

CANScope

CANScope Analyzer

V1.01

UM12090301

Date: 2012/09/03



Item	Contents
Tormo	CANScope, safety on usage, hardware description,
Terms	PC software, parameters
Abstract	This document is an overview on how to use the
ADSITACI	CANScope analyzer.



Revision History

Version	Rev. Date	Modifications
V1.00	2011-09-01	Original Chinese version
V1.01	2012/08/31	Revised Chinese version
V1.01	2012/09/03	Translated to English



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Chapter 1: Notices on Safety Usages

The usage of this product may deal with high voltage hazard conditions; in order to avoid electric shock or other risks that may cause personal injury or even death, before using the product, please make sure that all the notices of the product listed in this chapter are fully known and understood.

1.1 Safety Information

Do not use product in any manner other than those specified in the user manual.

Do not install substitute parts or perform any unauthorized modification to the product. Please contact Guangzhou ZHIYUAN Electronics Stock Co., Ltd. and return the product to its technical support office for repair and maintenance.

The safety symbol of the product is shown in Figure 1-1:



Figure 1-1: Safety symbol

CAT II (300V) IEC Measurement Category II, inputs may be connected to power sources (up to 300VAC) under category II over-voltage conditions.

WARNING

- (1) Disconnect with main power and test input: Before repair, please unplug the power cable from instrument, and remove all the probes from all the terminals. Only qualified and trained personnel should remove the cover from instrument.
- (2) Protection limits: To avoid damage to instrument and the risk of electric shocks, do not exceed the protection limits defined below. When the practical values stay within the limits of the protection, the protection circuit on CANScope Analyzer can effectively prevent damage to instrument and risk of electric shock. So for safe operation, do not exceed the limit values.

1.1.1 Test suite

The rated values and limits of the testing suite for CANScope:

- Banana plug: CAT II 1000V / Max 32A
- Test hook: CAT III 1000V / Max 10A

- Alligator clip: CAT II 300V / Max 15A
- Test probe: CAT III 1000V / Max 10A

WARNING

If user uses the test suite in anyway other than those specified by Guangzhou ZHIYUAN Electronics Stock Co., Ltd.; the protection of the test suite may be weaken. Do not use a damaged or broken test lead probe for measurement, it may result in damage to instrument or personnel injury.

1.1.2 Power supply connection

The rated values and limits of the CANScope power adapter:

- (Input) I/P: 100~240V / 50-60Hz, 0.55A
- (Output) OI/P: 12V, 2A。

WARNING

To avoid damage to instrument and the risk of electric shocks, and to ensure there is an appropriate voltage supply to the instrument, please use the power adapter and cable provided by Guangzhou ZHIYUAN Electronics Stock Co., Ltd., or a national standard power adapter and cable. Also to avoid damage to instrument and the risk of electric shocks, please ensure that the instrument has a good grounding connection.

After confirming the power supply voltage, user can connect the power cable to the instrument and push the power button down and hold it to turn it on. Once the power is connected, the red PWR LED on the instrument will light up first, keep holding the button down until the instrument give out two beeps, it means that the instrument is fully on; user can then run the PC software and perform measuring works.

Chapter 2: Hardware Description

This chapter introduces the basic functions and operations of the CANScope Analyzer. Reading this chapter can help you quickly understand how to use CANScope Analyzer to perform basic measurement works.

2.1 Hardware interfaces

2.1.1 Front side interfaces



Figure 2-1: CANScope front side view

- ③ Soft switch: After connection to 12V power, hold down it a while to turn on/off the analyzer, after power up, the butter will turn to red
- ② Power indicator: After connection to 12V power, the red PWR LED will light up.
- ③ Running status indicator: This yellow indicator lights up when the Analyzer is under monitoring or working state.
- ④ USB indicator: When CANScope host is working, the USB blue light will flicker.
- S Port connector: With built-in transceiver and uses M12 communication cable; it can be used to test CAN-bus communication.



2.1.2 Backside interfaces



Figure 2-2: CANScope backside view

- ① Power switch: turn on/off power supply.
- 2 Power supply: 12V DC power adaptor connector.
- ③ USB port: High speed port; connect to PC through the provided A-B USB cable.
- ④ Trigger output: synchronized trigger output signal for multiple devices.
- 5 Trigger input: external trigger signal input.
- 6 Clock input: external 10MHz clock source signal input for base clock.

