Section 1 Specifications

1-1 GENERAL

The SS-7635 and SS-7625 are the general purpose portable oscilloscope . The SS-7635 is the 350 MHz oscilloscope. The SS-7625 is the 250 MHz oscilloscope. The SS-7635 and the SS-7625 have the four vertical input channels and the dual time bases with the cursor measurement capability. The SS-7635 is the advanced versatile oscilloscope including automatic meaurement, auto-setup functions and the capabilities of the SS-7625.

- DC to 350 MHz (SS-7635)
- DC to 250 MHz (SS-7625)
- Four input channels
- 2 mV/div high sensitivity
- 0.5 ns/div maximum sweep rate by using X10 MAG
- CRT character readout and cursor measurement
- Four cursors simultaneous display
- Automatic vertical sensitivity correction for the specified probes
- Automatic DC voltage measurement and peak voltage measurement
- Calender and real time clock
- Setup memories and comment mode
- Auto-setup function

All the specifications in this section are:

1) applicable to the all units of the SS-7635 and SS-7625 if not specified.
2) valid within +10°C to +35°C, unless noted.
3) valid after 30-minute warm-up time.

1-2 ELECTRICAL SPECIFICATIONS

Vertical deflection system (Y axis)

Mode: CH1, CH2, CH3, CH4, ALT, CHOP, ADD (CHOP switching frequency: 500kHz ±2%)

CH1 and CH2

Deflection factor: 2 mV/div to 5 V/div in a 1-2-5 sequence of 11 steps
2 mV/div to 12.5 V/div (continuously variable with VARIABLE)

Accuracy:

5 mV/div to 5 V/div	±2%
	±5% (−10°C to +50°C)
2 mV/div	±3%
	±6% (−10°C to +50°C)

[Note]
- Add 2%, when the ENV is on.
- The above accuracies are valid after auto calibration (CALIB) at +23°C ±5°C.
- Within ±5°C from the temperature at which auto calibration is done and between +10°C and +35°C, the accuracy is:
  ±1% at 5mV/div to 5V/div

Frequency response:

SS-7635

Sensitivity	With SS-082R probe or internal 50Ω termination	With external 50Ω termination
2mV/div	DC to 150MHz;−3dB	DC to 150MHz;−4.9dB
5mV/div to 5V/div	DC to 350MHz;−3dB	DC to 350MHz;−4.9dB

SS-7625

Sensitivity	With SS-082R probe or internal 50Ω termination	With external 50Ω termination
2mV/div	DC to 100MHz;−3dB	DC to 100MHz;−4.9dB
5mV/div to 5V/div	DC to 250MHz;−3dB	DC to 250MHz;−4.9dB

[Note]
- The lower cutoff frequency (−3dB) at AC coupling is 10Hz.
- When the bandwidth limit is on, the bandwidth is limited to 20MHz.
- The input coupling is set to DC at 50 Ω input impedance position.

Rise time: At 10mV/div with internal 50 Ω termination
SS-7635: 1ns
SS-7625: 1.4ns
(Rise time is calculated from: Bandwidth x Rise time = 0.35)

Pulse response:
At 10mV/div with internal 50 Ω termination
Overshoot: 5%
Sag (at 1kHz): 1%
Other distortion: 5%

Signal delay:
20ns or greater (delay time on the screen) by internal delay cable

Input coupling:
AC, DC, GND

Input RC:
At 50Ω input impedance
50Ω ±1%
At 1MΩ input impedance
1MΩ ±1% // 16pF ±1pF (without probe)
10MΩ ±2% // 13pF ±2pF (with SS-082R probe)

Maximum input voltage:
At 50Ω input impedance
5Vrms, or 0.5W second during any one second within ±50V peak voltage
At 1MΩ input impedance
±400V MAX (without probe)
±600V MAX (with SS-082R probe)

VSWR:
SS-7635
1.6 or less in DC to 350 MHz with 50Ω input impedance
SS-7625
1.6 or less in DC to 250 MHz with 50Ω input impedance

Drift:
0.2 div/hour or 1mV/hour, whichever is greater after 15-minute warmup (typical value)

Polarity:
CH2 only

Common mode rejection ratio:
At 10mV/div
50: 1 (1kHz sine wave)
15: 1 (20MHz sine wave)

CH3 and CH4

Deflection factor:
0.1V/div and 0.5V/div
Accuracy: ±4%
±6% (−10°C to +50°C)

Frequency response:
With SS-082R probe or 50Ω input impedance
SS-7635
DC to 350MHz; −3dB
SS-7625
DCto 250MHz; −3dB
[Note]
- The lower cutoff frequency (−3dB) at AC coupling is 10Hz.
- When the bandwidth limit is on, the bandwidth is limited to 20MHz.

