

RECORDER

HIOKI

MEMORY HI CORDER

8820

Built-in 2-channel FFT analyzer
High-speed waveform recorder
with analog/digital analysis function



High-speed waveform recorder with 6 measurement functions

Memory Hi Corder 8820 is a high-speed waveform recorder offering analog and logic inputs and capable of FFT analysis. Six measurement functions have been systematically combined into this one unit.

Memory Recorder Function (MEM)

Stores the input signal and then records it

- Records all input channels on the same time axis.
- Time axis can be set in 13 steps from 200 μ s/DIV to 2 s/DIV.
- Storage capacity (recording length) is a maximum of 30k words (equivalent to 250 DIV).
- Enlargement and reduction printing
Enlargements are printed double size and reductions are printed 1/5 or 1/10 size, or a Small Print function compresses the entire range of the stored waveform in the direction of the width of the paper.
- High-quality print function
Permits a smooth print-out that is even closer to the analog waveform at x1 size.
- Printing of certain portions
Selection and printing of only the desired portion of the entire stored waveform is possible.
- Memory division
Division of the memory capacity permits continuous storage of most signals.

FFT Analyzer Function

Converts waveforms of the time domain into the frequency domain, permitting spectrum analysis of measurement data.

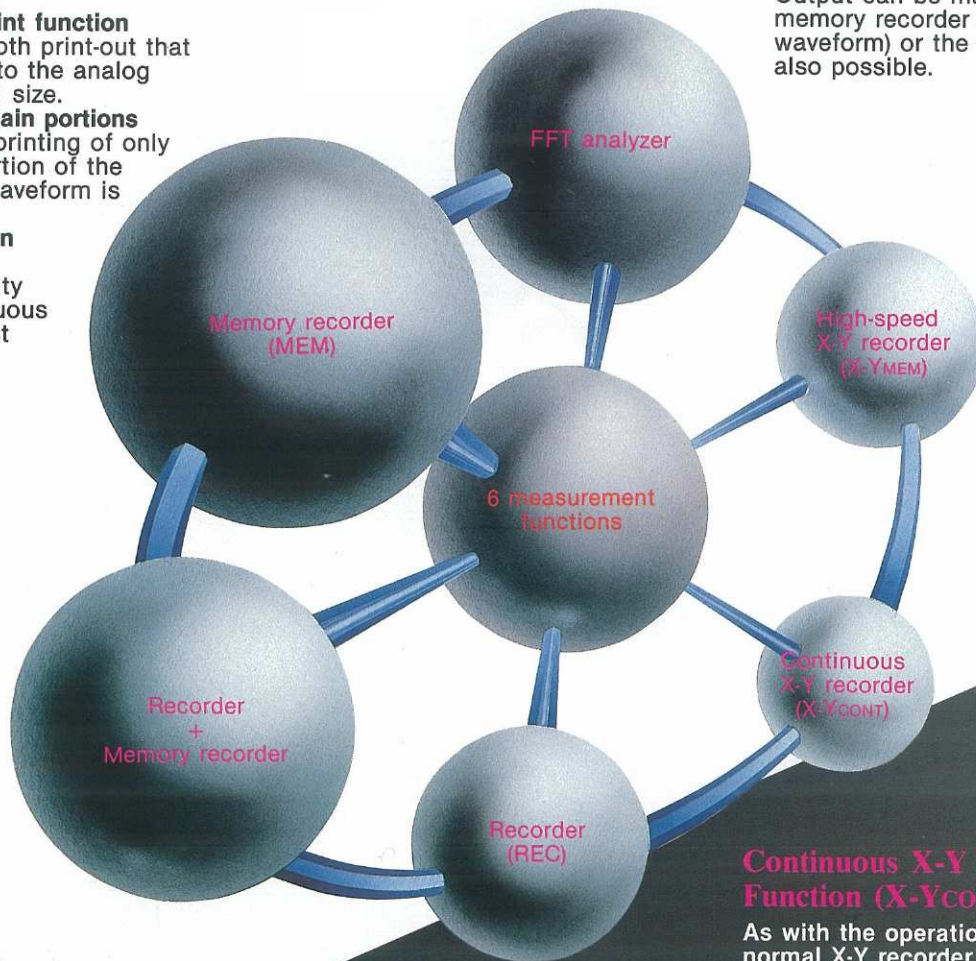
- Nine kinds of computations
Linear spectrum, power spectrum, auto correlation, histogram, transfer function, cross power spectrum, cross correlation, impulse response, and coherence computations are permitted.
- 1024 sampling points
- Two kinds of windows
Rectangular and Hanning windows are provided.
- Averaging process
The FFT computation allows for an averaging process in nine steps from 2 times to 512 times.

- Input dynamic range of 56 dB or better
- Permits frequency analysis from DC level to approx. 240 kHz.

High-Speed X-Y Recorder Function (X-YMEM)

As with the operation of the memory recorder, X-Y synthesis between each of the three input channels of the main unit is possible. The input channels corresponding to the X axis and Y axis can be set freely.

- Changeable output format
Output can be made to the memory recorder (time axis waveform) or the reverse is also possible.



Recorder + Memory Function (REC + MEM)

When sporadic phenomena are input during the execution of real-time recording, the trigger function records these signals in memory and returns to real-time recording. Thereafter, the print operation can be used to reproduce only those signals. This function can record a portion at high speed during a recording operation performed at a slow chart speed in this way.

Recorder Function (REC)

Real-time continuous recording is possible

- Records all input channels on the same time axis.
- Chart speed can be set in 13 steps from 1 s/DIV to 100 min/DIV.
- High-speed sampling
Sampling is performed at a maximum of 3.43 kHz and a minimum of 1 kHz which permits observation of the envelope.

