TEAC

http://www.teac.co.jp/

Data Recording and Acquisition Unit

LX-100 Series

LX-110 / LX-120

RoHS Compliant

Pursuit of "Usability" and "Speed".

LX-100 Series —— Endless evolution of data recording

LX-100 Series data acquisition and recording system pursues the usability and reliability in the field.
LX-100 Series supports FAT32, 24bits AD conversion and RoHS (Restriction of Hazardous Substances).

- FAT32 file system for large capacity card
- 100dB dynamic range by 24 bits AD
- Records voltage, sound, vibration and strain from DC to 40kHz
- Supports various popular analysis software formats
- Records in TAFFmat data format.

LX-100 Series Specification

Main body

		DC Input Amp (AR-LXDC100)					PA Input Amp (AR-LXPA100)					Strain Input Amp (AR-LXST100)				
I/O Type		Input			Input and Output		Input			Input and Output		Input			Input and Output	
Channels		8ch	16ch	32ch	8ch	16ch	8ch	16ch	32ch	8ch	16ch	8ch	16ch	32ch	8ch	16ch
Weight Approx (kg/lb)	LX-110	3.6/7.9	3.9/8.6	6.1/13.4	3.9/8.6	6.1/13.4	3.6/7.9	3.9/86	6.1/13.4	3.9/8.6	6.1/13.4	3.6/7.9	3.9/7.9	6.1/13.4	3.9/8.6	6.1/13.4
	LX-120	3.7/8.1	4/8.8	6.2/13.6	4/8.8	6.2/13.6	3.7/8.1	4/8.8	6.2/13.6	4/8.8	6.2/13.6	3.7/8.1	4/8.8	6.2/13.6	4/8.8	6.2/13.6
Power Consumption(W)	LX-110	30	36	48	36	48	35	46	66	46	66	40	56	86	56	86
	LX-120	36	42	56	42	56	41	52	76	52	76	46	62	92	62	92

Sampling Frequencies
LX-110
LX-120

96 / 48 / 24 / 12 / 6 / 3 / 1.5 kHz (Common to each Channel)

Low speed sampling	Cutoff Frequency	Attenuation
1kHz	400Hz	-80dB (at 500Hz)
500Hz	200Hz	-80dB (at 250Hz)
200Hz	80Hz	-80dB (at 100Hz)
100Hz	40Hz	-80dB (at 50Hz)
50Hz	20Hz	-80dB (at 25Hz)
20Hz	8Hz	-80dB (at 10Hz)
10/5/2/1Hz	4Hz	-80dB (at 5Hz)
2/5/10/30/60s (cycle)	4Hz	-80dB (at 5Hz)

(Aliasing may occur at and under 5Hz sampling)

Sampling Frequencies
LX-120 only

102.4 / 51.2 / 25.6 / 12.8 / 5.12 / 2.56 / 1.28 kHz
65.536 / 32.768 / 16.384 / 8.192 / 4.096 / 2.048 / 1.024 kHz
100 / 50 / 20 / 10 / 5 / 2 / 1 kHz (Common to each Channel)

Tachometer Pulse Input
LX-120 only

Num. of Input Channels : 12 x 16 bit Channels, 2 x 32 bit Channels (Highest sampling frequncy settings support the moving average only at one(1))(Cannot be used simultaneously with generator output)
Use the lowest 1bit for techometer pulse timing bit.
Input Format : Threshold level selections +0.5/1/2.5/10/20 V (Max allowable input voltage is 50V)
Input Connector : BNC
Frequency Division Ratio Setting : 1 to 255
Moving Average Measurement : 1 to 16
Measurement Mode : Pulse count mode (Count of number of pulses within the gate time; Conunt of the total number from start to stop), Cycle count mode, Frequncy measurement mode, RPM mode

Generator Output • • • • • • **(Cannot be used simultaneously with tachometer pulse input)**
LX-120 only

Num. of Output Channels : 1
Output signal : Sine wave, Sweep Sine wave, Pulse, Pink noise, White noise

