



Instruction Manual for AT7328/7340 Dual Channel Oscilloscope

Introduction

1. **AT7328 /7340 Series Dual Channel Oscilloscope**, Maximum sensibility is 5mV/div, maximum sweep speed is 0.2 μ s/div, and can be expanded ten times to 20ns/div. This item apply 6in with red graticule rectangular CRT, with stable and reliable performance.
2. **Feature**
 - CRT with Bright and high accelerated pole voltage
This oscilloscope tube is of fast speed and high light. Voltage of accelerated pole up to 2kV, it can be able to display clear traces even under high-speed sweep.
 - The alternative triggering function can observe different signal waveform in two frequencies.
 - TV signal synchronous function
 - CH1 output
50 Ω output signal in the rear panel can drive frequency counter directly or other instrument.
 - Z-axial input
Function of bright adjustable can add frequency or time marker to oscilloscope, trace of positive signal blanking, TTL matching
 - X-Y operation
This item can be used as an X-Y oscilloscope while setting in X-Y position, CH1 is horizontal axial and CH2 is vertical axial.

ATTEN Electric Instrument Series

- 1. Spectrum analyzer**
 - Frequency Expander**
- 2. Sweeping Graph Show Spectrum Analyzer**
- 3. EMC Pre-Authentication Measurement**
 - 1) Electric Network Conduction ,Radiated Interference Test Interface**
 - 2) Spectrum Analyzer Probe**
- 4. Signal Generator**
- 5. Frequency Counter / Power Meter**
- 6. RF& Microwave Transmission Measurement Components(Coaxial Waveguide Component)**
 - SWR Reflect Measurement Bridge and Terminal Load**
 - Amplifier**
 - 1) AT2000 RF Amplifier**
 - 2) Wideband LNA**
 - 3) Microwave RF Amplifier**
 - Attenuator**
 - 1) High Power Coaxial Coupler**
 - 2) Coaxial Load**
 - Coaxial Load**
 - Impedance Transformer**
 - Coaxial Directional Coupler**
 - Detector**
 - Power Divider**
- 7. Advanced Milli-volt Meter**
- 8. Regulated DC Power Supply**
 - 1) AT-TPR Series Low Ripple CV Digital Display Power Supply(Industrial Products)**
 - 2) AT-E Series Ultra Ripple High Precision CV ,CC Power Supply(Research, Education Military Products)**
 - 3) AT-SPS Series Compensation Linear Power Supply**
 - 4) AT-KPS Series Switching Adjustable Power Supply**
 - 5) AT-QK Light Weight Series Switching Integrated Power Supply**
(Corrosion Protection, Waterproof, Salt-mist products)
 - 6) AT-DC/DC Series Converter**
 - 7) AT-TX Series Communication Special Power Supply (DC 48 V Input)**
 - 8) AT-NB Series Inverter Power Supply**
 - 9) AT-APR Series CC,CV Pointer Power Supply(Commercial Products)**
 - 10) AT-APS Series Maintenance Power Supply**
- 9. Advanced Rework Station**

Specifications

Data		Item	20MHz Oscilloscope	40MHz Oscilloscope	
			AT7328	AT7340	
Vertical System	Sensitivity		5mV~5v/div		
	Accuracy		≤3%		
	Trimming Sensitivity		1/2.5 or less than panel graduation		
	Frequency Bandwidth			DC~20MHz	
				AC Coupling: <10Hz	
	Rise Time		Approx.17.5 ns	Approx. 17.5 ns	
	Input Impedance		1MΩ/25PF		
	Waveform Characteristic		≤5%(in 10mv/DIV range) Other Distortion : Add 5% to this Value		
	DC Balance Shift		5mV--5V/DIV : ±0.5DIV		
	Linearity		When waveform shift vertically in the center of the grid , Amplitude variety is < ±0.1DIV		
	Vertical system		CH1:Channel 1 CH2:Channel 2 DUAL: Channel 1 and Channel 2 display in the same time, any sweep speed can be able to select interactive or interrupt mode ADD: Addition of Channel 1 and Channel 2		
	Interruption Repetitive Frequency		Approx.250KHz		
	Input Coupling		AC GND DC		
	Max Input Voltage		300Vp-p(AC Frequency≤1KHz) When probe sets in 1:1, maximum effective readout value is 40Vpp (14Vrms Sine wave) When probe sets in 10:1, maximum effective readout value is 400Vpp(140Vrms Sine wave)		
	CMRR		>50:1(@50KHz sine wave) (If CH1 and CH2 have the same sensibility)		
	Isolation between dual channels (Within 5mV/DIV)		>1000:1 50KHz		
		>30:1 20MHz	>30:1 40MHz		
CH1 Signal Output		Min.20mV/DC (50Ω output bandwidth 50Hz--5MHz)			
CH2 INV BAL		Balance variance ratio≤1 DIV(For the center of the scale)			
Trigger	Trigger Source		CH1,CH2,LINE,EXT(When it is DUAL or ADD ,for CH1 and CH2 you can select only one of them , If it is ALT and TRIG.ALT switch is selected ON , it can be used as interactive trigger of two different signal .)		
	Coupling		AC:20Hz20MHz		

