CHAPTER 3. SPECIFICATIONS OF AD-3522

3.1 Display

◦ Analyzed items for display	Time waveform, spectrum (magnitude, phase), histograms	
◦ Display	Raster scan CRT, 320(H) x 200(V) dots, 86(H) x 56(V) mm (frame size)	
◦ Display system	Single screen display	
◦ Vertical cursor	Single cursor	For reading values on the X- and Y-axes
	Dual cursor	For finding the difference or the energy between two points on the X- and Y-axes
	Harmonic cursors	For displaying up to the 11th harmonic, THD and THP
	With cursor turned off	Peak values read out
◦ Conversion of units	On X-axis	Hz, CPM, ORDER, EXT (for external sampling)
	On Y-axis	Set by the engineering unit (EU) key, changeable to /Hz
◦ Vertical axis	Time waveform	Magnified from 1x up to 16x; offset available
	Magnitude spectrum	Mangnified from 80 dB to 16 dB/FS; offset available for logarithmic display; magnified from 1x to 65536x for linear display
	Phase spectrum	1x, 2x, 4x, 8x magnification
	Histogram	1x, 2x, 4x, 8x, 16x magnification
◦ Horizontal axis	Time waveform	1x, 2x, 4x, 8x, 16x, 32x magnification; offset available
	Spectrum	Linear or logarithmic
◦ Scale	A scale is displayed by pressing the GRATI key.	

3.2 Input

- No. of input channels: 1
- Input method: Single ended
- Input impedance: 1 MΩ, 100 pF
- Input connection: AC, DC, GND (-3 dB at 0.5 Hz point for AC)
- Maximum input voltage: ±200 V
- Maximum input sensitivity: -115 dB

- Input ranges

Range	Effective value	Peak value	Sensitivity	Input connection
30 dB	31.6 Vrms	44.7 V	-30 dB	AC/DC
20 dB	10.0	14.1	-40	AC/DC
10 dB	3.16	4.47	-50	AC/DC
0 dB	1.00	1.41	-60	AC/DC
-10 dB	316 mVrms	447 mV	-70	AC/DC
-20 dB	100	141	-80	AC/DC
-30 dB	31.6	44.7	-90	AC/DC
-40 dB	10.0	14.1	-100	AC
-50 dB	3.16	4.47	-110	AC
-60 dB	1.00	1.41	-115	AC

- Test signal: Square wave (0 - +1.41 V) at frequency of 4% of each frequency range
- Overload detection: Analog and digital detection used together. The OVERLOAD LED lights up and the buzzer sounds when the input signal exceeds 93% of the input range, or when an input signal outside the frequency range exceeds 125% of the input range.

3.4 Analyzer

- Sampling points: 512 per frame
- Frequency ranges

Frequency range	Frame time	Anti-aliasing filter
20 kHz	10 ms	20 kHz
10	20	10
5	40	5
2	100	2
1	200	1
500 Hz	400	500 Hz
200	1 s	200
100	2	100
50	4	50
20	10	20
10	20	10
5	40	10
2	100	10
1	200	10

- Frequency resolution: 1/200 of each frequency range
- No. of analyzed points: 512 points for the time domain, 201 points (DC + 200 lines) for the frequency domain, 128 points for histograms
- Real-time frequency: 200 Hz max.
- Sampling frequency: 2.56 times the frequency range, or an external sampling clock (51.2 kHz max.)
- Anti-aliasing filter: Either set for each of the frequency ranges for analysis (fixed to 10 Hz for ranges lower than 10 Hz); or the filter is turned off.
- A/D converter: 12-bit type

- Dynamic range: Over 60 dB (+30 to -50 dB range); Over 55 dB (-60 dB range)
- Magnitude accuracy: ±0.5 dB max.
- Windows: Rectangular, hanning, flattop

- Average items and averaging modes

Average item	Averaging mode		
	Arithmetic mean average	Exponential average	Peak hold
Time waveform	o	o	-
Magnitude spectrum	o	o	o
Histogram	o	o	-

- Averaging count: 2, 4, 8, ..., 8192
- Average control: Start, stop, continue
- Computations: Addition, subtraction, (measured data) ± (stored data), differentiation, 2nd order differentiation, integration, double integration (for magnitude spectrum only)

