change display width, or any update of the screen will erase all of the old data.
	See also: View menu, Toolbar, clear button.
Zoom align from	Set cursor Bar (V1, V2, Trigger, Screen (left or center)) for zoom operate reference.

Setup Menu

Setup	<u>L</u> ogic <u>B</u> ackup	<u>C</u> olor	W	Lindow	Help	Test	
Cha <u>C</u> al	annel <u>M</u> ode ibrate		+	SET	Trig	gere	d
Free	quency Counter		•	Chan	nel A <u>1</u>		
Sof	tware Catch		۲	Chan	nel A <u>2</u>		
Fun	iction Channel	Ctrl+F		Coun	ter resol	ution	
Me	asurements	Ctrl+M		Coun	ter offse	t	۲
Init	ialize(Hardware)	Ctrl+I		÷.			

Channel mode	To select 1 Ch (1Gsa/s sampling) or 2 Ch (500Msa/s) mode in DSO-50212. To select 2 Ch (1Gsa/s sampling) or 4 Ch (500Msa/s) mode in DSO-50412.
Calibration	 Connect the scope probe Ground Connection to the BNC GND. Hold the probe's tip against the calibration point on the BNC center Hole. A Square wave signal should appear on the screen. Adjust the probe calibration until a true square wave is shown on the screen, noting the corners of the waveform which should be sharp and square, not rounded over or peaky.
Frequency counter	Precision 7 digital resolution frequency counter for A1, A2, A3, A4 channel.
Software catch	To capture data rate lower 500Sa/s be used, no Triggering.
Function Channel	To perform Channel +, -, *, /.
Measurements	Setup Measure Item.
Initialize (Hardware)	This function allows you to restart DSO.

Logic Menu

<u>L</u> ogic	Backup	$\underline{C}olor$	<u>W</u> indo [.]
<u>T</u> rig	ger word	Ctr	l+T
Sear	rch Logic (ilata Ctr	1+5
Gro	up Edit		
Mne	emonic Ed	it	

Trigger word

Logic Trigger Setup 🛛 🛛 🕅					
<pre> Parallel (D(11:0)) Update I2C (D1:SCL, D0:SDA) OK SPI (D2:CS-, D1:SCL, D0:SDA) OK </pre>					
- Parallel Trigg	per D(15:8)	D(7:0)			
C Qualify0	xxxx0000	11111111	V1Bar		
Qualify1	xxxx0000	11111111	V2Bar		
C Qualify2	xxxx0000	11111111	v20ai		
C Qualify3	xxxx0000	11111111	Trigger		
C Group0	xxxx0000	11111111			
C Group1	xxxx0000	11111111			
C Group2	xxxx0000	11111111			
C Group3	xxxx0000	11111111			

Set Trigger word for digital channel 11 ~ 0 or Group 0 ~ 3.

The Trigger word backup four Qualify data and four Group data for quickly set digital trigger.

conveniently setup from V bars.

Search data	
Search Logic data	
Option GroupO by v1 Group1 by v1 Group2 by v1	Search data by V1bar C V2bar
C Group3 by v1 C V1bar data C V2bar data	→ D15-D8 ×××××××× D7-D0 00001001
C Trigger bar	Backward Forward

Sorting through all your data is easier with our search feature ! You can specify a search pattern, including Don't Care bits, in any shown numeric bases. Then just click on the forward or backwards search to find what you are looking for !