	Polarity	+/- 20Hz—2MHz : 0.5DIV TRIG.-ALT : 2DIV EXT : 200Mv 2—20MHz : 1.5DIV 2---40MHz : 1.5DIV TV : Synchronous pulse > 1 DIV(EXT : 1V)
	Trigger mode	AUTO : When no trigger signal input , sweep is under free mode.(apply to above 25Hz repeated signal) NORM : When no trigger signal , track is under armed state but no display TV Vertical: When you want to observe a field of TV signal. TV Horizontal: When you want to observe a line of TV signal.
	Trigger signal Input Impedance Max Input Voltage	Approx 1MΩ/25Pf 300V(DC+AC peak)AC not exceed 1KHz
Horizontal System	Sweep time	0.2μ Sec0.5Sec/DIV
	Accuracy	±3%
	Trimming	≤1/2.5 panel graduation
	Sweep expansion	10 times
	×10MAG Sweep time accuracy	±5% (20n sec—50n)
	Linearity	±3%,×10MAG: ±5% (No calibration at 20ns—50ns)
	Position by×10MAG	< 2DIV in center CRT

RF & MICROWAVE INSTRUMENT SERIES

Specifications

X-Y Mode	Sensibility	Refer to Vertical axis
	Bandwidth	DC-500KHz
	X-Y Phase difference	≤3(within DC50KHz)
Z Axis	Sensibility	5Vp-p
	Bandwidth	DC-2MHz
	Input impedance	Apporx.47KΩ
	Max input voltage	30V(DC+AC peak , AC frequency is smaller than 1KHz)
Calibration Signal	Waveform	Square wave
	Frequency	Approx 1Kz
	Duty Ratio	<48:52
	Output voltage	2Vp-p±2%
	Output impedance	Approx 1KΩ

CRT Oscilloscope Tube	Type	6 in, Rectangle, Inside graduation
	Phosphor	P31
	Acceleration Voltage	Approx 2kV 200MHz
	CRT Screen Size	8×10DIV[1DIV=10mm(0.39in)]
	Graduation	Inside
	Trace rotation	Adjustable via panel

Power requirement:

- **Voltage:** Fixed AC220v±10% or 110/220V±10% changeable
- **Frequency:** 50/60Hz
- **Power consumption:** approx.40VA

Operating Ambient:

- Indoor, 2000m elevation
- Ambient temperature:10℃~35℃
- Max operating range:0℃~40℃
- Humidity: 85% RH, dry
- Size: 310×150×455(mm)
- Weight: approx. 8kg
- Storage temperature: -10℃~70℃

Accessories:

- Power cord: ×1
- Instruction manual:×1
- Probe:×2

Precautions

1. Unsealing

Strict inspection and test are done before leaving factory, open the package immediately as this item is received to check whether there is any spoilage during transportation, if yes, contact supplier or sender immediately.

2. Check power voltage

AC 110V/220V is available, check the voltage switch whether conforms with the local supply or not before switch on.

Notice: Failure in select power will result in damage the oscilloscope.

Warning: To prevent electric shock, do connect protect terminal to ground reliably.

Replace the fuse refer to the following form if the fuse is burnt out.

(Form 2)

Voltage	Range	Fuse(AT7328)	Fuse(AT7340)

Warning: For protection, cut off power before replacing the fuse.

3. Environment

Ambient temperature of operation between 0-40℃ is recommended. If you operate this item under exceeding temperature range which may damage the circuit

4. Installation and Operation

Make sure there is no other article in the sink hole of oscilloscope.

