



SS-7840H  
**DC – 470 MHz, 4 CH, 10 traces**  
 SS-7840  
**DC – 400 MHz, 4 CH, 10 traces**  
 SS-7825  
**DC – 250 MHz, 4 CH, 10 traces**

- *Save/recall of up to 256 panel settings*
- *Quick auto setup*
- *Full NTSC, PAL (SECAM), HDTV TV triggering with field and line*
- *2 mV/div high sensitivity and 500 ps/div sweep rate (SS-7840, H)*
- *5-digits frequency counter*
- *Cursor function*
- *100 mV, 500 mV/div CH3 ranges*
- *Probe power for FET or current probe*
- *Offset function*
- *TV pedestal clamp function*

■ **DC – 470 MHz, 4 CH, 10 traces**

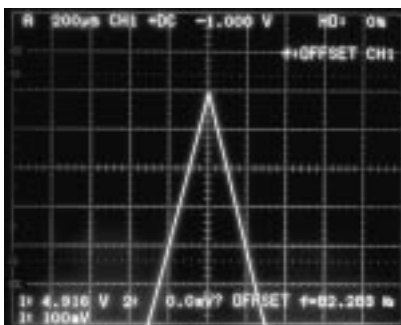
Four channels of up to 470 MHz are available with CH1 and CH2 boasting the widest frequency range.

■ **SS-7840H**

- DC – 470 MHz (-3 dB) at 5 mv ~ 50 mV/div
- DC – 440 MHz (-3 dB) at 2 mV, 100 mV ~ 5 V/div
- All other features and specifications are same as SS-7840.

■ **Input offset function**

Suitable for the observation of small amplitude signals, the DC input offset function features an offset equivalent to  $\pm 500$  div. max. that can be applied to CH1 or CH2.



■ **Counter measurement function**

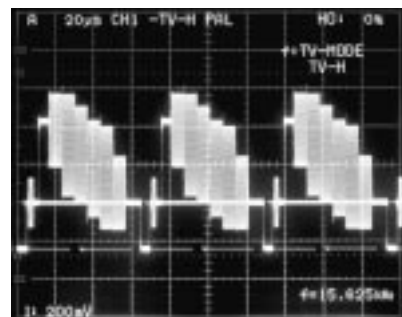
Built-in 5-digit counter displays frequencies of up to 400 MHz. (6 digit: Factory option)

■ **Quick auto setup (CH1, CH2)**

Pressing the button automatically displays the optimum range for the input waveform on the CRT (for CH1 and CH2).

■ **TV/HDTV trigger**

TV triggering is available for NTSC, PAL (SECAM) and HDTV. Field (EVEN/ODD/BOTH) and line select functions are provided.



■ **Save/recall of up to 256 settings**

Turning the FUNCTION knob recalls the panel setup. Up to 256 settings can be stored in memory.