Pulse response:
With 50Ω input impedance
Overshoot : 13%
Sag (at 1kHz) : 2%
Other distortion : 8%

Input coupling:
AC, DC

Input RC:
1MΩ ±1.5% // 16pF ±2pF (without probe)
10MΩ ±2% // 13pF ±2pF (with SS-082R probe)

Maximum input voltage: ±400V MAX (without probe)
±600V MAX (with SS-082R probe)

Triggering

A Triggering

Trigger sensitivity: The value in the parentheses is for the SS-7625.

Couplin	Frequency range	Maximum sensitivity			
		Without AUTO LEVEL		With AUTO LEVEL	
		Without NOISE REJ	NOISE REJ	Without NOISE REJ	NOISE REJ
AC	10Hz to 10MHz	0.4 div		0.6 div	
	10MHz to 100MHz	1.0 div		1.5 div	
	100MHz to 350 (250) MHz	1.5 div		2.5 div	
DC	DC to 10MHz	0.4 div	1.5 div	0.6 div	1.8 div
	10MHz to 100MHz	1.0 div	3.5 div	1.5 div	4.0 div
	100MHz to 350 (250) MHz	1.5 div	4.5 div	2.5 div	
TV-V TV-H		Composite video signal amplitude: 1.5 div		Composite video signal amplitude: 2.5 div	

[Note]

- The lower limit frequency at AUTO mode is 50Hz.
- The composite video signal is assumed to be consists of 70% video signal amplitude and 30% sync signal amplitude.
- At REJ coupling, the trigger signal is attenuated at the frequency of:
  HF REJ: 50 kHz or higher
  LF REJ: 50 kHz or lower

Trigger source: CH1, CH2, CH3, CH4, LINE, COMB, VERT
Coupling: DC, DC HF REF, DC NOISE REJ, AC HF REJ, AC LF REJ, AC, TV-V, TV-H
Polarity: Positive (+), negative (–)

B Triggering

Trigger sensitivity: Same as in the A trigger sensitivity except that maximum frequency is 250MHz on both of SS-7635 and SS-7625.
Trigger source: CH1, CH2, CH3, CH4, COMB
Coupling: AC, DC, DC HFREJ, DC NOISE-REJ, AC HFREJ
Polarity: Positive (+), negative (–)

Event delay

Count range:	1 to 65535
Maximum count frequency:	20MHz

TV Triggering

Triggerable TV system:	NTSC, PAL, SECAM
FIELD SELECTOR (NTSC only)	BOTH, ODD, EVEN
LINE SELECTOR	1 to 9999 line

Horizontal deflection system (X axis)

Horiz Display:	A, ALT, B, X-Y
Sweep mode:	AUTO LEVEL, AUTO, NORM, SINGLE

A time base

Sweep mode: AUTO LEVEL, AUTO, NORM, SINGLE

Sweep rate:
5ns/div to 0.5s/div in a 1-2-5 sequence of 25 steps
5ns/div to 1.5s/div (continuously variable with VARIABLE)
Accuracy I :(over center 8 divisions)
±2% at 5ns/div to 0.2s/div with VARIABLE off
±3% at 0.5s/div with VARIABLE off
±3% at 5ns/div to 1.5s/div with VARIABLE on
Accuracy II (over any 2 divisions within center 8 divisions)
±5%at 5ns/div to 1.5s/div with VARIABLE on or off

[Note]
- The above accuracies are valid after auto calibration (CALIB) at +23°C ±5°C.
- Within ±5°C from the temperature at which auto calibration is done and between +10°C and +35°C, the accuracy I is:
  ±1.2% at 5μ s/div to 0.5s/div with VARIABLE off

Holdoff time: Variable with HOLDOFF

B time base

Delay: Continuous delay (RUNS AFT DLY) or triggered delay (TRIG AFT DLY)
5ns/div to 20ms/div in a 1-2-5 sequence of 21 steps
Accuracy I :(over center 8 divisions)
±2%
Accuracy II :(over any 2 divisions within center 8 divisions)
±5%

[Note]
- The above accuracies are valid after auto calibration (CALIB) at +23°C ±5°C.
- Within ±5°C from the temperature at which auto calibration is done and between +10°C and +35°C, the accuracy I is:
  ±1.2% at 5 μ s/div to 20ms/div

Delay time range:	0 to 5.0ms or more at 0.5ms/div Accuracy at 1 μ s/div to 0.5s/div ±1% of reading ± 1.5% of full scale-45ns
Delay jitter:	1/20,000or less
Sweep magnification:	10 times (max. sweep rate: 0.5ns/div) Accuracy I :(over center 8 divisions) ±5% at 5ns/div to 50ns/div ±3% at 100ns/div to 0.5s/div Accuracy II :(over any 2 divisions within center 8 divisions) ±10% at 5ns/div to 50ns/div ±5% at 100ns/div to 0.5s/div

[Note]

- At 5ns/div to 20ns/div, the first 20ns and last 20ns of the sweep are not valid for this specification.
- At 50ns/div to 50ms/div, the first 1 division and the last 20ns of the sweep are not valid for this specification.