5. CRT magneto-optical coating

Do not set the CRT trace in a extremely bright position or focus the bright spot stay for a long period of time.

6. Maximum voltage of Input

Do not exceed the limitation refer to the following form. The effective readout voltage is 40Vp-p (14Vrms in sine wave) for setting the probe in 1:1. The max effective readout is 400Vpp (140Vrms in sine wave) for setting the probe in 10:1. (Form 3)

Input	Max input voltage
CH1, CH2	300V peak
External trigger input (EXT TRIG IN)	300V peak
Probe	600V peak
Z-axial	30V peak

Warning: To prevent damage, do not exceed these values. Frequency of Max input voltage must be lower than 1 kHz.

If an AC volt overlaps on DC volt, the maximum voltage of CH1 and CH2 input cannot exceed $\pm 300V$, therefore, for a AC which average voltage is zero, its peak-peak value is 600Vpp.

Operation methods

1. Features of front panel: (See fig.1)

- CRT: 6) ----- Power Main power switch, LED 5) lights when this switch is ON
 - 2) ----- Intensity Adjust intensity of trace or spot
 - 3) ----- Focus Adjust focus of trace or spot
 - 4) -----Trace Rotation adjust the parallel of horizontal trace and scale line via a semi-fix potentiometer
 - 33) -----Color filter for the waveform looks more clearly
- Vertical axial: 8) CH1 (X) Input: as input of X-axial for X-Y mode
 - 20) CH2 (Y) Input: as input of Y-axial for X-Y mode
- Model: AT7328 (Fig.1)
- Model: AT7340 (Fig.2)

- 10) 18) – AC-GND-DC: Choose input mode of input signal of vertical axial
AC: AC coupling
GND: input grounding of vertical amplifier, input switch off
DC: DC coupling
- 7) 22) – Vertical attenuation switch: adjust vertical reflection sensibility vary from 5mV/div – 5V/div, in 10 steps
- 9) 21) – Vertical fine-tune: Fine-tune sensibility not less than 1/2.5 of nominal; sensibility just is nominal when in calibration position.
- 13) 17) – DC BAL of CH1 and CH2: Used to balance testing for attenuator (See detail to DC BAL testing in page 16)
- 11) 19) – Vertical position: Adjust vertical position of trace in screen
- 14) – Vertical mode: Operation modes of CH1 and CH2 amplifier
CH1 or CH2: display of CH1 or CH2 individually
DUAL: both channels display simultaneously
ADD: display of the algebraic sum of both channels (CH1+CH2). Algebraic difference (CH1-CH2) for CH2 INV 16) pressed.
- 12) – ALT/CHOP: release the button when in dual channel display, indicates alternative display of CH1 and CH2 (usually for the faster sweep speed condition) ; Chop display simultaneously of CH1 and CH2 when press the button (usually for the slower sweep speed condition).
- 16) CH2 INV: signal invert of CH2, both signal and trigger signal of CH2 invert simultaneously.
- Triggering:
 - 24) – External trigger input: Used for trigger for external signal. For this case, Switch 23) it should be set in EXT.
 - 23) – Selection of trigger source: Trigger of internal (INT) or external (EXT)
CH1: Choose CH1 as internal trigger signal source, for vertical mode switch 14) is set in DUAL or ADD.
CH2: Choose CH2 as internal trigger signal source, for vertical mode switch 14) is set in DUAL or ADD.
TRIG.ALT 27): Alternatively choose CH1 and CH2 as internal trigger signal source by pressing 27), for vertical mode switch 14) is set in DUAL or ADD, and trigger source switch is set in CH1 or CH2.
LINE: Choose AC power source as triggering signal.
EXT: External triggering signal connect 24) as triggering signal source.
- 26) – Polarity: Choose polarity of trigger signal. “+” for rising edge triggering, and “-” for falling edge trigger .
- 28) – Trigger level: Display a synchronous stable waveform, and setting a starting point of a waveform. Trigger level up shifting by turning toward “+”, and trigger level downward shifting by turning toward “-”.
- 25) – Trigger modes: Choose trigger modes
AUTO: Automatic Sweeping in free mode when no trigger signal input.
NORM: Normal Trace in standby state and without display when no trigger signal input.
TV-V: TV-Vertical observing a field of TV signals
TV-H: TV-Horizontal observing a line of TV signals