■ **Power supply for FET probe**

■ **Pedestal clamp function (CH1 or CH2)**

## Specifications

<b>■ CRT</b>									
<b>Shape</b>	6-inch rectangular. internal graticule, meshless CRT with scale illumination								
<b>Effective area</b>	8 x 10 div (1 div = 10 mm)								
<b>Accelerating voltage</b>	Approx. 20 kV								
<b>■ Vertical deflection system (Y axis)</b>									
<b>Vertical mode</b>	CH1, CH2, CH3, CH4 ADD (CH1 + CH2) ALT, CHOP (555 kHz ± 1%)								
<b>● CH1, CH2</b>									
<b>Sensitivity</b>									
<b>Range</b>	2 mV/div – 5 V/div(1-2-5 sequence in 11 steps)								
<b>Variable adjuster</b>	2 mV/div – 12.5 V/div. continuously variable								
<b>Accuracy</b>	±2%								
<b>Frequency bandwidth</b>									
<b>Bandwidth</b>	DC – 470 MHz -3 dB (SS-7840H) DC – 400 MHz -3 dB (SS-7840) DC – 250 MHz -3 dB (SS-7825) Note: The lower limit frequency is 10 Hz with AC coupling								
<b>Bandwidth limiter</b>	DC – 20 MHz, 100 MHz (SS-7840/7840H) DC – 20 MHz (SS-7825)								
<b>Rise time</b>	Approx. 745 ps (SS-7840H) Approx. 875 ps (SS-7840) Approx. 1.4 ns (SS-7825) Note: Calculated from the following formula								
	$Tr = \frac{350}{\text{Bandwidth [MHz]}} \text{ [ns]}$								
<b>Signal delay time</b>	20 ns or more (on the screen)								
<b>Input coupling</b>	AC, DC, GND								
<b>Input RC</b>	1 M $\Omega$ ± 1.5% // 16 pF ± 2 pF, 50 $\Omega$ input: 50 $\Omega$ ± 1%								
<b>Max. input voltage</b>									
<b>1 M<math>\Omega</math> input</b>	± 400 V (DC + AC peak)								
<b>50 <math>\Omega</math> input</b>	5 Vrms								
<b>VSWR</b>	1.35 or less (with DC – 400 MHz,DC – 250 MHz for SS-7825)								
<b>Offset voltage</b>									
	<table border="1"> <thead> <tr> <th>Vertical range</th> <th>Offset voltage</th> </tr> </thead> <tbody> <tr> <td>2 mV/div – 50 mV/div</td> <td>±1 V</td> </tr> <tr> <td>0.1 V/div – 0.5 V/div</td> <td>±10 V</td> </tr> <tr> <td>1 V/div – 5 V/div</td> <td>±100 V</td> </tr> </tbody> </table>	Vertical range	Offset voltage	2 mV/div – 50 mV/div	±1 V	0.1 V/div – 0.5 V/div	±10 V	1 V/div – 5 V/div	±100 V
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2 mV/div – 50 mV/div	±1 V								
0.1 V/div – 0.5 V/div	±10 V								
1 V/div – 5 V/div	±100 V								
<b>Polarity switching</b>	CH2 only								
<b>Probe sense</b>	1:1, 10:1, 100:1								
<b>● CH3, CH4</b>									
<b>Sensitivity</b>									
<b>Range</b>	100 mV/div, 500 mV/div								
<b>Accuracy</b>	± 3%								
<b>Frequency bandwidth</b>	DC – 400 MHz, -3 dB (SS-7840) DC – 250 MHz, -3 dB (SS-7825)								
<b>Input coupling</b>	AC, DC								
<b>Input RC</b>	1 M $\Omega$ , ±1.5%/16 pF ±3 pF								
<b>Max. input voltage</b>	±400 V max. (DC + AC peak)								
<b>Probe sense</b>	1:1, 10:1, 100:1								
<b>■ Triggering</b>									
<b>● A triggering</b>									
<b>Trigger mode</b>	EDGE, EVENT, TV								
<b>Source</b>	CH1, CH2, CH3, CH4, LINE								
<b>Coupling</b>	AC, DC, HF-REJ, LF-REJ								
<b>Slope</b>	+, –								
<b>Sensitivity</b>									
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	HF-REJ: Attenuates at 10 kHz or more HF-REJ: Attenuates at 10 kHz or less								
<b>● B triggering</b>									
<b>Source</b>	CH1, CH2, CH3, CH4								
<b>Coupling</b>	AC, DC, HF-REJ, LF-REJ								
<b>Slope</b>	+, –								
<b>Sensitivity</b>									
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10 MHz – 100 MHz	1.0 div								
*100 MHz – 250 MHz	2.0 div								
	*SS-7840/7840H								
	HF-REJ: Attenuates at 10 kHz or more HF-REJ: Attenuates at 10 kHz or less								
<b>● TV trigger</b>									
<b>Format</b>	NTSC, PAL (SECAM), HDTV								
<b>Trigger mode</b>	TV-V (ODD, EVEN, BOTH), TV-H								
<b>NTSC</b>	1 H – 525 H								
<b>PAL (SECAM)</b>	1 H – 625 H								
<b>HDTV</b>	1 H – 1125 H								
<b>TV clamp</b>									
<b>Clamp position</b>	Back porch level								
<b>Clamp level</b>	Within ±1 div								
<b>Signal amplitude</b>	1.5 div – 8 div								

