Product End-of-Life Disassembly Instructions

Product Category: Monitors and Displays

Marketing Name / Model
[List multiple models if applicable.]

- HP S2331 LCD Monitor
- Name / Model #2
- Name / Model #3
- Name / Model #4
- Name / Model #5

**Purpose:** The document is intended for use by end-of-life recyclers or treatment facilities. It provides the basic instructions for the disassembly of HP products to remove components and materials requiring selective treatment, as defined by EU directive 2002/96/EC, Waste Electrical and Electronic Equipment (WEEE).

**1.0 Items Requiring Selective Treatment**

1.1 Items listed below are classified as requiring selective treatment.

1.2 Enter the quantity of items contained within the product which require selective treatment in the right column, as applicable.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Notes</th>
<th>Quantity of items included in product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed Circuit Boards (PCB) or Printed Circuit Assemblies (PCA)</td>
<td>With a surface greater than 10 sq cm</td>
<td>3</td>
</tr>
<tr>
<td>Batteries</td>
<td>All types including standard alkaline and lithium coin or button style batteries</td>
<td>0</td>
</tr>
<tr>
<td>Mercury-containing components</td>
<td>For example, mercury in lamps, display backlights, scanner lamps, switches, batteries</td>
<td>4 {Backlight Assembly(CCFL)}</td>
</tr>
<tr>
<td>Liquid Crystal Displays (LCD) with a surface greater than 100 sq cm</td>
<td>Includes background illuminated displays with gas discharge lamps</td>
<td>1</td>
</tr>
<tr>
<td>Cathode Ray Tubes (CRT)</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Capacitors / condensers (Containing PCB/PCT)</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Electrolytic Capacitors / Condensers measuring greater than 2.5 cm in diameter or height</td>
<td>1 (C854 location)</td>
<td></td>
</tr>
<tr>
<td>External electrical cables and cords</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Gas Discharge Lamps</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Plastics containing Brominated Flame Retardants</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Components and parts containing toner and ink, including liquids, semi-liquids (gel/paste) and toner</td>
<td>Include the cartridges, print heads, tubes, vent chambers, and service stations.</td>
<td>0</td>
</tr>
<tr>
<td>Components and waste containing asbestos</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
Components, parts and materials containing refractory ceramic fibers | 0
Components, parts and materials containing radioactive substances | 0

### 2.0 Tools Required

List the type and size of the tools that would typically be used to disassemble the product to a point where components and materials requiring selective treatment can be removed.

<table>
<thead>
<tr>
<th>Tool Description</th>
<th>Tool Size (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description #1: Crossing Screwdriver</td>
<td>#1 &amp; #2</td>
</tr>
<tr>
<td>Description #2: Bushing Screwdriver</td>
<td>(HEX5.5MM)</td>
</tr>
<tr>
<td>Description #3</td>
<td></td>
</tr>
<tr>
<td>Description #4</td>
<td></td>
</tr>
<tr>
<td>Description #5</td>
<td></td>
</tr>
</tbody>
</table>

### 3.0 Product Disassembly Process

3.1 List the basic steps that should typically be followed to remove components and materials requiring selective treatment:

1. Lay the Monitor on the desk, remove the VGA cable, base, arm down
2. Take out the bezel with hand
3. Remove the LVDA cable, lamp line with hands, then take out the panel
4. Unlock the screws which fix the back cover and hinge, then take out the key-pad PCBA from groove.
5. Release chassis from back cover, then get back cover and assembly chassis.
6. Unlock the left 5 screws which fix hinge and back cover, then take out the hinge
7. Unlock the screws which fix I/F board and chassis, then get the I/F board
8. Unlock the screws which fix P/I board and chassis, then get the P/I board

3.2 Optional Graphic. If the disassembly process is complex, insert a graphic illustration below to identify the items contained in the product that require selective treatment (with descriptions and arrows identifying locations).
A.6 Ecology of TCO’03

Model Name: MT230DW01 V.0

Product Number: AM2300001001

<table>
<thead>
<tr>
<th>Approval</th>
<th>Check</th>
<th>Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM Chen</td>
<td>Thomas Su</td>
<td>Na01 Yang</td>
</tr>
</tbody>
</table>
A.6.0 Product description

Background
The aim of this front page is to provide a brief description of the product that is to be reviewed for compliance with the ecological requirements of Section A.6.

