

FFT Hi CORDER

8803

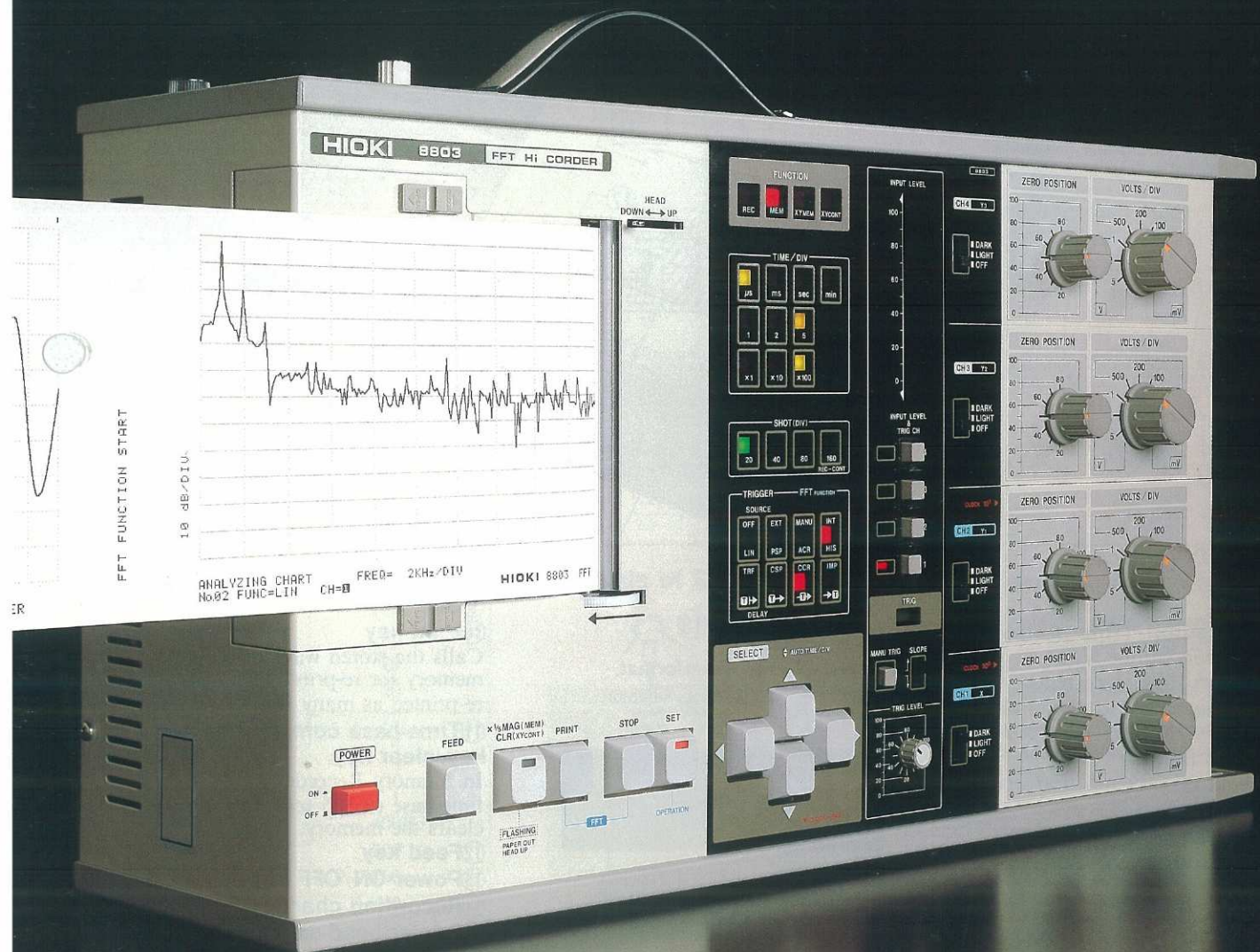
New Waveform Recorder with Dual-Channel FFT Analysis Capability

Waveform Recording Functions

- Memory recorder
- Recorder
- High-speed X-Y recorder
- Continuous X-Y recorder
- Simultaneous four-channel recording
- Time recording function

FFT Analysis Functions

- Linear spectrum
- Power spectrum
- Auto-correlation function
- Histogram
- Transfer function
- Cross power spectrum
- Cross-correlation function
- Impulse response



Transient waveform recording and FFT analysis--all with the ultimate in operational simplicity.