X-Y operation

X axis	
Input:	CH1
Deflection factor:	Same as CH1 Accuracy: ±3%
Frequency response:	DC to 2MHz; -3dB
Input RC:	Same as CH1
Max. input voltage:	Same as CH1
Y axis	
Input:	CH1, CH2, CH3, CH4, ADD
Deflection factor:	Same as CH1, CH2, CH3, and CH4
Frequency response:	Same as CH1, CH2, CH3, and CH4
Input RC:	Same as CH1, CH2, CH3, and CH4
Max. input voltage:	Same as CH1, CH2, CH3, and CH4
Phase difference:	Within 3° (at DC to 1MHz)

External intensity modulation (Z axis)

Min. modulation voltage:	0.5Vp-p
Polarity:	Positive going signal decreases intensity, and negative going signal increases intensity.
Frequency range:	DC to 5MHz
Input impedance:	5kΩ ±20%
Max. input voltage:	±50V MAX

Signal output

Calibrator

Waveform:	Square wave
Repetition rate:	1kHz
	Accuracy: ±0.01%
Duty ratio:	49% to 51%
Output voltage:	0.6V
	Accuracy: ±1%
	±1.5%(−10°C to +50°C)
Output current:	10mA
	Accuracy: ±1%

CH2 signal output

Output voltage:	20mV ±20% for 1 division screen amplitude (at 50Ω load)
Bandwidth:	DC to 100MHz; −3dB
Output impedance:	50Ω ±20%

A GATE output

Output voltage:	5Vp-p approx.
Output impedance:	2.7kΩ approx.

B GATE output

Output voltage:	5Vp-p approx.
Output impedance:	2.7kΩ approx.

Readout and cursor measurement

Readout

Vertical readouts:	CH1 through CH4 deflection factors with automatic factor correction of using SS-082R probe, UNCAL, AC, DC, GND, INV, VERT MODE, BW
Triggering readouts:	A and B trigger sources, couplings and slopes
Horizontal readouts:	A and B sweep rates, X 10MAG with automatic factor correction, DLY, HOLDOFF
Cursors:	Two voltage cursors (horizontal cursors) and two time cursors (vertical curosrs)
Menu display:	MEASUREMENT, SAVE/RECALL, COMMENT, and SYSTEM menus
CRT control:	ENHANCE

Frequency counter

Measurement channel:	Same as A trigger block
Maximum sensitivity:	Two times of A trigger maximum sensitivity
Display digit:	Four digits
Maximum count time:	5s

Frequency range:

SS-7635
40Hz to 350MHz
SS-7625
40Hz to 250MHz

Measurement error:

±3 counts

DVM

Measurement channel:

CH1 only

Measurement range:

VOLTS/DIV setting	Range	Resolution
2mV/div to 50mV/div	±1.2V	0.5mV
0.1V/div to 0.5V/div	±12V	5mV
1V/div to 5V/div	±120V	50mV

Accuracy without probe
±1.5% of reading ± 3 x resolution

Peak voltage measurement

Input signal:

DC (+PEAK and −PEAK only), or sine waveform of 40Hz to 100MHz frequency and within center ±3 vertical major divisions

Accuracy:

+PEAK and −PEAK
±2% of reading ±2.8% of full scale ±0.2div +0db/-1dB*
p-p
±2% of reading ±0.3% of full scale ±0.2 div +0db/−1dB*

[Note]

- +0db/−1dB*: is a value between 0dB and −1dB, and follows a curve of the peak detector frequency response.

Cursor measurement

Delta voltage (ΔV): ±2% of reading ±0.3% of full scale
Voltage ratio (V-RATIO): ±2% of reading ±0.3% of full scale
Delta time (Δt): ±1% of reading ±1% of full scale
Phase and time ratio (t-RATIO): ±1% of reading ±1% of full scale
Frequency (1/ Δt): ±1% of reading ±1% of full scale
Rise time (Tr): ±2% of reading ±1% of full scale
Cursor position range: Resolution: 0.01 divisions

The adove cursor measurement accuracies are valid within center ±3 vertical divisions of voltage cursors, and within center ±4 horizontal divisions of time cursors.