Group edit									
Group edit		3baar		-9-2 					×
□ Group0 Hex 💌 8 bits 💌	7	6	5	4	3	2	1	0	D(7:0)
□ Group1 Hex 12 bits 13 12 11 10	9	8	7	6	5	4	3	2	D(11:0)
□ Group2 Hex 💌 8 bits 💌	10	9	8	7	6	5	4	3	D(7:0)
Group3 Oct 💌 8 bits 💌	11	10	9	8	7	6	5	4	D(7:0)
IZC Hex -	1	(D1:S	ICL, C	00:SI	DA)		1	0	
SP Hex T CS-active high Data on falling edge (D2	:CS-,	D1:S	CL, C)0:SI	DA)	2	1	0	
UARTO Hex 🔽 🗖 Parity check								3	
UART1 Hex 💽 Set Sampling Rate to 2Msa/s (Defaut: 1 Star	t bit	1Ste	op bit	t 8 d	lata l	bit)		4	
Baudrate 38400 26us Channel select 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 OK 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 OK									
Edit channel 11 ~ 0 for Group Channel, every Group Channel supports 16 Ch Max. Could be									
display in Hex, decimal, binary, Oct, or Ascii code.	display in Hex, decimal, binary, Oct, or Ascii code.								

Mnemonic edit

smemonic setup		×	
Group select	Group0 💌	OK	
v xxx11xxx		Read	
v xxx10xxx		Write	
x11xxxxx		memRead	
x10xxxxx		memWrite	
🔽 x1111xxx		Reset	

Backup	
Backup <u>C</u> olor <u>W</u> ir	du
Copy A1 to M1	
Copy A2 to M1	
Copy A3 to M1	
Copy A4 to M1	
Copy A1 to M2	
Copy A2 to M2	
Copy A3 to M2	
Copy A4 to M2	_
Clear A1 buffer	
Clear A2 buffer	
Clear A3 buffer	
Clear A4 buffer	
Clear M1 buffer	
Clear MZ Duffer	
Clear Buffer all	
Char Dater al	
Backup Analog	Channel to M1, M2 channel:
Copy A1 to M1	Store channel A1 to M1(memory 1)
Copy A1 to M2	Store channel A1 to M2(memory 2)
Copy A2 to M1	Store channel A1 to M1(memory 1)

Channel Box

A1 A2 A	3 A4 M1 M2 F1
Probe	10:1
<u>C</u> ouple	DC <
<u>V</u> /div	200mV •
Offset	0.mV
H1	800.mV 🔁
H2	-800.mV. 📥 🚽
H1-H2	-1.6V

A different channel can be selected by hitting the "A1, A2, A3, A4, M1, M2, F1" Channel select button.

Probe

This controls the attenuation level for the probe inputs. This should be set to match the probe itself, either 1x, 10x, 100x or 1000x. When working with signal amplitudes within 200V, either the 1X or the 10X setting can be used. However, if the signal amplitude is outside of 200V, use the 100X setting. Note that using the 10X setting with both the probe and the scope even for signals within 200V will provide better frequency response through the system due to smaller voltage swings through to the digitizer..

Voltage range Probe and probe settings:

5mv/div to 2v/div @probe 1:1

50mv/div to 20v/div @probe 10:1

500mv/div to 200v/div @probe 100:1

5v/div to 2000v/div @probe 1000:1

Coupling

The three selections available are AC, DC, and GND couple. In the AC setting, the signal for The selected channel is coupled capacitivity, effectively blocking the DC components of the input signal and filtering out frequencies below 10 Hz. The input impedance is 1MW || 5pF. In the DC setting, all signal frequency components of the signal for the selected channel, are allowed to pass through. The input impedance is 1 MW || 5pF. In the GND setting, both the input and the A/D converter are connected to ground. Again, the input impedance is 1 MW || 5pF. Use for setting the Ground reference point on the display

or if calibrating the DSO board.

Volts/Division

V/div controls the vertical sensitivity factor in Volts/division for the selected analog channel.

Each V/div step follows in a 1-2-5 sequence.

To get the best representation of the input signal, set V/div such that the maximum amplitude swing is displayed on the screen.

This will match the signal amplitude to use most of the digitizer's range, allowing the most bits to be used.

Volts/division can be set via the V/div Combo to Settings.