<b>● Event trigger</b>	COUNT, BURST
<b>Count range</b>	1 – 65535
<b>Max. count frequency</b>	50 MHz
<b>Burst time range</b>	0.15 $\mu$ s – 9.99 s
<b>● AUTO SETUP</b>	
<b>Input channel</b>	CH1, CH2
<b>Frequency range</b>	50 Hz – 100 MHz
<b>■ Horizontal deflection system (X axis)</b>	
<b>Display (HORIZ DISPLAY)</b>	A, ALT, B, X-Y
<b>● A sweep</b>	
<b>Sweep mode</b>	AUTO, NORMAL, SINGLE
<b>Sweep rate</b>	5 ns/div – 500 ms/div (1-2-5 sequence in 25 steps) (SS-7840) 10 ns/div – 500 ms/div (1-2-5 sequence in 24 steps) (SS-7825) 500 ps/div (SS-7840), 1 ns/div (SS-7825) Variable
<b>Max. sweep rate</b>	
<b>Hold-off time</b>	Variable
<b>● B sweep</b>	
<b>Delay</b>	TRIG'D DELAY, RUNS AFTER DELAY
<b>Sweep rate</b>	5 ns/div – 20 ms/div (1-2-5 sequence in 21 steps) (SS-7840) 0 ns/div – 20 ms/div (1-2-5 sequence in 20 steps) (SS-7825) 500 ps/div (SS-7840) 1 ns, div (SS-7825)
<b>Max. sweep rate</b>	
<b>Delay time</b>	
<b>Range</b>	0.2 div – 10.2 div of A sweep
<b>Delay jitter</b>	1/20000 at 1 ms/div of A sweep, 500 ns/div of B sweep
<b>● Sweep magnification</b>	
<b>■ X-Y operation</b>	
<b>● X axis</b>	(CH1)
<b>Sensitivity</b>	Same as CH1
<b>Accuracy</b>	±2%
<b>Frequency bandwidth</b>	DC – 2 MHz -3 dB
<b>● Y axis</b>	CH1, CH2, CH3, CH4, ADD
<b>Phase difference</b>	Within 3° (DC – 200 kHz)
<b>■ CAL (calibration signal)</b>	
<b>Waveform</b>	Square-wave
<b>Frequency</b>	1 kHz, ±0.1%
<b>Duty ratio</b>	49% – 51%
<b>Output voltage</b>	0.6 V, ±1%
<b>■ CH2 OUT</b>	
<b>Output voltage</b>	20 mV/div, ±30% (50 $\Omega$ load)
<b>Frequency bandwidth</b>	200 MHz, -3 dB (50 $\Omega$ load) (100 MHz for SS-7825)
<b>Output resistance</b>	50 $\Omega$ , ±20%
<b>■ Probe power</b>	
<b>Connector number</b>	2
<b>Voltage</b>	+12V, -12V
<b>■ Z AXIS IN</b>	
<b>Modulation voltage</b>	0.5 Vp-p or more
<b>Polarity</b>	With positive voltage, dark: with negative voltage, bright
<b>Frequency bandwidth</b>	DC – 5 MHz
<b>Input resistance</b>	5 k $\Omega$ ±20%
<b>Max. input voltage</b>	±40 V max.
<b>■ Cursor measurement</b>	Time difference ( $\Delta t$ ), voltage difference ( $\Delta V$ )
<b>■ Counter</b>	
<b>Display digits</b>	5-digit (A trigger source)
<b>Accuracy</b>	±0.01%
<b>Frequency range</b>	2 Hz – 400 MHz (SS-7840) 2 Hz – 250 MHz (SS-7825)
<b>■ Save/ Recall</b>	
<b>Backup time</b>	Max. 256 panel settings
<b>■ Power supply</b>	
<b>Voltage range</b>	Approx. 30,000H (at 25 °C) AC 100 V – 240 V
<b>Frequency range</b>	50 Hz – 400 Hz
<b>Power consumption</b>	Max. 120 VA
<b>■ Weight and dimensions</b>	
<b>Weight</b>	Approx. 8.5 kg (without accessories)
<b>Dimensions</b>	Approx. 320W x 160H x 420L mm
<b>■ Environmental conditions</b>	
<b>Performance guaranteed temperature</b>	+10 – +35 °C
<b>Operating range</b>	
<b>Temperature</b>	0 – +40 °C
<b>Humidity</b>	90% RH (0 – 40 °C)
<b>Storage range</b>	
<b>Temperature</b>	-20 – +40 °C
<b>Humidity</b>	80% RH (-20 – +40 °C)
<b>■ Accessories</b>	Power cord (x1), probe (x2), panel cover (1), fuse (x2), operation manual (x1), accessory bag (x1)

# Ultimate 400 MHz analog oscilloscopes

## Model SS-7840 400 MHz and model SS-7840H 470 MHz analog oscilloscopes from IWATSU

With four channels and a wide 400-MHz bandwidth, this leading-edge analog oscilloscope boasts the highest level of performance in its class. The flagship of IWATSU's popular SS-7800 line of analog oscilloscopes — with models ranging from DC – 100 MHz to DC – 470 MHz — the SS-7840 is setting the standards for analog oscilloscopes with features like the IWATSU-developed meshless box lens CRT.

