



Models

Model name (No.)	Max. sampling rate	Freq. BW	Max. record length	Input channels
SB5710 (701361)	5 GSps	1 GHz	6.25 MW (Mpts)	Analog 4 CH + Logic 32-bit
SB5310 (701561)	5 GSps	1 GHz	6.25 MW (Mpts)	Analog 4 CH + Logic 8-bit

FlexRay Analysis Functions

FlexRay bus	FlexRay Protocol Version 2.1
Bit rate	10Mbps, 5 Mbps, 2.5 Mbps

●Trigger function	Source CH1 to CH4
Type	FlexRay bus signal (BP and BM signals input through differential probe) Selectable from the following options: Frame Start: Trigger at Frame Start ID/Data: Trigger at Indicator/ID/Cycle Count/Data ID/Data OR: Trigger at OR condition of Indicator/ID/Cycle Count/Data Error Trigger: Trigger at CRC/BSS/FES errors OR condition for these errors can be set

●Analysis function	Source CH1 to CH4, M1 to M4
Analyzable number of frames:Max. 600	
Min. required sampling rate for analysis:	Eight (8) times or more of the FlexRay signal bit rate
Sample point:	Approximate point is accepted when the sample rate and the multiple of eight (8) times as bit rate are different.
Analyzable Frames	Header Segment, Payload Segment, Trailer Segment
Display of analysis results:	●Simple: Displays number of frame (No.), Frame ID,Data ●Detail: Displays number of frame (No.), Time, Segment (Static, Dynamic), Payload preamble indicator, Null frame indicator, Sync frame indicator, Startup frame indicator, Frame ID, Payload length, Cycle count, Information (errors), Payload Data

Field Jump	When the zoom link function is enabled, the zoom position can be moved to the head of the specified field of the frame that is highlighted in the analysis result list. Select the field from Frame ID, Payload length, Header CRC, Cycle count, Data, CRC
●Field Jump:	When the zoom link function is enabled, the zoom position can be moved to the head of the specified field of the frame that is highlighted in the analysis result list. Select the field from Frame ID, Payload length, Header CRC, Cycle count, Data, CRC

Automatic measurement of waveform parameters:	BSS Interval, FBSS Interval, BSSFES
Waveform parameters:	Max, Min, Mean, σ , Cnt
Statistical items:	Max, Min, Mean, σ , Cnt
●Bus drive electrical test:	FlexRay EPL-Specification V2.1
Receiver Test@TP4:	<Measures from BP-BM and RxEN waveforms> dBDRxa(Activity Reaction Time) dBDRxa(Idle Reaction Time) <Measures from BP-BM and RxD waveforms> dBDRx10(Receiver delay(Negative edge)) dBDRx01(Receiver delay(Positive edge)) dRxAsym(Receiver delay mismatch IdBDRx10- dBDRx01)

Transmitter Test@TP1	<Measures from TxD and BP-BM waveforms> dBDTx10(Transmitter delay(Negative edge)) dBDTx01(Transmitter delay(Positive edge)) dBusTx10(Fall time differential bus voltage) dBusTx01(Rise time differential bus voltage) dTxAsym(Transmitter delay mismatch IdBDTx10- dBDTx01) uBDTx(Absolute value of uBus IBP-BM)
●Measures from TxEN and BP-BM waveforms >	dBDTxia(Propagation delay Idle -> Active) dBDTxia(Propagation delay Active -> Idle) dBusTxia(Transition time Idle -> Active) dBusTxia(Transition time Active -> Idle)

Eye-diagram test	Test items: Mask Test/Eye parameter test Mask Test Item: Wave Count/Wave Count%/Sample Point Count/Sample Point Count% Eye Parameter Item: Vtop/Vbase/ctop/cbase/Tcrossing1/Tcrossing2/ Crossing/Crossing%/Eye Height/EyeWidth/ QFactor/Jitter/Duty Cycle Distortion%/Rise/Fall
Saving of the data of the analysis result list	Saves the data of the simple display and detail display of the analysis result list in CSV format (.csv extension).

●Search function	Data search Search the waveform by specifying a field or frame condition. If a waveform that matches the condition is found, the zoom box moves to that point and displays the specified waveform in the zoom window.
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CAN Analysis Functions

CAN bus	CAN Version 2.0B
Bit rate	Set any of the following bit rates: 1 M, 500 k, 250 k, 125 k, 83.3 k, 33.3 k [bps], or an arbitrary bit rate from 10 k to 1 M [bps] (0.1 kbps resolution). Supports High speed CAN (ISO11898) and Low speed CAN (ISO11519-2).

