



TOA Electric USA, Inc.

Microcomputer & Starter kit

TLCS-870C

Microcontroller board

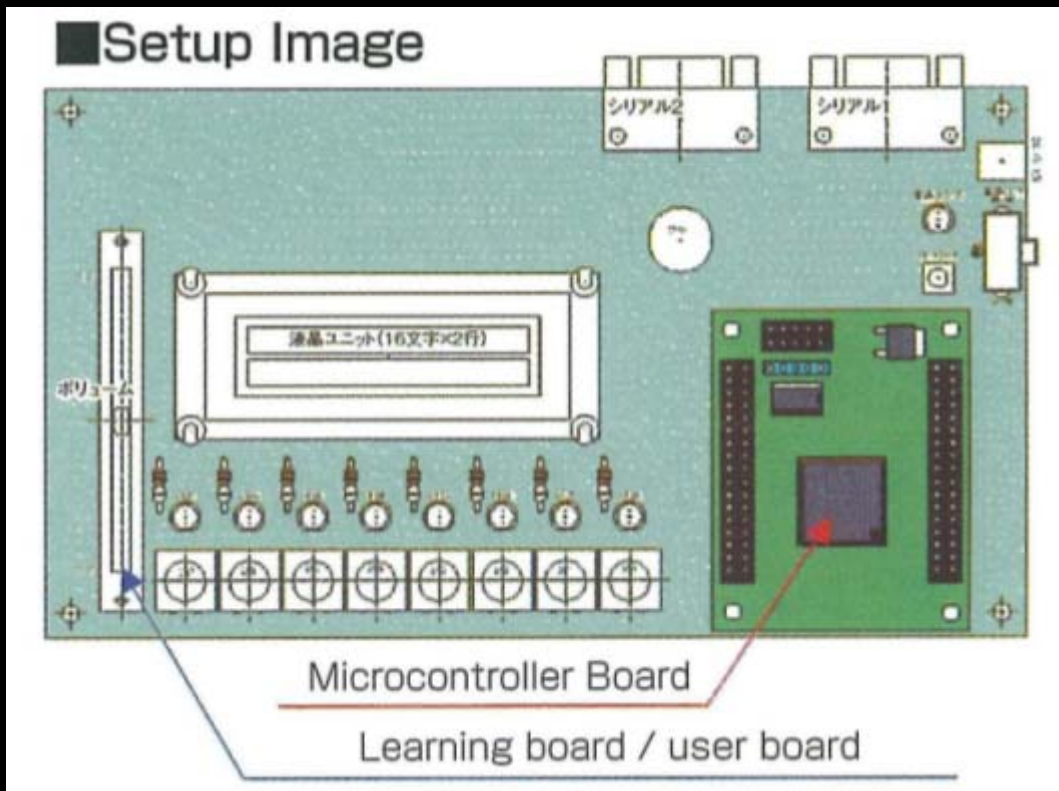
- **Small-scale integration system development**
- **Uses 8 bit Toshiba microcontroller**
- **Utilizes Flash memory**
- **On-board Programming**
- **Customer circuit board can be easily connected**
- **Starter kit is available**
- **Lead-free**



Starter Kit

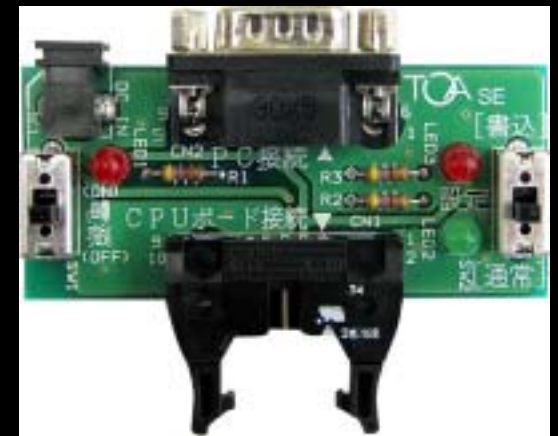
- TLCS-870C microcontroller board
- Learning board
- Sample C compiler (Software)
- Cable set

For the education of new employees or for individual study, the starter kit is an affordable and convenient tool to learn microcontroller programming quickly.