Input Channel change	2 / 4 / 8 / 16 / 24 / 32 ch
Recording Devices	Choice of Memory only ,Memory + PC card drive *
	PC card is Flash memory , supports up to 8GB capacity (FAT16 or FAT32)
Inteface	Choice of 100BASE-TX or Firewire (IEEE1394)
	(Specify one when you order)
Front Panel Control Keys	REC, FWD, STOP, PAUSE, EVENT, P.LOCK
Monitor Channel	1 (analog output) , BNC
Monitor output level	+/-1 to 5 V (0.1 V step)
Microphone Jack	1
Speaker and Earphone Jack	1 each
MAX. Recording Rate	Memory Approx. 1.6 MB/s, PC card Approx.0.8 MB/s
PC Throughput	Firewire (IEEE1394) Approx. 1.6 MB/s, Ethernet Approx. 0.8 MB/s
Time Precision	+/-1 ppm (25 deg C)
Temperature and Humidty	0 to 45 deg C, Humidity 10 to 85%RH (Operation)
Internal Clock Correction	+/- 30 seconds adjustment
Power Supply	11 to 30 V DC
Safety Standards	CE, VCCI
Vibration	Conforms to MIL-STD-810 Figure 514.4-1,2,3
	for the models with memory only or memory + PC card drive
External Dimension (WxHxD) (Excluding protruding parts)	Approx 300 x 65 x 200 mm
	Approx 11 13/16" x 2 9/16" x 7 7/8"

Input amplifier

	DC Input Amp (AR-LXDC100)	PA Input Amp (AR-LXPA100)	Strain Input Amp (AR-LXST100)
Input Format	Unbalanced	Balanced and Unbalanced	Balanced and Unbalanced
Input Coupling	DC	Balanced DC, Balanced AC, Unbalanced DC	DC
Input Impedance	1 M ohm	1 M ohm	1 M ohm
Input Range (over-range to +/-127%)	+/- 0.5/1/2/5/10/20/50 V	+/- 0.01/0.0316/0.1/0.316/1/3.16/10/50 V	DC mode : +/- 1/2/5/10 V, ST mode : 500/1000/2000/5000/10000/ 20000/50000/100000 microST, Precision(range value) +/-1% or less
Absolute Max. Input Voltage	+/- 100 V	+/- 50 V, but +/-100 V in the +/-50V range	+/- 25V
		Weighting: FLAT/A/C; HPF: OFF/10/20 Hz; Supply voltage for a sensor: 28V DC/4mA	Gauge Factor: 2.0; Applicable Gauge Resistance: 120 to 2000 ohm; Remote Sensing: Possible; Balance Range: +/- 10000 microST; Balance Method: By electronic auto balance; Bridge Connection: Full Bridge; Bridge Method: DC; Bridge Voltage: 2V (+/-1V) 10V(+/-5V)
Anti aliasing filter	Joint use of both a digital filter(*) and an analog filler(2nd Order Butteworth)	Joint use of both a digital filter(*) and an analog filler(2nd Order Butteworth)	Joint use of both a digital filter(*) and an analog filler(2nd Order Butteworth)
LPF	---	---	10,30,100,300,1k,3k,10k,30kHz,Pass:-48dB OCT Butterworth filter (Switched Capacitor Filter = SCF) for 8 channels indeependent;At LPF to Pass Joint use of both a digital filter(*) and an analog filter (2nd Order Butterworth)
Frequency Bandwidths	DC to the sampling frequency (listed above) / 2.4 +/-0.5 dB	DC Coupling : DC to the sampling frequency (listed above) / 2.4, AC Coupling : 1Hz to the sampling frequency (listed above) / 2.4, +/-0.5 dB	DC Method : DC to the sampling frequency (listed above)/2.4, +0.5/-3 dB ST Method : DC to 30 kHz, +0.5/-3 dB
Num,of Quantizing Bits	16bits / 24Bits	16bits / 24Bits	16bits / 24Bits
Conversion Method	128 times over sampling delta sigma method : however 64 times over sampling at 40kHz	128 times over sampling delta sigma method : however 64 times over sampling at 40kHz	128 times over sampling delta sigma method : however 64 times over sampling at 40kHz
Linearity	+/-0.1 % or less	+/-0.1 % or less	+/-0.1 % or less
Distortion Factor	Sampling Frequenies / Measurement Fequency / Distortion factor: 96kHz / 20kHz / +/-0.1% or less; 48kHz / 10kHz / +/-0.07% or less; 24kHz or less / fs / 4.8 / +/-0.4% or less	Sampling Frequenies / Input Range / Distortion factor: 48k, 96kHz / 0.316V or over / +/-0.1% or less; 0.1V or less / +/-0.2% or less; 24k or less / All / +/-0.4% or less	DC mode : same as DC100 ST mode : (SCF : 10kHz, 30kHz), Sampling Frequencies 24kHz, 96kHz 10000microST 0.1% or less
Range Accuracy	+/-0.1 % or less	+/-0.1 % or less	+/-0.1 % or less
Signal to Noise ratio (16bits/24bits) (25 deg C) (in band)	Input Range band (dB) / 20kHz / 40kHz: 84 / 94 / 80 / 88	Input Range band (dB) / 20kHz / 40kHz: 0.01V 64 / 67 60 / 63; 0.0316V 74 / 77 69 / 72; 0.1V 83 / 86 77 / 80; 0.316 / 1 V 87 / 93 77 / 80; 3.16V 87 / 96 77 / 80; 10 / 50 V 87 / 98 77 / 80	Input Range band (dB) / 1kHz / 3kHz / 10kHz / 20kHz / 40kHz: 0.25 mV/V 67 62 58 --- ---; 0.5 mV/V 73 68 64 --- ---; 1 mV/V 75 74 71 --- ---; 2.5 / 5 / 10 / 25 / 50 mV/V 75 75 75 --- ---; 1 / 2 / 5 / 10 V --- --- --- 87/93 77/83
	S/N is a difference of noise level for 100% of each input range. Dynamic range is the greatest input level and a difference of noise level of each input. Dynamic range ≈ S/N +2dB The overall accuracy specified here is the accuracy of the analog output when using an input amp and an analog output amp, and may differ depending on the frequency characteristics and the input range of the input amp.		
Crosstalk (in band)	Input Range band (dB) / 20kHz / 40kHz or less: -82 / -88 / -80 / -86	Input Range band (dB) / 20kHz / 40kHz: 0.01V -64 -60; 0.0316V -73 -69; 0.1V -78 -74; 0.316 / 1 / 3.16 / 10 / 50 V -78 -74	Input Range band (dB) / 1kHz / 3kHz / 10kHz: 0.25 mV/V -67 -62 -58; 0.5 mV/V -73 -68 -64; 1 mV/V -75 -74 -71; 2.5 / 5 / 10 / 25 / 50 mV/V -75 -75 -75
Inter-channel phase difference	1 deg or less (At 20 kHz or less), 3 deg or less (At 400 kHz or less)	1 deg or less (At 20 kHz or less), 3 deg or less (At 400 kHz or less)	1 deg or less (At 20 kHz or less), 3 deg or less (At 400 kHz or less)
TEDS sensor	---	Possible (V 0.9)	---
Input Connecter Type	BNC	BNC	Lemo 7-pin, 10ø (ECG0 Type)