### Save/recall function

Up to 256 different setups and 12-character comments can be saved and recalled.

### Direct selection of the cursor measurement

One-touch selection of  $\Delta t$  and  $\Delta V$ . Up to four cursors can be displayed simultaneously for measurement.

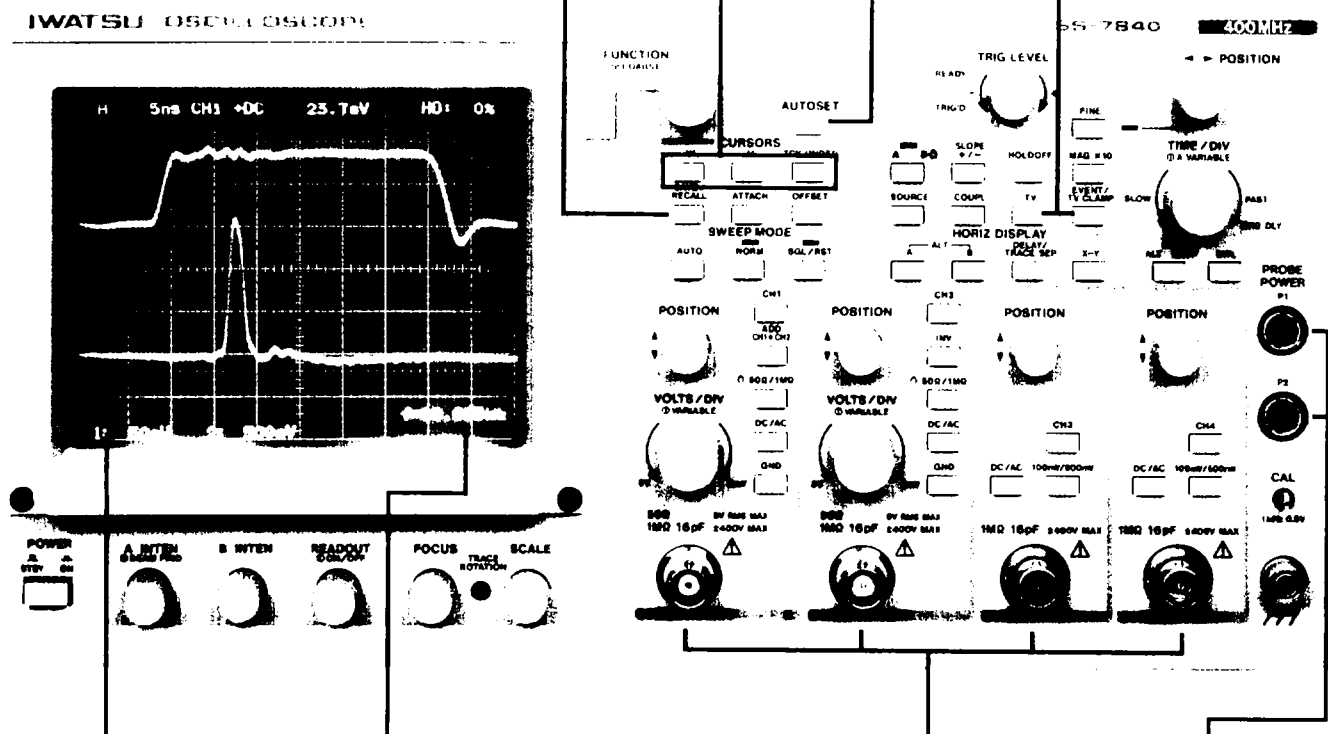
### High-speed auto setup

Just press this button and the optimum range for the input waveform is automatically displayed on the CRT (for CH1 and CH2).

### Powerful TV triggering

TV-H, ODD, EVEN or BOTH fields can be selected. Line selection is possible from NTSC: 1 – 525H, PAL (SECAM): 1 – 625 and HDTV: 1 – 1125.