3.5 Memory

◦ Display data memory	Can store and recall data for one display. (Up to 40 with optional memory)
◦ Panel condition memory	Can store and recall four panel-setting conditions (comparator area included but menu cursor position excluded). (Up to 10 with optional memory)
◦ Panel memory	Panel conditions (comparator area included) in effect when power was cut off are stored. The same conditions go into effect when power is restored.
◦ Memory battery back up	Approximately 1 month

3.6 Comparator

◦ Manner of judgment	Up to 10 rectangular comparator areas are used, with one of the level, peak and Partial overall methods selected for judgment by comparison.
◦ No. of settings for judgment	Four (i.e., the number of comparator areas in effect when the panel conditions were stored) are stored in panel condition memory.
◦ Display of judgment	GO or NG displayed on screen/LED
◦ Output of judgment	BUSY, GO or NG signal output by relay
◦ Judgment start input	A judgment start command (TTL) may be input from the outside.

3.7 Data output and control input/output

◦ Composite video output	Compatible with a non-interlace 320(H) x 200(V) dot display, 1 V_{p-p} of output voltage at 75
◦ Comparator start input	Fan-in 1 for TTL input, started at trailing edge
◦ Comparator output	BUSY, GO or NG signal output by relay (relay capacity: 100 mA/50 V DC max.)
◦ External trigger signal input	Fan-in 1 for TTL input, 50 kHz max.
◦ External sampling clock input	Fan-in 1 for TTL input, 51.2 kHz max.
◦ Sampling clock output	Fan-out 2 for TTL output
◦ GP-IB interface	Optional

3.3 Trigger

◦ Trigger mode	Free Run, Armed (single shot trigger), Auto Armed (multiple trigger)
◦ Trigger source	Input signal (internal trigger), external trigger signal (external trigger)
◦ Trigger slope	Leading edge, trailing edge, external trigger signal edges (leading and trailing)
◦ Trigger levels	15 points (+7/8, +6/8, +5/8, +4/8, +3/8, +2/8, +1/8, 0, -1/8, -2/8, -3/8, -4/8, -5/8, -6/8, -7/8 of full scale of the input range)
◦ Trigger position	-512 to -512 (step-by-step setting)
◦ External trigger input	TTL level input, fan-in 1

3.8 Connector Pin Arrangement

(1) Video output (VIDEO OUT)

Pin No.	Function
1	NC
2	Video signal output
3	NC
4	NC
5	NC
6	NC
7	Signal ground
Frame	Case ground

DIN connector pin arrangement (NC: not connected)

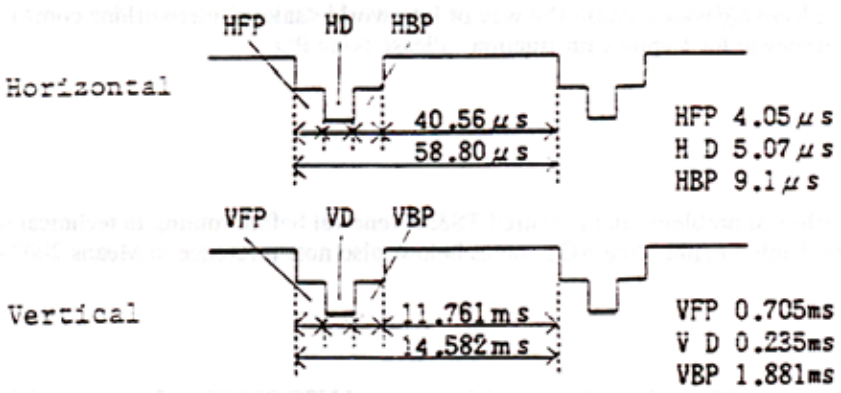
(The pin arrangement is the same as for comparator input/output and external trigger input.)

Compatible connector:
TCP0576 (7-pin DIN connector, available from Hoshi Denki Manufacturing K.K.)