●Trigger function	Source CH1 to CH4
Type	Selectable from the following options: SOF: Activates a trigger on the SOF (Start of Frame). Error Frame: Activates a trigger on an error frame. ID Std/Data: Activates a trigger on a data frame or remote frame (ID: standard format). ID Ext/Data: Activates a trigger on a data frame or remote frame (ID: extended format). ID/Data OR: Activates a trigger on the OR conditions of four types of data frames or remote frames. Select standard or extended format for each ID. Message/Signal: CAN Message (ID), Signal (ID/Data)

●Analysis function	Source CH1 to CH4, M1 to M4
Analyzable number of frames:Max. 3000	
Analyzed frames	Data frame, remote frame, error frame, and overload frame.
Display of analysis results:	●Simple: Displays the analysis number (No.), frame type (Frame), ID in hexadecimal notation, Data in hexadecimal notation, and ACK slot state.

●Detail	Displays the analysis number (No.), frame type (Frame), time from the trigger position (Time (ms)), ID in hexadecimal notation, DLC in hexadecimal notation, Data in binary notation (Data (Bin)), Data in hexadecimal notation (Data), CRC sequence in hexadecimal notation, and ACK slot state.
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Field Jump	When the zoom link function is enabled, the zoom position can be moved to the head of the specified field of the frame that is highlighted in the analysis result list. Select the field from SOF, ID, Control Field, Data Field, CRC, ACK.
●Field Jump:	When the zoom link function is enabled, the zoom position can be moved to the head of the specified field of the frame that is highlighted in the analysis result list. Select the field from SOF, ID, Control Field, Data Field, CRC, ACK.

Saving of the data of the analysis result list	Saves the data of the simple display and detail display of the analysis result list in CSV format (.csv extension).
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●Search function	Data search Search the waveform by specifying a field or frame condition. If a waveform that matches the condition is found, the zoom box moves to that point and displays the specified waveform in the zoom window.
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●Stuff Bit Computation Function	Stuff bit computation Extracts stuff bits from the CAN bus waveform and displays them as a MATH waveform (MATH1 to MATH4).
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LIN Analysis Functions

LIN bus	LIN1.3 or LIN2.0
Bit rate	Set any of the following bit rates: 19200, 9600, 4800, 2400, 1200 [bps], or an arbitrary bit rate from 1000 to 20k [bps] (0.1kbps resolution).

●trigger function	Source CH1 to CH4, Logic PodA*1
Type	Selectable from the following options: Break + Synch: Activates a trigger on the (Break + Synch). ID/Data: Activates a trigger on a ID/Data and /or their combination ID/Data OR: Activates a trigger on the OR conditions of four types of ID/Data conditions. Error: Activates a trigger on a frame at which error occurred. Activates a trigger on the OR conditions of error conditions

(Error conditions)	Parity Error, Checksum Error, Synch Error, Timeout Error (Slave Not Responding Error, Header Timeout Error, Response Timeout Error), Framing Error
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●Analysis functions	Source CH1 to CH4, Logic PodA*1, M1 to M4
Analyzable number of frames:Max. 3000	
Analyzed frames	ID, ID-Field, Data, Checksum, Information(ID parity error, Checksum error, Wakeup signal)

Display of analysis results:	●Simple: Displays the analysis number (No.), ID in hexadecimal notation, Data in hexadecimal notation, and ChkSum in hexadecimal notation.
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●Detail	Displays the analysis number (No.), time from the trigger position (Time (ms)), ID in hexadecimal notation, ID-Field in hexadecimal notation, Data in binary notation (Data (Bin)), Data in hexadecimal notation (Data), CheckSum in hexadecimal notation, and Information.
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Field Jump	When the zoom link function is enabled, the zoom position can be moved to the head of the specified field of the frame that is highlighted in the analysis result list. Select the field from Break, Synch, ID, Data, Checksum.
●Field Jump:	When the zoom link function is enabled, the zoom position can be moved to the head of the specified field of the frame that is highlighted in the analysis result list. Select the field from Break, Synch, ID, Data, Checksum.

Saving of the data of the analysis result list	Saves the data of the simple display and detail display of the analysis result list in CSV format (.csv extension).
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●Search function	Data search Search the waveform by specifying a field or frame condition. If a waveform that matches the condition is found, the zoom box moves to that point and displays the specified waveform in the zoom window.
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UART Analysis Functions

Bit rate	Set any of the following bit rates: 1200bps, 2400bps, 4800bps, 9600bps, 19200bps, 38400bps,57600bps, 115200 [bps], or an arbitrary bit rate from 1000 to 200 k [bps] (0.1kbps resolution).
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●Trigger function	Source CH1 to CH4, Logic PodA*1
Data Format	Selectable from the following options: ●8bit Data (Non-Parity bit) ●7bit Data + Parity bit (Available only when error trigger is selected) ●8bit Data + Parity bit (Available only when error trigger is selected) Selectable from the following options: ●Data: Activates a trigger on a any data(up to 4-byte) ●Error trigger: Activates a trigger on a frame which Parity or Framing error is occurred.