### Front panel



### High-intensity CRT

The built-in IWATSU-developed 6-inch, meshless CRT with internal graticule displays waveforms with bright and sharp traces.

### High-accuracy 5-digit frequency counter

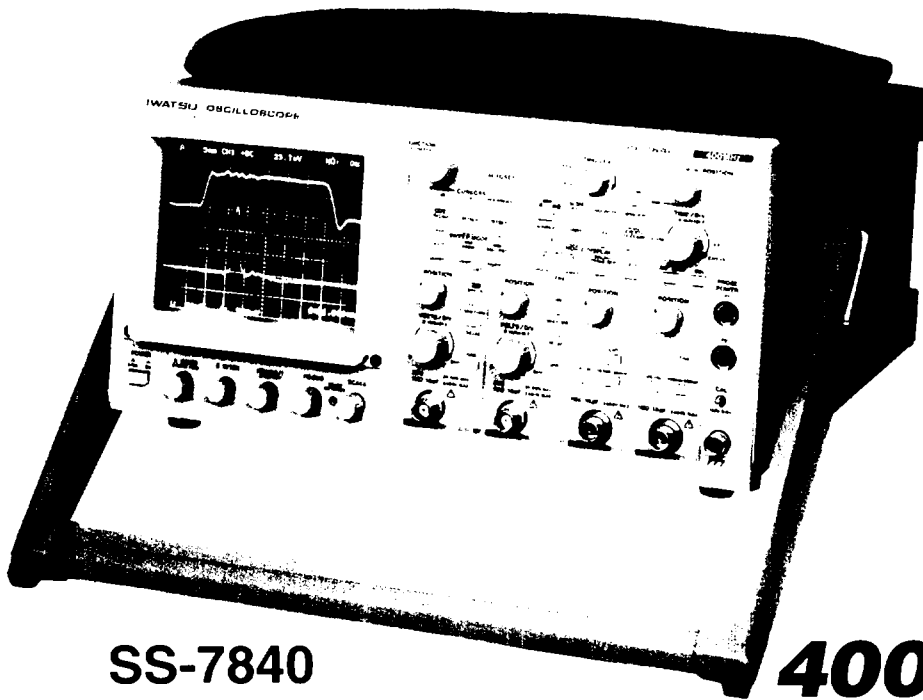
A frequency counter with  $\pm 0.01\%$  accuracy is built in.

### Wide frequency bandwidth of DC – 400 MHz guaranteed for all channels

CH1 and CH2 have the highest sensitivity of 2 mV/div. For CH3 and CH4, 100 mV/div or 500 mV/div can be selected. Also, 1 M $\Omega$  or 50  $\Omega$  can be selected.

### Power supply output terminal for FET probe

The optional SFP-5A/4A (DC – 1 GHz/800 MHz) FET probe can be used.



## SS-7840

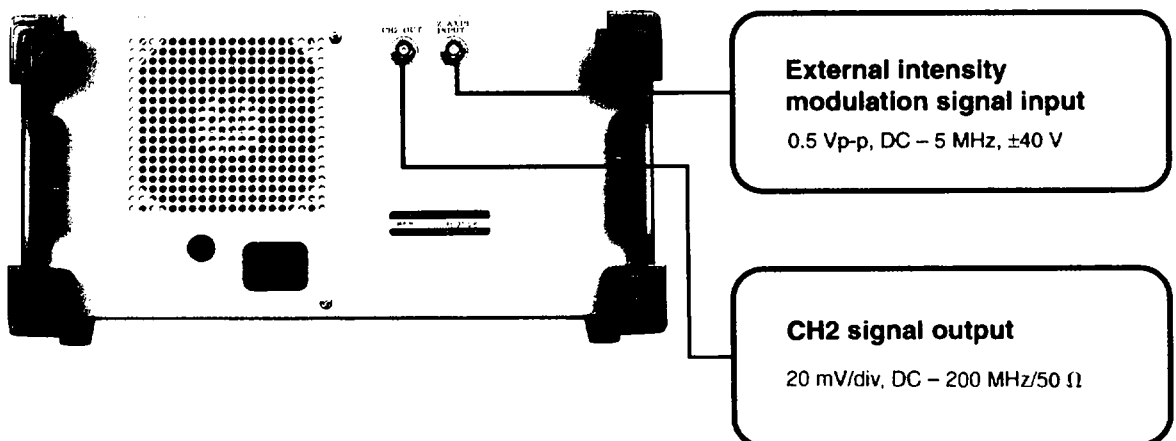
# 400/470 MHz

- DC – 400 MHz, 4 CH, 10 traces
- Full TV triggering with clamping function
- Input offset function
- 5-digit frequency counter
- High-speed auto setup
- Save/recall of up to 256 panel settings