Program Writing Board Set

- **Onboard program writing**
- **Serial cable connection**
- **Download the intel HEX formatted object file in the PC to the microcontroller board**



Light System Connection Board

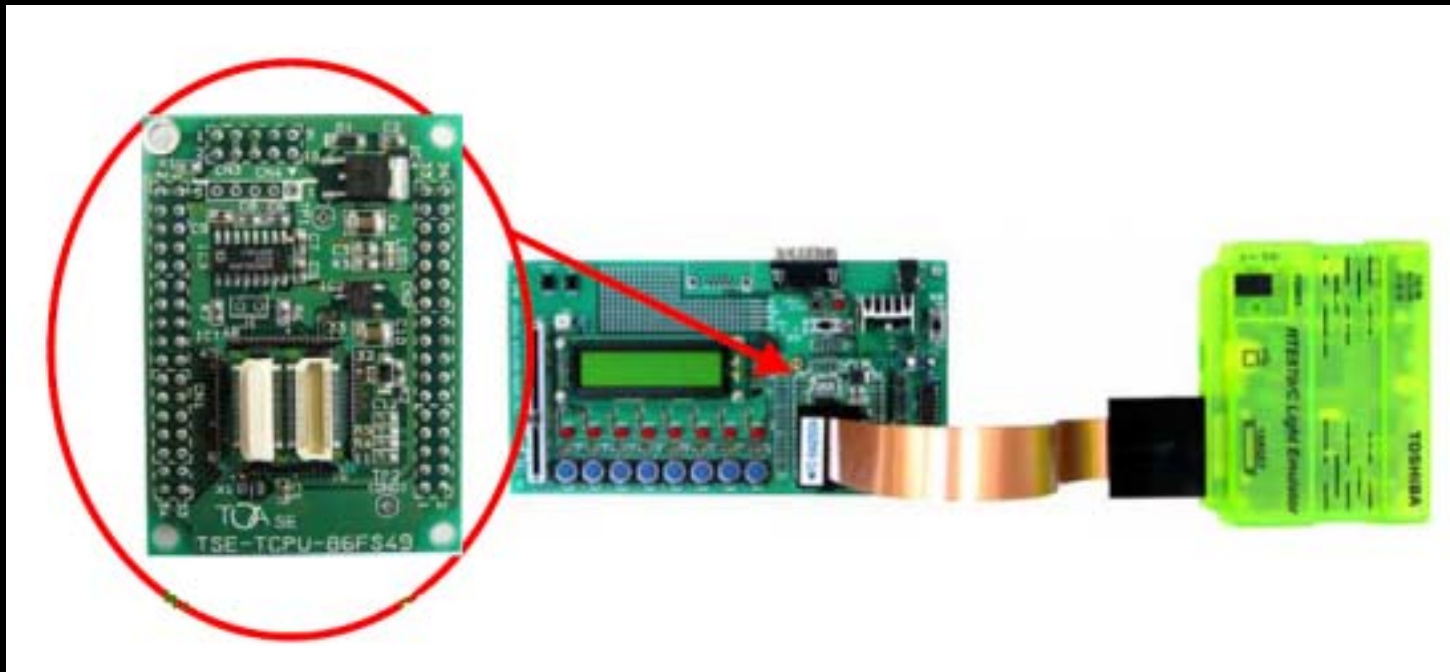
TOSHIBA RTE870C Light Emulator



Target connector



MCU Probe



Your benefit

Shorten the
development
process

Cost
reduction of
product

Want to have
learning tool with
reasonable price

We have your solution !