Output amplifier

				DC Input Amp (AR-LXDC100)	PA Input Amp (AR-LXPA100)	Strain Input Amp (AR-LXST100)
Output Format	---	---	---	Unbalanced	Unbalanced	Unbalanced
Output Coupling	---	---	---	DC	DC	DC
Output Impedance	---	---	---	75 ohm	75 ohm	75 ohm
Output Range	---	---	---	+/-1 to 5 V , 0.1 V Step	+/-1 to 5 V , 0.1 V Step	+/-1 to 5 V , 0.1 V Step
Smoothing Filter	---	---	---	Combination of Analog fillter + Digtal fillter	Combination of Analog fillter + Digtal fillter	Combination of Analog fillter + Digtal fillter
Frequency Bandwidths	---	---	---	DC to fs / 2.4 +/- 0.5 dB (< fs 48 kHz)	DC to fs / 2.4 +/- 0.5 dB (< fs 48 kHz)	DC to fs / 2.4 + 0.5 dB, -3 dB
Num,of Quantizing Bits	---	---	---	16 / 24 Bits	16 / 24 Bits	16 / 24 Bits
D/A Conversion Method	---	---	---	128 times over sampling delta sigma method : however 64 times over sampling at 40kHz	128 times over sampling delta sigma method : however 64 times over sampling at 40kHz	128 times over sampling delta sigma method : however 64 times over sampling at 40kHz
Linearity	---	---	---	+/-0.1 % or less	+/-0.1 % or less	+/-0.1 % or less
Distortion Factor	---	---	---	+/-0.2 % or less	+/-0.2 % or less	+/-0.2 % or less
Range Accuracy	---	---	---	+/-0.1 % or less	+/-0.1 % or less	+/-0.1 % or less
Signal to Noise ratio (16bits/24bits) (25 deg C)	---	---	---	87 / 93 dB (in band) (1V input)	87 / 93 dB (in band) (1V input)	87 / 93 dB (in band) (1V input)
Crosstalk	---	---	---	-78 dB (At 20 kHz or less) -75 dB (At 40 kHz or less)	-78 dB (At 20 kHz or less) -75 dB (At 40 kHz or less)	-78 dB (At 20 kHz or less) -75 dB (At 40 kHz or less)
Inter-channel phase difference	---	---	---	1 deg or less (At 20 kHz or less) 3 deg or less (At 40 kHz or less)	1 deg or less (At 20 kHz or less) 3 deg or less (At 40 kHz or less)	1 deg or less (At 20 kHz or less) 3 deg or less (At 40 kHz or less)
Output Connecter Type	---	---	---	BNC	BNC	BNC