## SS-7840H (Special Order)

- DC – 470 MHz, 4 CH, 10 traces
  - DC – 470 MHz (–3 dB) at 5 mV ~ 50 mV/div
  - DC – 440 MHz (–3 dB) at 2 mV, 100 mV ~ 5 V/div
- All other features and specifications same as SS-7840

### Rear panel

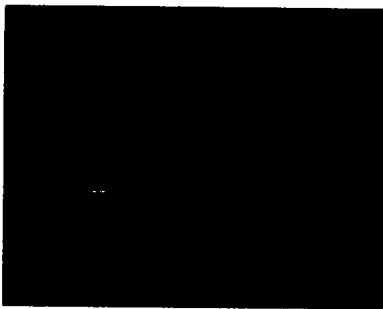


# ***IWATSU is aiming to become the world's top producer of analog scopes***

You can capture and measure your signal with IWATSU oscilloscopes. Applications for analog scopes in many high-tech fields include:

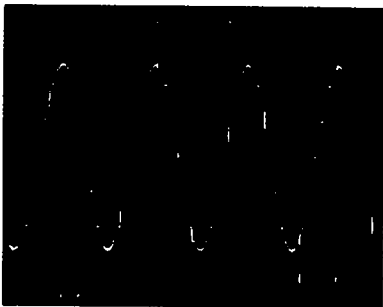
- Video applications, especially VCRs and TVs.
- Observation of optical disc (such as DVD) eye patterns.
- Observation of wide-bandwidth noise on magneto-optical discs (MO).
- Observation of radar burst waveforms.

## **DC – 400 MHz (all channels), high-sensitivity of 2 mV/div (CH1, CH2)**



DC – 400 MHz for all channels. CH1 and CH2 have the maximum sensitivity of 2 mV/div, ensuring extremely high-quality waveforms. As there is a little difference in the high-speed step response characteristics between ranges, accurate waveform observation is possible.

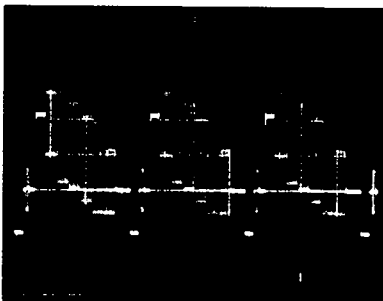
## **Frequency counter**



The built-in 5-digit counter is accurate within a range of  $\pm 0.01\%$  and can measure frequencies between 2 Hz and 400 MHz. Also shows the sync signal frequencies.

\* 5-digit counter

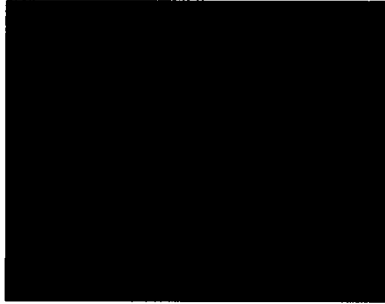
## **High-speed auto setup (CH1, CH2)**



Input signals are set in the optimum range at high speed. In the TV mode, HDTV/NTSC/PAL signals are automatically recognized.

\*NTSC signal waveform

## IWATSU-developed bright, sharp CRT

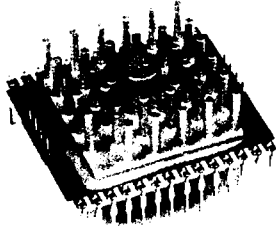


For the most important part for the analog oscilloscope — the CRT — IWATSU uses its own original CRT. Based on our more than 40 years experience in CRT design, this advanced model features superlative brightness and sharpness that even allows you to easily observe signals with slow repetition and a high-speed rise.