Applicability
All FPDs and the peripherals supplied with them.

Mandate:
A product declaration shall be provided for the FPD.

The following information shall be submitted:
1. The following table, completed where applicable.
2. A copy of the marking plate for the display.

The information submitted shall be signed by the responsible person at the applicant company.

<table>
<thead>
<tr>
<th>Panels</th>
<th>MT230DW01 V.0 (P/N:AM2300001001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Innolux Display Corp</td>
</tr>
<tr>
<td>Type/Model name</td>
<td>23&quot;TFT-LCD module</td>
</tr>
<tr>
<td>Technology</td>
<td>TFT</td>
</tr>
</tbody>
</table>

We hereby guarantee that the above mandate is fulfilled.

Signature: CM Chen

Date: Mar. 13, 2009

Director, Quality Management Division
InnoLux Display Corp.
Company
A.6.1 Environmental management system certification

Background
A certified environmental management system is proof that the company shows concern for the environment and has chosen to work in a systematic way with constant improvement of the environmental performance of the company and its products in focus. A certified environmental management system includes external independent revisions.

Definitions
Manufacturing plant is the site where the final assembly of the product is taking place.

Applicability
The company or companies which manufacture the FPD.

References
Please see references 52 and 64.

Mandate:
Each manufacturing plant must be certified in accordance with ISO 14001, or EMAS registered. If the product is manufactured by a third party, it is this company that shall be certified or registered.

The following information shall be submitted:
1. A document showing the names and addresses of the manufacturing plants.
2. Copies of the ISO 14001 certificates or EMAS registrations.
3. A written guarantee that the certificate(s)/registration(s) are valid.

The guarantee shall be signed by the responsible person at the applicant company.

We hereby guarantee that the above mandate is fulfilled.

............................................................
Signature
CM Chen
Director, Quality Management Division
InnoLux Display Corp.

............................................................
Date
Mar. 13, 2009
A.6.2 Environmental hazards

A.6.2.1 Cadmium (Cd), mercury (Hg), and hexavalent chromium (CrVI)

Background
The effects of mercury and cadmium on human health and the natural environment have been very thoroughly documented since the mid-1950s. In an EU Directive, both mercury and cadmium shall be phased out in electrical and electronic equipment, no later than by July 1st, 2006. The UN/ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) was extended in June 1998 by a Heavy Metals Protocol that included cadmium pollutants and products containing levels of mercury.

Applicability
FPDs and the peripheral equipment supplied with them.

References
Please see references 51, 57, and 69

<table>
<thead>
<tr>
<th>Mandate:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Until July 1st, 2006:</td>
</tr>
<tr>
<td>The FPD and peripheral equipment shall not contain cadmium and mercury. The requirement applies to components, parts, and raw materials in all assemblies and subassemblies of the product. The listed parts are found in the TCO’03 Guidelines.</td>
</tr>
<tr>
<td>Exempted are mercury lamps in background lighting systems.</td>
</tr>
<tr>
<td>The limit value for listed parts is 2 ppm for mercury and 5 ppm for cadmium.</td>
</tr>
<tr>
<td>From July 1st, 2006:</td>
</tr>
<tr>
<td>The FPD and peripheral equipment shall not contain cadmium, mercury and hexavalent chromium. The requirement applies to components, parts, and raw materials in all assemblies and sub-assemblies of the product.</td>
</tr>
<tr>
<td>Exempted are mercury lamps in background lighting systems. Other exemptions are to be found in the TCO’03 Guidelines and are in accordance with EU Directive 2002/95/EC (RoHS).</td>
</tr>
<tr>
<td>The limit values for mercury and hexavalent chromium is 0.1 % by weight and for cadmium 0.01 % by weight in homogeneous materials. For batteries please see TCO’03 Guidelines.</td>
</tr>
</tbody>
</table>

The following information shall be submitted:
A written guarantee that the mandate above is fulfilled. The guarantee shall be signed by the responsible person at the applicant company.

We hereby guarantee that the above mandate is fulfilled.

CM Chen
Director, Quality Management Division
InnoLux Display Corp.