Continuous X-Y Recorder Function (X-YCONT)

As with the operation of the normal X-Y recorder, X-Y synthesis between each of the input channels is possible. The input channels corresponding to the X axis and Y axis can be set freely.

- High-speed sampling
Recording is possible at a speed of up to approx. 6 kHz maximum and down to a minimum of 100 Hz.
- Unlimited recording time
- Superimposed printing
Pen-up/pen-down superimposed printing can be continued until the memory is cleared.

Wide selection of input units for various types of analog/digital measurement

Expandable to analog 8-channel input

Features

- **High-resolution analog input unit**
Permits measurements with a maximum sensitivity 5 mV/DIV at 6 dots/mm resolution.
- **Twelve-channel logic input unit**
Use of the optional logic probe permits expansion of the measurement range from the analysis of sequence timing to the detection of power line irregularities. (Max. 24ch)
- **Expandable to 8-channel input**
- **Thermal printer for paper widths of up to 216 mm**
- **High-speed sampling and large-capacity storage**
The maximum sampling speed of 600 kHz and the 11bit x 30kwords/channel storage capacity combine to capture sporadic phenomena.
- **Enriched trigger functions**
- **Use of an IC card**
Memory waveform data and setting conditions can be stored on an IC card.

- **GP-IB supplied as standard**
- **Simple operation**
The front panel employs an LED display for direct settings and an LCD display for selection type settings which contribute to ease of use.
- **FFT analyzer function**
Not limited to time domain waveform recording, waveform observation in the frequency domain permits accurate data analysis.

Recording paper (for thermal printer)

8901 analog input unit

8900 5-channel expansion unit

Optional input unit with built in 8-bit analog input amplifiers provides five extra input channels

8903 logic input unit

8902 analog input unit with anti-aliasing filter

CURSOR
Moves the cursor displayed on the LCD panel.

SELECT
Selects settings displayed on the LCD panel.

IC card
Stores waveform data, setting data, etc.

Operation keys

FEED Press to feed paper.
PRINT
[MEM] function: Reprints the contents of memory.
[R + M] function: Prints data stored in memory.
[XY_{MEM}] function: Reprints the contents of memory.
[XY_{CONT}] function: Prints recorded X-Y waveform.
[FFT] function: Reprints analysis results, or changes mode and restarts calculation.
CLR
[XY_{CONT}] function: Clears the memory.
STOP
 Stops all recorder operation.
 Clears error messages.
LIST
 Prints recorder settings.
START
 Starts measurement and analysis.

Measuring condition setting keys

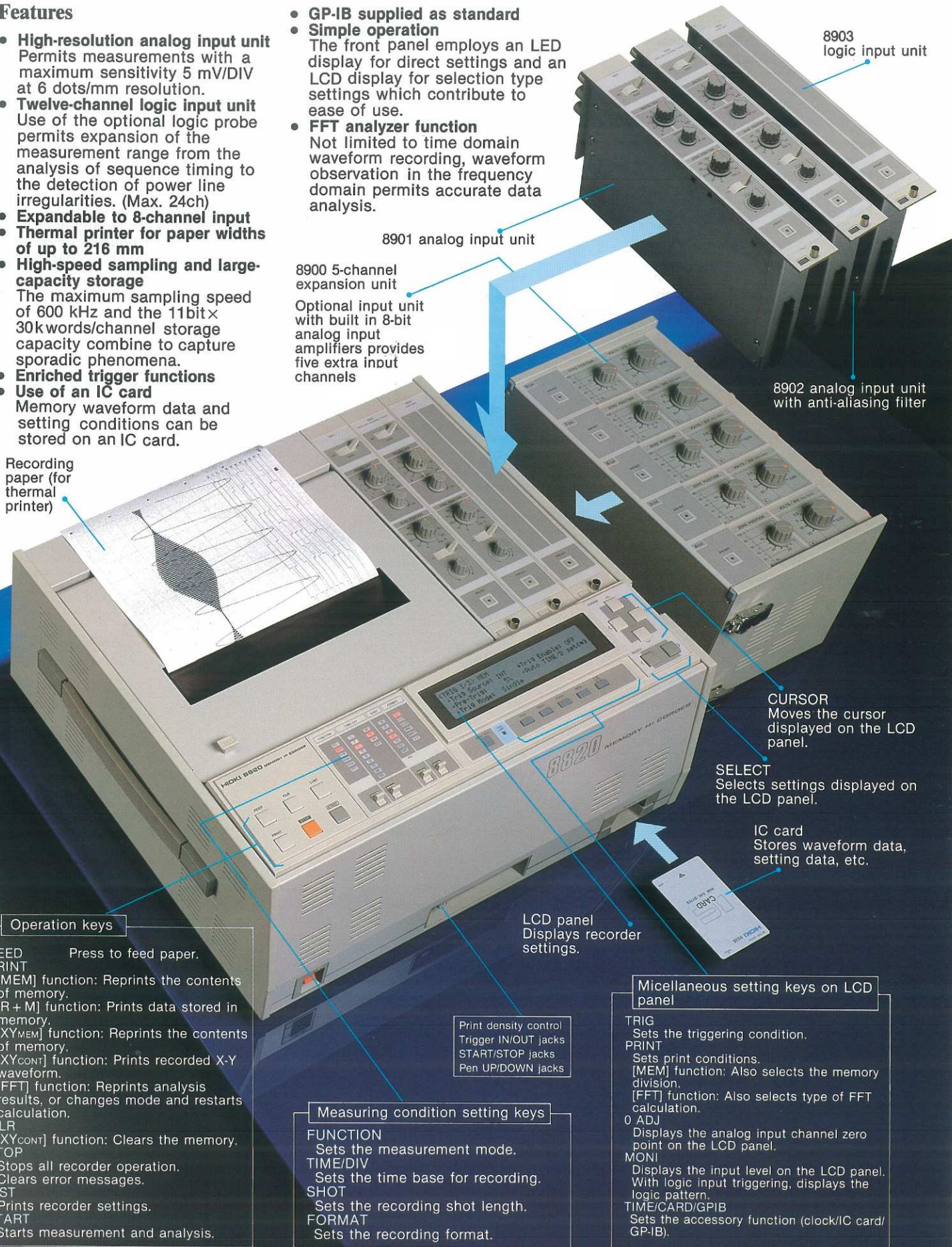
FUNCTION
Sets the measurement mode.
TIME/DIV
Sets the time base for recording.
SHOT
Sets the recording shot length.
FORMAT
Sets the recording format.