(Synchronizing TV-Vertical and TV-Horizontal only in the case of synchronous signals are negative pulses)

- Time base
 - 29) — Horizontal sweep speed switch: Sweep speed is divided into 20 steps, from 0.2μS/div to 0.5S/div. And set X-Y position can use as X-Y oscilloscope.
 - 30) — Horizontal fine tune: Fine tuning the time of horizontal sweep, in order to calibrate the sweep time in accordance with TIME/DIV on panel. The sweep speed of TIME/DIV is continuously changed, when you anticlockwise go round and round the base, that is the calibration location. The total delayed time is above 2.5 times.
 - 32) — horizontal position: Adjust the horizontal position of trace on screen.
 - 31) — Sweep expand switch: Sweep speed will be magnified 10 times by pressing it.
- Others:
 - 1) — CAL: Provide square signal with 2Vp-p amplitude and 1kHz frequency, which is used in calibrating compensate capacitor of 10:1 probe, also detecting the vertical and horizontal deflection factor of oscilloscope.
 - 15) — GND: Grounding terminal of oscilloscope case.

2. Features of rear panel: (See fig.2)

- 34) — AC Power: AC Power input jack, AC power wire connects here.
- 35) — Supporter: For supporting the oscilloscope and lead out the power cord.

Operation methods

3. Basic operation: Single channel operation

Make sure whether the voltage of the unit is in accordance with your local voltage before switch on, then adjust the relative control components according to the following form: (Form 4)

接通电源前务必先检查电压是否与当地电网一致，然后将有关控制元件按下表设置：(表四)

Functions	No.	Setting
POWER	6)	OFF
INTEN	2)	Centralize
FOCUS	3)	Centralize
VERT MODE	14)	CH1
ALT/CHOP	12)	Released(ALT)
CH2 INV	16)	Released
▼▲POSITION	11) 19)	Centralize
VOLTS/DIV	7) 22)	0.5V/DIV
VARIABLE	9) 21)	CAL(Calibration position)
AC-GND-DC	10) 18)	GND
Source	26)	+
TRIG.ALT	27)	Released
TRIGGER MODE	25)	Automatic
TIME/DIV	29)	0.5mSee/DIV
SWP.VER	30)	Calibration position
◀▶POSITION	32)	Centralize
X10 MAG	31)	Released

After setting the switch and control part, connect power cord, continue:

- Switch on, power indicator on , traces appear on screen in about 20s. If no traces appear in 60s, check the settings of

switches and control knobs.

- Adjust intensive and focus respectively, make the traces clear.
- Adjust CH1 position knob and trace turning potentiometer to parallel the trace and horizontal scale (use screw driver to adjust trace turning potentiometer 4).
- Input the calibrated signal to CH1 input port by using 10:1 probe.
- Set the switch AC-GND-DC in AC state. A waveform as fig.3 will appear on screen.
- Adjust focus to achieve clearest figure.
- Regard to other signals, by adjust vertical attenuation switch and sweep time to desired position, and achieve clear figure.
- Adjust vertical and horizontal position knob, in order to read out the amplitude and time of waveform easily.

* The above are the foundational operations of oscilloscope, the operation of CH2 and CH1 are the same.

4. Operation of dual channel

Adjust Vertical mode to DUAL, and trace of CH2 will appear on screen (the same with CH1). At this time, a square wave displays on CH1 (come from output waveform of calibration signal), and only one straight line displays on CH2, since no signal through this channel. Now put the calibration signal to CH2 input, which is the same with CH1, set AC-GND-DC switch to AC, adjust vertical position (11) and (19) to make both channels as fig.4. Release ALT/CHOP switch, (set in ALT). The signals of CH1 and CH2 display on screen alternatively, this setting is used for scanning the two signals of shorter sweep time. Press ALT/CHOP switch, (set in CHOP). Signals of CH1 and CH2 display on screen separately with the rate of 250 kHz, this setting is used for scanning the two signals of longer sweep time. When in the operation of dual channel, (DUAL or +/-), must select the signal of CH1 or CH2 by triggering switch of signal generator, which act as trigger signal. If the signal of CH1 and CH2 synchronize, the both waveform stably display. In reverse, only the signal of trigger signal generator can stably display; if TRIG/ALT switch depressed, both the waveforms stably display.