Signature
Date

Mar. 13, 2009
A.6.2.2 Lead (Pb)

Background
Lead is a well known hazardous element. Lead has a very well documented negative health effect and is subject to restrictions in many countries and for different kind of uses.
In an EU Directive, lead shall be phased out in electrical and electronic equipment, no later than by July 1st, 2006.
UNEP has defined lead as one of the substances that requires regulation on a global level with a binding convention.

Applicability
FPDs and the peripheral equipment supplied with them.

References
Please see references 51, 54, 57 and 69.

Mandate:
The FPD and peripheral equipment shall not contain lead. The requirement applies to components, parts, and raw materials in all assemblies and sub-assemblies of the product

Until July 1st 2006:
*Printed wiring boards*, electronic components, and solder are exempted.

The limit value for listed parts is 50 ppm.

From July 1st 2006:
Exemptions that are valid from July 1st 2006 are to be found in TCO'03 Guidelines and are in accordance with EU Directive 2002/95/EC (RoHS).

The limit value for lead is 0.1 % by weight in homogeneous materials. For batteries please see TCO'03 Guidelines.

The following information shall be submitted:

A written guarantee that the mandate above is fulfilled. The guarantee shall be signed by the responsible person at the applicant company.

We hereby guarantee that the above mandate is fulfilled.

Signature
CM Chen
Director, Quality Management Division
InnoLux Display Corp.

Date
Mar. 13, 2009
Company

5
A.6.2.3 Flame retarding agents containing bromine and chlorine

Background
The general requirements and discussion in respect of bromine and chlorine flame retardants and the phasing out of this group concern about 75 substances. Two families within the bromine flame retardants group have been identified in particular as environmentally harmful. These are PBB and PBDE.
Chlorine and bromine flame retardants used are often persistent and can bioaccumulate in living organisms, and have been detected in flora and fauna.
A series of international elimination activities in respect of chlorine and bromine flame retardants is currently in progress within the EU, OECD, North Sea Conference, OSPAR (the Commission for the Protection of the Marine Environment of the North-East Atlantic) and HELCOM (the Baltic Marine Environment Protection Commission).

Applicability
All FPDs and the peripheral equipment supplied with them.

References
Please see references 53, 55, 59, 61, 65, 66, and 69.

Mandate:

Until 1st July, 2006:
1. Plastic parts weighing more than 25 grams shall not contain flame retardants that contain bromine or chlorine. The requirement applies to plastic parts in all assemblies and sub-assemblies of the product.
The limit value for flame retardants which contain bromine or chlorine is 0.5 percent by weight of the plastic part.

From 1st July, 2006:
1. Plastic parts weighing more than 25 grams shall not contain flame retardants that contain bromine or chlorine. The requirement applies to plastic parts in all assemblies and sub-assemblies of the product.
2. The FPD and peripheral equipment shall not contain PBB and PBDE (listed in the TCO'03 Guidelines). The requirement applies to components, parts and raw materials in all assemblies and sub-assemblies of the product.
The limit value for flame retardants is 0.1 % by weight in homogeneous materials.
Exemptions are to be found in the TCO'03 Guidelines.
The following information shall be submitted:

A written guarantee that the above mandate is fulfilled. The guarantee shall be signed by the responsible person at the applicant company.

We hereby guarantee that the above mandate is fulfilled.

CM Chen
Director, Quality Management Division
InnoLux Display Corp.

Signature

Date

Mar. 13, 2009
A.6.2.4 Information regarding flame retarding agents

Background
The spread of synthetic chemical substances in various products is a global and very widespread environmental problem. Knowledge in respect of the different health and environmental characteristics of these substances is very limited. In order to be able to apply the correct type of measures, good basic information is required.

Applicability
All FPDs and the peripheral equipment supplied with them.

References
Please see references 56, 58, and 60.

Mandate:

The material specifications shall be provided for plastic parts and PWB laminates that weigh more than 25 grams and which have flame retardant concentrations above 0.5 percent by weight.

The following information shall be submitted:

The table below shall be completed and signed by the responsible person at the applicant company. Manufacturers of plastic materials who consider such information confidential may submit the information to a test laboratory approved by TCO Development.

