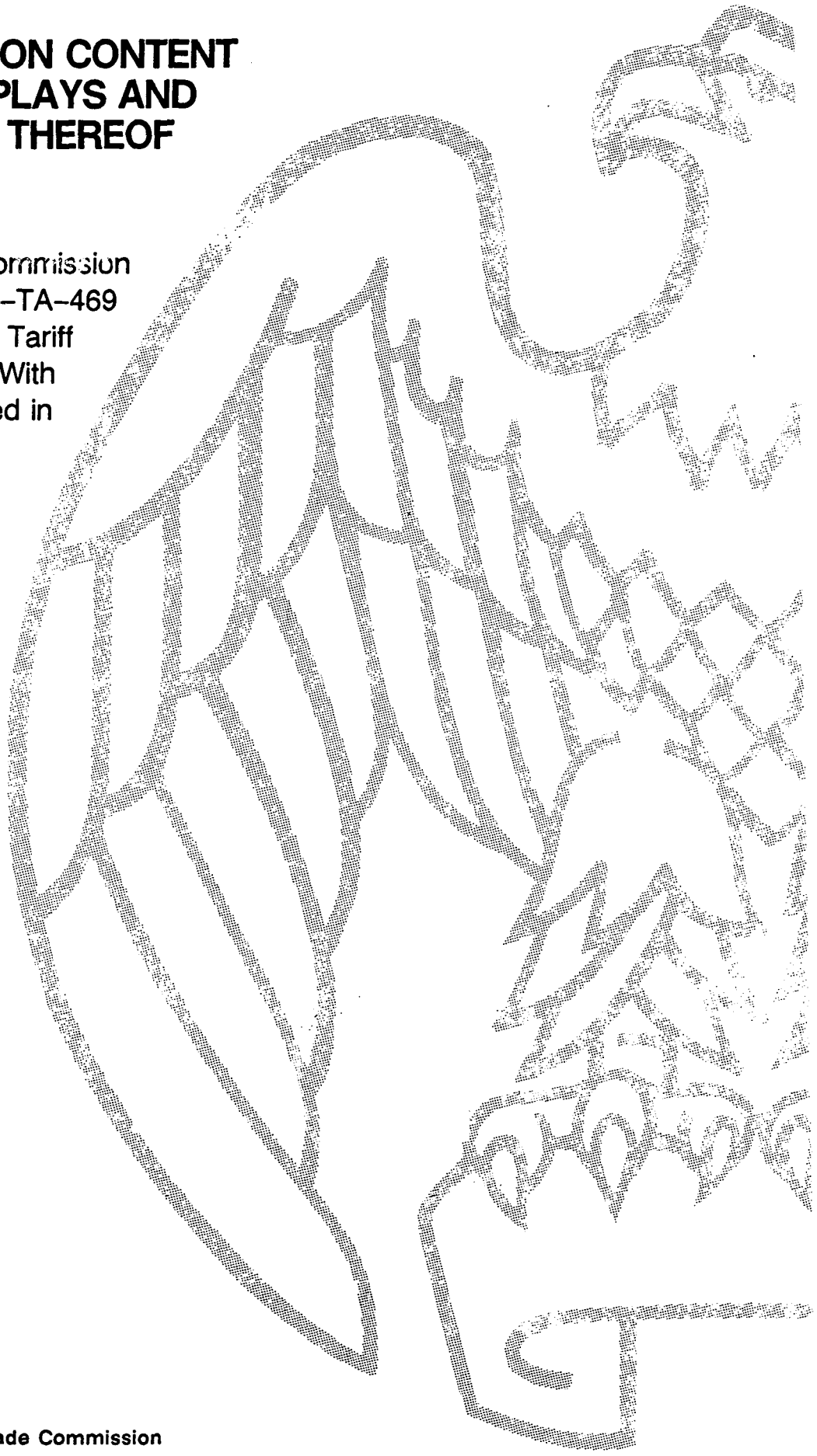
HIGH-INFORMATION CONTENT FLAT PANEL DISPLAYS AND SUBASSEMBLIES THEREOF FROM JAPAN

Determination of the Commission in Investigation No. 731-TA-469 (Preliminary) Under the Tariff Act of 1930, Together With the Information Obtained in the Investigation



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UNITED STATES INTERNATIONAL TRADE COMMISSION

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Note.--Information that would reveal business proprietary operations of individual concerns may not be published and, therefore, has been deleted from this report. Such deletions are indicated by asterisks.

