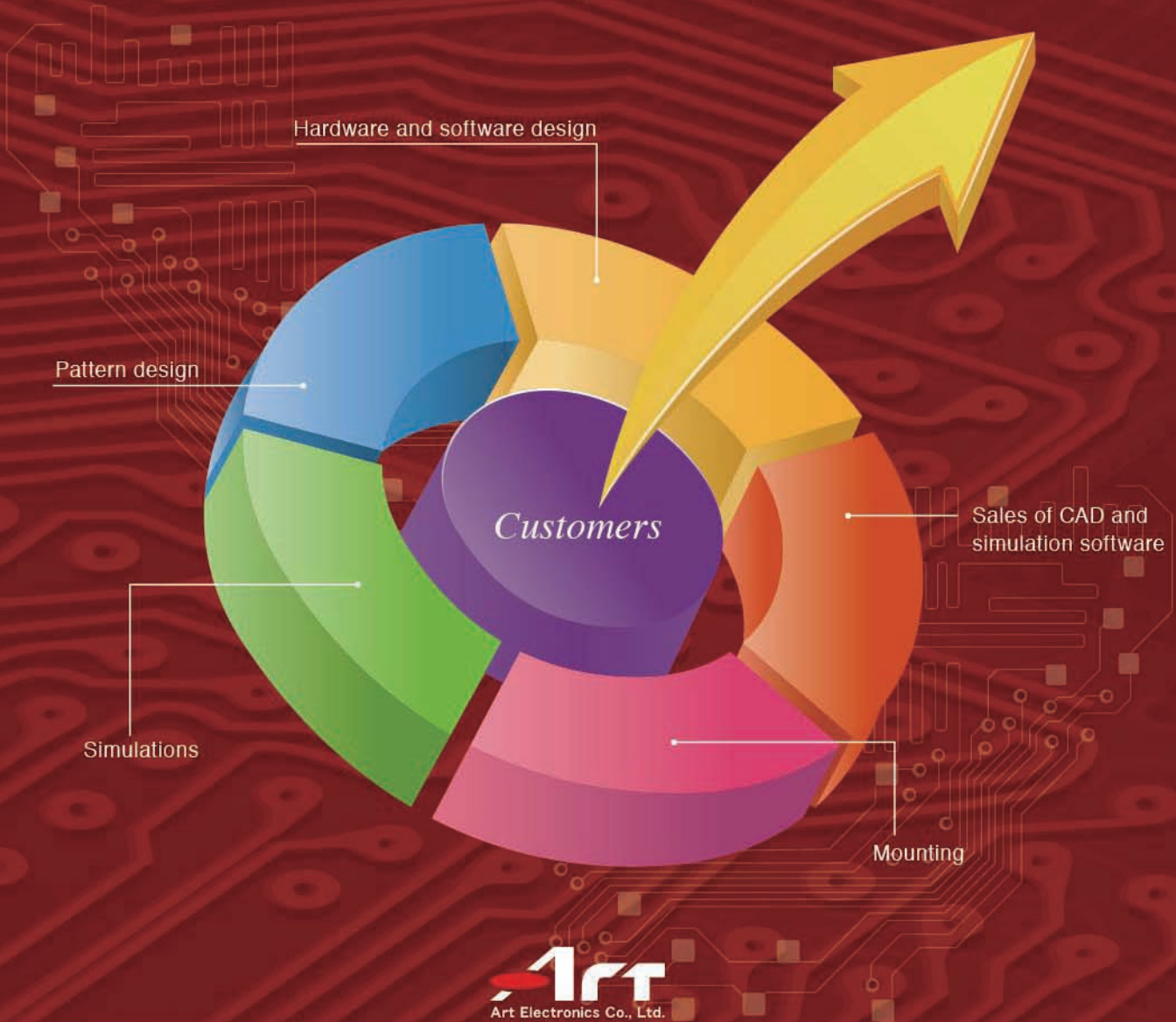


**Your Total Solution for
Printed Circuit Board Development**

Art Electronics – expediting customer R&D



Total support for design through to simulation and mounting

Art Electronics offers comprehensive, in-house support for everything from circuit design, simulation, and pattern design, right through to mounting. As well as providing proposals for pattern designs that take into account the mounting of components, our departments work closely together to share information. This allows a framework that can respond to short delivery deadlines, and even accommodate sudden changes to specifications.