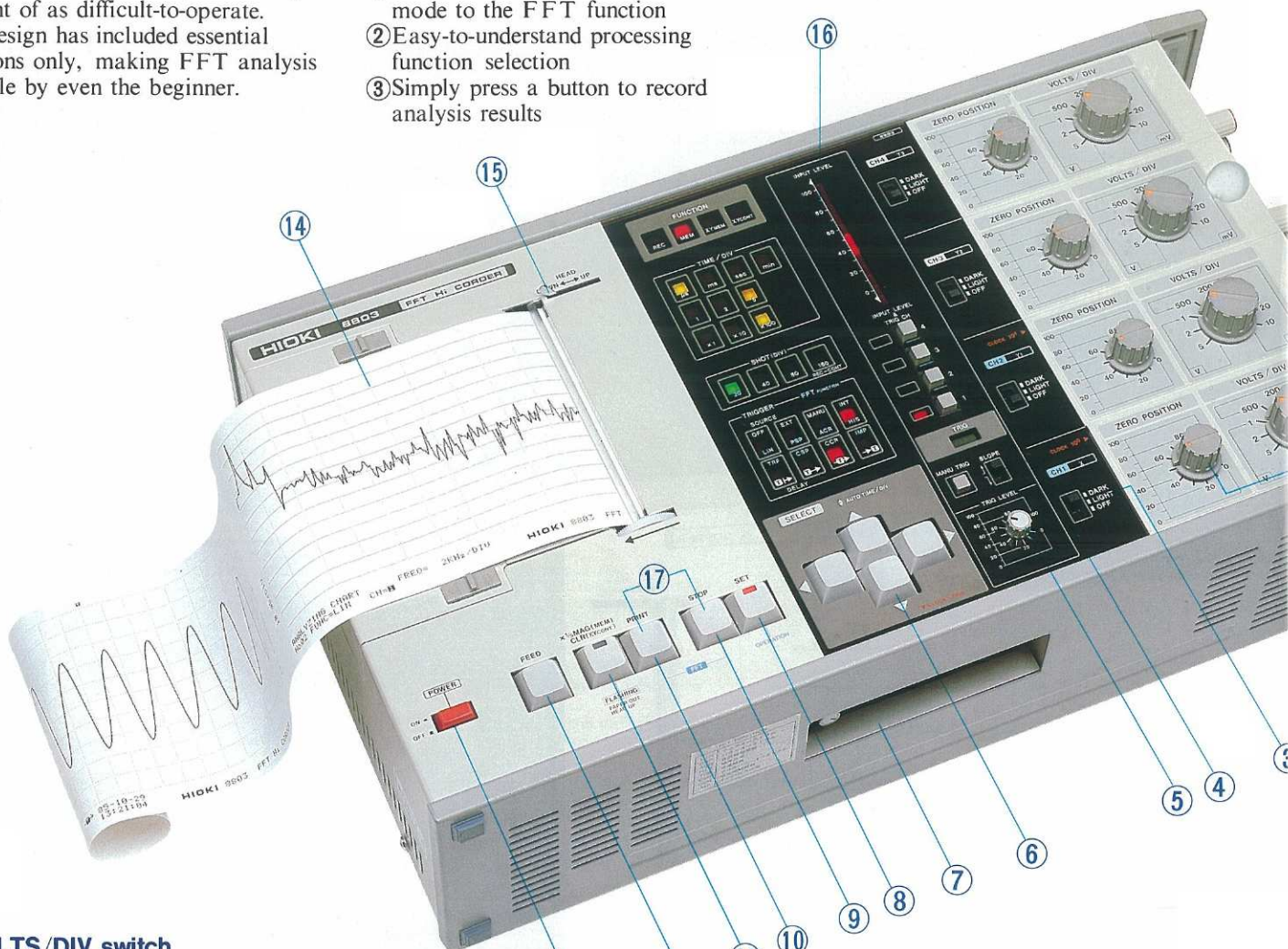
The 8803 FFT Hi Corder is a 4-channel waveform recorder with an FFT function and is capable of performing tasks ranging from recording of high-speed phenomena to waveform analysis and recording. In addition to the high-speed X-Y recording and memory functions which

enable real-time capture and continuous multi-channel X-Y recording, the 8803 has a 2-channel FFT (Fast Fourier Transform) function. This enables not only recording of waveforms, but frequency-axis, time-axis and amplitude-axis analysis of waveforms as well. The 8803 is designed for

extremely simple operation and provides a wide range of versatile recording and analysis functions, making it the ideal choice for a broad range of applications, including plant maintenance, noise measurements, vibration measurements and measurements of characteristic vibration frequencies.