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation No. 731-TA-469 (Preliminary)

HIGH-INFORMATION CONTENT FLAT PANEL DISPLAYS AND SUBASSEMBLIES THEREOF FROM JAPAN

Determination

On the basis of the record [1] developed in the subject investigation, the Commission unanimously determines, pursuant to section 733(a) of the Tariff Act of 1930 (19 U.S.C. § 1673b(a)), that there is a reasonable indication that an industry in the United States is materially injured by reason of imports from Japan of high-information content (HIC) flat panel displays and subassemblies thereof that are alleged to be sold in the United States at less than fair value (LTFV).[2]

Background

On July 18, 1990, a petition was filed with the Commission and the Department of Commerce by Advanced Display Manufacturers of America (Washington, DC) and its individual member companies, Planar Systems, Inc.,

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[1] The record is defined in sec. 207.2(h) of the Commission's Rules of Practice and Procedure (19 CFR § 207.2(h)).

[2]For purposes of this investigation "HIC flat panel displays" are large area, matrix addressed displays, no greater than 4 inches in depth, with a picture element ("pixel") count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Included are monochromatic, limited color, and full color displays. Displays may utilize, but are not limited to, the following technologies: liquid crystal, plasma, and electroluminescence. HIC flat panel displays are used to display text, graphics, and video. Subassemblies of a display that are exclusively dedicated to or designed for use in HIC flat panel displays are also covered by this investigation.

The following merchandise is excluded: segmented flat panel displays, matrix addressed flat panel displays with less than 120,000 pixels, and cathode ray tubes.

The appropriate Harmonized Tariff Schedule (HTS) subheadings under which the subject merchandise is classifiable cannot be specified because (1) Customs rulings are not available on such goods, and (2) numerous provisions appear potentially applicable.

Plasmaco, Inc., OIS Optical Imaging Systems, Inc., The Cherry Corporation, Electro-Plasma, Photonics Technology, Inc., and Magnascreen Corporation, alleging that an industry in the United States is materially injured, is threatened with material injury, or is materially retarded from being established by reason of LTFV imports of HIC flat panel displays from Japan. Accordingly, effective July 18, 1990, the Commission instituted preliminary antidumping investigation No. 731-TA-469 (Preliminary).

Notice of the institution of the Commission's investigation and of a public conference to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the Federal Register of July 24, 1990 (55 F.R. 30042). The conference was held in Washington, DC, on August 7, 1990, and all persons who requested the opportunity were permitted to appear in person or by counsel.

VIEWS OF THE COMMISSION

We unanimously determine 1/ that there is a reasonable indication that an industry in the United States is materially injured by reason of imports of high-information content flat panel displays and subassemblies thereof from Japan, allegedly sold in the United States at less than fair value ("LTFV"). 2/

Like Product

In determining whether there is a reasonable indication that an industry in the United States is materially injured or is threatened with material injury by reason of the subject imports, the Commission must first determine the "domestic industry" and concomitantly, the "like product." Section 771(4)(A) of the Tariff Act of 1930 defines the relevant domestic industry as the "domestic producers as a whole of a like product, or those producers whose collective output of the like product constitutes a major proportion of the total domestic production of that product . . . ." 3/ In turn, "like product" is defined as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation . . . ." 4/ The Commission's decision regarding the appropriate like product or products is essentially a factual determination, and the

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1/ Vice Chairman Brunsdale joins in the discussion of like product and domestic industry. See her additional views.

2/ Material retardation was alleged by petitioner as an alternative argument in the event the Commission failed to find material injury. Because we have found that the domestic industry is established and there is a reasonable indication that the industry is experiencing material injury, we do not reach the question of material retardation.

3/ 19 U.S.C. § 1677(4)(A).

4/ 19 U.S.C. § 1677(10).

Commission has applied the statutory standard on a case-by-case basis. 5/

The Commission generally considers a number of factors when analyzing like product issues. These factors include: (1) physical characteristics, (2) end uses, (3) interchangeability of products, (4) channels of distribution, (5) production processes, (6) customer or producer perceptions of the product, (7) use of common manufacturing facilities and production employees, and (8) price. No single factor is dispositive and the Commission may consider other factors. 6/

The products under investigation are high-information content (HIC) flat panel displays. 7/ HIC flat panel displays are electronic devices for displaying information or images when integrated into such enduser systems as

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5/ Asociacion Colombiana de Exportadores de Flores v. United States, 12 CIT ___, 693 F. Supp. 1165, 1169 (1988) (Asocoflores).

