Notebook computer (PSC-ID: AS)

2003/03/26 rev. 1

Note: Requirements here are for development of EcoLeaf™ environmental labels. Use for any other purpose without consent of the EcoLeaf™ program office is strictly prohibited.

No.	Major key	Minor key	Class	Requirements
1	Preconditions	Target product	Description	Notebook personal computers that can be powered by batteries (hereafter called notebook PCs), including those with tablet function (pen input). Does not include PDA type computers. [Note 1]
2			Items to cover	The main body of the notebook PC and accessories. The accessories covered include the following. [Note 2] • Manuals provided on paper, floppy disks, CD-ROM, DVD-ROM, etc., and application software • Packaging for the main body and all the above accessories
3		LCA	Target item lifecycle stages	All lifecycle stages (all the stages contained in the PEIDS governing this program: manufacture, distribution, use, disposal, recycling).
4	Product data sheet (PDS) Input data for the LCI: Lifecycle inventory analysis	Production stage information (Product itself)	Materials and/or ingredients of the product	1. Parts treated as Class A (refer to item 3.4 of the implementation guidelines) include the semiconductor mounting board (main board only) and LCD panel. Processes subject to investigation for foreground data investigation are: • Printed circuit board mounting process for the semiconductor mounting board (main board only) • LCD panel manufacturing process including TFT and CF board manufacturing as far as the paneling process for the LCD 2. The material names included in the product data sheet comprise the 11 items “normal steel, stainless steel, aluminum, other metals, thermoplastic resins, thermosetting resins, rubber, glass, paper, assembled circuit boards, batteries”. For other materials, list the name of basic units. For assembled circuit boards, the main printed circuit board and the printed circuit boards associated with each unit should be listed separately.
5		Manufacturing stage information (production site)	Materials and energy for input/consumption and discharge/emission	**1. Input items consumed:** Electricity, heavy oil type A, diesel, kerosene, gasoline, LNG (municipal gas), LPG, drinking water, industrial water, ground water **2. Discharge and emissions:** Not specified. List items identified as important by each reporting organization. **3. By-products and sub-materials:** Sub-materials are defined as materials brought to site but not shipped with the final product. By-products and sub-materials are not included in the data items collected.

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				4. Transport: The impact of transport of Class A parts from the manufacturing site to final assembly site is included.
6	Product Data Sheet (PDS) Input data for the LCI: Lifecycle Inventory analyses	Distribution stage information	Product transportation conditions	1. The method of transport to the user and the loading ratio shall be in accordance with a model set by each reporting organization. 2. When the final processing is within Japan, assume the overall transport distance to the place of use is 500 km. When the final process is outside Japan, each reporting organization shall create a model for transport to Japan, and add it to the above.
7	Product Data Sheet (PDS) Input data for the LCI: Lifecycle Inventory analyses	Usage stage information	Product usage conditions	**1. Conditions of use** **(1) Standard conditions during use** The number of hours and days of use, based upon a model of general office PC use, are listed in "Energy-saving personal computers and peripheral equipment" published by the Japan Electronics and Information Technology Industries Association (the Japan Electronics Industry Development Association at the time of publication). Also, measurements should be carried out with an AC adaptor connected to the power socket. • Active time/waiting time: 4.5 hours per day Active time/waiting time are defined separately in "Energy-saving personal computers and peripheral equipment" as active time 3.5 hours, waiting time 1 hour. However, it is considered difficult to distinguish between these, so in this standard this grouping is taken to be 4.5 hours. Active time/waiting time is defined as the condition where the power is ON, but the function of the device is not operating. At this time the screen is static. When measuring, the display is at its brightest. • Low power time: 4.5 hours per day In the international Energy Star program, if there has been no input or calculation performed for a predetermined length of time, the device is required to transfer into low power mode, which uses less power than waiting time mode. In this standard, the electricity consumption in low power mode as required by the international Energy Star program is taken to be the energy consumption in low power time. • Number of days of use annually: 240 days 5 days per week × 4 weeks per month × 12 months = 240 days of operation per year. **(2) Standard conditions when OFF** The standard conditions for power consumption when OFF are with the PC turned OFF but with the AC adaptor connected to the power socket. Calculation of OFF time shall be made from the number of days of use (240 days) times the number of hours of non-use (15 hours per day × 240 days) plus the number of days of non-use (125 days) times the number of hours of non-use (24 hours × 125 days).