<table>
<thead>
<tr>
<th>Plastic part name</th>
<th>Weight in grams</th>
<th>Type of plastic</th>
<th>Plastic brand name</th>
<th>Plastic model name</th>
<th>Flame retardant type</th>
<th>Flame retardant CAS#</th>
<th>Plastic label code</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGP</td>
<td>1005</td>
<td>PMMA</td>
<td>CHIMEI</td>
<td>CM-250X</td>
<td>NONE</td>
<td>NONE</td>
<td>Plastic Light Guide=PMMA&lt;</td>
</tr>
<tr>
<td>Plastic Frame</td>
<td>38.5</td>
<td>PC</td>
<td>samyang</td>
<td>3025N1BK</td>
<td>KSS</td>
<td>63336-43-8</td>
<td>43M23001-01&gt;PC&lt;M1</td>
</tr>
<tr>
<td>PCBA</td>
<td>33.33</td>
<td>FR-4</td>
<td>TUC</td>
<td>TU-742</td>
<td>Phosphorous epoxy resin</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

We hereby guarantee that the above mandate is fulfilled.

CM Chen
Director, Quality Management Division

InnoLux Display Corp.

Date
Mar. 13, 2009
A.6.2.5 Plastics with chlorine and bromine as part of the polymer

Background
PVC is by far the most common halogen containing plastic. There are however other plastics that contain chlorine or bromine in the plastic itself. As the requirement concerning permissible flame retardants tightens, the risk increases that halogenated plastics will become more common. TCO Development sees a future environmental risk with such development.

PVC is a much-debated plastic that can pose environmental problems in most parts of its life cycle. The magnitude of the environmental problems related with PVC differs depending on the environmental status of a particular manufacturing facility and the uses of additives. At present there are very limited possibilities to distinguish between harmful and less harmful production facilities for PVC.

Applicability
All FPDs and the peripheral equipment supplied with them.

References
Please see references 57 and 67.

Mandate:
Plastic parts that weigh more than 25 grams shall not contain chlorine or bromine as a part of the polymer.
Laminates for printed wiring boards, PWBs and all kinds of cable insulation are exempted.

The following information shall be submitted:
A written guarantee that the above mandate is fulfilled. The guarantee shall be signed by the responsible person at the applicant company.

We hereby guarantee that the above mandate is fulfilled.

CM Chen
Director, Quality Management Division
InnoLux Display Corp.

Signature
Date

Mar.13 ,2009

Company
A.6.3 Preparation for recycling
A.6.3.1 Material coding of plastics

Background
Within the EU the problem of electronic waste has been a major issue for many years. The EU has now brought out a set of rules for dealing with environmental questions related to electronic items in waste. There are large volumes of FPDs all over the world. Recycling and the handling of harmful substances is therefore an important environmental area.

Applicability
All FPDs and the peripheral equipment supplied with them.

References
Please see references 57, 62, 63, and 68.

Mandate:
Plastic parts that weigh more than 25 grams shall be material-coded in accordance with ISO 11469 and ISO 1043-1, -2, -3, -4. Such parts shall be listed in the table at Section A.6.2.4.

Exempted are laminates for printed wiring boards, PWBs.

The following information shall be submitted:
A written guarantee that the above mandate is fulfilled. The guarantee shall be signed by the responsible person at the applicant company.

We hereby guarantee that the above mandate is fulfilled.

Signature
CM Chen
Director, Quality Management Division

Date
Mar. 13, 2009

Company
InnoLux Display Corp.
A.6.3.2 Design for recycling – Mercury lamps

Background
During the dismantling and recycling of FPDs it is the mercury in the lamps that presents one of the greatest environmental problem. By setting the requirement that the lamps must be easily detached and dealt with separately, the process of material reclamation of the rest of the display is facilitated.

Applicability
All FPDs which contain mercury lamps for background lighting systems.

Mandate:
- Connections to be separated during the disassembly of FPD must be easy to take apart in order to not damage the mercury lamps. This means that gluing and welding must not be used to bond parts and make removal of the lamps complicated.
- The total amount of mercury in the lamps shall be declared in the table below.