Volts/division Probe can be set to

5mV, 10mV, 20mV, 50mV, 100mV, 200mV, 500mV, 1V, 2V (1:1)

50mV, 100mV, 200mV, 500mV, 1V, 2V, 5V, 10V, 20V (10:1)

500mV, 1V, 2V, 5V, 10V, 20V, 50V, 100V, 200V (100:1)

5V, 10V, 20V, 50V, 100V, 200V, 500V, 1000V, 2000V (1000:1)

Offset

This parameter offsets the input signal in relation to the digitizer. This changes the usable input voltage range. The input voltage range is the offset +/- 5 divisions. Thus if you moved the offset to 1.00V with 1V /division the usable range would be 6.00V to -4.00V. Data outside the input range is clipped and stored as either the max or min input value. The offset references the 0.00V point (GND) for the input channel. The ground point is marked on the screen by the Ground Point Tick Marks to the right of the Analog Display. To change the offset in this dialog box, move the elevator button in the scroll bar. The offset can also be changed by grabbing and moving the appropriate Ground Point Tick Mark in the analog display area.

Trigger Box

TrigCh 🛛 🗛 🗸	
TrigType 📭 +Pulse 💌	
Level -320.mV	
Width > 40 ns	
100 ns ±60 ns	
Count 3	1
TrigCh	To select A1, A2, A3, A4 or Logic pod for Trigger source.
TrigType	To select +Slope, -Slope, +Pulse width, -Pulse width, NTSC/525 or PAL/625 for Analog channel.
Level	To adjust Trigger Level for A1, A2, A3, A4 or Threshold for Logic Channel.
Width (Pulse width)	To adjust pulse width for A1, A2, A3, A4 Analog Channel trigger.
Count	To adjust pulse count for A1, A2, A3, A4 Analog Channel trigger.



This figure shows 200ns +Pulse width Trigger at third count.

Al A2 A	3 A4 MI M2 F1	Capt <u>u</u>	re Normal	•	Rate F	125MSa/S	1	Zoom x	-	Dept	h 4K	-
Probe	10:1 💌				Б		ныс	nnn r		i - i		
<u>C</u> ouple	DC 🔽	-	1568 🔺 🕨									
<u>V</u> /div	500mV · ·		С <u>.</u>							الـــا المد		
Uffset	-1.5 V 3.5 V	_	500mV 1.37388MF	łz :								
H2 H1-H2	-500.mV	J										
<u>T</u> rigCh	.A1 💌	1			_			۴		sa d a		
Tr <u>i</u> gType	L F -Pulse 💌	2115									1 23 2 2	
Level	1.5 V			<u>a na mana 19</u> ma M						<u>1997-1997-1997</u> 1		
Width	> 176 ns	200	der side		en 972		307 888	u sang	888) 8784		e 1822 (1971-183	
200 ns	< 224 ns						202 - 202					
124 115	<u> </u>	A1	- 		اسمعان		•••••••		••••••••••		. 	
Count	3	000	400 ns		0.00				1920100			

This figure shows 200ns -Pulse width Trigger at third count.

A1 A2 A3 A4 M1 M2 F1	Capture Normal 💌 Rate 250MSa/S • Zoom x1 • Depth 4K	
Probe 10:1 Couple DC V/div 500mV Offset 1. V H1 3. V H2 1. V H1-H2 4. V TrigCh .12C_D(1:0) Level 1.248 V	5.92us 5.92us Logic Trigger Setup C Parallel (D(11:0)) Update C I2C (D1:SCL, D0:SDA) C SPI (D2:CS-, D1:SCL, D0:SDA) OK 12C Length 4(Bytes+Ack) MSB 10100110 X Ack A6 MSB 10000100 X Ack 84 011110011 Ack 73 C heck Stream Head(Start)	
00 I2C Grp4 2	A6 Write 0 95 0 84 0 73 0 Start	
SDA 0 0011		
SCL 1 1011		
This figure shows 4 (bytes	+ Ack) I2C Trigger.	



This figure shows 28 bits **SPI** Trigger.

Color Setup



The color of each channel, Group, cursor line(V1, V2, Trigger bar, Screen, H1,H2)... can be set

independently.