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				(3) Period of use 4 years is assumed. (The Japanese legal period of depreciation is adopted) **2. Consumables and replacement parts** It is assumed that there are no consumables or replacement parts in the usage stage. [Note 3] **3. Maintenance** It is assumed that there is no maintenance in the usage stage. **4. Disposal and recycling of the packaging for the main body and peripheral equipment** After use, the product will become a disposal/recycle item; refer to No. 8 "Waste/recycling stage information".
8		Waste / recycling stage information	Product waste/recycling conditions	**1. Scenario setting [Note 4]** The separate document "Disposal and recycling scenarios for products after use (PC version)" will be adopted. 1) Each reporting organization shall set the recycling route scenario, including transportation. • Product reuse scenario: Each reporting organization to set • Parts reuse scenario: Each reporting organization to set • Recycling scenario: Each reporting organization to set, including the material-specific recycling ratio (η). • Non-reuse/non-recycle disposal scenarios: Each reporting organization to set 2) For the non-recycling route, the separate document "Disposal scenarios" will be adopted. **2. Deduction scenarios** The separate document "Disposal and recycling scenarios for products after use (PC version)" will be adopted. **3. Criteria for determination of recyclability and reusability** Criteria to determine whether a product can be reused as a product or not shall be set by each reporting organization for each product type. For each product dismantled without being reused, criteria to determine whether the parts can be recycled and reused or not shall be set by each reporting organization for each unit separately. **4. Product recycling ratio (η1)** Each reporting organization shall use its own results, or the industry's official value. Where it is not possible to

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				obtain this information, the value η1 = 20% shall be used. **5. Product reuse** Add the impact of the reuse process, including transport for reuse, and deduct the impact of the manufacture, processing, and assembly of the product's materials. (As a rule, the impact of reuse shall be measured) If a product is recycled after a period of longer than 4 years, at the time of determination of reuse a reuse deduction ratio of 0.5 shall be set. If components are replaced, the manufacturing stage impact of these parts shall be added. Each reporting organization shall set scenarios for after product reuse. Therefore, the following formula shall be used for the deduction calculation:. Product reuse deduction amount = "reused product's materials manufacturing impact and processing and assembly impact" × "product recycling ratio η1" × "product reuse ratio" × "reuse deduction ratio" **6. Component reuse** Add the impact of the reuse process, including transport for reuse, and deduct the impact of the manufacture, processing, and assembly of the reused components' materials. (As a rule, the impact of reuse shall be measured) If a product is recycled after a period of longer than 4 years, at the time of determination of reuse a reuse deduction ratio of 0.5 shall be set. Each reporting organization shall set scenarios for after component reuse. Therefore, the following formula shall be used for the deduction calculation: Component reuse deduction amount = "reused component's materials manufacturing impact and processing and assembly impact" × "product recycling ratio η1" × "1 – product reuse ratio" × "component reuse ratio" × "reuse deduction ratio" **7. It is assumed that during the life of the product there is no reuse or replacement of consumables.** **8. Method of calculating the process impact of products or components disposed of without recycling or reuse** The separate document "Disposal and recycling scenarios for products after use (PC version)" will be adopted. **9. Quality weighting coefficient for recycled materials** In accordance with the separate document "Disposal and recycling scenarios for products after use (PC version)" the following quality weighting coefficients (Z) shall be used, except where a reporting organization has applied to use their own coefficients. Metal: Z = 0.5, Glass: Z = 1, Sheet paper and cardboard: Z = 0.9, Others: Z = 0.35