We handle any part of your development process

Art Electronics utilizes a system that integrates all processes from printed circuit board design through to mounting, and we can also handle requests for mounting or pattern design alone. We hope that you select Art Electronics as a development partner, and also for urgent design and production tasks.

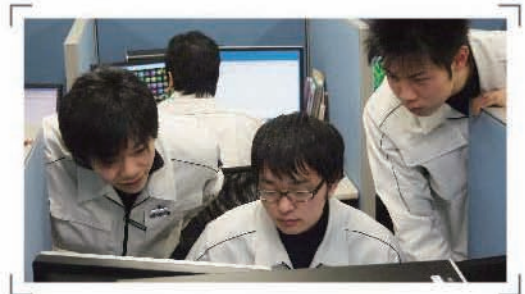
Comprehensive management of customer information

Given that Art Electronics is part of our customers' development processes, we have in place a comprehensive security management system in order to prevent the disclosure of customers' latest development information. For example, all customer information is stored in an encrypted format, and within the company, all customers are referred to using code names. Other measures include the prohibition of bringing personal mobile phones into design rooms and mounting areas. As our customer, you can feel confident with leaving your data with us.



Internal systems dedicated to prototyping and development

Here at Art Electronics, we would like to be your development and prototyping solution. To that end, we have in place both equipment that can support small-lot, high mix production. Also, our internal systems let us leverage our process-wide handling of all stages from circuit design to mounting in order that we can promptly divert issues detected on the mounting line or during simulations into pattern design, circuit design, and reselection of parts. Of course, we provide proposals not only for testing and development, but also for parts and development geared towards volume production.

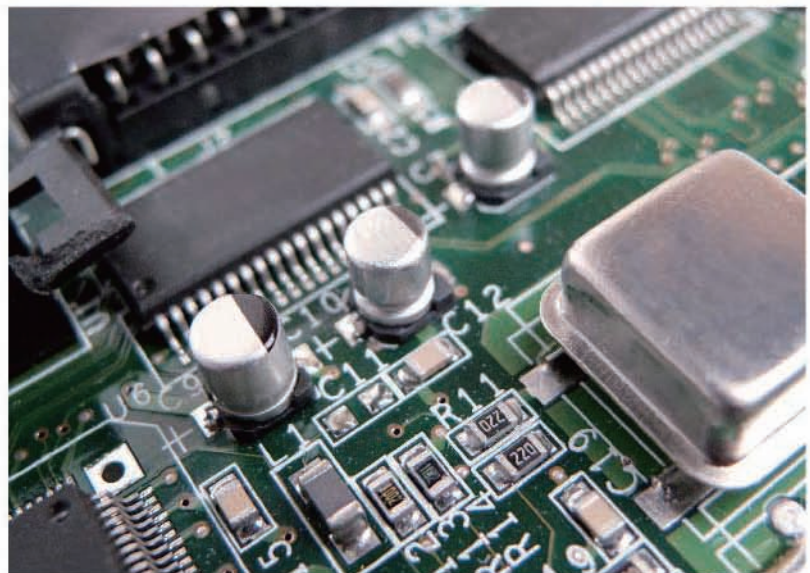


Proven performance

At Art Electronics, we have a wealth of development experience in using simulations in our noise suppression technologies, and a specialty of ours is the development of high-speed transmission circuits and high frequency circuits that require extra care regarding noise. By using these development technologies, we are also developing various combinations and applications for different types of control boards. Leave it to Art Electronics for whatever type of PCB you require.