Measurements

Measur	ements 🗶
V_Max.	240.mV
V_Min.	-240.mV
V_p-p.	480.mV
Period	2.4us
Freq.	416.667KHz
V_Max.	240.mV
V_Min.	-232.mV
V_p-p.	472.mV

Automatic measurements on input waveforms can be performed. These include frequency, period, rise time, fall time, min, max, area, Pulse parameter measurements are performed as specified by ANSI/IEEE std 181-1977 IEEE

Standard on Pulse Measurement and Analysis by Objective Techniques.

Up to 10 signal parameters can be measured, tested, and displayed simultaneously. To setup A measurement, select the Measurements (Setup menu) and choose one of the tests to setup (1 to 11).

Area	Sum of all voltages * sample time.
V1Bar (time)	V1Bar (time) position of V1Bar in time.
V2Bar (time)	V2Bar (time) position of V2Bar in time.
Trigger (time)	Trigger position of trigger Bar in time.
V1-V2 (time)	Time difference between V1Bar and V2Bar.
V1-trigger (time)	Time difference between V1Bar and Trigger.
V2-trigger (time)	Time difference between V2Bar and Trigger.
H1-H2 (voltage)	Voltage difference between H1Bar and H2Bar.
V_max.	Maximum voltage.
V_min.	Minimum voltage.
V_p-р.	The difference between maximum and minimum voltages.
V_avg.	Average of minimum and maximum voltages.
rms SQRT	((1/ # samples) * (sum ((each voltage) * (each voltage))))
rms (AC) SQRT	((1/ # samples) * (sum ((each voltage - mean) * (each voltage - mean))))
Period	Average time for a full cycle for all full cycles in range.
Risetime(1090)	Average time for a rising transition between the 10% to the 90% points.
Risetime(2080)	Average time for a rising transition between the 20% to the 80% points.
Falltime(1090)	Average time for a falling transition between the 10% to the 90% points.
Falltime(2080)	Average time for a falling transition between the 20% to the 80% points.
Pulse width (positive)	Average width of positive pulses measured at 50% level.
Pulse width (negative)	Average width of negative pulses measured at 50% level.
Frequency	Average frequency of waveform.

Parameter Measurements

ŦT		×
		 ✓ ● 30.525KHz ✓ ● 91.575KHz
0 dBmV		a stat stata Stati s
Mari e 19 e 1		e ene ene pre e
HAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	1 A H A F A F	
	ኯኯዸዸዸዸኯዸኯዸዸ	ለስለስለስለስለ
	╏┪╀ѦѼ╋ҲѦѼѼѼӉ	
	μ	NY . U U U U U U U U U U U U
15.263KHz	61.05KHz	106.838KHz
H1 40.dBmV	GainType Powerspec	trum 🗾 Points 1024 📃
H2 -120.dBmV - DB/div 20	DBm 💌 Window Hanning	Zoom /5 💽

The FFT window allows control and display of FFT's.

The following controls are available:

ССТ

Window Select the FFT window type: (Triangular, Hanning, Hamming, Blackman-Harris, Rectangular, Wetch and Parzen).

Sample points Select how many points the FFT will sample, points can't exceed memory depth.Horizontal zoom Select horizontal zoom ratio.

The FFT routines will process the selected channel starting at V1Bar and continue until "Sample Points" number of points has been reached. If V1Bar is not within the buffer, start of buffer will be used.