The 8803 has radically changed the image of FFT analyzer, commonly thought of as difficult-to-operate. The design has included essential functions only, making FFT analysis possible by even the beginner.

- Designed-in operational simplicity
- ① Simple switching from the recorder mode to the FFT function
- ② Easy-to-understand processing function selection
- ③ Simply press a button to record analysis results



① VOLTS/DIV switch

Select range according to input signal level.

② Zero Position/Time Setting

Zero position can be set to 11 points. 0~100% in 10% increments. Also used for time setting (internal clock) for 8801-10, 8802-11, -12, 8803.

③ Channel Switch

Select light or dark tone for waveform recording.

④ Trigger Level Setting Knob

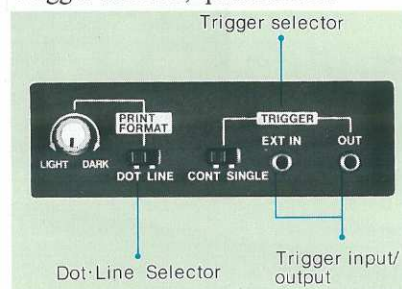
⑤ Trigger Slope Selector

⑥ Select keys

Used to set MEASUREMENT FUNCTION, TIME/DIV, SHOT, TRIGGER, or to select FFT FUNCTION.

⑦ Side Panel

Trigger selector, printformat.



⑧ Set key/FFT Operation key

Used to set the automatic recording/

print mode, or to start analyzing.

⑨ Stop key

⑩ Print key

Calls the stored waveform out of memory for re-print. (Can be re-printed as many times as desired.)

⑪ Time-base compression key/clear key

In Memory Recorder mode, reduces time-base to 1/5 scale. In XYCONT, clears the memory.

⑫ Feed key

⑬ Power ON/OFF key

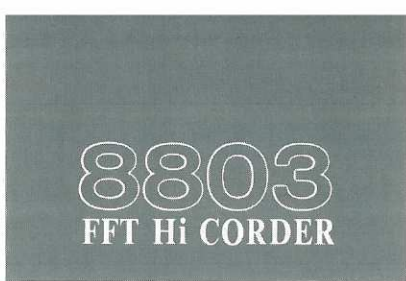
⑭ Recording chart

⑮ Printer head-up/down lever

⑯ Level meter

⑰ FFT mode key

8 FFT Analysis Functions

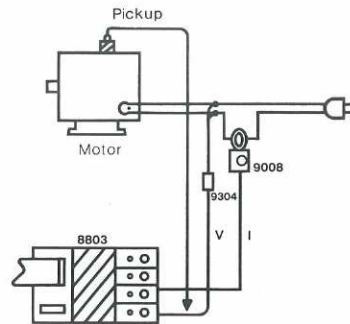


● FFT Analysis Functions

- ① Linear spectrum
- ② Power spectrum
- ③ Auto-correlation function
- ④ Histogram
- ⑤ Transfer function
- ⑥ Cross power spectrum
- ⑦ Cross-correlation function
- ⑧ Impulse response

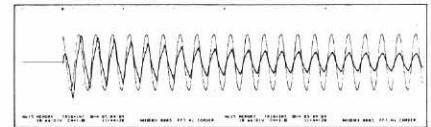
■ Application Example

Motor Performance Testing

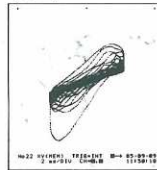


- Inrush current recording
- Voltage/current phase recording
- Voltage/current X-Y recording
- Power spectrum diagnosis in the FFT mode

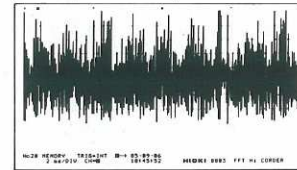
(Inrush current)



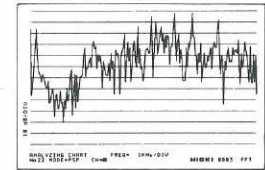
(X-Y)



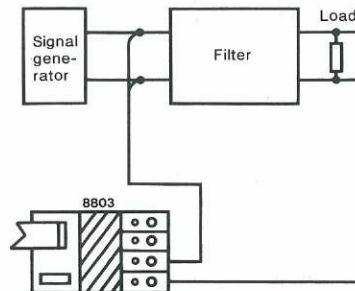
(Pickup waveform)



(Power spectrum)

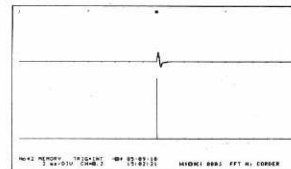


Filter Frequency Characteristics

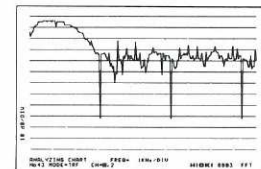


- Input/output relationships in the time domain determined from the transient waveform
- Calculation of the transfer function and the determination of filter frequency response in the FFT mode.