[Note]

- The cursor tracking mode, which allows to position the cursors maintaining the span between the cursors, is available.

Date and time

Display format: DD-MMM-YY HH:MM:SS

where

DD	: day (2-digit number, 01 to 31)
MMM	: month(3-digit alphabet, Jan through Dec)
YY	: year(2-digit number, 00 to 19, or 89 to 99)
HH	: hour(2-digit number, 00 to 23)
MM	: minute(2-digit number, 00 to 59)
SS	: second (2-digit number, 00 to 59)

Leap year: Auto correction of a leap year

Comment display

Display area: 6th row through 11th row from top of the screen

Number of characters: Up to 240 characters

Character set:

	!	"	#	$	%	&	'	(	)	*	+	`	–	.	/
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
P	Q	R	S	T	U	V	W	X	Y	Z					

Data storage

Data memory: Supported by built-in backup batteries

Storage data: 64 setup memories excluding the last setup at power-off

Battery life: Approx. 40,000 hours (at room temperature)

CRT

Shape: Rectangular, 7 inches

Display area: 8 div X 10 div(1div = 12mm) Non-parallax internal graticule with scale illumination

Phosphou: B31

Accelerating voltage: Approx. 18kV

Power supply

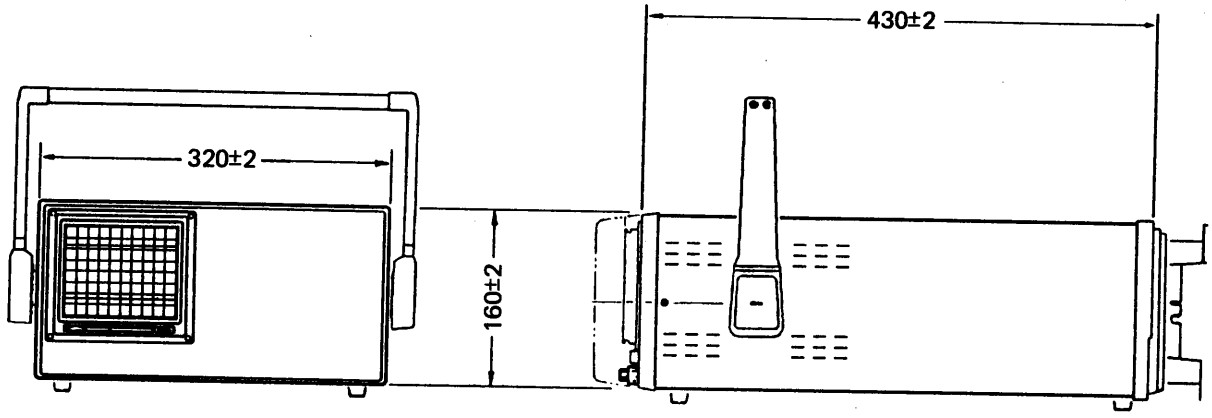
Voltage range: 90V to 250V AC

Frequency range: 48Hz to 440Hz

Power consumption: Approx. 115W (at 100V AC)

1-3 WEIGHT AND DIMENSIONS

Weight:	Approx. 11.5kg (excluding the panel cover and accessories)
Size:	(320 ±2) W X (160 ±2) H X (430 ±2) L[mm]



1-4 ENVIRONMENTAL CHARACTERISTICS

Operating temperature:	−10°C to +50°C
Operating humidity:	90% at 40°C (relative humidity)
Storage temperature:	−20°C to +70°C
Altitude:	Operating : 5,000m, barometric pressure of 405 mmHg Non-operating : 15,000m, barometric pressure of 90 mmHg
Vibration test:	Start from 10Hz to 55Hz and back in one minute. Peak-to-peak amplitude 0.63 mm; for 15 minutes each in vertical, horizontal, and longitudinal directions for a total of 45 minutes.
Shock test:	Raise one side by 10 cm and let it fall into a piece of a hard wood; 4 times for each side.
Drop test:	Pack the instrument in the transportation carton and drop it from the height of 90 cm.

1-5 REMOTE CONTROLLER (SE-500)

Operating temperature:	−10°C to +50°C
Operating humidity:	90% at 40°C (relative humidity)
Storage temperature:	−20°C to 60°C (relative humidity)
Controlrange:	Approx. 4m
Control angle:	Approx. ±45°
Battery life:	Approx. 2 months under 8-hour use per day with manganese battery

1-6 ACCESSORIES

Remote controller (SE-500)	1
Power cord (3-core)	1
Fuse (5A/250V, slow blow)	2
Probe (SS-082R)	2
Dust cover	1
Panel cover	1
Introduction manual	1
Accessory bag	1
Operations manual	1