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9	Product Environmental Information Declaration Sheet (PEIDS)	Inventory analyses	Lifecycle Inventory calculation rules	**1. Calculation method for assembled semiconductor boards** Assembled semiconductor boards consist of semiconductor packages (LSI, memory [Note 5]), connectors for external cables, laminated boards, and others (ICs, capacitors, resistors, connectors for internal cabling, etc. [Note 5]). Calculate semiconductor packages with the unified basic unit semiconductor package. Calculate connectors for external cabling with the unified basic unit electroplated steel plate. Calculate laminated boards and others with the unified basic unit laminated board. Also, the process of assembling components onto printed boards shall be calculated as in "No. 5: Manufacturing stage information" within a manufacturing site. The mass of solder used for connections is small, so the cut off rules can be applied. **2. Method of calculating the impact of LCD manufacture** For materials that comprise LCD units, apply the unified basic unit for manufacture of the relevant material. For component manufacture, calculate LCD panel manufacture as in "No. 5: Manufacturing stage information" within a manufacturing site; for other components, such as fluorescent tubes, optical waveguides, metal frames, and plastic frames, apply the relevant processing unified basic unit. When the LCD unit is being assembled using these components, calculate using the assembly unified basic unit. **3. Other unit components** For materials comprising a unit, apply the unified basic unit for manufacture of the relevant material. For component manufacture, apply the relevant processing unified basic unit. When assembling these components, calculate using the assembly unified basic unit.
10		Impact analyses	Additional impact category	Delete the items "Destruction of the ozone layer" and "Eutrophication" from PEIDS.
11	Breakdown data sheet (Product DS related)	Data processing	Allocation rule	Not uniform. Each reporting organization is to determine as appropriate.
12		Data collection	Coverage	Data collection for Class A parts (refer to item 3.4 of implementation guidelines): • If data cannot be collected, then data including the conditions at the design or planning stages may be substituted. • If the same part is manufactured over several sites, then data for a representative factory may be adopted. • If collection of data at a manufacturing site is difficult for practical reasons, then measured data for the manufacturing site of a similar component may be substituted.

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13	Breakdown data sheet (Product DS related)		Cut off rules	1. The mass of materials used shall be taken as the mass of material at the stage where it has become a product. Provide a breakdown of over 90% of the product mass as different types of material, and apportion the remainder proportionately to obtain 100%. 2. If a cut off is applied to the assembly impact, indicate this fact clearly, and indicate the reason clearly.
14	Breakdown data sheet (PEIDS related)	Database	Rules for application of EcoLeaf Unified Basic Units	Except where a reporting organization has applied to use its own units, for the following components, the following specified material manufacture unified basic units or component manufacture unified basic units shall be applied. LSI, memory, and ICs on the main printed circuit board → [Note 5] Connectors on the main printed circuit board for external cabling → electroplated steel plate Assembled circuit boards apart from the main printed circuit board → assembled circuit boards Fluorescent tubes → glass Small motors → electromagnetic steel plate Cables → copper 50%, applicable resin 50% Batteries → [Note 6] AC adaptor → electromagnetic steel plate 50%, copper 20%, applicable resin 30% Magnesium alloy → Al plate
15			Addition of Basic Unit	None. Where necessary, each reporting organization shall apply.
16			Addition of characterization factor	None.
17	Product environmental information	Product specification		1. CPU type and clock frequency 2. Main memory capacity 3. Hard disk capacity 4. Monitor size 5. Optical drive, floppy disk drive, network function, and other main configuration of units/function.
18		Data disclosure		**1. Items to list** • The compulsory items are “global warming impact”, “acidification impact”, and “energy consumption”, as required by item 3.2 of the implementation guidelines. Apart from “ozone layer destruction” and “eutrophication”, optional items can be freely listed. • Include the following text in the bottom of section E of the PEAD sheet: “The scope of this examination includes the main body of the personal computer, manuals, application software, and packaging”.