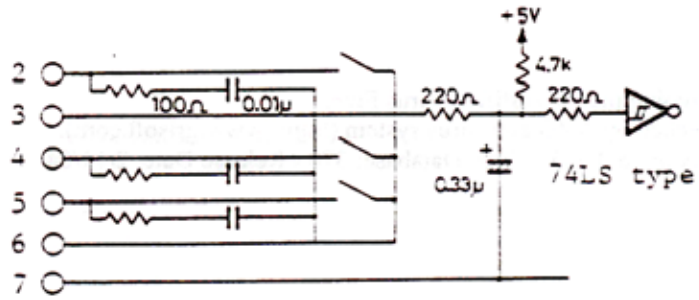
① General specifications

- Output signal system	Composite
- Data signal	1 V_{p-p} (output impedance: 75 Ω)
- Horizontal synchronizing signal	17.00 kHz
- Vertical synchronizing signal	68.57 Hz
- Output connector	7-pin DIN connector
- Compatible connector	TCP0576 (7-pin DIN connector, available from Hoshi Denki Manufacturing K.K.)

② Timing chart



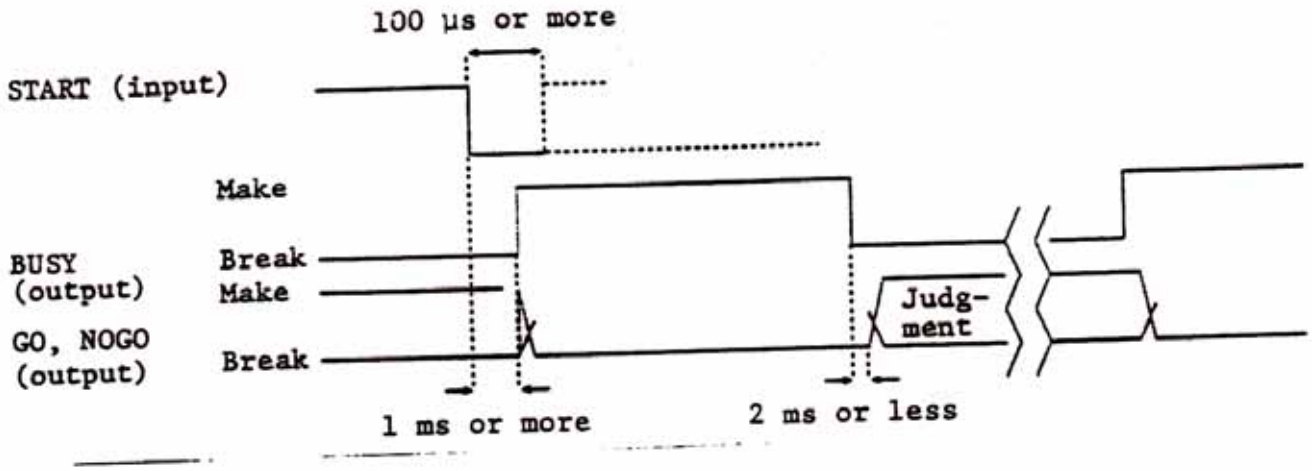
(2) Comparator input/output (COMP OUT)

Pin No.	Function	Internal circuit
1	NC	
2	NG relay output	
3	START input	
4	GO relay output	
5	BUSY relay output	
6	Relay common	
7	Signal ground	
Frame	Case ground	