●Analysis function	Source CH1 to CH4, Logic PodA*1, M1 to M4
Analyzable number of frames:Max. 3000	
Analyzed frames	Data, Information (Parity error, Framing error)
Display of analysis results:	●Simple: Displays the analysis number (No.), Data in hexadecimal notation ●Detail: Displays the analysis number (No.), time from the trigger position (Time (ms)), Data in binary notation (Data (Bin)), Data in hexadecimal notation (Data) and Information.

Saving of the data of the analysis result list	Saves the data of the simple display and detail display of the analysis result list in CSV format (.csv extension).
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●Search function	Data search Search the waveform by specifying a field or frame condition. If a waveform that matches the condition is found, the zoom box moves to that point and displays the specified waveform in the zoom window.
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I²C Analysis Functions

I ² C bus	Bus transfer rate:Up to 3.4 Mbits/s Address mode: 7 bits/10 bits
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●Trigger function	Source CH1 to CH4, Logic PodA*1
Type	Select from the following five trigger types. Every Start: Activate a trigger when a start condition is detected Address&Data: Activate a trigger based on the comparison against the specified address and data Non-ACK: Activate a trigger when Nack is detected General Call: Activate a trigger based on the comparison against the second byte pattern of the general call address Start Byte/HS Mode: Activate a trigger on the start byte or the master address of HS mode The address type of the Address&Data trigger can be selected from the following three types. ●7bit address ●7bit + Sub Adr ●10bit Address

●Alalysis function	Source CH1 to CH4, Logic PodA*1, M1 to M4
Analyzable number of data:Max. 40000-byte	
Display of analysis results:	●Simple: Displays the analysis number (No.), Start/Stop conditions (S/P), Data in hexadecimal notation, Address/Data (Form), Read/Write (R/W), ACK ●Detail: Displays the analysis number (No.), Start/Stop conditions (S/P), time from the trigger position (Time (ms)), Data in binary notation (Data (Bin)), Data in hexadecimal notation (Data), Address/Data (Form), Read/Write (R/W), ACK and Information.

Saving of the data of the analysis result list	Saves the data of the simple display and detail display of the analysis result list in CSV format (.csv extension).
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●Search function	Data search Set the address pattern, data pattern, and Acknowledge bit condition and search the waveform. If a waveform that matches the condition is found, the zoom box moves to that point and displays the specified waveform.
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●Search function	Data search Set the address pattern, data pattern, and Acknowledge bit condition and search the waveform. If a waveform that matches the condition is found, the zoom box moves to that point and displays the specified waveform.
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SPI Analysis Functions

●Trigger function	Source CH1 to CH4,Logic PodA*1
Type	Activate a trigger by comparing data from an arbitrary byte counts after the assertion of the CS. The length of data that is compared can be set to 1 to 4 bytes.

●Analysis function	Source CH1 to CH4, Logic PodA*1, M1 to M4
Analyzable number of data:Max. 40000-byte	
Analyzed frames	Data
Display of analysis results:	●Simple: Displays the analysis number (No.), Data1 in hexadecimal notation (Data1 (H)), Data2 in hexadecimal notation (Data2(H)), CS ●Detail: Displays the analysis number (No.), time from the trigger position (Time (ms)), Data1 in binary notation (Data1(B)), Data2 in binary notation (Data2 (B)),Data1 in hexadecimal notation (Data1(H)), Data2 in hexadecimal notation (Data2 (H)), CS (CS signal status or the CS signal name with high precedence).