No.	Major key	Minor key	Class	Requirements
				• In the explanation column of the PEIDS sheet include the following text: "Calculations for the disposal/recycling stage assume PCs for commercial use. At the present time, recycling of PCs for home use has just begun, and the situation is not clear. Hence, the established recycling route for commercial PCs is taken to be representative". **2. Method of representation** • In section E of the PEAD sheet, the warming impact (converted to CO_2 equivalent) for each stage and the total for all stages shall be represented as vertical bar graphs.
19	Other environmental information	Items to select		The following items may be listed. 1. Type I and/or Type III environmental label 2. Acquisition of ISO 14001 certification 3. Certificates, approvals, or awards from National or industry organizations 4. Information on harmful substances Specify the part, and clearly list the extent of the following 6 substances: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs), and polybrominated diphenyl ethers (PBDE). 5. Information on environmentally friendly materials Specify the part, and clearly list the material names.

Note 1: PDAs are not included in this PSC because the unit composition is different and the conditions of usage are different:
PDAs do not have hard disk drives, floppy disk drives, CD/DVD drives, and other such memory media, or keyboards or other input and output devices. Also, the usage conditions differ from the daily hours of use and usage mode given in item 7 “Usage stage information”.

Note 2: The reason the scope of peripherals is limited is that if the scope was the minimum sales unit then, depending upon the model type, such accessories as a mouse or headphones might be included, and there would be no uniformity. Also, there is the possibility that various other peripherals would be included in the future.

Note 3: If the performance of a new battery is taken to be 100%, then after recharging in excess of 500 times the performance falls below 60%, and the product life is considered to be over. This PSC assumes that the product will be used for 960 days (240 days per year × 4 years = 960 days) in the usage stage and that half of the time (480 days) it will be used with an AC adaptor and half with battery only. Therefore, the battery will not be recharged more than 500 times, so it is assumed that the battery will not be changed during the usage stage.

Note 4: In the disposal and recycling stage, PCs for commercial use are postulated. At the present time, recycling of PCs for home use has just begun, and the situation is not clear. Hence, the established recycling route for commercial PCs is taken to be representative.

Note 5: As a rule, items containing 10 000 or more transistors are dealt with using the unified basic unit semiconductor packages. Items with less than 10 000 transistors are dealt with as “Others” as defined in “Item 9-1: Method of calculating semiconductor circuit boards”, and use the unified basic unit laminated boards.

Note 6: For lithium ion batteries, nickel mercury batteries, and other secondary batteries, use the following method given in the Digital Camera PSC (AP).
Various types of lithium type (mainly) batteries are used for digital camera products. However, the impact of the production processes for such various types of batteries cannot be calculated directly, since the Basic Unit data available from the EcoLeaf Basic Unit database for battery products are presently limited to alkaline–manganese type (primary), manganese type (primary), and lead–acid storage type (secondary). Therefore, the digital camera PSC sets out a method by which to calculate the impact by using the formula shown below, based on the assumption that the impact of the battery production process has a correlation to the amount of electrical power stored (voltage × service capacity)

1. According to reports by various camera companies, the CR123A, a typical lithium-type battery for camera products (nominal voltage: 3 V, nominal service capacity: 1300 mAh), provides the same life for camera products as two LR6 batteries (AA type alkaline-manganese battery) connected in series. In light of this fact, the impact of producing a CR123A battery can be calculated by using EcoLeaf Basic Unit data “U” (/kg) for an alkaline–manganese battery as follows:

   Environmental Impact of production of a CR123A battery (L) = The impact of producing two LR6 batteries (nominal weight: 23.5 g per unit) = “U” × 23.5/1000 × 2

   By this logic, the following formula has been set for calculating the environmental impact of various types of battery.