*** Specify one when you order**

- **Main Body *** LX-110 / LX-120
- **Number of Channels *** 8 / 16 / 32
- **Amplifier *** DC / PA / Strain / Output
- **Recording Devices *** Internal Memory / PC card
- **Interface *** Ethernet / Firewire(IEEE1394)
- Remote Control Unit / PC

Accessories
- DC Cable
- AC Adapter
- LX Navi software

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The analog monitor output is available during recording.
Time base conversion is possible in playback.

Recording format is TAFFmat, which is supported by many popular analysis software applications.

Through a remote control unit (stand-alone) or PC (LX Navi software), the LX-100 Series can be fully controlled

Full color remote control unit ER-LXRC100

PC card slot

Acquired data also can be transmitted to the PC while media recording.

OPTION :
Wave data display software LX View (PL-S1001)

Recording Devices
Choice of Memory and Memory + PC card drive

◀CF card & Adapter

Trigger recording
Voice Memo recording
A voice memo can be recorded, which simplifies the future data searches. Trigger recording offers the pre-trigger, level-trigger, the repeat and interval recording.

DC power supply and AC adapter
OPTION : Battery Unit

Frequency Bandwidth vs. Recording Time

Internal memory recording An example) Nom. of 8 Channels , 576MB Memory

Frequency Bandwidth (Sampling Frequenies)		Recording Time	
		16bit	24bit
DC to 40 kHz	(96 kHz)	Approx 6 minute	-
DC to 20 kHz	(48 kHz)	Approx 12 minute	Approx 6 minute
DC to 10 kHz	(24 kHz)	Approx 24 minute	Approx 12 minute
DC to 5 kHz	(12 kHz)	Approx 48 minute	Approx 24 minute
DC to 2.5 kHz	(6 kHz)	Approx 1 h 36 min	Approx 48 minute
DC to 1.25 kHz	(3 kHz)	Approx 3 h 12 min	Approx 1 h 36 min
DC to 675 Hz	(1.5 kHz)	Approx 6 h 24 min	Approx 3 h 12 min
DC to 400 Hz	(1 kHz)	Approx 9 h 36 min	Approx 4 h 48 min
DC to 80 Hz	(200 Hz)	Approx 48 hour	Approx 24 hour

Note : Recording rate is approx 1.6MB/sec (DC to 40 kHz bandwidth x 8ch)

PC card recording An example) Nom. of 8 Channels , 4GB PC card

Frequency Bandwidth (Sampling Frequenies)		Recording Time	
		16bit	24bit
DC to 20 kHz	(48 kHz)	Approx 1 h 20 min	-
DC to 10 kHz	(24 kHz)	Approx 2 h 40 min	Approx 1 h 20 min
DC to 5 kHz	(12 kHz)	Approx 5 h 20 min	Approx 2 h 40 min
DC to 2.5 kHz	(6 kHz)	Approx 10 h 40 min	Approx 5 h 20 min
DC to 1.25 kHz	(3 kHz)	Approx 21 h 20 min	Approx 10 h 40 min
DC to 675 Hz	(1.5 kHz)	Approx 42 h 40 min	Approx 21 h 20 min
DC to 400 Hz	(1 kHz)	Approx 64 hour	Approx 32 hour
DC to 80 Hz	(200 Hz)	Approx 320 hour	Approx 160 hour

Note : Recording rate is approx 0.8MB/sec (DC to 20 kHz bandwidth x 8ch)

Synchronous video and data recording

AQ-VU is a visual data recorder with which 4-channels of video and analog signals can be synchronously recorded and played back.
By synchronizing LX-100 series data recorder with AQ-VU, a variety of data measurements are possible.