2.1.3 M12 Communication cable



Figure 2-3: M12 communication cable

- Yellow connector: CANH signal.
- Green connector: CANL signal.
- Black connector: System grounding.
- Red connector: Reserved, do not connect it to any places
- Blue connector: System cable shielding

2.2 Device connections

The hardware connections of CANScope are listed as below:

- 1. Power cable: Plug the power cable to a 220V power outlet, and connect the other side of cable to the power port on the back of the CANScope.
- 2. USB Cable: Connect the A side of the cable to PC, and the B side to the USB port of the CANScope on its back.
- 3. M12 Cable: Connect connector side of the cable to the Port connector, and connect the test clips to the signal to measure.
- 4. Port connector: Connect between the CANScope and the M12 communication cable

Chapter 3: Software Installation

This chapter demonstrates how to install CANScope software to your computer, the basic function of the PC software for CANScope analyzer, and how to use it to perform basic measurement works.

The CANScope software is the PC software for CANScope Analyzer; it can communicate with the analyzer hardware through USB connection, and controls the analyzer to perform operations and measurements. This software can perform all operations provided by the CANScope, including message collection, waveform display, oscilloscope, hardware eye diagram, software eye diagram, bus interference, data storage, network sharing, protocol analysis, and other functions.

3.1 Install CANScope software

3.1.1 System requirements

CANScope software supports the Windows XP, Windows Vista, Window 7 operating systems. The basic PC hardware requirements are: 1.6GHz CPU (dual core is recommended), 1GBytes RAM (2G Byes is recommended), and 1GBytes free space on hard disk, USB2.0/USB1.1 host controller.

3.1.2 Steps to install the software

1. Launch the setup program

Download the software setup program from our website or find it within the product CD; double click on the execution file icon, as Figure 3-1 shows, to launch the software setup program, as Figure 3-2 shows.



Figure 3-1: Software Setup program file

CANScope

Guangzhou ZHIYUAN Electronics Stock Co., Ltd.



Figure 3-2: CANScope setup program: getting start

Click next to proceed, then the install path window will appear, as Figure 3-3 shows.

2. Set installation path

Default path is: "C:\Program Files (x86)\zhiyuan\CANScope", user can specify a new path for installation. After path setting, click next to proceed.

j号 安装向导 - CANScope
法择目标位置 将 CANScope 安装到哪里? Image: CANScope 安装到哪里?
安装向导将把 CANScope 安装到以下文件夹中。
若要继续,单击"下一步"。如果你要选择不同的文件夹,请单击"浏览"。
C:\Program Files (x86)\zhiyuan\CANScope [] 浏览(R)
至少需要 27.7 MB 的空闲磁盘空间。
< 上一步 (B) 下一步 (M) > 取消



3. Start menu settings

This window can configure the location of the software icon in "Start menu" the default location is "zhiyuan\CANScope", user can redefine this location. After this, click next to proceed; as Figure 3-4 shows.

📴 安装向导 - CANScope
选择开始菜单文件夹 把程序快捷方式放到哪里?
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zhiyuan\CANScope 刻览 (R)
< 上─步 (8) 下─步 (11) > 取消

Figure 3-4: CANScope setup program: start menu options

4. Desktop icon settings

Check the create desktop icon option to add software shortcut icon to desktop, then click next to proceed to next window, as Figure 2-6 shows.

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附加图标: ☑ 创建桌面图标 (0)	
	< 上一步 (B) 下一步 (B) > 取消

Figure 3-5: Create desktop icons

5. Get ready to install files

As Figure 3-6 shows, all the installation information configured previously will be listed out by this window, user can use back button to go back for modifications, when all information is correctly set, click the next button to proceed, and then a file installation progress window will pop up.

j	
准备安装 安装向导现在准备开始安装 CANScope。	
点击"安装"继续安装,如果你想要查看或者更改设置请点击"上一步"	•
目标位置: C:\Program Files (x86)\zhiyuan\CANScope	*
开始菜单文件夹: zhiyuan\CANScope	
附加任务: 附加图标: 创建桌面图标 (0)	
٠	P P
< 上一步 (B) 安装 (I) <	取消

Figure 3-6: CANScope setup program: get ready to install files

6. Start the file installations

As Figure 3-7 shows, wait till the installation of software files is complete, an installation complete window will then pop up, click the finish button to finish the installation.