The following information shall be submitted:
A written guarantee that the above mandate is fulfilled together with:
- An adequate description of the method by means of which the lamps shall be removed. The description shall be signed by the responsible person at the applicant company.
- The mercury lamp suppliers, the lamp ID code, the average, maximum and minimum amount of mercury in each lamp, the total number of lamps, the panel ID code, panel technology and the manufacturer shall be declared. A written declaration shall be signed by the responsible person at the applicant company.

Display type/model name: 23”TFT-LCD module
FPD size: 23” inches.
Panel manufacturer: Innomux Display Corp
Panel identification code: MT230DW01 V.0 (P/N: AM2300001001)
Panel technology: TFT
Number of lamps: 4 lamps

<table>
<thead>
<tr>
<th>Mercury lamp supplier</th>
<th>Lamp ID code:</th>
<th>Average mg Hg/lamp:</th>
<th>Max. mg Hg/lamp:</th>
<th>Min. mg Hg/lamp:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta</td>
<td>NS24252A18H5D80</td>
<td>2.6611</td>
<td>2.7411</td>
<td>2.5978</td>
</tr>
</tbody>
</table>

We hereby guarantee that the above mandate is fulfilled.

CM Chen
Director, Quality Management Division
Innomux Display Corp.

Date
Mar. 13, 2009
Method of lamp disassembly on MT230DW01 V.0

1. Original condition

2. Remove the Tape

3. Remove the Screw
4. Remove the protect cover (above PCBA)

5. Remove Top Bezel

6. Remove LCD Cell&PCBA
7. Remove Mold Frame (Plastic Frame)

8. Remove the Film

9. Remove the Backcover
10. Remove BLU (LGP)

11. Remove CCFL from Lamp Assy
   a. Lamp Assy

   b. Remove tape & Separate wires from Lamp Reflector
c. Remove Lamp Reflector

d. Separate Rubber & Oring
Technical Notification

- Sequence of Module Disassembly for Lamp Separation – (LTM230HT01)

DATE: Oct. 08, 2008

Application Engineering 1,
HD development, LCD Business

Any of information, data and/or records in these documents shall be treated as “CONFIDENTIAL” and no copy thereof shall be allowed without sender's prior written authorization. The disclosure of these documents shall be made to those who have need to know or are intended to know.
Sequence of Module Disassembly for Lamp Separation

- LTM230HT01 Module front and rear side

- Disassemble top chassis and PCB cover
Sequence of Module Disassembly for Lamp Separation

- Disassemble the panel from the Mold frame

- Disassemble the mold frame, sheets and diffuser plate from the bottom chassis
Sequence of Module Disassembly for Lamp Separation

- Separate side mold to pull out lamp

- Separate lamp from backlight
<table>
<thead>
<tr>
<th>Action</th>
<th>Tool</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove the VGA Cable</td>
<td>#2 Crossing Screw Driver</td>
<td></td>
</tr>
<tr>
<td>Remove the base</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Remove the Arm Down</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Remove the Front Bezel with hand.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Remove the LVDS Cable with Hand.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Tool</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Remove the Lamp Line with Hand.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Unlock the screw fixed the Hinge and Back Cover.</td>
<td>#2 Crossing Screw Driver</td>
<td></td>
</tr>
<tr>
<td>Take out the OSD PCB from the groove with hand.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Release the Chassis from Back Cover, then get the Back Cover and Assembly Chassis.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Step</td>
<td>Tool Action</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Unlock the 2 screws which fix the Arm Up and Hinge and get the Arm Up.</td>
<td>#2 Crossing Screw Driver</td>
<td></td>
</tr>
<tr>
<td>Unlock the 5 fixed Back Cover and Hinge and Get the Hinge.</td>
<td>#2 Crossing Screw Driver</td>
<td></td>
</tr>
<tr>
<td>Unlock the 5 screw fixed the I/F Board and Chassis</td>
<td>#2 Crossing Screw Driver and Hexagon recess screw driver (HEX5.5MM)</td>
<td></td>
</tr>
<tr>
<td>Unlock 4 screws fixed the Power Board and Chassis then get the Chassis.</td>
<td>#2 Crossing Screw Driver</td>
<td></td>
</tr>
<tr>
<td>Delivered all the parts with Hand</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Component</td>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Power board</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>I/F Board</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>KeyPad and LVDS Cable, Keypad Connector</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>