   The impact of a target battery = “L” × (nominal voltage “V” / 3) × (nominal service capacity “A” / 1300) = “U” × “V” × “A” × 47/3,900,000

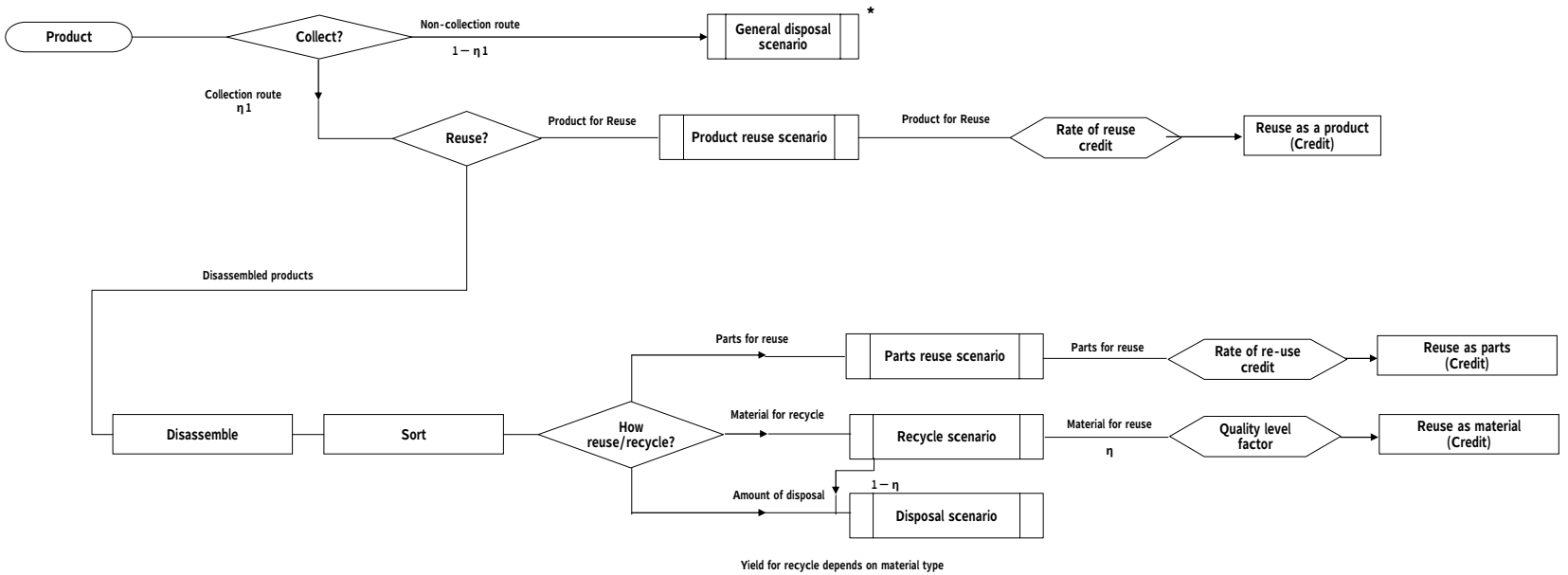
   Reference: Voltage and service capacity of principal types of battery (for battery types not listed below, use values supplied in the manufacturers’ literature)

   CR2: 3 V, 750 mAh; CR123A: 3 V, 1300 mAh; 2CR5: 6 V, 1300 mAh; CR-V3p: 3 V, 3000 mAh