Development benefit

Shorten development process

Quick volume production

Learning tool

TOSHIBA Development Environment



- Not necessary to design the microcomputer peripheral circuitry
- Not necessary to have hardware debug, customer can focus on your own debug
- Designing circuit and board, efficient software development can be given

Development benefit

Shorten development process

Quick volume production

Learning tool

TOSHIBA Development Environment



Quick transition to
volume production

- Built-in process can be done
- Circuit can be built in the product
- Lead-free
Can be built in Lead-free product
- OTP and Mask product are available

Developed as Flash product



Volume production as OTP and Mask product

Development benefit

Shorten development process

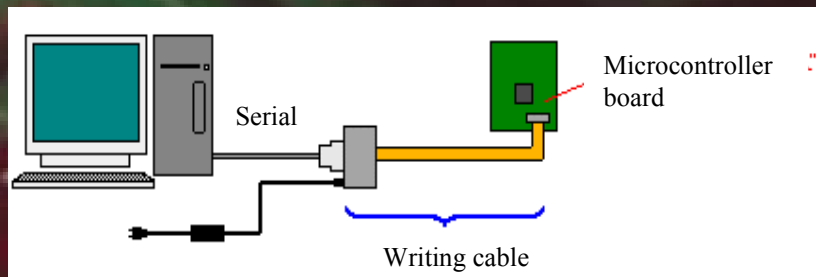
Quick volume production

Learning tool

TOSHIBA Development Environment

As learning tool

- Sample program provides efficient learning (Free download available in HP)
- **Learning board is on sales**
Together with TOSHIBA Microcomputer, effective learning environment can be gained.
- Software update can be done by onboard writing tool and writing cable



Development benefit

Shorten development process

Quick volume production

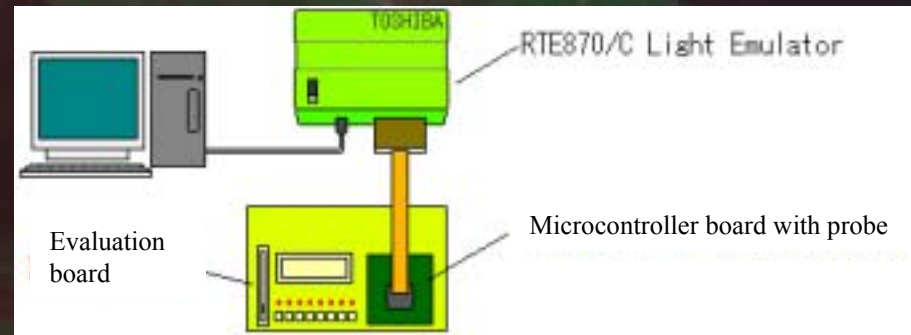
Learning tool

TOSHIBA Development Environment



Development Environment for TLCS-870/C

- C compiler is available with reasonable price
- Low cost Full ICE can be connected



Let's get development environment ready

Specification of TSE-TCPU-86FS49 (1)

Specification of microcomputer

TOSHIBA 8 bit microcomputer 870C TMP86FS49FG

Packager	QFP64 pin
Memory	ROM-60KB (FLASH) RAM-2KB
IO PORT	MAX 56 (AD/Serial terminal common use)
Timer	8 bit timer × 4 16 bit timer × 2
Serial communication	UART × 2 or High speed SIO × 2 I2C bass × 1
AD converter	10 bit AD converter × 16ch
Clock frequency	5V power、16MHz (Minimum instruction run-time=0.25 μs)

Specification of TSE-TCPU-86FS49 (2)