🕑 安装向导 - CANScope	X
正在安装 正在你的计算机中安装 CANScope,请稍等	
正在提取文件 D:\Program Files (x86)\zhiyuan\CANScope\vcredist_x86.exe	
	取消



7. Installation completed

Now the installation is completed, as Figure 3-8 shows, If user checked the run CANScope option within the finish window, then the software will be run immediately after the installation of the software.



Figure 3-8: CANScope setup program: Installation complete

3.2 Software Operations

3.2.1 Main window

Figure 3-9 shows the main window of the software.

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Figure 3-9: Main window of the CANScope software

Notice: if there is an "offline" quoted after the top middle title of the main software window, it means that the software is not connected with the device, after connection, the quoted content will be "online".

3.2.2 CAN Messages

Single click on the "CAN Messages" option within the main menu to open the "CAN Messages" analysis window; as Figure 3-10 shows.

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500	34.220	00:02:18.668 962	成功	接收(本地)	标准数据帧	8	5AB H	AB 85 00 00 00 00 00 00 00	н	
500	34.221	00:02:18.672.089	成功	接收(本地)	标准数据帧	8	SAC H	AC 85 00 00 00 00 00 00 00	н	
1	34,222	00:02:18.674 459	成功	接收(本地)	标准数据帧	8	SAD H	AD 85 00 00 00 00 00 00 00	н	
500	34,223	00:02:18.676 829	成功	接收 (本地)	标准数据帧	8	SAE H	AE 85 00 00 00 00 00 00	н	
-	34,224	00:02:18.679 330	成功	接收 (本地)	标准数据帧	8	SAF H	AF 85 00 00 00 00 00 00	н	
500	34,225	00:02:18.681 946	成功	接收 (本地)	标准数据帧	8	580 H	B0 85 00 00 00 00 00 00 00	н	
<u>.</u>	34,226	00:02:18.684 373	成功	接收 (本地)	标准数据帧	8	581 H	B1 85 00 00 00 00 00 00 00	н	
1	34,227	00:02:18.687 228	成功	接收 (本地)	标准数据帧	8	582 H	B2 85 00 00 00 00 00 00 00	н	
<u>190</u>	34,228	00:02:18.694 005	成功	接收(本地)	标准数据帧	8	583 H	B3 85 00 00 00 00 00 00 00	н	
<u>190</u>	34,229	00:02:18.700 585	成功	接收(本地)	标准数据帧	8	584 H	B4 85 00 00 00 00 00 00 00	н	
<u>- 10</u>	34,230	00:02:18.705 067	成功	接收(本地)	标准数据帧	8	585 H	B5 85 00 00 00 00 00 00 00	н	
<u>. su</u>	34,231	00:02:18.707 447	成功	授収(本地)	你住叙婚顺	8	586 H	86 85 00 00 00 00 00 00 00	н	
<u>.</u>	34,232	00:02:18.709.865	10%3-571 - 1175-1	授収(本地)	你住我姑娘	8	587 H	87 85 00 00 00 00 00 00 00	н	
	34,233	00:02:10.712 197	DX4-50	按收(本地)	1511日32318190		500 H	B0 05 00 00 00 00 00 00 00		
301	34,235	00:02:10.714 004	成功	接收(本地)	标准数据临	8	5BA H	BA 85 00 00 00 00 00 00 00	н	
500	34,236	00:02:18.723 442	成功	接收(本地)	标准数据帧	8	5BB H	BB 85 00 00 00 00 00 00 00	н	
	34,237	00:02:18.729 446	成功	接收(本地)	标准数据帧	8	5BC H	BC 85 00 00 00 00 00 00 00	н	
100	34,238	00:02:18.732 314	成功	接收(本地)	标准数据帧	8	5BD H	BD 85 00 00 00 00 00 00	н	
<u>.</u>	34,239	00:02:18.736 617	成功	接收 (本地)	标准数据帧	8	5BE H	BE 85 00 00 00 00 00 00	н	
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Keady	· .							议窗:版本(Standard)	,序列专(29) 米样率:	100 M 波特率:1 Mbps

Figure 3-10: CAN messages window

Within Figure 3-10, number 1~3 mark areas with different functions:

- ① Menu area: Contains basic operations for CAN message module
- ② Data filter area: Allow user to set filter conditions to filter display data within the data list
- ③ Data list area: List out data collected from the device

3.2.2.1 Operations

- Step 1: Open CAN message analysis window and configure the data collection settings.
- Step 2: Single click on the " ^{开启} " button within the "Control" field, then CANScope will enter data listening state.
- Step 3: Configure the frame contents to send within the "Send Frames" field; after this,

single click on the "²⁵" button to start the send function of the CAN User Manual V1.01

message; now CANScope works in normal state.