6/ See, e.g., Certain Laser Light-Scattering Instruments from Japan, Inv. No. 731-TA-455 (Preliminary), USITC Pub. 2282 at 7 (May 1990); Certain Telephone Systems and Subassemblies Thereof from Japan and Taiwan, Inv. Nos. 731-TA-426 and 428 (Final), USITC Pub. 2237 at 4, n.6 (Nov. 1989). See also Asocoflores, 693 F. Supp. at 1167-71.

7/ In its notice of initiation, the Department of Commerce (Commerce) defined the class or kind of merchandise subject to investigation as follows:

> The products covered by this investigation are high information content flat panel displays and subassemblies thereof. High information content flat panel displays are large area, matrix addressed displays, no greater than four inches in depth, with a picture element ("pixel") count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Included are monochromatic, limited color, and full color displays. Displays may utilize, but are not limited to, the following technologies: liquid crystal (LCD); plasma; and electroluminescence (EL). High information content flat panel displays are used to display text, graphics, and video.
>
> Subassemblies of a display that are exclusively dedicated to or designed for use in high information content flat panel displays are also covered by this investigation.
>
> The following merchandise is excluded: segmented flat panel displays; matrix addressed flat panel displays with less than 120,000 pixels; and cathode ray tubes (CRTs).

55 Fed. Reg. 33146-7 (Aug. 14, 1990).

laptop and portable computers, medical and office equipment, and instrumentation for the military. In this investigation, the petitioner alleges that HIC flat panel displays and subassemblies thereof comprise a single like product. 8/ Respondents challenge this position and propose other like product definitions. We determine for the purposes of this preliminary determination that the like product comprises HIC flat panel displays and dedicated subassemblies thereof, as sought by petitioner.

1. There is one like product, all HIC flat panel displays

Petitioner urges the Commission to find that all HIC flat panel displays are one like product. Respondents contend that there are four like products because there are four principal technologies used in making HIC flat panel displays: 9/ (1) passive matrix liquid crystal display (LCD), in which liquid crystals act as optical shutters and allow the passage of light when a small voltage is applied; (2) active matrix LCD, similar to but far more complex than the passive form and containing a transistor at each pixel; (3) plasma display, in which voltage causes pixels of a gas to emit light; (4) electroluminescent (EL) display, in which voltage causes pixels in a solid EL material to emit light. 10/

As a threshold matter, the record indicates that there is no domestic producer of passive matrix LCDs. 11/ Consequently there is no separate like

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8/ Petitioner's brief at 5.

9/ Japanese respondents' brief at 5.

10/ Report at A-5-6. Other types of HIC flat panel displays are currently subject to research and may be marketed in the future. Such technologies include field emission spun cathode, electromechanical, electrochromic, and others. Id. at A-5, n.13.

11/ Japanese respondents' brief at 5.

product consisting of passive matrix LCDs. As in past cases we reject "the notion that a like product could be defined as a product not produced by a U.S. industry." 12/

LCD, EL, and plasma displays exhibit noticeable differences, such as the type of medium, i.e., EL material, liquid crystal, or gas, used to activate the display pixels. However, we do not consider that such differences are sufficient to warrant dividing the like product along technological lines. 13/ The display types share such physical characteristics as minimal thickness and a display glass panel on the front backed with a matrix of electrodes and a panel of electronics. The record suggests that active matrix LCD, EL, and plasma displays have achieved similar levels of contrast and response time. 14/ Although respondents have stressed the importance of power consumption in choosing a display type, the record on this point is still too unclear to form a basis for distinguishing among types of HIC flat panel displays for like product purposes. 15/

The record shows that different display types can be and are used in similar applications. Notably, domestically produced EL, plasma, and LCD displays are all used in military equipment and aerospace instrumentation, and

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12/ Certain All-Terrain Vehicles from Japan, Inv. No. 731-TA-388 (Final), USITC Pub. 2163 at 7-8 (Mar. 1989) (ATVs); see also Internal Combustion Engine Forklift Trucks from Japan, Inv. No. 731-TA-377 (Final), USITC Pub. 2082 at 9-11 (May 1988).