\* IWATSU-developed 6-inch meshless CRT

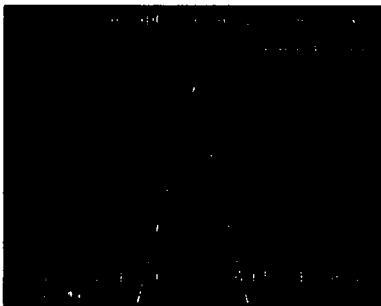
## IWATSU-developed preamp IC for improved signal stability



A preamp circuit has been provided for the IC to increase signal stability.

\* IWATSU-developed preamp IC

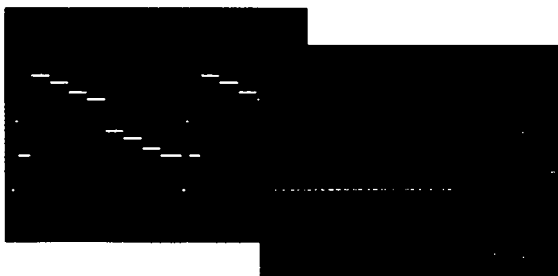
## DC offset function (CH1 or CH2)



This function is convenient when you need to observe a signal with very small amplitude superimposed over a signal with large amplitude. It's especially useful when observing high-frequency noise superimposed over video signals or ripple of high-voltage DC power supply. DC offset equivalent to  $\pm 500$  div max. can be applied.

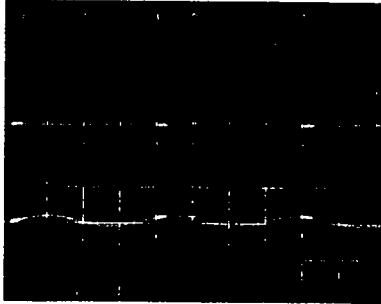
\* Function generator triangle waveform

## TV/HDTV triggering



Field (EVEN/ODD/BOTH) and line selection is possible for HDTV/NTSC/PAL/SECAM. Meeting the needs of engineers who want to observe HDTV signals without any attenuation (even as low as 0.1 dB), the 400 MHz bandwidth allows an entire TV signal to be observed at a glance using the intensity information characteristic of the analog oscilloscope.

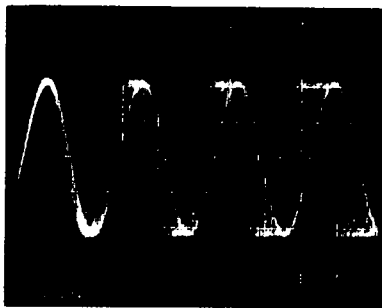
## Pedestal clamp function (CH1 or CH2)



The amplitude of video signals varies dynamically depending on the intensity of a picture. With this function, stable observation is ensured.

## Measurement examples

### ● Observation of video head frequency modulation signals



Input and output signals to/from video heads are frequency modulation waveforms with the modulation frequency shown below.

VHS: 3.3 MHz – 4.4 MHz

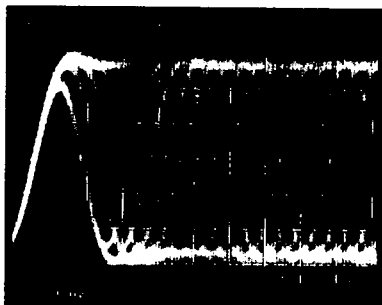
S-VHS: 4.4 MHz – 7.0 MHz

HDTV: 14 MHz – 22 MHz

The voltage of recorded or read-out signals to/from the video heads is specified. To observe these FM signals, an analog oscilloscope is indispensable.

\* S-VHS deck head signal waveform

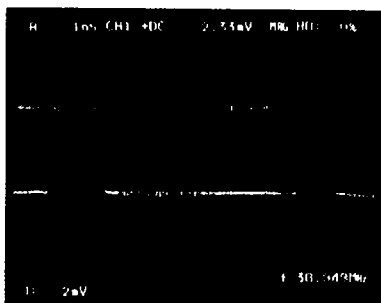
### ● Observation of the eye pattern is indispensable for the development and manufacturing of optical discs



When evaluating optical discs such as CDs, CD-ROMs, LDs, MOs or DVDs, eye patterns need to be observed. With this analog oscilloscope, accurate observation of the eye patterns of high-speed and high-density media is easily possible.