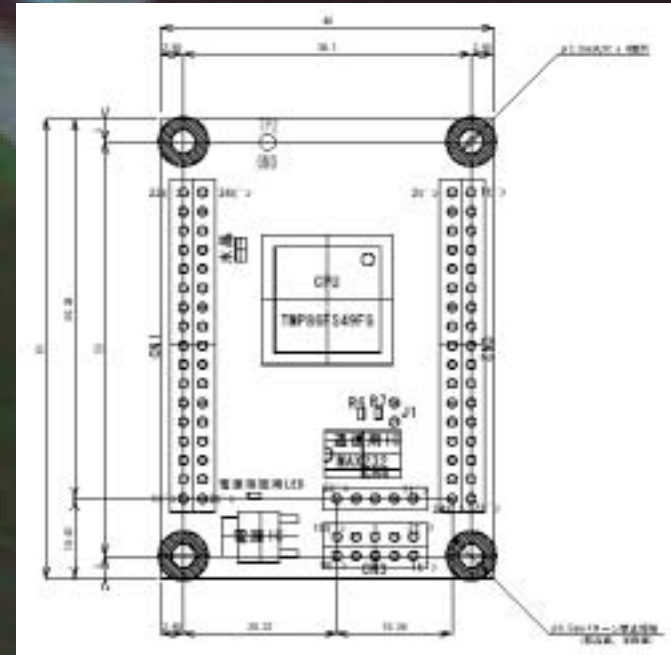
Specification of microcontroller board

① Dimension of the board

- Size : 44mm × 61mm
- Type : Double sides board (Material: glass epoxy)

② Electrical specification

- Power: DC5V is impressed or DC9-12V is impressed and step down to 5V by regulator
- Operating frequency: Maximum frequency 16MHz is adopted



Specification of TSE-TCPU-86FS49 (3)

Specification of microcontroller board

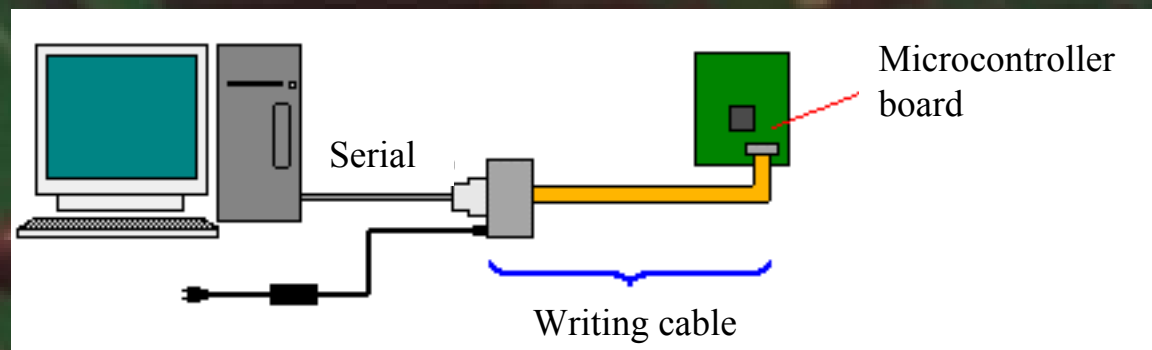
③ Specification of communication

- IC (Max. 232) is adopted, and can communicate with UART communication for external serial device

④ Onboard writing

- Using special writing cable and Special writing tool, onboard writing can be possible.

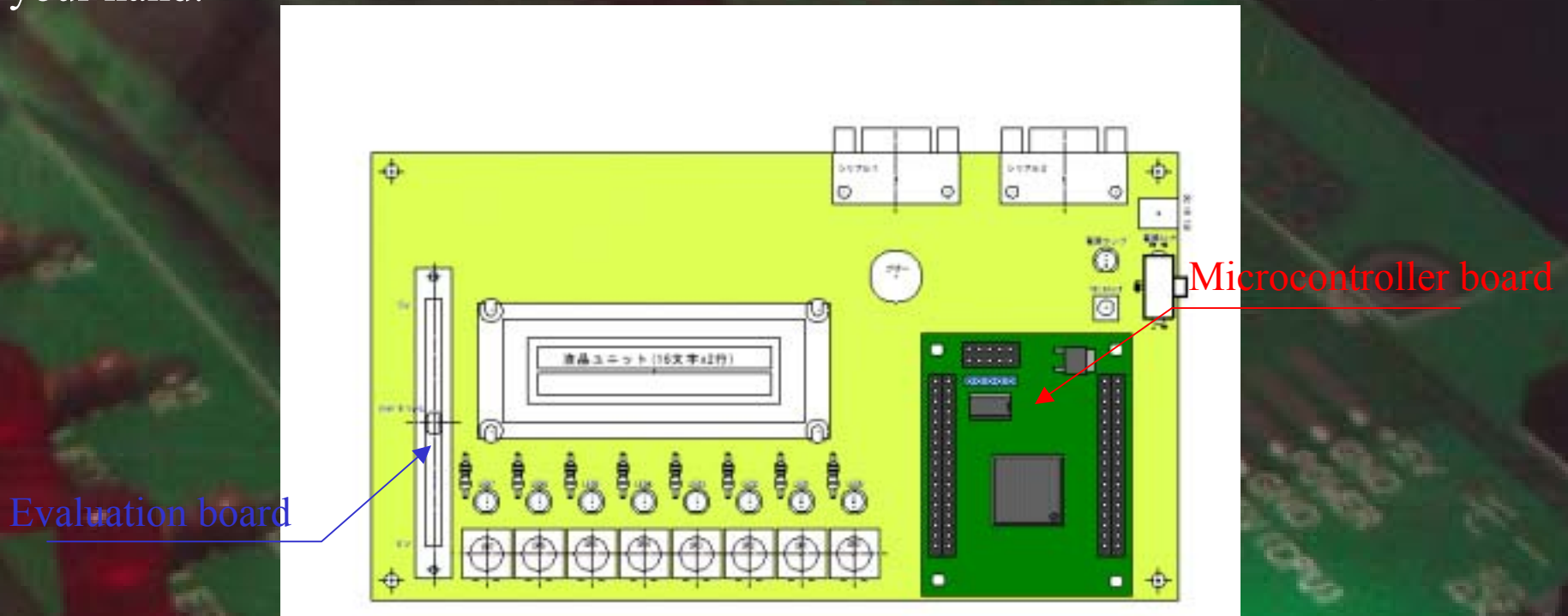
- Numbers of writing is guaranteed for 100 times