- Step 4: Within the data list area, the receive data will be shown in the list window, the default settings of the list window is auto scroll display. If user doesn't need this function, just uncheck the "Auto scroll" option within the menu area.
- Step 5: During the receive process; modify the data settings within the "Send frames" field to observe change of data within the data list area.



- Step 6: Single click the "停止" button to stop sending can messages.
- Step 7: To filter data, just fill in the filtering condition within the data filter field.
- Step 8: User can specify the data display mode within the data list area, including the time display mode, frame ID display mode, and data display mode.
- Step 9: Single click on the " button within the tool area to open the search window, user can find data by specifying search conditions within this window.
- Step 10: Single click on the " button within the tool area to see the statistic information of the frames.
- Step 11: Single click on the " button within the tool area to see the utilization rate of the bus.
- Step 12: Single click on the " , button within the tool area to see the message and utilization rate of the bus.
- Step 13: Single click on the " button within the tool area to export message data.

Step 14: Single click on the " 💷 " button within the tool area to stop collecting data.

3.2.3 Network and sharing

Network and sharing function allows user to share data to the server, allowing other users to access them through server connection. To use CANScope itself as a server, simply configure the corresponding server parameters within the "Server settings" area. To connect CANScope to an existing server for data access, just configure the corresponding parameters within the "Connect to server" area.

Single click the "Share" tag on the main menu can bring up the network and sharing page, as Figure 3-11 shows.

CANScope

CANScope Analyzer User Manual

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1	chenyuping	CANScope	t	192. 168. 4. 18:	29198 2	46.94K	144B	正常 -> 正常	正常 ← 正	常 2012-6-8 1
2	chenyuping	iCAN	t	192. 168. 4. 18:	33806 2	46.94K	144B	正常 -> 正常	正常 ← 正	常 2012-6-8 1
										2
										2
Ready					设备:版	本(Standa	ard),序列号	(29) 釆样率:1	100 M 波物	寺率:1 Mbps.;

Figure 3-11: Network and sharing window

Within Figure 3-11, number 1~2 marks areas with different functions:

- ① Menu area: contains basic operations of the network and sharing function.
- ② Connections area: list out information of the connections that already established.

3.2.3.1 Operations

- Step 1: Open the network and sharing window, and configure parameters within the menu area
- Step 2: Server settings: including ports, maximum connections, and connection password. Click "Activate service" to activate the selected services.
- Step 3: Connect to server settings: including Server IP (default IP is the local IP of CANScope itself), connection port, and connection password (this password should be matched with the server setting). Then click the "Connect" button to establish connect.
- Step 4: After establishing a connection, the details of the connection will be listed out in the connection area.
- Step 5: Single click on the "Stop service" or "disconnect" button can close the server or disconnect from other server.
- **Notes:** On the client side, user can use CANScopeEx software to connect with the server to access share data.

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3.2.3.2 Connection List

Figure 3-12 shows the connection list, details of a connection can be found in this place.

序号	计算机名	客户端软件	IP地址:端口	发送	接收	发送状态	接收状态	连接时间	其他操作
1	HUANGFAN	:已授权	192.168.4.104	OB	96B	正常 -> 正常	正常 <	2011-9	更多操作

Figure 3-12: Network and sharing: connection list

3.2.4 CAN Waveform

This function can display a CAN message in waveform mode.

Single click on the "CAN Waveform" tag to bring up the "CAN Waveform" page, as Figure 3-13 shows.



Figure 3-13: CAN waveform

Within Figure 3-13, number 1~5 marks areas with different functions:

- ① Menu area: contains basic operations of the CAN waveform function.
- ② Toolbar: including functional buttons for waveform display controls.
- ③ Left control area: list out waveform names in tree structure.
- ④ waveform display area: Display CAN-H, CAN-L, CAN differential, CAN logic, CAN analysis waveforms

S Navigation bar: Drag to control the waveform display, allow user to observe the complete waveform.

The CAN waveform menu area contains 5 options, which are mode, zooming, position, view, and settings; as Figure 3-14 shows.