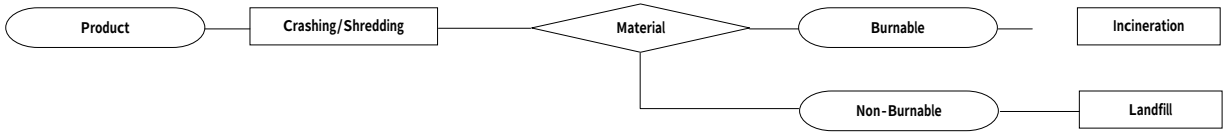
Attachments:
1. “Disposal and recycling scenarios for products after use (PC version)”
   “Disposal scenarios”
2. “Diagram of the manufacturing stages of notebook computers: Overall”
3. “Diagram of the manufacturing stages of notebook computers: Detail of Printed circuit board units”
   “Diagram of the manufacturing stages of notebook computers: Detail of LCD unit”

Attachment 1

Disposal and Recycling scenarios for products after use (PC version)

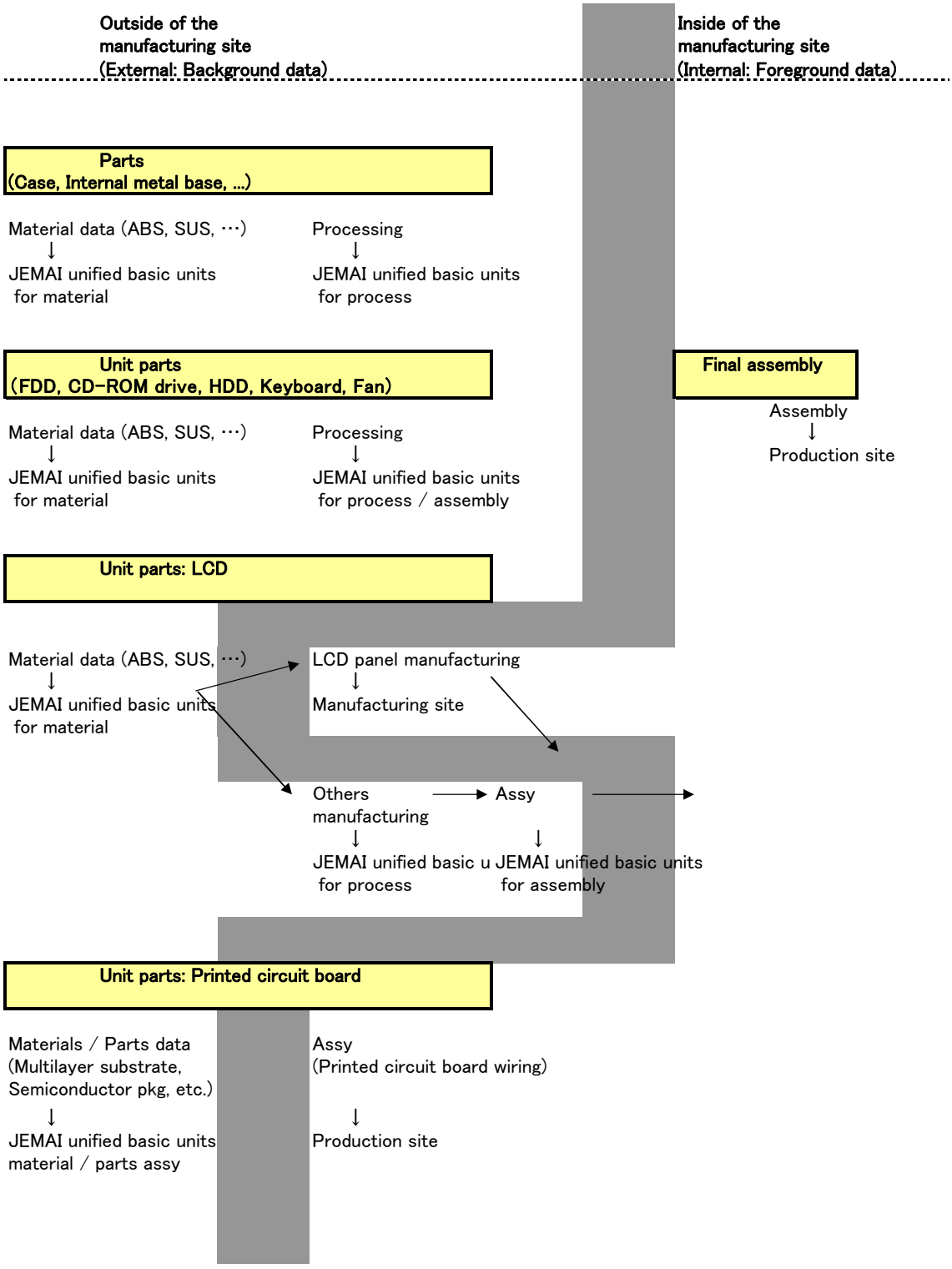


****General disposal scenario***



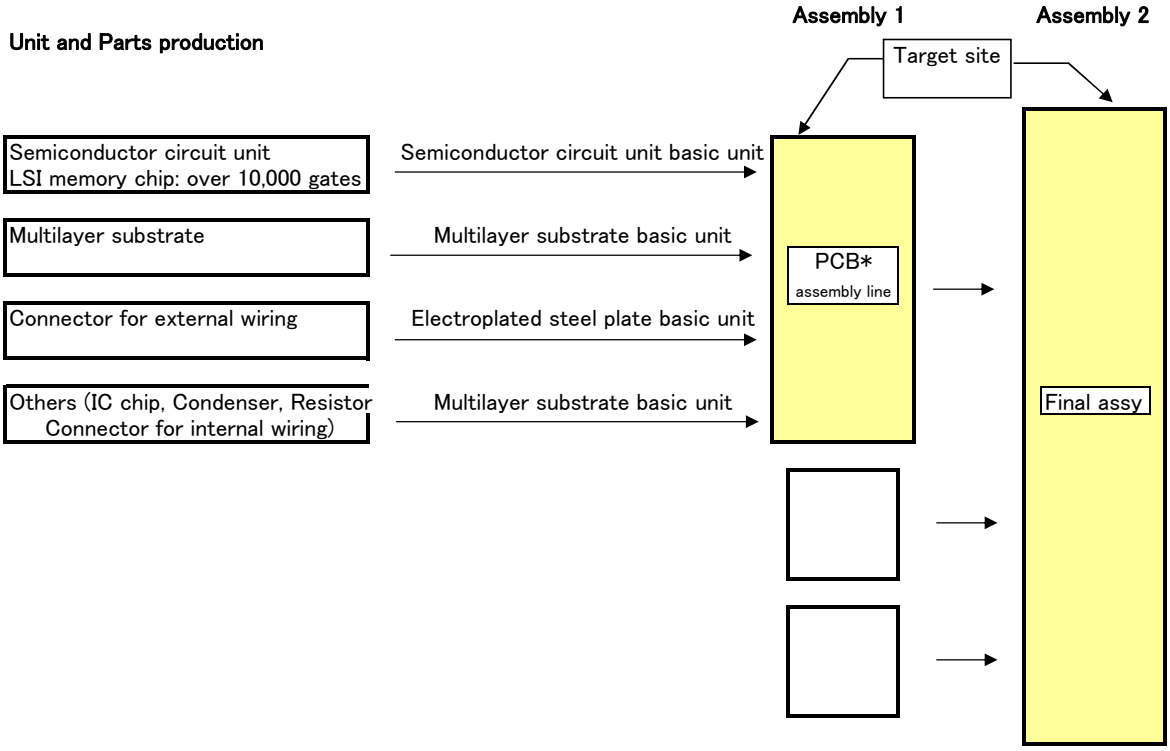
Attachment 2

Diagram of the manufacturing stages of notebook computers: Overall



Attachment 3

Diagram of the manufacturing stages of notebook computers: Detail of Printed circuit board units



*PCB: Printed circuit board

Diagram of the manufacturing stages of notebook computers: Detail of LCD units