Print density control
 Trigger IN/OUT jacks
 START/STOP jacks
 Pen UP/DOWN jacks

LCD panel
Displays recorder settings.

Miscellaneous setting keys on LCD panel

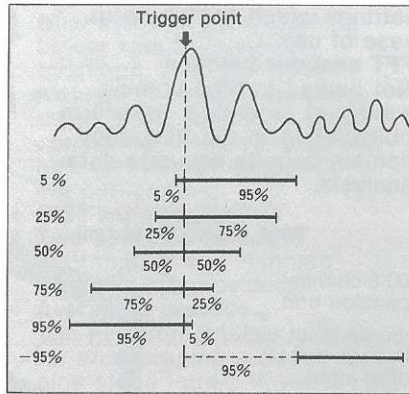
TRIG
Sets the triggering condition.
PRINT
Sets print conditions.
[MEM] function: Also selects the memory division.
[FFT] function: Also selects type of FFT calculation.
0 ADJ
Displays the analog input channel zero point on the LCD panel.
MONI
Displays the input level on the LCD panel. With logic input triggering, displays the logic pattern.
TIME/CARD/GPIB
Sets the accessory function (clock/IC card/GPIB).



Variety of trigger functions allow recording many types of waveforms

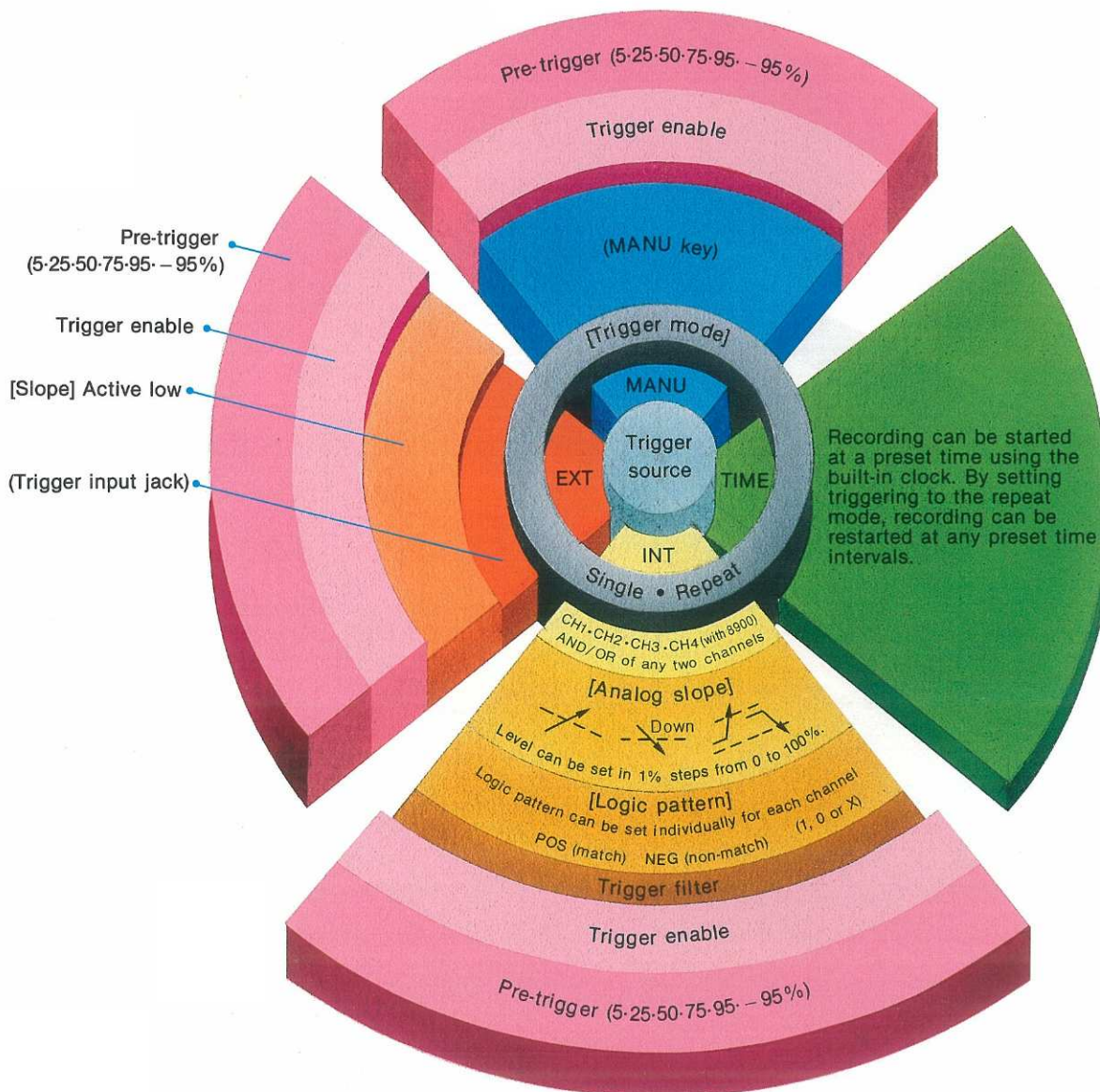
- **Five kinds of trigger sources**
The OFF, EXT, MANU, INT, and TIME trigger sources are selectable.
- **Digital trigger circuit**
With the setting at INT and triggering caused by the input signal, the signal is compared by the digital signal following A/D conversion and is detected. This permits the trigger level to be set in 1% steps across the entire recording width.
- **The trigger can be set from any channel** (ch1·ch2·ch3·ch4 (with 8900))
Trigger conditions can be set by each of the input channels. In addition, triggering can be set by ANDing or ORing the channels.
- **Trigger logic pattern setting**
Triggering can be set by the logic pattern at the logic input channel.