\* CD signal eye pattern waveform

### ● Observing ATM 155 Mbps signal eye patterns



The standard transmission rate for most networked communication systems is 155 Mbps (STM-1). This is standard for both WANs (Wide Area Network) and LANs (Local Area Network). However, since the maximum amount of jitter that can be contained in an STM-1 waveform is stipulated by the ITU-T, measurement of the amount of jitter is necessary. The amount of jitter can be estimated by observing the signal waveform with the eye pattern and following the pulse mask standard. Again, the analog oscilloscope is indispensable for these measurements.

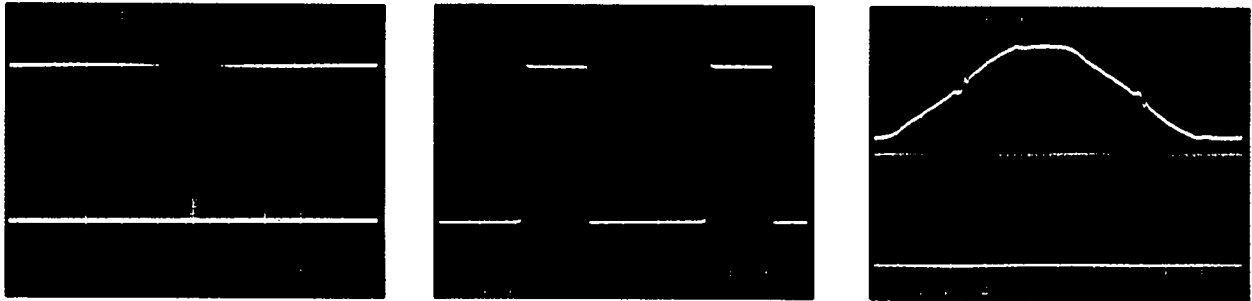
\* 155 Mbps signal eye pattern waveform measured with SS-7840H (DC – 470 MHz Special Order Model)

- **Comparing waveform observation capabilities of analog and digital oscilloscopes (switching power supply waveform used as an example)**

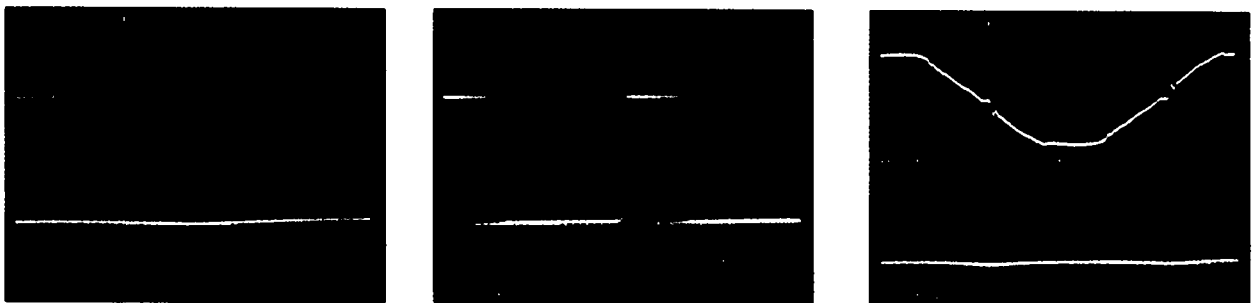
A switching power supply unit with a higher harmonics measure switches the voltage of a commercial power supply at high speed. In terms of circuit operation, switching stops at the zero cross of the AC power supply. To observe this condition, an analog oscilloscope is required. Analog

oscilloscopes are also superior when simultaneously observing voltage and current waveforms. In addition, when magnifying a switching waveform for observation on an analog oscilloscope, no complicated operations are required to trigger the waveform.

**Observation example on an analog oscilloscope**



**Observation example on a digital oscilloscope**



**Other features**

- **Panel settings save/recall function**

Up to 256 panel setups can be saved together with comments (up to 12 characters).

- **Event trigger**

In addition to the event delay trigger which allows you to trigger events a specified number of times (1 – 65535), there's also a burst trigger mode which allows you to easily trigger a burst signal — something that is difficult to do with an ordinary oscilloscope.

- **CH2 skew adjust**

The delay time of CH2 in response to CH1 can be adjusted with a range of 1 ns. Therefore, accurate measurement is possible by compensating for the delay time difference between the probes.

- **FET probe power supply provided as standard**

A dedicated power supply for two FET probes is provided. The DC offset voltage of each FET probe can be controlled.