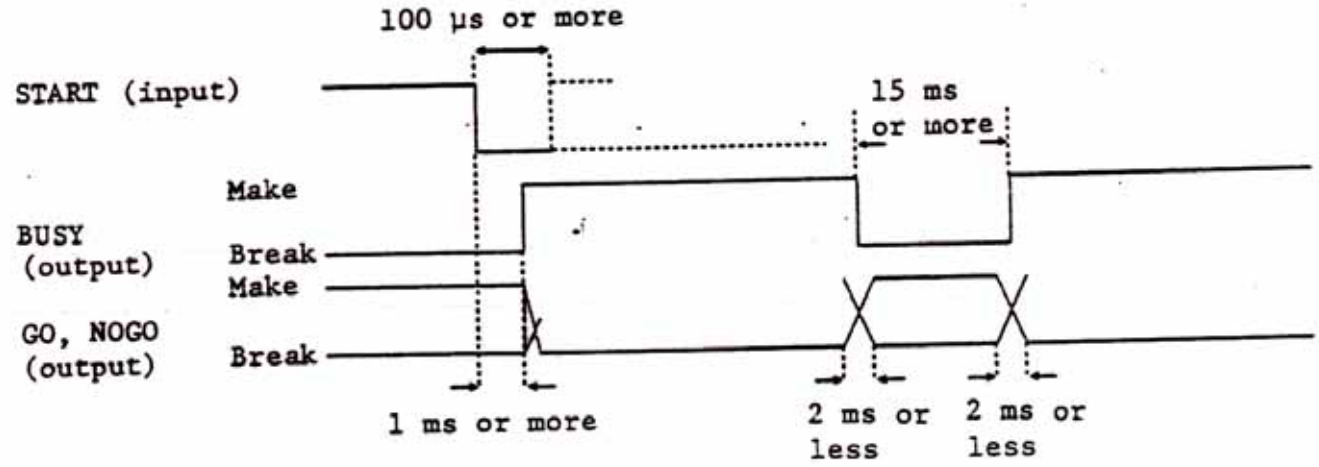
Compatible connector:

TCP0576 (7-pin DIN connector, available from Hoshi Denki Manufacturing K.K.)

- When "SNGL" (single) is displayed in the MODE field of the COMP menu:

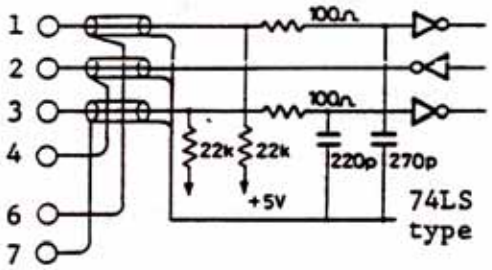


- When "FREE" is displayed in the MODE field of the COMP menu:



* The BUSY, GO and NG outputs are a relay output each, with inevitable variations in chattering and operating times. Each signal should be read in at least 1 ms after an edge is detected so that the variations may be accommodated.
* The START signal acts at a trailing edge. Do not input START when BUSY is in effect. To input START, supply a trailing edge with no chattering.

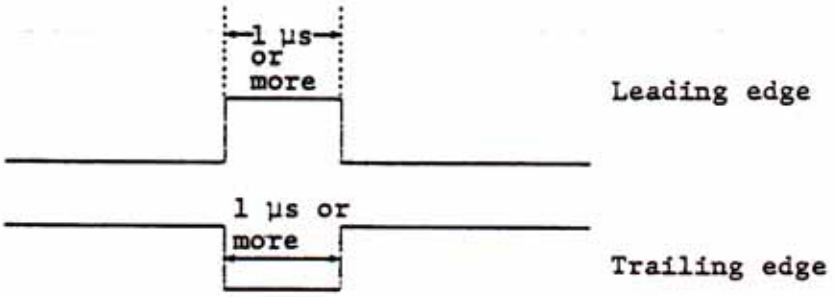
(3) External trigger input, external sampling input, and sampling clock output (EXTCLK, EXTTRG)

Pin No.	Function	Internal circuit
1	External trigger input	
2	Sampling clock output	
3	External sampling clock input	
4	Signal ground (sampling clock output)	
5		
6	Signal ground (external trigger input)	
7	Signal ground (external sampling clock input)	
Frame	Frame ground	

Compatible connector:

TCP0576 (7-pin DIN connector, available from Hoshi Denki Manufacturing K.K.)

- Pin No. 1: External trigger input (TTL), fan-in 1



Either a leading edge or a trailing edge may be selected using the SLOPE field of the TRIG menu.