Further information on FFT's can be found in the following sources:

Embedded Systems Programming magazine Volume 3, Number 5, May. 1990 Embedded Systems Programming magazine Volume 7, Number 9, Sept. 1994 Embedded Systems Programming magazine Volume 7, Number 10, Oct. 1994 Embedded Systems Programming magazine Volume 8, Number 1, Jan. 1995 Embedded Systems Programming magazine Volume 8, Number 2, Feb. 1995 Embedded Systems Programming magazine Volume 8, Number 2, Feb. 1995 Circuit Cellar Ink, The Computer Applications Journal Issue 52 Nov. 1994 Circuit Cellar Ink, The Computer Applications Journal Issue 61 Aug. 1995 Dr. Dobb's Journal Issue 227 Feb. 1995

State List

State di	splay			×
Mnemor	hic [Key function]	↑↓ Home End Page↑	Page↓	
Position	D15-D0	Group2	Group3	
40	1428	00010100		
41	1429	00010100		
42	152A	00010101		100
43	152B	00010101		
44	162C	00010110		
45	162D	00010110		
46	172E	00010111		
47	172F	00010111		
48	1830	00011000		
49	1831	00011000		
50	1932	00011001		
51	1933	00011001	1	
52	1A34	00011010	A	
53	1A35	00011010	Q	
54	1B36	00011011	а	
55	1B37	00011011	q	
56	1C38	00011100		
57	1C39	00011100		
58	1D3A	00011101		
59	1D3B	00011101		
60	1E3C	00011110		
61	1E3D	00011110		
62	1F3E	00011111 Reset		
63	1F3F	00011111 Reset		
64	2040	00100000 Write		
65	2041	00100000 Write		
66	2142	00100001 Read		
67	2143	00100001 Read	2	
68	2244	00100010 memRe	ad B	
69	2245	00100010 memRe	ad R	
70	2346	00100011 memWr	ite b	
71	2347	00100011 memWr	ite r	
72	2448	00100100		
73	2449	00100100		
74	254A	00100101		
75	254B	00100101		
76	264C	00100110		
		00100110		-

Channels can be organized into groups and be displayed on screen in ASCII, binary, decimal,

hex-decimal, and user defined mnemonics.

Channels can be displayed in any sequence. Time between V1bar, V2bar, and Trigger is displayed.

USB driver install

Windows 2000 USB driver install

When USB2.0 control interface be connected to computer, screen will display as following:



Click Next to continue

A dev A dev an op	ardware Device Drivers vice driver is a software program that enables a hardware device to work with perating system.	EUT?
This v	wizard will complete the installation for this device:	
R	USB2.0 Device	
A dev needs install	vice driver is a software program that makes a hardware device work. Windows s driver files for your new device. To locate driver files and complete the lation click Next.	:
What	: do you want the wizard to do?	
œ	Search for a suitable driver for my device (recommended)	
0	Display a list of the known drivers for this device so that I can choose a speci driver	ific
	Z Back Maria C	

Click Next to continue

Where do y	Files ou want Windows to search for driver files?
Search for d	river files for the following hardware device:
ag us	B2.0 Device
The wizard a any of the fo	earches for suitable drivers in its driver database on your computer and in Illowing optional search locations that you specify.
To start the insert the flo	search, click Next. If you are searching on a floppy disk or CD-ROM drive, ppy disk or CD before clicking Next.
Optional se	arch locations:
Flopp	iy aisk anves
Flopp CD-R	iy aisk anves OM drives
Flopp CD-R Spec	y aisk arryes IOM drives ify a location

Click Next to continue



Edit or browse path to ...\USB20driver\win2000_XP\gene.inf

(here F: is CD location, dso25216 may be dso50x12 or dso29xxA/B or la5000 or pg32x00) Press OK



Click Next to continue



Click Yes to continue



Completing install

Windows XP USB driver install

When USB2.0 control interface be connected to computer, screen will display as following:



Click Next to continue

Please cho	ose your search and installation options.
💿 Searc	h for the best driver in these locations.
Use t i paths	ne check boxes below to limit or expand the default search, which includes local and removable media. The best driver found will be installed.
	Search removable media (floppy, CD-ROM)
	Include this location in the search:
	E:\dso25216\Usb20Driver\Win2000_XP Browse
🔿 Don't	search. I will choose the driver to install.
Choos the dr	e this option to select the device driver from a list. Windows does not guarantee to iver you choose will be the best match for your hardware.
	<pre></pre>