- **Pre-trigger function**
The pre-trigger function provides a delay of up to 95% maximum and permits recording prior to triggering.



Pre-trigger at the time of MEM and X·MEM operations

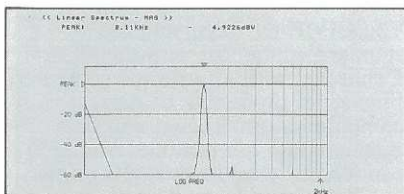
- **Trigger filter function**
Prevents erroneous triggering when there is chattering of the signal at time of a logic input or noise at the time of an analog input. Settable to OFF and 9 steps, from 1 to 128 dots.
- **Trigger enable function**
This function receives the trigger at only a specific period for all functions except REC + MEM. The settings Month, Day, Hour, Minute, and Second can be designated with the built-in clock.
- **Trigger output function**
Permits notification of triggering to other devices.



2-channel FFT analyzer function and GP-IB interface

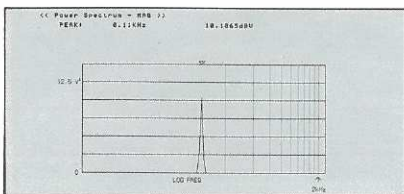
FFT analyzer function

Linear spectrum



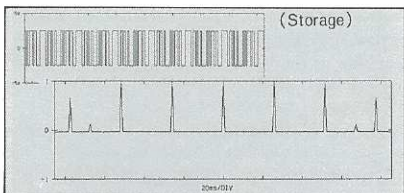
Used when analyzing the distribution condition of the frequency component as well as when looking at high-frequency or low-frequency spurious output.

Power spectrum



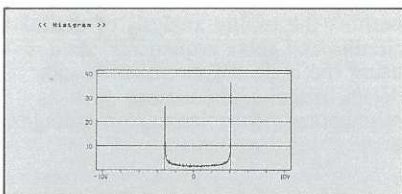
Helpful in the analysis of linear spectrum squared amplitude, noise, or vibrations.

Auto-correlation



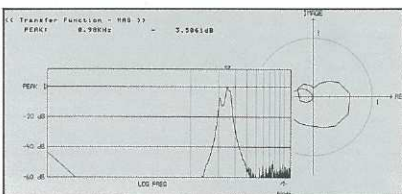
Used in checking the periodicity of randomly viewed waveforms and the periodic components in waveforms with noise.

Histogram



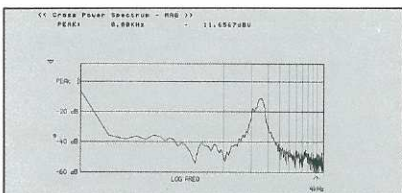
Provides a graphic representation of the inclination of the waveform on the amplitude axis as well as the distribution of the dispersion, and aids in the analysis of the characteristics.

Transfer function



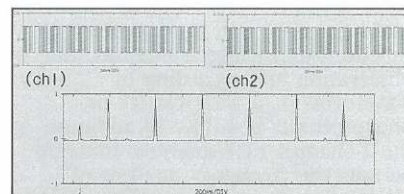
The frequency response (amplitude and phase) of the measurement system can be found and it is also effective in the analysis of the resonant frequency of structures.

Cross power spectrum



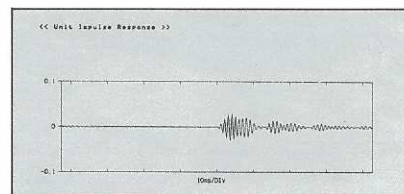
Shows the product of the spectrum of two signals and the frequency components of each of the two signals can be investigated.

Cross-correlation



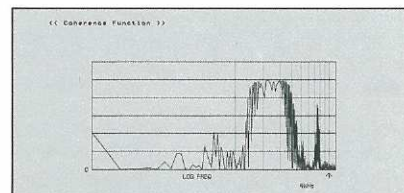
Used when viewing the phase shift of two signal components by time unit.

Impulse response



An expression of the transmission characteristics of the measurement system in the time domain. Used when analyzing the time delay of the signals.

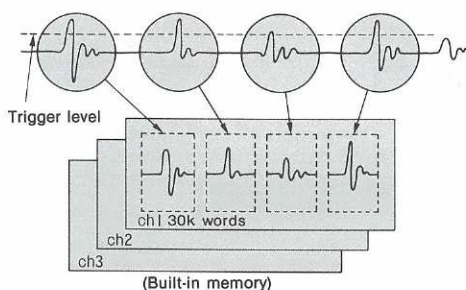
Coherence



Shows a causal relationship between the input and output signals which in turn shows the reliability of the transfer function.