13/ Differences in technical characteristics have not precluded a finding of one like product. See, e.g., Sony Corp. of America v. United States, 13 CIT ___, 712 F. Supp. 978, 982 (1989) (one like product consisting of all color picture tubes was appropriate despite differences in shadow mask, electron gun type, shape of faceplate, and production process).

14/ U.S. respondents' brief at 10-11.

15/ Petitioner's brief at 9; transcript of the conference (Tr.) at 165-6.

EL and plasma displays are both used in medical instruments. 16/ Considering the market as a whole, including both domestic and imported displays, there are demonstrable overlaps in uses, with all three types appearing in laptops. 17/ U.S. HIC flat panel display producers perceive the types as equivalent. 18/ Several computer producers offer essentially the same model portable computer with a choice of more than one type of display. There appears to be a significant amount of commonality of end use, producer perception, and customer perception among the various types of HIC flat panel displays.

The different display types lack absolute interchangeability. The record suggests that there is also a lack of interchangeability in use even among displays of the same format and technology. 19/ However, we have found that lack of absolute interchangeability does not preclude a finding of one like product in light of other considerations. 20/ In a market such as this in which technology changes rapidly, a critical phase of competition occurs at the design stage of computer and display development. At the design stage, the various types of HIC flat panel displays appear to be largely

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16/ Report at A-17.

17/ Id. at A-16-17. Computers smaller than desktop models are variously described as hand-held, notebook, laptop, portable, transportable, and luggable computers, although the distinctions between types of such computers are unclear. Id. at A-18, n.51.

18/ Petitioner's brief at 5.

19/ U.S. respondents' brief at 106.

20/ See, e.g., Digital Readout Systems and Subassemblies Thereof from Japan, Inv. No. 731-TA-390 (Final), USITC Pub. 2150 at 12 (Jan. 1989); Shock Absorbers and Parts, Components, and Subassemblies Thereof from Brazil, Inv. No. 731-TA-421 (Preliminary), USITC Pub. 2128 at 15 (Sept. 1988).

interchangeable. 21/

The production processes for the various types of displays differ somewhat, 22/ and no two types of display are produced on the same production line. However, the similarities between processes are significant. Active LCD, EL, and plasma displays are each made in a "clean room" environment similar to that used for making semiconductors. 23/ As a result of such similarities, production workers have on several occasions moved easily from one firm's technology to that of another. 24/

All types of HIC flat panel display appear to share the same general channels of distribution, i.e., mostly sales to original equipment manufacturers. 25/ Prices differ somewhat, but the record suggests that they are reasonably close. 26/

Based on the foregoing, we determine for the purposes of this preliminary investigation that there is one like product covering all HIC flat panel displays.

21/ See, e.g., petitioner's brief at Confidential Appendices.

22/ Electrode formation, material filling, and sealing are processes that differ according to display technology. Report at A-11.

23/ See, e.g., Liquid Crystal Display Television Receivers from Japan, Inv. No. 751-TA-14, USITC Pub. 2042 at A-9 (Dec. 1987) (LCD TVs) ("all [display types] use similar techniques for applying layers of materials to a glass substrate that must be conducted in a dust-free 'clean room.'"). Glass cleaning, assembly, aging, and testing are processes common to all HIC flat panel displays. Report at A-8-9.

24/ Petitioner's brief at 17. Respondent Sharp also admits that its senior production personnel could move between technologies. Tr. Exhibit 7, statement of Sharp at 6.

25/ Report at A-31; Petitioner's brief at Attachment D.

26/ Report at A-55-56.

2. Cathode ray tubes and low-information content displays are not included in the like product

The scope of the investigation does not include either cathode ray tubes (CRTs) or flat panel displays containing less than 120,000 pixels or that are more than 4 inches deep. 27/ We find that such products are not part of the like product in this investigation.

Although in a general way CRTs resemble HIC flat panel displays, we consider that there are sufficient reasons to distinguish the two types of displays. CRTs and flat displays differ in characteristics; uses; channels of distribution; production processes, facilities, and employees; and price. 28/

As to flat panel displays containing less than 120,000 pixels, many of them, such as digital watch faces, are of the "segmented" type limited to display of certain characters and incapable of displaying the complex text and graphics that the HIC flat panel display can. 29/ Consequently, we do not include segmented and similarly limited displays in the like product.