- Pin No. 2: Sampling clock output (TTL), fan-out 2; data is sampled at trailing edges.
- Pin No. 3: External sampling clock input (TTL) at trailing edge, 51.2 kHz max., fan-in 1

3.9 General Specifications

◦ Power supply	
- AC power source	85 - 132 V AC or 170 - 264 V AC, 50/60/400 Hz, 45 VA
- DC power source	11 - 15 V DC, 33 W Compatible connector Plug: 1-480700-0 (by AMP Mfg.) or equivalent (1 plug) Socket: 350550-1 (by AMP Mfg.) or equivalent (3 sockets)
- Battery adaptor	The system operates for 2 to 3 hours on battery (OP-04/06). The battery is rechargeable with the AD-1451 battery charger.
◦ Operating temperature	0°C to 40°C, with relative humidity of less than 85%
◦ Storage temperature	-20°C to +65°C
◦ Dimensions	150(H) x 260(W) x 385(D) mm (handle and protrusions excluded)
◦ Net weight	Approximately 8 kg
◦ Accessories	
- Input cable	1
- Power cable	1
- DC power cable	1
- Fuse	1 for AC use (2 A), 1 for DC use (8 A)
- Connector	1 (7-pin DIN connector)
- Instruction manual	1

3.10 Optional Specifications

- OP-01 GP-IB interface
  This interface is incorporated in the AD-3522 and complies with IEEE488-1978. The functions include SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, and C0.

- OP-02 expansion memory (function unit)
  - Memory to store data for 40 displays and 6 sets of panel conditions.
  - 1/3 octave band analysis and "A" weighting.
  - 3 dimensional display.
  - Zooming function (magnifications of 2, 4, 8, 16, 32 times).

- OP-03 OP-01 and OP-02 combined unit.

- OP-04 battery unit
  This unit, installed under the AD-3522, allows it to operate anywhere on battery power.

- Capacity	12 V, 8.5 Ah
- Operating time	AD-3522 running for 2 to 3 hours (on fully charged battery)
- Charging	The unit, with the battery remaining inside, is charged by the AD-1451. The AD-3522 can operate on an AC power supply during the charging operation.
- Effective charging count	300 or more
- Operating temperature	0°C to 40°C, with relative humidity of less than 85%
- Storage temperature	-20°C to +50°C, with relative humidity of less than 85%

- Dimensions	74(H) x 260(W) x 385(D) mm (protrusions excluded)
- Net weight	Approximately 6 kg

∘ OP-05 printer unit

This unit, installed under the AD-3522, allows display screens (including date, time of day, and counter values) and parameter lists to be printed out as hard copy.

- Copy size	89 x 55 mm
- Printing time	Approximately 75 seconds per screen
- Printing paper	WP: PP-123 (thermosensitive paper, printed in black, 122 mm in width)
- Printer life	Approximately 5800 screens
- Operating temperature	0°C to 40°C, with relative humidity of less than 85%
- Storage temperature	-20°C to +65°C, with relative humidity of less than 85%
- Accessories	1 roll of printing paper, 2 connection cables
- Dimensions	74(H) x 260(W) x 385(D) mm (protrusions excluded)
- Net weight	Approximately 3.5 kg

∘ OP-06 battery/printer unit

This feature is a combination of the OP-04 and the OP-05. The battery-and-printer combination is installed under the AD-3522 for use.

- Operating temperature	0°C to 40°C, with relative humidity of less than 85%
- Storage temperature	-20°C to +50°C, RH<85%
- Accessories	1 roll of printing paper, 2 connection cables

- Dimensions	74(H) x 260(W) x 385(D) mm (protrusions excluded)
- Net weight	Approximately 6.5 kg

Refer to the descriptions of the OP-04 and OP-05 for the other items.

◦ WP:PP-123 thermosensitive paper

A roll of this paper (printing paper for dedicated use with OP-05/-06) is put into the printer.

- Printing color	Black
- Dimensions	112 mm(W) x 18 m (roll 40 mm across)
- Screen copy count	Approximately 200 screens

◦ AD-1451 battery charger

Charges the battery while it remains in the subcase. The AD-3522 can continue to operate on an AC.power source during the charging operation.

- Charging time	Approximately 6 hours
- Operating temperature	0°C to 40°C, with relative humidity of less than 85%
- Storage temperature	-20°C to +65°C, RH<85%
- Supply voltage	100 V AC ± 10%, 50/60 Hz, 40 VA
- Dimensions	150(W) x 105(H) x 250(D) mm (protrusions excluded)
- Net weight	Approximately 5 kg
- Accessories	Fuse (1 A) 1
	Power cable 1
	Charging cable 1
	Instruction manual 1