Accessory functions

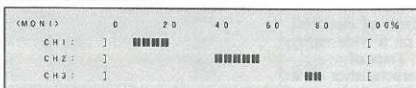
Memory division function



- The range of use of the built-in memory (30 k words) can be set in four types of divisions for each channel: 10 DIV × 16, 20 DIV × 8, 40 DIV × 4, and 80 DIV × 2.
- Former models have been unable to receive triggers during printout, but this function permits a number of types of data to be effectively stored in memory.
- One divided signal or all signals may be selected and printed out.

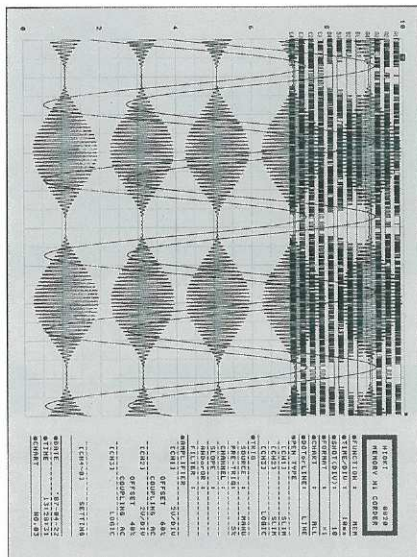
Input level monitor

The input level of three channels can be monitored simultaneously on the LCD. Even with the 5-channel expansion, all channels can be displayed by showing 3 channels at a time.



Wide variety of printing formats

For each of the channels, the printer can be switched on and off, and the thickness (MEM) only can be designated. In addition, switching between dot and line printing is possible. All of these setting conditions can be printed out as a setting list.



Re-print function

With the MEM function, re-printing can be performed with a printing format setting or chart conversion (MEM ↔ X-YMEM).

GP-IB supplied as standard

(In conformance with IEEE 488-1978)
With the exception of operations on the analog input unit, the remote control of all settings and the input/output of measurement data can be performed.

Clock function

An automatic calendar, automatic judgement of leap years, and a 24-hour clock are built in so the time at which sporadic phenomena occur can be known at a glance. The function can also be used as a timer and the trigger can be designated to the month, day, hour, minute, and second.

Pen-up/pen-down functions

At the time of X-YCONT, the pen-up/pen-down functions and on-off switching of data take-in can be performed by external signals. In addition, the X-Y recorder output of an oscilloscope or another device can be connected and recording performed.

Zero-position adjustment

The adjustment of the zero position of the analog input unit can be positioned at 10% intervals and fine adjustment is also possible.

IC card (9526 — option)

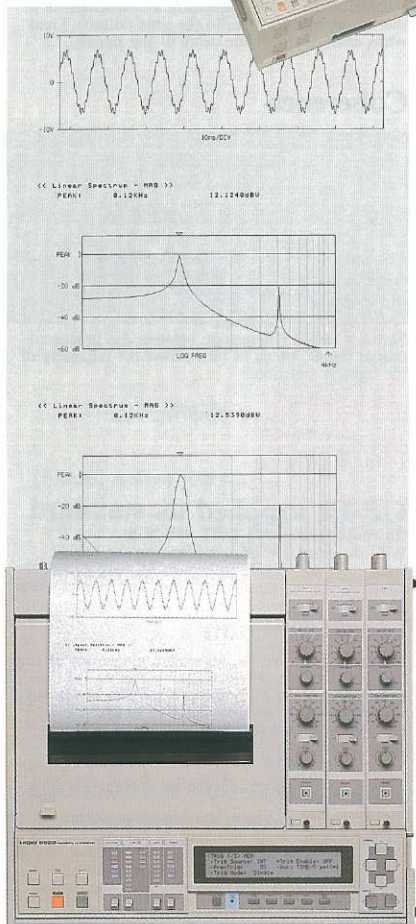
Measurement conditions and measurement data can be stored on the IC card which has a capacity of 64 kilobytes.



Wide range of applications, whether in lab or factory

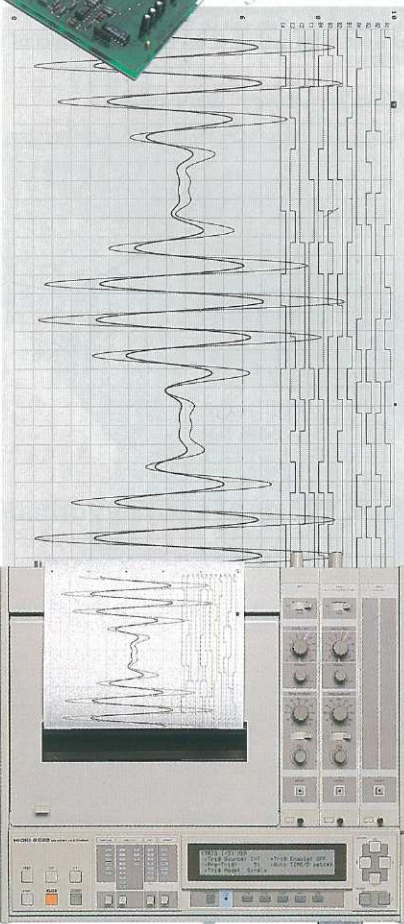
From waveform observations to frequency analysis

Making use of rich measurement functions and trigger functions, the observation and recording of waveforms of a wide variety of phenomena is possible. In addition, the 2-channel FFT analyzer function permits the frequency analysis of electrical amounts from DC level to 240 kHz.