Example of development results

- 1 High-speed transmission circuits**
DDR2, DDR3, PCI Express
- 2 High frequency circuits**
2.4 GHz band antenna PCBs
- 3 Control printed circuit boards**
Air conditioning, infrared transmission circuits, waveform control circuits, motor control circuits, multi-axis control circuit robots, sensor input control circuits.
- 4 Power supply printed circuit boards**
Various power circuits, LED lighting power circuits.
- 5 Special application printed circuit boards**
High current capacity printed circuit boards, device evaluation boards.



Software and hardware design

We focus on the design and development process of new products. From the analog circuit stage, such as high frequency circuits and power supply circuits, through to digital circuits, such as microcomputers and field-programmable gate array designs.

1 Circuit design

We have extensive experience in developing products ranging from high-speed transmission and high frequency circuits through to automotive control circuits.

2 Microcomputer designs

Design and development of firmware and software applications.

3 Development of hardware and software for various instrument control systems

4 FPGA design

5 Other services

(1) Component selection

We select components using comprehensive criteria that include availability, functionality, and cost.

We utilize "CR-5000SD" software to trace hand-written and other circuit diagrams that do not exist as electronic data, converting these into CAD data.

(2) Case, housing, and jig design

(3) Circuit diagram tracing

We use "OrCAD Capture" and "CR-5000SD" circuit diagram design tools to trace hand-written and other circuit diagrams that do not exist as electronic data, converting these into CAD data.



Pattern design

In addition to conducting simulations of designs aimed at reducing noise, we carry out a design review that focuses on all aspects including circuit board layout as well as mounting of components, allowing us to provide proposals that balance technology, speed, and cost.

1 Advanced design technical capabilities

All of Art Electronics' pattern design staff are nationally licensed.

Our staff include industry veterans with careers spanning more than 15 years, letting us deliver levels of design technology exceeding those provided by other companies.

2 Rapid response

The know-how of skilled engineers, combined with concurrent design processes lets us achieve quick response times and rapid delivery for full customer satisfaction.

3 PCB wiring design system

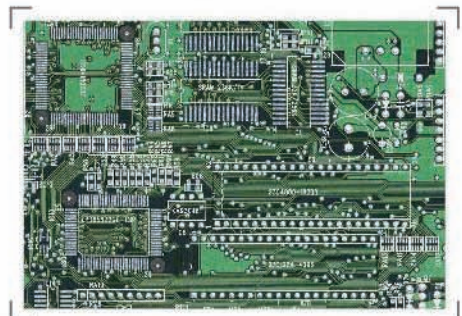
We support Cadvance aIII Design and CR-5000BD.

4 Printed circuit boards supporting pattern design-examples

(1) Special board designs including IVH, BVH specification, flexible boards, and boards with built-in components.

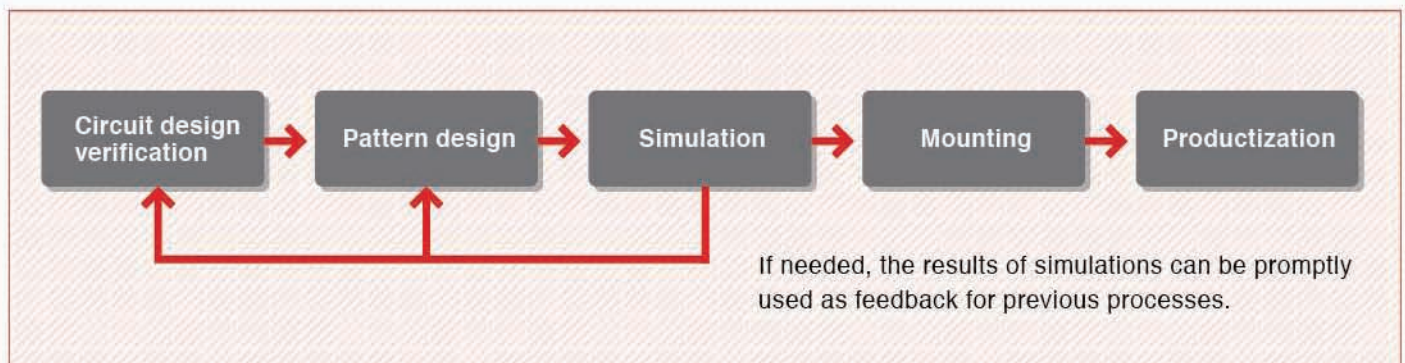
(2) Boards supporting DDR2 and DDR3.