Saving of the data of the analysis result list	Saves the data of the simple display and detail display of the analysis result list in CSV format (.csv extension).
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●Search function	Data search Set the data pattern and search the waveform. If a waveform that matches the condition is found, the zoom box moves to that point and displays the specified waveform.
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Basic Specifications

●Analog Inputs	Input channels: 4 (CH1 to CH4) Input coupling: AC, DC, GND, DC50 Ω Input impedance: 1 M Ω \pm 1.0% approx. 20 pF 50 Ω \pm 1.5%
Voltage axis sensitivity:	For 1 M Ω input : 2 mV/div to 5 V/div (steps of 1-2-5) For 50 Ω input: 2 mV/div to 500 mV/div (steps of 1-2-5)
Maximum input voltage:	For 1 M Ω input: 150 Vrms CAT I (when frequency is under 1 kHz) For 50 Ω input: 5 Vrms or less and 10 Vpeak or less

Vertical (voltage) axis sensitivity:	For 1 M Ω input: \pm (1.5% of 8 div + offset voltage accuracy) For 50 Ω input: \pm (1.5% of 8 div + offset voltage accuracy)
Offset voltage axis accuracy*2:	2 mV/div to 50 mV/div: \pm (1% of setting + 0.2 mV) 100 mV/div to 500 mV/div: \pm (1% of setting + 2 mV) 1 V/div to 5 V/div: \pm (1% of setting + 20 mV)

Frequency characteristics*2,*3	(Attenuation point of -3 dB when inputting a sine wave of amplitude \pm 2 div or equivalent): For 50 Ω input 0.5 V/div to 10 mV/div: DC to 1 GHz 5 mV/div: DC to 750 MHz 2 mV/div: DC to 600 MHz
For 1 M Ω input (from the probe tip when using the PB500 dedicated passive probe)	5 V/div to 10 mV/div: DC to 500 MHz 5 mV/div to 2 mV/div: DC to 400 MHz

A/D conversion resolution	8 bits (25 LSB/div) Max. 12 bits (in high resolution mode)
Probe attenuation settings	1:1, 2:1, 5:1, 10:1, 20:1, 50:1, 100:1, 200:1, 500:1, 1000:1, 1A:1V, 10A:1V, 100A:1V

Bandwidth limit	For each channel, selectable from: FULL, 200 MHz, 20 MHz, 8 MHz, 4 MHz, 2 MHz, 1 MHz, 500kHz, 250 kHz, 125 kHz, 62.5 kHz, 32 kHz, 16 kHz, and 8 kHz Achieved by combining the analog filter (200 MHz, 20 MHz) and digital filter (IIR + FIR)
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Maximum sample rate	Realtime sampling mode When interleave mode is ON: 5 GS/s When interleave mode is OFF: 2.5 GS/s Repetitive sampling mode: 2.5 TS/s
Max. record length	6.25 MW (Mpts)
Maximum acquisition rate	For 1.25 MW (Mpts) record length 60 waveforms/s/channel For 12.5 kW (kpts) record length 9,000 waveforms/s/channel For 2.5 kW (kpts) record length 25,000 waveforms/s/channel 400 ns or less (equivalent to 2,500,000 waveforms/s for each channel)

Dead time for N single*4	
●Logic Inputs	Compatible probes 701980 and 701981 (8-bit input)
Maximum toggle frequency*5	When using the 701980: 100 MHz When using the 701981: 250 MHz
Maximum input voltage	\pm 40 V (DC + ACpeak) or 28 Vrms at a frequency of 1 kHz or less

General Specifications

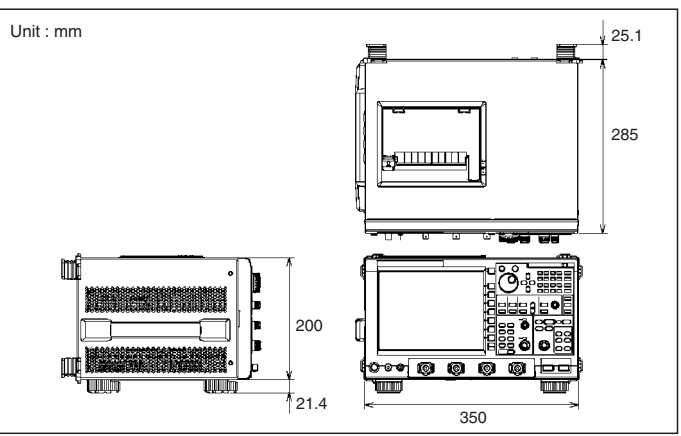
Rated supply voltage	100 to 120 VAC or 220 to 240 VAC (automatic switching)
Rated supply frequency	50/60 Hz
Maximum power consumption	300 VA
External dimensions	350 (W) \times 200 (H) \times 285 (D) mm (with printer cover put away, excluding handle and other projections)
Weight	Approx. 7.7 kg (without options)
Operating Temperature	5 to 40 $^{\circ}$ C

*1: Pod A (8-bit) is only available regardless of models
*2: Values measured under standard operating conditions after 30-minute warm-up and calibration with the time base set to internal clock.
Ambient temperature: 23 \pm 5 $^{\circ}$ C
Ambient humidity: 55 \pm 10% RH
Power supply voltage and frequency tolerance: Within 1% of rated value

*3: Values for a repeating phenomena.
The frequency bandwidth of a single burst frequency bandwidth is the smaller of the two values, DC to the sampling frequency/2.5 and the frequency bandwidth of the repeating phenomena.