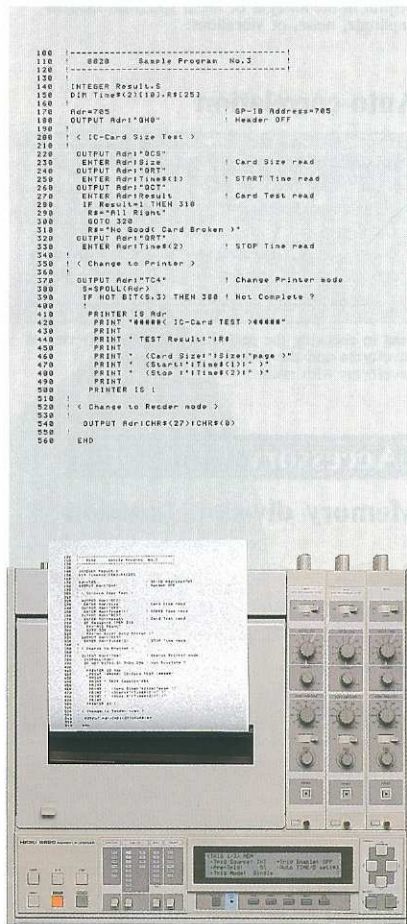
From analog to logic analysis

Use of the 12-channel logic input unit permits the timing analysis of digital circuits and relay sequencers. And using the logic trigger function can detect irregular phenomena such as momentary power losses and voltage drops.



Expanded range of application with the GP-IB

The GP-IB has been supplied as standard equipment with the 8820. Connected with an external computer, time series processing of data, computation processing, and data accumulation are possible. The 8820 can also be used as a GP-IB printer.



```

100 |-----|
110 | 8820 Sample Program No.3 |
120 |-----|
130 |
140 | INTERR Result 5 |
150 | DIR Time#(2)(10),RS(25) |
160 |
170 | Rer=705 | GP-IB Address=705 |
180 | OUTPUT Rer(1)GND | Header OFF |
190 |
200 | < IC-Card Size Test > |
210 |
220 | OUTPUT Rer(1)PCS | Card Size read |
230 | ENTER Rer(1)Size | Card Size read |
240 | OUTPUT Rer(1)RT | START Time read |
250 | ENTER Rer(1)TimeK1 | |
260 | OUTPUT Rer(1)QCT | Card Test read |
270 | ENTER Rer(1)Result | |
280 | IF Result=1 THEN 310 |
290 | Rer="ALL RUN" |
300 |
310 | Rer="No Good Card Broken" |
320 | OUTPUT Rer(1)RT | STOP Time read |
330 | ENTER Rer(1)TimeK2 | |
340 |
350 | < Change to Printer > |
360 |
370 | OUTPUT Rer(1)CA | Change Printer mode |
380 | "SPOLL" |
390 | IF NOT BIT(6,3) THEN 300 | Not Complete? |
400 |
410 | PRINTER IS Rer |
420 | PRINT "***** IC-Card TEST *****" |
430 | PRINT |
440 | PRINT "TEST Result:" |
450 | PRINT "Card Size:" |
460 | PRINT "Start Time:" |
470 | PRINT "Clock Time:" |
480 | PRINT |
490 | PRINTER IS ! |
500 |
510 | < Change to Reader mode > |
520 |
530 | OUTPUT Rer(1)CHR(27)>CHR(8) |
540 |
550 |
560 |
    
```

FFT Analog Logic GP-IB

Electrical

- Measurement of transient phenomena in electrical appliances
- Power supply waveform analysis
- Operating characteristics of relays
- Measurement of arc current waveforms
- Others

Electronics

- Transient phenomena and characteristics of electronic circuits
- Analysis of audio waveforms
- Characteristic tests on filters
- Analysis of signal distortion and phase
- Others

Machinery

- Analysis of the resonant frequency of structures
- Characteristic tests on engines
- Diagnosis of irregularities in automatic machines
- Vehicular collision and shock tests
- Others

Materials

- V-I characteristics of transistors
- Tests of electrical characteristics on a wide variety of materials
- Tests of mechanical characteristics on a wide variety of materials
- Others

Others

- GP-IB printer

Specifications (recorder only; input units sold separately)