	🔊 🐸 🖬 🗗 🖽 📼 🙋 🔻						CANScope(在线 已配置)						
	开始	高级	报文	: 测	试	共享	波形	眼图	示波器	POR	T板		
A			Q	Ð								■ 电压测量	
标准	移动	放大镜	缩小	放大	全屏	开始	à 上−j	页下一	页 结束	水平	垂直	M U U U TYK	属性
	模式			缩放			-	位置			礼	见图	设置

Figure 3-14: CAN Waveform: menu area

The toolbar for CAN waveform window is shown in Figure 3-15.

Figure 3-15: CAN waveform: toolbar

3.2.4.1 Operations

- Step 1: Select a fame of CAN message that has a mark in front of its serial number within the "CAN message" page, switch to "CAN Waveform" page, then the waveform of this CAN message will be show in the waveform window.
- Step 2: Move mouse cursor onto the waveform, then the information of this waveform will show up.
- Step 3: Right click on the left control area to bring up the dropdown menu, select a display mode of the waveform.
- Step 4: Adjust waveform display.
- Step 5: Single click on the St
- Step 6: Single click on the **1 button** on the toolbar can also zoom in or zoom out the waveform, or display the whole waveform within the window.
- Step 7: Single click on the button within the menu area, then move the cursor to the waveform window, then the cursor will change to a "+", at the same time a transparent rectangular box will show up, move the cursor to let the rectangular box to cover a segment of waveform, then left click, the waveform display will zoom in to display this segment of waveform.

- Step 8: Within the display area, right click to bring up the dropdown menu; in its options, user can select "zoom in/zoom out/whole view" to change waveform display.
- Step 9: Move the cursor to the display area, hold down the [ctrl] key, the cursor will

change to "^Q", then a left click (with [ctrl] key down) can zoom in the waveform, right click can zoom out the waveform.

- Step 10: Adjust the height of the waveform to an appropriate size.
- Step 11: Adjust the display position of the waveform. Enter the time offset within the "Time offset" blank within the toolbar (unit: s, ms, or ns), press enter or single click outside of the "Time offset" blank to let the time offset setting take effect. Then the waveform display will adjust to start from this offset. Dragging the scroll bar under the waveform display is another way to change the time offset.
- Step 12: Adding labels. Right click on the waveform that you want to label, select the "Add label" option to add label to it.

3.2.5 CAN Oscilloscope

Click the "CAN Oscilloscope" tag within the main menu can bring up the "CAN Oscilloscope" page, as Figure 3-16 shows.



Figure 3-16: CAN Oscilloscope

Within Figure 3-16, number 1~2 marks areas with different functions:

- ① Menu area: contains basic operations of the CAN oscilloscope function.
- ② Display area: display CAN oscilloscope waveforms.

3.2.5.1 Operations

Step 1: Open "Port board" interface and activate oscilloscope and terminal resistor function.

Check "Enable oscilloscope" to activate oscilloscope function. Check "Enable terminal resistor" to activate terminal resistor function. Select the differential mode from "Math" (Mathematical result of CANH-CANL subtraction, not actual differential signal on the bus) or "Hardware" (actual CAN-bus differential signal)

- Step 2: Open "CAN Oscilloscope" interface.
- Step 3: Single click the "开启" button to start the oscilloscope.
- Step 4: Single click the "Example" button to automatically set the waveform display to the best mode.
- Step 5: Within the display area, configure the waveform display options to display the required waveforms and hide not required ones.

Check "CAN_H", "CAN_L", or "CAN_DIFF" to display their corresponding waveforms.

Check "Time measurement" or "Voltage measurement" to show time value or voltage value.

Check "Common window" or "Independent window" to show all waveforms in a common window or show them in separated windows.

- Step 6: Set the waveform properties within the "CAN-H, CAN-L and CAN-Diff" field.
- Step 7: Set trigger condition within the trigger setting field.
- Step 8: Adjust horizontal offset: move the cursor to the "T" label on top of the wave, then it will change to a double arrow, hold down the left mouse button and drag it left or right, then the corresponding offset value within the menu will changed following the drag direction.
- Step 9: Adjust trigger level: move the cursor to the "T" label on the left of the wave, then it will change to a double arrow, hold down the left mouse button and drag it left or right, then the corresponding offset value within the menu will changed following the drag direction.
- Step 10: Within the oscilloscope window, hold down the left mouse button and drag a transparent rectangular box, then the details of the waveform covered by the box will appear, including name of waveform, starting abscissa, and ending abscissa.