(3) High current capacity printed circuit boards. (board design specifications proposals)



Simulations — Development of hardware and software in support of product development.

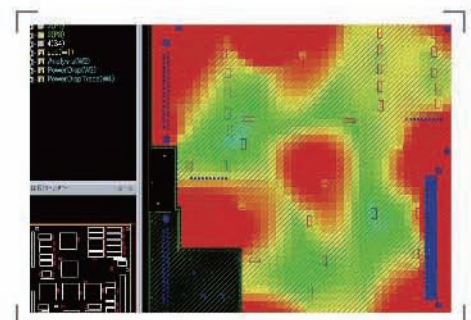
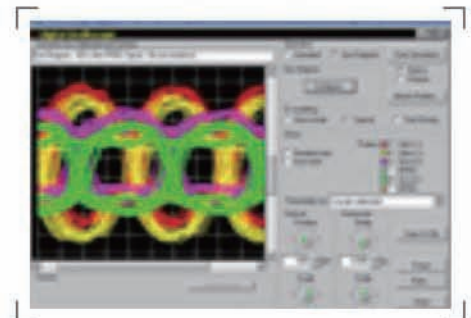
Our range of simulation software enables not only circuit creation and validation, but also pre-analysis and feedback for these results. These contribute towards both shortened product development times, and improved quality.



Because Art Electronics offers a slew of services from circuit design right through to mounting, we can facilitate a smooth transition from circuit design to pattern design. This gives us the ability to respond in a timely fashion to any issues that may occur. Feedback from simulations to previous processes is channeled promptly to both pattern and circuit design, allowing us to deliver product profitability and shortened development times.

1 Supported simulations

- (1) **High frequency and microwave simulations**
Software: high frequency, microwave EDA tool
S-NAP Microwave Suite
- (2) **High-speed transmission circuit simulations**
Application: DDR2, DDR3, PCI Express, etc.
Software: High-speed transmission analysis tool, HyperLynxSI (LNESM)
HyperLynxSI (Board SM)
- (3) **Plane resonance simulations**
(shape, VIA disposition consideration)
Software: EMI suppression design support tool DEMITAS NX
- (4) **EMC countermeasure simulations**
Application: high frequency circuits, power supply circuits, etc.
Software: S-NAP PCB Suite
- (5) **Mounting profile simulations**
Software: SimPRESSO
- (6) **Close proximity noise measurement system**
As per customer needs, we also measure noise on completed boards.



2 Feedback using simulation analysis results

We submit simulation analysis history as a results report, letting customers use these analysis results to accumulate their own simulation know-how. Additionally, using this simulation analysis, we can also submit simulation proposal reports regarding the selection of circuits and components.

Sales of CAD and simulation software

Art Electronics also sells CAD software and other simulation tools used by developers. This software is the same as that used by Art Electronics, meaning we can provide customers with a full range of after-sales support. Customer training is undertaken by design staff with more than 10 years of design experience. They provide training and support utilizing their know-how and practical experience. Rest assured that you will be able to begin operations in the shortest time possible after installation.

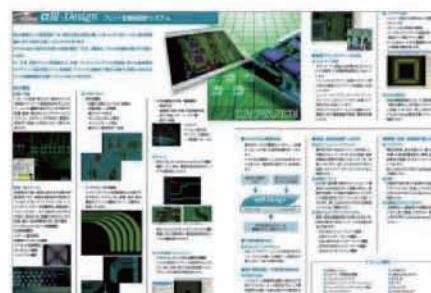
1 Products handled

- (1) Cadvance aIII Series PCB design CAD system
- (2) MountCAM component mounting data creation support tool
- (3) S-NAP PCB Suite PCB simulation software
- (4) SimPRESSO mounting profile simulation software
- (5) NES Series close proximity noise measurement system

At the time of product sale, we also provide a measuring service for the near-field measuring system.