| | | |
|---------------------------------------|--|--|
| Recording method | Thermal line-head printer | |
| Recording paper | 216 mm (effective recording width 200mm) × 50m thermal paper (9224), 20 mm/DIV (120 dots/DIV, F.S.= 10DIV), 10 mm/DIV auxiliary lines | |
| Print speed | 30 mm/sec (except with REC operation) | |
| No. of input units | 3 analog inputs, or 2 analog inputs/1 logic input, or 1 analog input/2 logic inputs (5-ch expansion input unit available) | |
| Memory capacity | 11 bits × 30k words per channel / 8 bit × 30k words per channel (with 8900 expansion unit) | |
| Measurement functions | Memory recorder (MEM) | Time base: 200 μs/DIV to 2 sec/DIV (13 steps), or 500 μs/DIV to 2 sec/DIV when using 5 expansion channels Sampling rate: 600 kHz to 60 Hz (120 dots/DIV), or 240 kHz to 60 Hz for 5 expansion channels Recording shot length: 10, 20, 40, 80, 160, or 250 DIV/SHOT Interpolation function: Dot or line (thin or wide). Output formats: ×2, ×1, ×1/5, ×1/10, small, smooth |
| | Recorder (REC) | Time base: 1 sec/DIV to 50 sec/DIV, 1 min/DIV to 100 min/DIV (12 steps) Sampling rate: Independent of selected time base Dot recording: 3.43 kHz for 1-channel recording, 3 kHz for 2-channel recording, 2.67 kHz for 3-channel recording, 1.6 kHz for 5 expansion channels Line recording: 1 kHz Recording shot length: 10, 20, 40, 80, 160, or 250 DIV/SHOT, or continuous Interpolation functions: Dot or line (thin only) |
| | Recorder + memory recorder | With real-time recording, high-speed events are stored by a trigger function, after which real-time recording continues. Stored data can then be printed out after real-time recording is completed. |
| | High-speed X-Y recorder (XY_{MEM}) | No. of channels: Up to 3 channels for both X and Y Effective recording area: 200 × 200 mm (1200 × 1200 dots) Sampling rate: Same as memory recorder function Recording time: 2 msec to 500 sec (10 div to 250 div equivalent). Interpolation functions: Dot or line |
| | Continuous X-Y recorder (XY_{CONT}) | No. of channels and effective recording area are same as high-speed X-Y recorder. Recording time: Unlimited Interpolation functions: Dot or line. Sampling rate: Set automatically according to the number of channels used and the selected type of printing. Dot recording: 6 kHz for 1-channel recording, 4.8 kHz for 2-channel recording, 4 kHz for 3-channel recording Line recording: 100 Hz. Pen up/down controllable externally |
| | FFT | Analysis modes: When using 1 channel - Linear spectrum, power spectrum, auto-correlation, and histogram When using 2 channels - Transfer function, cross power spectrum, cross-correlation, impulse response, coherence Maximum frequency: 234 kHz Frequency resolution: 1/400 Frequency accuracy: +0.02% Sampling points: 1024 Dynamic range: 56 dB. Window: Rectangular/Hanning. Averaging: 2/4/16/32/64/128/256/512/OFF Anti-aliasing filter (provided with the optional 8902 input unit): 46.8 Hz to 4.68 kHz, automatically switched according to range Frequency axis: Linear/logarithmic Triggering function: Same as memory recorder function. Data output: Calculated data can be printed in any FFT mode |
| Auxiliary functions | Input monitor, memory division, time printing, IC card, GP-IB | |
| Trigger | Triggering method: Digital comparison Trigger source: OFF/EXT/INT/TIME/MANU Trigger slope: UP/DOWN/AREA. Trigger level: 0 to 100% in 1% steps. Trigger condition: AND or OR of channels selected (channels 1 to 3 and 4); the logic pattern (channel level for logic operation) can be set to 1, 0 or × (don't care) Pre-trigger: 5/25/50/75/95/-95% (MEM, XY _{MEM} , and FFT only) Trigger filter: 1/2/4/8/16/32/64/128 dots/OFF. Trigger mode: Repeat/single. Trigger output: TTL level (active low), with approx. 0.2 sec of pulse width. Trigger IN- OUT provided | |
| External control terminals | Mini-jacks for Trigger IN, Trigger OUT, SET, STOP, pen UP/DOWN (XY _{CONT}) | |
| Maximum floating potential | 350 VDC, 250 VAC (between input unit and body and between input units) | |
| CMRR | 80 dB or better (at 50/60 Hz with a signal source resistance of less than 100 ohms) | |
| Operating temperature/humidity | 0 to 40°C, 80% RH or less (no condensation) | |
| Power supply | 100 VAC ± 10% (50/60 Hz). Specify at time of order for 120/200/220/240 V types. | |
| Dimensions | 405H × 440W × 190D mm. approx. 19kg (with 3 analog input units) | |
| Accessories | Power cable, 9224 recording paper, fuse (10 A). Input cables are provided together with optional input units. | |

Memory recorder, high-speed X-Y recorder, FFT analyzer

| TIME/DIV | Sampling rate | Recording time | Time base resolution (per div) | Frequency range for FFT operation | Recording time (FFT function) |
|------------|---------------|----------------|--------------------------------|-----------------------------------|-------------------------------|
| 200 μs/DIV | 600 kHz | 50 msec | 1/120 | 234 kHz | 1.7 msec |
| 500 | 240 | 125 | | 93.7 | 4.2 |
| 1 msec/DIV | 120 | 250 | | 46.8 | 8.5 |
| 2 | 60 | 500 | | 23.4 | 17 |
| 5 | 24 | 1.25 sec | | 9.37 | 42 |
| 10 | 12 | 2.5 | | 4.68 | 85 |
| 20 | 6 | 5.0 | | 2.34 | 170 |
| 50 | 2.4 | 12.5 | | 937 Hz | 426 |
| 100 | 1.2 | 25 | | 468 | 853 |
| 200 | 600 Hz | 50 | | 234 | 1.7 sec |
| 500 | 240 | 125 | | 93.7 | 4.2 |
| 1 sec | 120 | 250 | | 46.8 | 8.5 |
| 2 | 60 | 500 | | 23.4 | 17 |

Recorder

| TIME/DIV | Chart speed | Time base resolution |
|-----------|-------------|----------------------|
| 1 sec/DIV | 20 mm/sec | 1/120 |
| 2 | 10 | |
| 5 | 4 | |
| 10 | 120 mm/min | |
| 20 | 60 | |
| 50 | 24 | |
| 1 min/DIV | 20 | |
| 2 | 10 | |
| 5 | 4 | |
| 10 | 120 mm/hr | |
| 20 | 60 | |
| 50 | 24 | |
| 100 | 12 | |

Optional accessories for an even greater range of utility

Optional input units

8901 analog input unit

- 5 mV/DIV to 5 V/DIV (10 ranges)
- Gain adjustable • Zero adj: -100% to +100% of recording width in 10% increments (21 steps); fine adjustment also possible
- Frequency response: DC to 240 kHz (+3dB) • Input resistance: 1 M Ω
- Amplitude accuracy: $\pm 0.35\%$ f.s. ± 2 dots • Zero position accuracy: ± 3 dots