(Transient waveform)

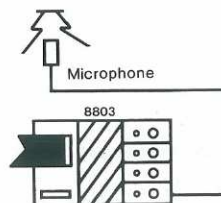


(Transfer function)



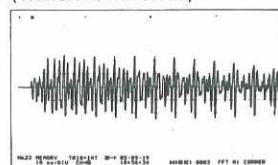
TIME/DIV	FFT frequency range
100 μ s/DIV	100kHz
200	50
500	20
1ms/DIV	20
2	10
5	4
10	2
20	1
50	400Hz
100	200
200	100
500	40
1sec. DIV	20
2	10
5	4

Analysis of Sound

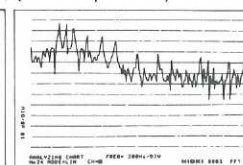


- Transient waveform recording of sound picked up using a microphone
- Frequency analysis of sound picked up by a microphone
- Measurement of the period of sound picked up by a microphone

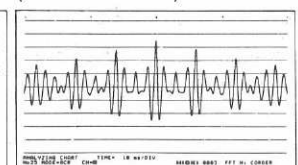
(Transient waveform)



(Linear spectrum)



(Auto-correlation)



Specifications

1. Basic Specifications

Measurement functions

- MEM: Memory recorder (high-speed)
- REC: Recorder (real-time)
- XY MEM : High-speed X-Y recorder
- XY CONT : Continuous X-Y recorder

Number of channels: 4

Storage capacity: 8 bits × 8K words/channel

Recording method: Thermal

Recording paper: 110mm × 30mm, effective recording width approx. 90mm (251 dots)

Unit scale: Approx. 9mm/div (25 dots)

Maximum printing speed: 0.5div/s in memory recorder mode, 1div/s in other three modes

Maximum floating Potential (including channel-to-channel potential differences): 180VDC, 130VAC

Common-mode rejection: 80dB or above (at 50Hz or 60Hz with a signal source impedance 100 or less)

Operating environment: 0°C to 40°C (80% RH or less)

Power Supply: 100VAC ± 10%, 50Hz/60Hz (120V, 200V, 220V, or 240V can be specified at time or ordering)

Power consumption: 80W max. (approx. 30W during normal recording)

Weight: Approx. 8.3kg

Dimensions: Approx. 420L × 240W × 117.5D mm (excluding protrusions)

2. Input Section (23°C ± 5°C)

Sensitivity: 10mV/div to 5V/div, in nine 1-2-5 steps

Amplitude accuracy: ± 0.35% ± 2 dots

Offset adjustment: Eleven selectable offsets, 0% to 100% of full width, in 10% steps (accuracy: 2 dots)

Frequency characteristics: DC to 100kHz (± 3dB)

Input circuit: Floating with guard

Input impedance: 1MΩ fixed

A-D conversion: 8-bit parallel comparison technique

Linearity: ± 0.5%

Maximum allowable voltage: 100VDC, 100VAC

3. Trigger Section

Trigger source: Off, external, manual, or internal (channel 1 to channel 4)

Trigger slope:

- Internal: Rising or falling
- External: Rising

Trigger level:

- Internal: Full recording range
- External: TTL level or contact closure

Trigger timing (delay): Record up to trigger or from trigger (in all function modes). Record before and after trigger or delayed 1 shot* after trigger (MEM and XY MEM modes)

Trigger output: TTL level (active low) Pulse width; Approx. 0.2s

Operating modes: Single trigger and repeated trigger

External trigger output terminal: Minijack

* A shot is the length of one recording.