5. +/- Operation

By adjusting the setting of "Vertical modes switch" to "add", the algebraic sum of CH1 and CH2 will be displayed, or algebraic difference if the switch CH2 INV is depressed. For gain the accurate values of both, the attenuation setting of the both channels must be consistent. Vertical position can be adjusted by "▼▲ Position". In consideration of the linear change of vertical amplifier, setting the knob in central position is recommended.

6. Selection of trigger source

Properly selecting trigger source is crucial to effectively use the oscilloscope. User should acquaint the selection function and operation sequence of trigger source.

- **MODE switch**

AUTO: In mode of Auto, sweep generator generates freely a sweep signal without trigger signal. It turns to trigger sweep when there is trigger signal. Usually observe a waveform at first time, set in "AUTO", and after a stable waveform is observed, adjust other setting. Having set other control parts, switch should be set to "NORM" trigger mode, as this mode more sensible. It should use "AUTO" mode when test DC signal or small signal.

NORM: Normal mode, sweeper often keeps in stationary state, no trace display on screen, When trigger signal through the valve level, which is set by "Trigger level switch", scan one time. Then the sweeper turn back to stationary state till to be triggered next time. When dual channel display "ALT" & "NORM" sweep, it doesn't display unless CH1 and CH2 have sufficient trigger level.

TV-V: when observe a full field TV signal in TV field, set MODE switch to TV-V, synchronize the field signal of TV signal, sweep time often set in 2ms/div (one frame signal) or 5ms/div (interleaved signal in one field two frame).

TV-H: synchronize the TV line with line signal of TV signal, sweep time is often 10us/div, display several signal waveform, adjust sweep time to required linage by using the fine tune knob. The synchronized signal send to

oscilloscope must be negative. (See fig 5)

- **Function of trigger source:**

In order to display a stable waveform on screen, a signal which is relate with display signal in time should be provided to trigger circuit, the trigger switch is just used to select the trigger signal.

CH1/CH2: Internal trigger mode in most cases. The signal which is sent to vertical input , separate one part to trigger circuit before pre-amplify. As the trigger signal is just the signal under tested, a stable waveform will display on screen.

In DUAL or ADD mode, trigger signal is selected by trigger source switch.

LINE: Use frequency of AC supply as trigger signal. This method is very available to test the signal relate with power frequency. Such as AC noise of acoustic equipment, thyristor circuit etc.

EXT: Drive scan trigger circuit by external signal. Since the external signal has certain time relate with the signal under tested, the waveform can be display more independently.

- **Trigger level and polarity switch**

It generates a sweep trigger signal when trigger signal through a preset valve level. The level can be changed by selecting trigger level, valve level move to positive when adjust toward “+”. And valve level move to negative when adjust toward “-”, and valve level set in average of signal when in centre. About positive signal, starting phase is variable. **Note: if the trigger level is adjusted over-positive or over-negative, there is also no sweep signal generates, because by now the trigger level has been exceed the amplitude of synchronized signal.** When the polarity trigger switch set in “+”, rising edger triggered, and falling edge is triggered for “-”. (See fig 6)

图 6 Fig 6 正极性区 Positive zone 水平 Level

- **Trigger alternative switch**

When vertical mode set in dual channel display, the switch used in alternative trigger and alternative display (suitable for the mode of summarize with CH1, CH2).

In alternative mode, trigger signal alternates one time for every sweep period. This mode is avail for the test of waveform amplitude and period, even the two waveform has no relative can be observed, but not suitable for measuring of phase versus time. About this measurement, both channels must be trigger by the source synchronize signal.

In dual channel display, if “CHOP”:& “TRIG.ALT” depressed simultaneously, cannot synchronize display, due to “CHOP” signal become trigger signal. Recommend to use “ALT” mode or directly select CH1 or CH2 as trigger signal source.

7. Sweep rate control

Adjust sweep rate knob, select the waveform number that you want to observe. If too many waveform display on screen, adjust sweep time faster, if only one period waveform display on screen, can slow down the sweep time.

When the sweep rate is too fast, only a part of period signal can be observed. But there may be only one straight line on screen for a square signal.