Visual data recorder AQ-VU

Connecting to Data Analysis Software (Commercial product)

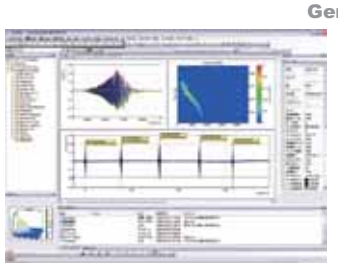
OPTION

The recording format is TAFFmat which is compatible with Windows file system and it is commonly used by TEAC Digital Data Recorders. The TAFFmat data file can be read by LX View software and by many other popular analytical software applications.

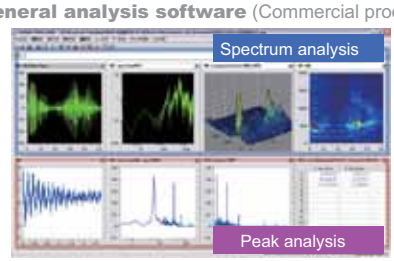
A real-time front-end software (Windows DLL) is also available for a system integrator for direct control of LX Series recorders. Contact TEAC for detail.

Please contact each distributor in your country

General analysis software (Commercial product)



FlexPro7 Professional
Developed by Weisang GmbH



DADiSP/2002
Developed by DSP Development Corporation

ME'scope Visual Engineering Series
Used only in 16 bits mode
Developed by Vibrant Technology, Inc.

Options

Remote Control Unit (ER-LXRC100)
Display : Color LCD 320×240 pixels
Functions :
Bar meter display
Main-unit control
(setting recording reproducing)
Microphone input
External Dimension (W x H x D) :
Approx 170 x 30 x 100 mm
(excluding protruding Parts)
Weight : Approx 0.65 kg
(excluding cables)

Battery Unit (BU-81)
Internal Battery Pack : HP-30L from Paco Electronics Industry Inc.
Num. of Internal Battery Packs : 3
(battery packs described below)
External Dimension (W x H x D) :
Approx 300 x 27.5 x 200 mm
11 13/16" x 1 1/16" x 7 7/8"
(excluding protruding Parts)
Weight : Approx 1.5 kg/3 lb
(excluding the battery pack and mounting brackets)

Battery Pack (HP-30L)
(Paco Electronics Industry Inc.)
Supply voltage :13.2V
Capacity : 3.3 Ah
Weight : Approx 700 g /1.5lb
Size : NP1type

Battery charger for Battery Pack
(KH-2S from Paco Electronics Industry Inc.)
Power Supply : 100V AC
(200V AC Automatic reshuffling)
Slot for Battery Pack : 4

Vehicle Mount Adapter

TZ-LXVM Series

LX-100 series accepts the needs of customers.

**LX-100 Series data acquisition and recording system was designed for reliable use in the lab and the field, and quick data processing.
Following the convenience of TEAC DAT technology, the LX-100 Series enables a wider recording bandwidth.
The connectivity to a transducer and PC are enhanced to meet the customer needs and offer cost-efficient data acquisition.**

Select 1 **Choice of Main Body**
LX-110 / LX-120

Select 2 **Choice of Number of Channels ***
8 / 16 / 32

Select 3 **Choice of Amplifier ***
DC / PA / Strain / Output

Select 4 **Choice of Recording Devices ***
Internal Memory / PC card

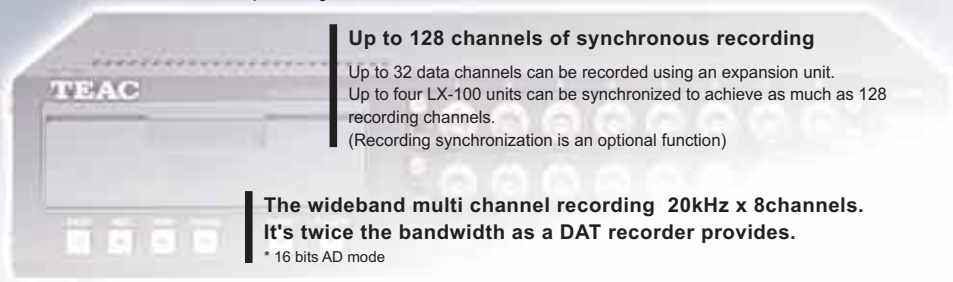
Select 5 **Choice of Interface ***
Ethernet / Firewire(IEEE1394)