8902 analog input unit with filter

- Anti-aliasing filter • Other specifications are same as with the 8901 • Sample hold function provided

8903 logic input unit

- 12 input channels (Max. 24ch)
- Uses up to 3 logic probes

8900 expansion unit

- 50 mV/DIV to 25 V/DIV (9 ranges) • Full span of 2 DIV (no overlap) • Zero-adj: 0 — 100% of recording width in 10% increments (11 steps); fine adjustment also possible • Frequency response: DC to 100 kHz (± 3 dB) • Input resistance: 1 M Ω • 8bit \times 30k words/ch

Optional accessories

9303 PT



Transformation ratio: 40:1/20:1
Rated input voltage: Max 440 VAC/220 VAC (depending on transformation ratio), $\pm 1\%$ Dielectric strength: 2000 VAC/1 min

9304 Attenuator



Attenuation ratio: 10:1 ($\pm 2\%$)
Rated input voltage: Max 600 VDC (or AC peak)
Input impedance: 10 M Ω
Frequency response: DC ~10MHz (± 3 dB)

9305 Trigger cable



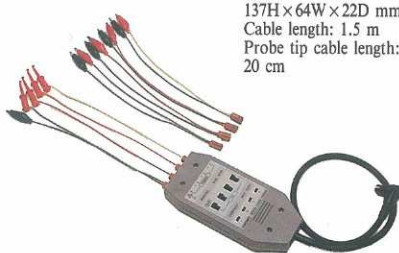
Allows synchronized operation of multiple recorders

9008 Clamp-on probe



Range: 10/20/50/100/200/500 A
Output voltage: 0.2 VAC full scale with an accuracy of $\pm 3\%$
Frequency range: 50/60 Hz
Clamp core jaw dia.: Approx. $\phi 46$ mm
Rated voltage: Max 600 VAC

9306 Logic probe



137H \times 64W \times 22D mm
Cable length: 1.5 m
Probe tip cable length: 20 cm

- Switchable input (digital/contact)
- Accommodates a wide range of digital input levels, from TTL to 50 V systems

| | | |
|------------------|-------------------|----------------|
| No. of channels | 4 | |
| Input type | Digital input | Contact input |
| Input resistance | 50 k Ω | 2 k Ω |
| Threshold level | +1.4 V | +1.4 V |
| Allowable input | ± 50 V max | ± 30 V max |
| Response time | 2 μ s or less | |

* When connected to a logic input unit, response time may affect dot positioning by ± 1 dot.

9307 Line type logic probe



137H \times 64W \times 22D mm
Cable length: 1.5 m
Probe tip cable length: 1 m

- Capable of detecting either AC or DC voltage
- 4-channel floating input
- Can be used for detecting relay ON/OFF operation in circuit systems ranging from 24 VDC to 240 VAC

| | | |
|--------------------|--|--|
| No. of channels | 4 (floating) | |
| Input voltage | LOW | HIGH |
| Input resistance | Approx 30 k Ω | Approx 100 k Ω |
| Detectable level | 60~150 VAC $\pm(20\sim 150)$ VDC | 170~250 VAC $\pm(70\sim 250)$ VDC |
| Undetectable level | 0~10 VAC $\pm(0\sim 15)$ VDC | 0~30 VAC $\pm(0\sim 43)$ VDC |
| Response time | 1 ms or less 3 ms or less (at 100 VDC) | 1 ms or less 3 ms or less (at 300 VDC) |
| Max floating level | 250 VAC | |

* Probe polarity has no meaning with DC measurements; the probe detects only the magnitude of DC voltage.

9308 Line dip detector



137H \times 64W \times 22D mm
Cable length: 1.5 m
Probe tip cable length: 1 m

Detects momentary voltage drops in AC 100 V/120 V power lines. Dip threshold can be set to 80 or 90%, and response time is fast enough to detect and record even instantaneous voltage drops in power lines.

| | |
|----------------------------------|------------------------------|
| No. of channels | 1 |
| Input resistance | Approx 12 k Ω |
| Input range | 100 VAC/120 VAC |
| Voltage drop detection threshold | Approx 80/90% of input range |
| Detection method | Peak value detection |
| Response time | Approx 1 cycle of AC input |
| Max floating voltage | 130 VAC |
| Attenuation ratio | 100:1, $\pm 3\%$ |
| Attenuator freq response | DC to 100 kHz, ± 3 dB |

8820 Memory Hi Corder (recorder only; input units sold separately)

Optional input units

- 8900 5-ch expansion unit
- 8901 Analog input unit
- 8902 Analog input unit with filter
- 8903 Logic input unit

Optional accessories

- 9224 Recording paper (50 m, six rolls)
- 9303 PT (400/200 V: 10 V)
- 9304 Attenuator (10:1)
- 9305 Trigger cable
- 9306 Logic probe
- 9307 Line type logic probe
- 9308 Line dip detector
- 9526 IC card (64KB)
- 9008 Clamp-on probe
- 9151-01 GP-IB cable (1 m)
- 9151-02 GP-IB cable (2 m)
- 9151-04 GP-IB cable (4 m)
- 220H Recording paper winder

Standard packing (double carton box)

| | Sets | M.W.kg | G.W.kg | M ³ |
|------|------|--------|--------|----------------|
| 8820 | 1 | 26 | 30 | 0.3 |

(with 3 analog input units)

HIOKI E.E. CORPORATION

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