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- Step 11: Within the oscilloscope, right click to bring up the dropdown menu, then select "save as..." option to save the current waveform to BMP, JPEG, GIF, TIFF, and PNG format image files.

3.2.6 CAN Eye Diagram

The Eye Diagram is a diagram of overlapped logic pulses signal on oscilloscope display, it can be used to measure signal quality.

Single click on the "CAN Eye Diagram" tag to switch the main window to the "CAN Eye Diagram" window page, as Figure 3-17 shows.



Figure 3-17: CAN Eye Diagram window

Within Figure 3-17, number 1~2 marks areas with different functions:

- ① Menu area: contains basic operations for CAN eye diagram display.
- ② Display area: displays the CAN eye diagram.

3.2.6.1 Operations

Step 1: Single click on the "me" button to open CAN eye diagram display.
Step 2: Single click on the "me" button to close CAN eye diagram display.
Step 3: Single click on the "me" button to clear CAN eye diagram.

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- Step 4: Single click on the "load pattern" to load eye pattern for comparison. Single click on the "match" option to match the eye diagram to loaded pattern. Check the "display pattern" and the "Matched part" option can select to show the loaded pattern and the matching part.
- Step 5: Check the "Time measurement", "Voltage measurement", or "Mouse measurement" options can perform measurements to time or voltage value. Single click on the "Auto measurement" button can let the software perform time and voltage measurement automatically.
- Step 6: Single click the zoom in/zoom out/full screen button can adjust the display of eye diagram

3.2.7 Protocol analysis

3.2.7.1 Enter protocol analysis mode

The protocol analysis is under the "Advance" tag of the main menu, as Figure 3-18 shows.



Figure 3-18: Advanced protocol analysis

Single click on the "Protocol analysis" button, then a Protocol list window will pop up, as Figure 3-19 shows.

2	CANS	copeEx			
	协议列制	表			
	序号	协议	协议文件	版本	
	0	CANopen	CANopen. dll	1.02	
	1	DeviceNet	DeviceNet.dll	1.02	
	2	iCAN	iCAN. dll	1.02	
	3	J1939	J1939.dll	1.02	
	Languag	e: 简体中文 👤	[确定	取消

Figure 3-19: Protocol list

Within Figure 3-19, there are 4 protocols:

- CANopen: CANopen protocol defines the application standard and CAN application layer communication protocol for distributed industrial automation system.
- DeviceNet: a kind of open field bus standard based on CAN-bus
- iCAN: iCAN is the application layer protocol for industrial applications, it defines the ID and data distribution and application of CAN messages. It establish a uniformed device module, defines the I/O resources and access rule.
- J1939: J1939 is a high speed communication network protocol between multiple ECUs that supports close loop control.

2	CANSo	opeEx - [i0	CAN]										_ 🗆 🗪	K
1 3	文件(F)	系统 礼	观图(V) 帮	助(H)									- 1	
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Figure 3-20: Protocol analysis window

Within Figure 3-20, number 1~5 marks areas with different functions:

- ① Menu and tool bar area: main menu and toolbar for CAN protocol analysis.
- 2 Parameter configuration area: parameter configuration, connection to server.
- ③ iCAN display area: displays data shared by the server, the name of this display area will change based on the selected protocol, in this figure, the selected protocol is iCAN.
- ④ Other windows area: including message frame information, result window and message details window
- **⑤** CAN frame window: display frame information.

3.2.7.2 Operations

- Step 1: Run the "protocol analysis" software.
- Step 2: Open the "Configure parameters" window. By default this window will be opened when the protocol software is run. User can open it from the menu "View=>Configure parameters", or click the "configure parameter" shortcut on toolbar.
- Step 3: After parameter configurations, left click the "Run" button to establish connection with the server, after connection user can observe server data on the iCAN display area.
- Step 4: Click the "Find" button on the toolbar can bring up the search dialogue for data searching.
- Step 5: Select a message of data within the iCAN display area, the corresponding information about this message will be shown in the "message frame information" window, "message details" window, and "CAN frame" window.
- Step 6: User can perform operations to the message data through the shortcut operations provided by the toolbar.