Specification of Starter Kit (1)

Outline

This board is adopted necessary functions for learning microcomputer. Connecting with microcontroller board, efficient study with lower cost is on your hand.



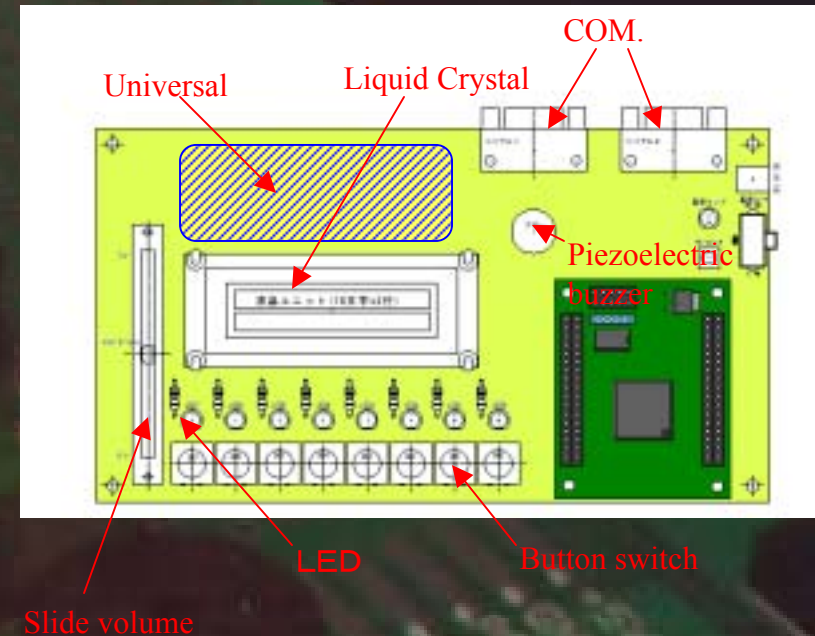
Specification of Starter Kit (2)

Specification of evaluation board

① Adopted functions

Necessary learning functions are adopted

Liquid crystal display	16 lettes × 2 lines
COM.	2 port (D-SUB 9Pin connector × 2)
IO	Button switch × 8 LED × 8 Slide volume × 1 (for AD input)
Buzzer	Piezoelectric buzzer × 1



Specification of Starter Kit (3)

Specification of evaluation board

②Connecting with microcontroller board

There is no microcomputer and peripheral circuitry on evaluation board.