Edit or browse path to ...\USB20driver\win2000_XP\gene.inf

(here E: is CD location, dso25216 may be dso50x12 or dso29xxA/B or la5000 or pg32x00) Click Next to continue



Press Continue Anyway



Completing install

Windows Vista USB driver install

When USB2.0 control interface be connected to computer, screen will display as following:



Press Locate and install driver software (recommended) Continue Anyway

Allo	ow Windows to search online for driver software for your USB2.0 Device?
•	Yes, always search online (recommended) Windows will automatically search for the latest drivers and applications for your hardware and download them to your computer.
+	Yes, search online this time only Windows will search for the latest drivers and applications for this device and download them your computer.
+	Don't search online Your device may not function properly until you get the latest software.
Pleas	se read Microsoft's privacy statement

Press Continue Anyway

In	sert the disc that came with your USB2.0 Device
If y sea	ou have the disc that came with your device, insert it now. Windows will automatically rch the disc for driver software.
Ē	

Press Insert the disc that came with your USB2.0 Device

8	Windows can't verify the publisher of this driver software
	Don't install this driver software You should check your manufacturer's website for updated driver software for your device.
	Install this driver software anyway Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information

Press Install this driver software anyway to Continue

0	Found New Hardware - USB2.0 Device	x
	The software for this device has been successfully installed	
	Windows has finished installing the driver software for this device:	
	USB2.0 Device	
		Close

Completing install

Windows 7 USB driver installation

First at all, Choose System and Security from Control Panel as following:





Adjust your computer's settings



System and Security Review your computer's status

Back up your computer Find and fix problems



Network and Internet Connect to the Internet View network status and tasks Choose homegroup and sharing options



Hardware and Sound View devices and printers Add a device



Programs Uninstall a program

🕒 🗢 🗞 🕨 Control Panel 🕨	System and Security 🕨
Control Panel Home • System and Security Network and Internet Hardware and Sound Programs User Accounts and Family Safety Appearance and Personalization Clock, Language, and Region	Action Center Review your computer's status and resolve issues Troubleshoot common computer problems Restore yo Windows Firewall Check firewall status Allow a program through Window System View amount of RAM and processor speed Check the V Allow remote access See the name of this computer Windows Update Turn automatic undating on or off
Ease of Access	

Choose Device Manager from System as following:



You will find out "other devices" has show device as following: LA-5000 show USB2.0 Device. LA-2132 show LA2132 Device. DSO-29xxA/B show DSO2900A/B Device. DSO50x12, PG32x00 show "Unknow Device" (still can install).



Choose Update Driver

🚔 Device Manager	
File Action View Help	
Image: Computer Image: Computer Image: Disk drives Image: Disk drit Image: Di	USB2.0 Device Properties General Driver Details Image: USB2.0 Device USB2.0 Device Device type: Other devices Manufacturer: Unknown Location: Port_#0010.Hub_#0001 Device status The drivers for this device are not installed. (Code 28) There is no driver selected for the device information set or element. Image: Update Driver. To find a driver for this device, click Update Driver. Update Driver

Press Browse my computer for driver software Continue Anyway

G	<u>0</u> U	pdate Driver Software - USB2.0 Device	×
	How	do you want to search for driver software?	
	•	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	
	•	Browse my computer for driver software Locate and install driver software manually.	
			Cancel

Browse to <u>E:\USB20Driver</u> from CD. "E:" is CD driver.

		×
Θ	Update Driver Software - USB2.0 Device	
	Browse for driver software on your computer	
	Search for driver software in this location:	
	E:\USB20Driver Browse	
	✓ Include subfolders	
	Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver software in the same category as the device.	
	Next Can	:el

Choose "Install this driver software anyway".

😵 Windows Security 💽		
\bigotimes	Win	dows can't verify the publisher of this driver software
	-	Don't install this driver software
		You should check your manufacturer's website for updated driver software for your device.
	•	Install this driver software anyway
		Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information.
	See det	tails



Installing is completed.

Technical Support

Technical Support



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Software Updates

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