Select 6 **Choice of Control Unit**
Remote Control Unit / PC

*Specify number of channels when you order

Records voltage, sound, vibration and strain from DC to 40kHz bandwidth

It achieves 100dB dynamic range by 24 bits AD
* PA amp 10V range.



Up to 128 channels of synchronous recording
Up to 32 data channels can be recorded using an expansion unit.
Up to four LX-100 units can be synchronized to achieve as much as 128 recording channels.
(Recording synchronization is an optional function)

**The wideband multi channel recording 20kHz x 8channels.
It's twice the bandwidth as a DAT recorder provides.**
* 16 bits AD mode

Possible to record longer using high capacity CF card
FAT32 file system for large capacity card
Up to 8GB card can be used at the moment.

Select 1 Choice of Main Body

LX-110 *Standard Model*

The LX-110 provides superior recording and playback performance with selectable recording media and input/output configurations.

LX-120 *High Specification Model*

In addition to all recording and playback features of the LX-110, LX-120 provides the selection of additional sampling rate and Tachometer pulse inputs.

Various sampling frequencies from high speed to low speed for extended time recording are available as selection.

96kHz,102.4kHz,65.536kHz,100kHz and lower sampling are (from 1kHz to 1/60Hz).

LX-110	96kHz, lower sampling
LX-120	96, 102.4, 65.536, 100kHz , lower sampling

Select 2 Choice of Number of Channels

Up to 32 channels

8 or 16 recording channels with a main unit or 32 channels using an expansion unit.

▲expansion unit

Select 3 Choice of Amplifier

Expandable amplifier with 8 channels per unit.

Various sensor amplifiers are available.

Three types of input amplifier cards are available :
A DC input amp card with lower sampling (from 1kHz to 1/60Hz), a selectable DC/IEPE(*) accelerometer input amp card, and a selectable DC/IEPE(*) accelerometer input amp card.
The output amplifier card outputs the analog voltage during recording and plays-back the analog voltage.

* IEPE : Integrated Electronics Piezoelectric.

DC	**DC input amplifier**	[AR-LXDC100]	
PA	**PA input amplifier**	[AR-LXPA100]	With TEDS
Strain	**Strain amplifier**	[AR-LXST100]	Common use DC input
Output	**Output amplifier**	[AR-LXAO100]	lower sampling will be available in the near future.

Select 4 Choice of Recording Devices

Internal Memory & PC card

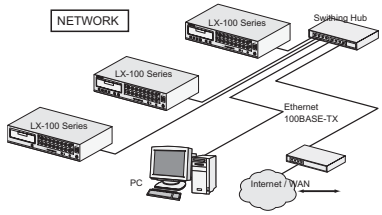
Memory - From standard 64MB to 576MB of internal memory achieving the maximum recording rate.
PC card - Supports up to 8GB* PCMCIA Type II or Compact Flash enabling the recording in harsh environments.

* : As of March, 2008.

Select 5 Choice of Interface

Ethernet / Firewire(IEEE1394)

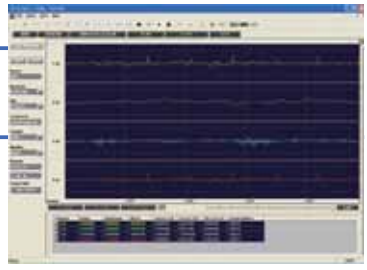
Simultaneous recording to media and PC with a selection of interfaces. A Firewire(IEEE1394) or 100BASE-TX Ethernet interface are available for the connection to the PC. The data can be transferred to a PC in real-time and displayed, processed and stored in the PC HDD.



Select 6 Choice of Control Unit

Remote Control Unit or PC

Through a remote control unit (stand -alone) or PC (LX Navi software), the LX-100 Series can be fully controlled.


LX Navi

An example Amplifier board & number. of channels