*4: No change in the acquisition rate with an increase or decrease in the number of channels.
*5: Values measured under standard operating conditions.

Dimensions



Vehicle Serial Bus Analyzer SB5000



Model and Suffix Codes of SB5710, SB5310

Model	Suffix Code	Description
701351		SB5310: 4 ch 1.0GHz + Logic 8-bit Max. 5GS/s(2.5GS/s/ch), 6.25 MW (Mpts)/ch
701361		SB5710: 4 ch 1.0GHz + Logic 32-bit Max. 5GS/s(2.5GS/s/ch), 6.25 MW (Mpts)/ch
Power Cable	-D	UL/CSA standard
	-F	VDE standard
	-Q	BS standard
	-R	AS standard
	-H	GB standard
Help menu language	-HE	English Help
	-HC	Chinese Help
	-HK	Korean Help
Options	/B5	Built-in printer
	/P4*1	4 Probe power terminals on rear panel
	/C8*2	Built-in HDD + Ethernet interface
	/C10*2	Ethernet interface
	/G2*3	User-defined math function
	/G4*3	Power Supply Analysis Function

*1: Please order /P4 option if you use either current probes or differential probes such as 701920, 701922.

*2: Choose either one

*3: Choose either one

Accessories (Optional)

Name	Model	Specification
PB500 (10:1 passive probe)	701943	10 M Ω (10:1), 500 MHz, 1.5 m(one per order)
PBA2500 (2.5 GHz active probe)	701913	2.5 GHz BW
PBA1500 (1.5 GHz active probe)	701914	1.5 GHz BW
PBA1000 (1.0 GHz active probe)	701912	1.0 GHz BW
PBD2000(2.0 GHz differential probe)	701923	2.0 GHz BW
Miniature passive probe	701941	10:1, DC to 500 MHz, 1.2 m
100:1 high voltage probe	701944	DC to 400 MHz, 1.2 m
100:1 high voltage probe	701945	DC to 250 MHz, 3 m
PBL5000 (5 GHz probe)	701974	5 GHz BW
DC block	701975	For 50 Ω input, SMA connector
FET probe*1	700939	900 MHz BW
Logic probe	701980	1 M Ω /10 pF, 100 MHz toggle frequency
Logic probe	701981	10 k Ω /9 pF, 250 MHz toggle frequency
Differential probe*1	701921	DC to 100 MHz BW/Max. \pm 700 V
Differential probe*1	701922	DC to 200 MHz BW/Max. \pm 20 V
Differential probe (coming soon)	701924	DC to 1 GHz BW/Max. \pm 25 V
Differential probe*1	700924	DC to 100 MHz BW/Max. \pm 1400 V
Differential probe*1	701920	DC to 500 MHz BW/Max. \pm 12 V
Current probe	701928	DC to 100 MHz BW, 30 Arms
Current probe	701929	DC to 50 MHz BW, 30 Arms
Current probe*1	701933	DC to 50 MHz BW, 30 Arms
Current probe*1	701932	DC to 100 MHz BW, 30 Arms
Printer roll	B9850NX	30 m roll, 5 rolls/order
Rack mount kit	701983-01	EIA standard-compliant
	701983-02	JIS standard-compliant
Xviewer	701992-SP01	standard type
	701992-GP01	with computation function
Probe stand	701919	Circular Base, 1 arm

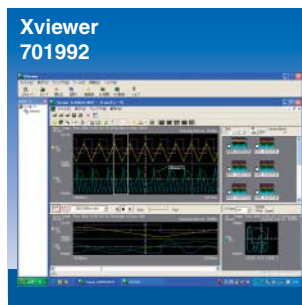
*1: /P4 option is required on the SB5710/SB5310 main unit.

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Standard Accessories

Name	Qty
Power Cable	1
PB500 passive probe	4
Printer roll paper (when option /B5 is specified)	1
User's manual (1 set)	1
Front panel cover	1
Rubber leg cap (2 per order)	2
Soft case	1

Related products



Note



- Before operating the product, read the user's manual thoroughly for proper and safe operation.

Yokogawa's Approach to Preserving the Global Environment

- Yokogawa's electrical products are developed and produced in facilities that have received ISO14001 approval.
- In order to protect the global environment, Yokogawa's electrical products are designed in accordance with Yokogawa's Environmentally Friendly Product Design Guidelines and Product Design Assessment Criteria.