Chapter 4: Parameters

4.1 Instrument

Table 4-1: CANScope instrument parameters

Power supply voltage	+12V
Power consumption	6W (Max)
Current consumption (Max)	500mA@12V
Working Temperatures	0~55⁰C
Dimensions (Port connector not included)	18.9cm×4.7cm×17.7cm (W×L×H)
USB Transmission rate	480Mbps

4.2 Hardware eye diagram

Table 4-2: Hardware e	ye diagram	parameters
-----------------------	------------	------------

Data source	CAN-H, CAN-L, CAN-DIFF	
Overlapping Rate	500,000UI/s, Depends on signal transmission rate	
Vertical Sensitivity (V/div)	0.125, 0.25, 0.5, 1, 2.5, 6.25	
Horizontal Range	Depends on base timeline of oscilloscope module	
Measuring Mode	18.9cm×4.7cm×17.7cm (W×L×H)	
Module	System standard module, user defined module	

4.2.1 Oscilloscope

	Number of Channels	2		
	Real-time Sampling Rate(Max)	100MSa/s (each channel)		
Collect	Storage Depth	512Mpts		
	Vertical Resolution	8-bit		
	Analogue Bandwidth (-3dB)	DC to 60MHz		
	AC Coupling	3.5Hz~60MHz		
	Rising Time (0.35/Bandwidth)	~8.75ns		
Vertical	Input resistance	1MΩ±1%		
System	Vertical Sensitivity (V/div)	0.125V/div, 0.25 V/div, 0.5 V/div, 1V/div, 2.5V/div, 6.25 V/div		
	Input Capacitance	~ 20pF		
	Coupling mode	AC, DC		
	Static discharge tolerance	±2kV		
Horizontal	Scanning range (s/div)	1µs/div -1/div (1-2-5 step)		
Horizontai	Working mode	Main mode		
	Triggering mode	Auto, Normal		
	Source of triggering	CAN-H, CAN-L, CAN-DIFF, CAN-RXD, CAN-TXD, Frame start, External signal		
Triggering system	Triggering type	Rising edge, falling edge, double edge, positive pulse, and negative pulse.		
	Triggering mode	Auto, Normal		
	External triggering voltage	-10V~+10V		
	Number of points	1024 (Standard version), 4096 (Professional version)		
FFT	FFT data source	CAN-H、CAN-L、CAN-DIFF		
	Data range	All data, window display part		
	Horizontal unit selection	Logarithm, virtual value, amplitude		
Measuring	Cursor	Supports voltage and time measurement		

Table 4-3: Oscilloscope parameters

4.3 Port Parameters

Transceiver (standard component) P8251T, P1040T								
Terminal resistor	Isolation voltage	Transient Voltage	Communication port	Supported Protocol				
120Ω	2500V	-200V~200V	M12 Connector, compliant with DeviceNet and CANopen Standard	Supports CAN2.0A/CAN2.0B Protocol, compliant with ISO/DIS 11898 standard				

Table 4-4: Port parameters

Table 4-5: P8251T and P1040T connector parameters

Parameters	P8251T	P1040T
Data Transmission Rate	5Kbps~1Mbps	20Kbps~1Mbps
CANH, CANL Voltage Limit	-36V~+36 V	-27V~40V
Positive Differential Voltage	1.5V~3.0V	1.5V~3.0V
Negative Differential Voltage	-0.1V~1.0V	-50mV~50mV
Differential Threshold Voltage	-	0.5V~0.9V
Positive CANH Voltage	3.0V~4.5V	3.0V~4.25V
Positive CANL Voltage	0.5V~2.0V	0.5V~1.75V
Negative CANH Voltage	2V~3V	2V~3V
Negative CANL Voltage		
Common Mode Resistance	5k~25kΩ	15k~35kΩ
Differential Input Resistance (120 Ω opened)	25k~75kΩ	20k~100kΩ
CANH Short Current	100mA (CANH to -36V)	95mA (CANH to 0V)
CANL Short Current	200mA (CANL to 36V)	100mA (CANL to 40V)



Chapter 5: General Features

- Power supply: 220V, 50Hz.
- Power consumptions:
 - 6W (Max).
- Storage temperature: 0°C~55°C.
- Working environment: Full precision 0°C~55°C, 80%R.H. no condensing.
- Communication Ports: USB2.0 High Speed.
- Development Language: Microsoft Visual C++.
- Warranty period: 1 Year
- Dimensions: 18.9cm×4.7cm×17.7cm

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