As connecting with microcontroller board, function as microcontroller circuit

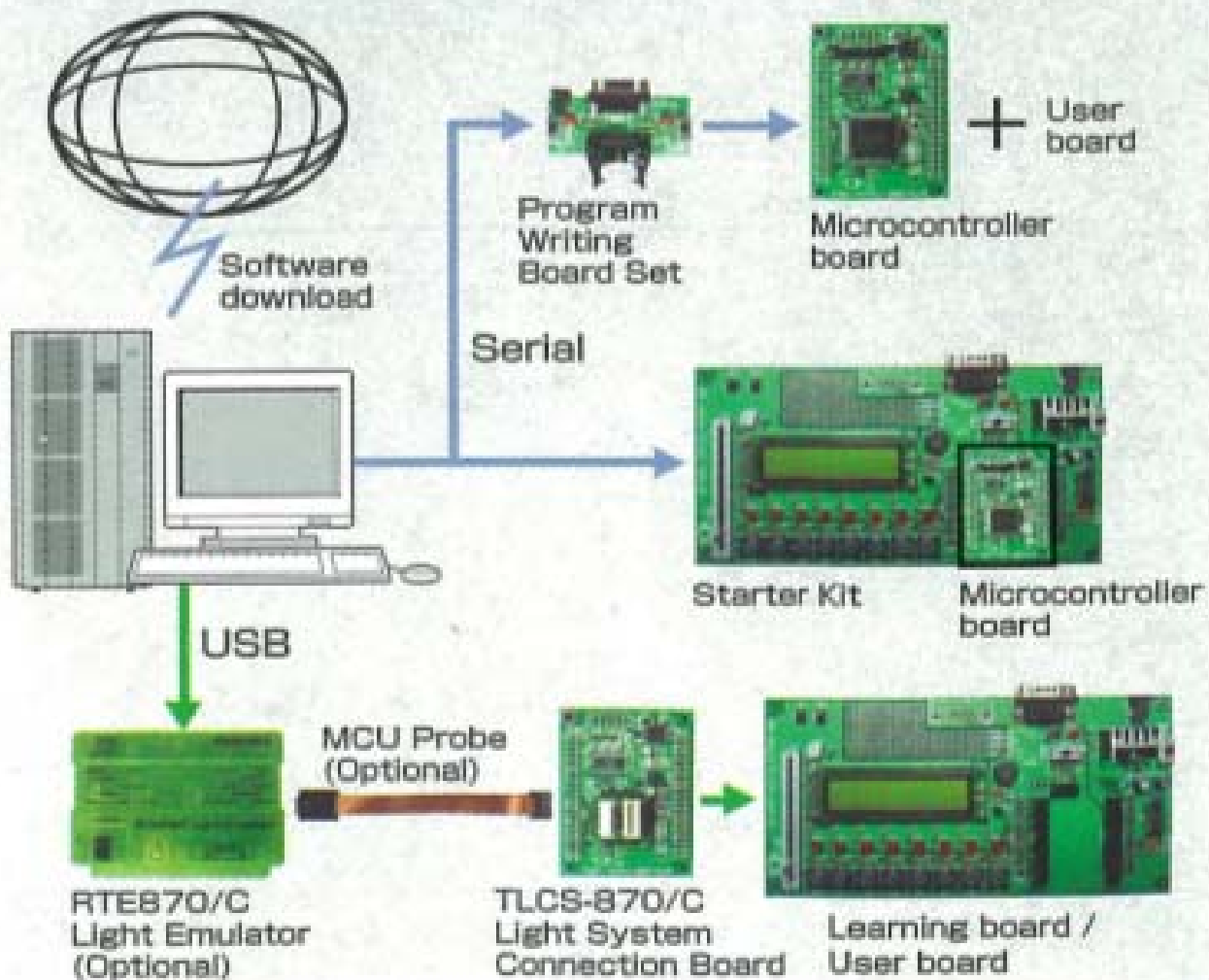
③Specification of power

AC adapter, DC9-12V, Step down to 5V by internal regulator
5V power is provided for microcontroller board.

④Universal board

Universal pattern is adopted on evaluation board.
Additional circuit is freely made.

Sample formation





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