2 Only Art Electronics provides these levels of after-sales support and service.

- (1) Technological services (transmission lines, noise countermeasures, electromagnetic wave analysis), individual seminars, CADVANCE training, proposals for parts information management systems.
- (2) We hold user meetings and private seminars, aimed at providing the latest information, knowledge, know-how, and technical information related to development.



Art Electronics initiatives

Art Electronics conducts "know-how" seminars providing information regarding issues such as noise countermeasures aimed at shortening development time. These seminars are immediately useful to developers of electronic equipment. Additionally, we also plan user meetings and private seminars for customers introducing CAD software.

These actively provide knowledge, know how, and technical information related to development. Furthermore, we provide proposals for improving system environments, and proposals and sales opportunities for increasing efficiency.

Through our website, Art Electronics also provides a technical handbook that brings together information regarding noise countermeasures. This is very useful to developers.

To download this, please visit www.noise-counterplan.com and request these materials.



Component mounting

Specialized testing and development equipment, together with our 24-hour, weekend and holiday support contribute to more a expeditious start of production by developers and designers. Our profile simulations also ensure high mounting quality.

1 Prototype development and a production line tailored to small-lot/high mix runs

- (1) Facilities equivalent to those on mass production lines mean we can handle anything from single item batches upwards.
- (2) We can also support loose, tape, stick, and tray component supply.

2 24-hour, weekend and holiday support

Art Electronics' mounting line is available 24-hours a day, seven days a week, including on weekends and public holidays.

Even in the event of sudden requests for mounting, adjusting the line lets us handle mounting prior to shipping.

※For example, if we receive a required component on Friday, we can ship on Monday. We can also receive components on weekends.

3 Increased development efficiency

Information from development and design lets us rapidly understand problems that may occur during production, avoid unnecessary rework, and offer effective proposals for mounting. We are also able to deal with sudden changes in components, quantity, or specifications.

4 Reduced work for customers

Art Electronics also carries out parts procurement, and as well as CR, has 30,000 items in stock. Let us take care of both board procurement, and the stress of worrying about delivery dates.

5 Assembly to customer specifications

We can assemble boards to meet customer specifications, including adjustment of component heights, bending, and mounting of heat sinks.

6 Initiatives in pursuit of cleanliness

Meeting the demands of our diverse customer base requires initiatives in order to maintain high levels of cleanliness within the production area.

- Our production area is isolated, with AT-401 air cleaners installed.
- Measures to prevent foreign matter entering (prohibition on the use and bringing into the production area of cardboard and mechanical pencils.)

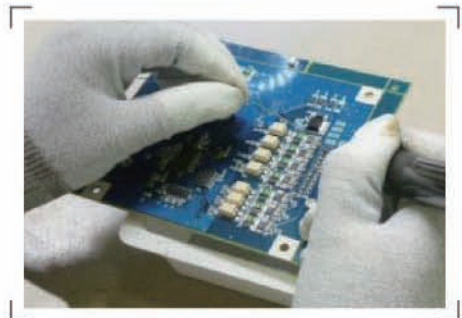
7 Other services

We offer BGA/CSP reworking as well as repairs and alterations to mounted boards, and a service with which we check the finishing of soldering conditions.

8 Information about facilities

Art Electronics has facilities for prototyping and development on a par with those in volume production plants.

- (1) We provide mounting of 0603 package sizes, BGA (0.35 mm pitch) CSP, and DIP components
- (2) Exterior appearance inspection is carried out using automated exterior and X-ray inspection devices.
- (3) Electrical inspection



Mounter

Reflow equipment

X-ray inspection equipment

Automatic survey testing equipment

Electrical inspection equipment





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