8. Sweep extension

Extreme high sweep rate is required when observe a part of a waveform. But if the part want to be observed is far from starting point of sweep, the observed waveform may be out of screen. Now we need the sweep extension switch. When the sweep extension switch is depressed, the display range can extend 10 times. Now the sweep extension switch is (the value of “Sweep rate switch”) multiple by 1/10. e.g., 1uSec/div can be extended to 100nSec/div.

图 7 乘 10 扩展 ×10 for extension 调节位置旋钮可观察到整个区域的波形 adjust position knob that you

can observe the waveform of the whole area.

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9. X-Y operation

Set the sweep rate switch in X-Y position, the mode of oscilloscope is X-Y.

X-axial: CH1 input

Y-axial: CH2 input

图 8 Y-轴 Y-axial X-轴 X-axial

Note: when HF signal in X-Y mode, should notice the difference of frequency and phase of X and Y axial.

X-Y mode allows the oscilloscope perform many tests that normal oscilloscope unavailable to. CRT can display an electronic image or two instant levels. It can be the directly comparison of the both levels, just as the vector oscilloscope display visual colorful images. If some relative parameters (frequency, temperature, rate etc.) are converted to voltage by using a sensor, X-Y mode can display almost any of the dynamic parameter images. Test of frequency response is a common example. Y-axial represents signal amplitude, X-axial represents frequency. (See fig 8)

10. Probe calibration

As concern above, oscilloscope probe can use for a very wide frequency range, but phase compensation is must. Distort waveform may cause measurement error. Therefore, it should proceed probe calibration before measurement. Connect 10:1 probe to the input of CH1 or CH2, set the attenuation switch to 50mV, connect the probe needle to the input of calibration signal, adjust compensation capacitor to the best waveform (no overshoot, fillet, upwarping). (See fig 9)

图 9 Fig 9 补偿合适 Appropriate compensation
过补偿 Overcompensation
欠补偿 Undercompensation

11. DC balance adjustment (DC BAL)

- Set the input coupling switch of CH1 and CH2 in GND, trigger mode in AUTO, adjust trace in centre position.
- Adjust the attenuation switch between 5mV and 10mV, tune DC BAL until the trace is below zero horizontal line and keep stationary.

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Maintenance 维护

Warning: No operator serviceable component inside, do not remove covers, refer servicing to qualified personnel only.

1. Replacement of fuse

If the fuse is burnout, power indicator will go out, and the oscilloscope will failure to work. Usually the fuse is not open circuit, unless the circuit has problem. Check the circuit problem at first, which may cause the fuse breakout, then replace the fuse. Use the specification with the original fuse. The fuse is on the rear panel, see fig 4-2.

Warning: To avoid fire, use the fuse with 250V voltage and pertinent current only. Disconnect the power cord before replacement.

2. Clean

Clean oscilloscope by using a soft cloth, which has been dipped neutral detergent and water. Do not pray the detergent on to the oscilloscope surface directly, since it may cause the inside parts damaged.

Do not use the chemicals with gasoline, benzene, toluene, xylene, acetone or other similar solvents.

Do not use abrasive powder or similar detergent to clean the oscilloscope.

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通道 1 (X) 输入 CH1 (X) input
衰减 Attenuation
预放 Pre-amplify
通道 1 输出 CH1 (X) output
通道 1 触发取样 CH1 trigger sampling
垂直扫描开关 Vertical sweep switch
垂直输出放大 Vertical output amplify
通道 2 (Y) 输入 CH2(Y) input
衰减 Attenuation
预放 Pre-amplify
开关逻辑电路 Switching logical circuits
Z 轴放大 Z-axial amplify
CRT 电路 CRT circuit
通道 2 触发取样 CH2 trigger sampling
触发开关 Trigger switch
Z 轴输入 Z-axial input
高压 High voltage.
X 轴信号 X-axial signal
通道 1 CH1
扫描发生器 Sweep generator
行扫开关 Line scan switch
通道 2 CH2
触发输入放大 Trigger input amplify
触发信号发生器 Trigger signal generator
行扫输出放大 Line scan output amplify
外接 External
自动电路 Auto circuit
自由振荡信号 Free oscillate signal
去各单元电路 To circuits of other units
电源电路 Power circuit
交流 50/60Hz AC 50/60Hz
电源触发 Power trigger
2Vp-p/1KHz 方波 2Vp-p/1KHz square waveform
校正信号发生器 Calibration signal generator

技术指标若有变动恕不另作声明

All specifications are subject to change without previous notice.