4. Specifications for Individual Measurement Functions

● Memory Recorder (MEM)

Time axis: 100μs/div to 500μs/div (25 samples/div) and 1ms/div to 5s/div (50 samples/div)

Recording length: 20, 40, 80, or 160div

Interpolation: Can be performed

Compressed output: Time axis can be compressed 1/5 in output (but FFT chart output is disabled)

● Recorder (REC)

Time axis: 1s/div to 50s/div and 1min/div to 50min/div, in 12 selections in 1-2-5 steps

Recording length: 20, 40, or 80div or continuous

Sampling period:

- 100μs (when 1 channel is used)
- 160μs (when 2 channels are used)
- 200μs (when 3 or 4 channels are used)

● High-Speed X-Y Recorder (XYMEM)

Number of channels: 3 (X-Y₁, X-Y₂, X-Y₃)

Effective recording area: Approx. 90mm × 90mm (251 × 251 dots)

Sampling period: 4μs to 100ms

● Continuous X-Y Recorder (XYCONT)

Number of channels: Same as for XYMEM

Effective recording area: Same as for XYMEM

Recording time: Unlimited

Sampling period:

- 60μs (when 1 channel is used)
- 100μs (when 2 channels are used)
- 120μs (when 3 or 4 channels are used)

5. Date and Time Printing Function

Information printed: Year, month, day, hour, minute, second (printed in comment field)

Time when printed: At trigger, when trigger is used in MEM or XYMEM mode. Otherwise at start of recording.

6. Internal Clock

Type: Crystal oscillator

Accuracy: ± 50ppm (at 25°C on battery backup with power off)

Backup time: 1 month or longer from a full charge

7. FFT Specifications

Analysis functions:

- Linear spectrum
- Power spectrum
- Auto-correlation function
- Cross-correlation function
- Cross power spectrum
- Transfer function
- Impulse response
- Histogram

Number of sampled points: 512

Dynamic range: 48dB

Frequency bandwidth: DC to 100kHz

Frequency resolution: 1/205

Sampling frequency: 2.5 times the frequency range

Window: Rectangular

Channels: 1 and 2

Typical calculation times (Actual times depend on data):

- Linear spectrum 12s
- Power spectrum 10s
- Auto-correlation function 17s
- Cross-correlation function 17s
- Cross power spectrum 21s
- Transfer function 22s
- Impulse response 28s
- Histogram 0.5s

8. Miscellaneous

Input level display: Indicated by 12-point LED display in 23 ranges. (Channel selected by switch)

Channel switches: Waveform dark/light/off can be selected for each channel (but only on/off in XY CONT mode)

Reprint function (from memory): X-Y --- chart switching possible (in XY CONT and MEM modes) Dark-light-off switching possible (in XY CONT and MEM modes) Overlaid plotting possible (in XY CONT mode)

Comment printing:

- Function
- Time axis (except in XY CONT mode)
- Cumulative output count (1-99)
- Channel No. and dark/light
- Trigger source
- Trigger delay
- Trigger mark (in MEM mode)
- 5div and 10div marks

Auto-setting of time axis range: Available in MEM and XYMEM modes

Gauge printing function provided

Standard accessories:

- Power cable 1
- Input cable 1
- Recording paper 1
- Vinyl cover 1
- Spare fuse 1
- Sticker 1
- Instruction manual 1

Optional accessories

- 9221 Recording Paper (Ten 30m rolls)
- 9303 Power Transformer 40:1 (400V input) and 20:1 (200V input) voltage ratios
- 9304 Attenuator (10:1 attenuation)
- 9305 Trigger Cable
- 9146 Carrying Case

Memory Recorder (XYMEM) Mode

TIME/DIV	TIME WORD	Recording time	No. of samples per time-base DIV
100μs/DIV	4μs	32ms (Notes)	25
200	8	64	
500	20	160	
1ms/DIV	20	160	50
2	40	320	
5	100	800	
10	200	1.6s	
20	400	3.2s	
50	1ms	8.0	
100	2	16.0	
200	4	32.0	
500	10	80.0	
1s/DIV	20	160	
2	40	400	
5	100	800	

Note: When printed in two lengths of 160div each

Standard Recorder

TIME/DIV	Chart Speed	Time-Base Resolution
1s/DIV	540mm/min	1/25DIV
2	270	
5	108	
10	54	
20	27	
50	10.8	1/50DIV
1min/DIV	540mm/hr	
2	270	
5	108	
10	54	
20	27	
50	10.8	

No. of channels	1	2	3	4
Sampling period	100μs	160μs	200μs	200μs

Continuous X-Y Recorder Mode (XYCONT)

No. of channels	1	2	3
Sampling period	60μs	100μs	120μs

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DISTRIBUTED BY

HEAD OFFICE: P.O. Box 1, Sakaki, Nagano, 389-06 Japan.

Tlx: 3327508 HIOKI J / Cable: HEWLOV, Ueda

Tel. (0268) 82-3030 / Fax. (0268) 82-3215

HIOKI-RCC, INC.: 198 Route 206 South Somerville, N.J. 08876 U.S.A.

Telephone: (201) 874-6484