There also exists a number of "low-information content" flat panel displays similar to HIC flat panel displays but containing fewer than 120,000 pixels. HIC flat panel displays and the smaller displays are made by similar production processes, although using different masks, tools, fixtures,

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27/ According to petitioner, no HIC flat panel displays contain less than 120,000 pixels or are more than 4 inches deep. Tr. at 78.

28/ Report at A-13. In LCD TVs, the Commission found that receivers that incorporate LCD displays and receivers that use CRTs were included in the same like product. However, the products covered in that case were television receivers, not just the display screens, and the Commission emphasized the receiver nature of the products in its like product analysis. USITC Pub. 2042 at 10-11.

29/ Tr. at 15-16.

assembly, and test programs. 30/ A lower pixel count leads to distinct end uses. Virtually all portable computers use HIC flat panel displays, which are the only ones that meet the computer industry's graphics formats requiring a minimum pixel count of 120,000. 31/ In contrast, low-information content displays generally contain fewer than 70,000 pixels and are used in other applications such as calculators and hand-held televisions. 32/ The record suggests that although there may be a small, limited overlap in end uses, HIC flat panel displays generally are not sufficiently similar in characteristics and uses to low-information content displays. 33/ Thus, we do not define the like product to encompass low-information content flat panel displays.

3. HIC flat panel displays and dedicated subassemblies form one like product

Commerce determined that the articles subject to this investigation include subassemblies exclusively dedicated or designed for use in HIC flat panel displays. 34/ Petitioner argues that subassemblies be included within

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30/ Report at A-12. Smaller displays can be made on HIC flat panel display production lines, but the reverse is not true. Japanese respondents' brief at Exhibit 4, statement of Optrex.

31/ The computer industry has established formats for graphics quality. The color graphics adapter (CGA) can correspond to 640x200, or 128,000 pixels; the enhanced graphics adapter (EGA) can use 640x400; the video graphics adapter (VGA) can use 640x480. Report at A-3, n.9.

32/ Id. at A-11-12.

33/ Id. at B-19-20.

34/ 55 Fed. Reg. 33146-7 (Aug. 14, 1990). The record currently indicates that the following subassemblies are dedicated or designed for use in assembled displays: (1) the display glass, incorporating a grid of electrodes, a material that reacts to a change in voltage, and contact pads for interconnecting the drive electronics to the electrodes; (2) the drive electronics, integrated circuits that provide voltage to the electrodes; (3) the control electronics that decode and transmit signals from the enduser system to the drive electronics; (4) the mechanical package, the casing that holds the display and mounts into the enduser system; and (5) the power supply that provides appropriate voltage to the display. Report at A-6.

the single HIC flat panel display like product. 35/ Respondents contend that petitioner was wrongly motivated in including subassemblies, and that only display glass should be included in a like product, because petitioner's members produce only display glass themselves and therefore allegedly lack standing as to other subassemblies. Respondents also claim that display glass for each type of display should be covered by that display type's like product. 36/

All dedicated subassemblies are covered by Commerce's scope determination. The Commission cannot exclude all but display glass from its like product finding solely on the basis of either an allegedly improper motive, i.e., fear of circumvention, or an alleged lack of standing. 37/ When determining whether subassemblies should be included in the same like product as finished products, the Commission has looked at: (1) the necessity for, and costs of, further processing; (2) the degree of interchangeability of articles at different stages of production; (3) whether the article at an earlier stage of production is dedicated to use in the finished article; (4) whether there are significant independent uses or markets for the finished

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35/ Tr. at 54.

36/ Japanese respondents' brief at 102; U.S. respondents' brief at 27-30. Respondents argue that petitioner's reason for including subassemblies is improper. Petitioner included subassemblies in the scope of its petition primarily to prevent circumvention of any antidumping order on completed displays. Petitioner's brief at 22; Tr. at 70. Once the subassemblies are manufactured, assembly into a completed display is allegedly fast, cheap, and easy. Consequently, petitioner is concerned that importers could easily import subassemblies into the United States and then assemble them at minimal expense and effort. Tr. at 45. Respondents also contest petitioner's position that assembly is easy and inexpensive.

37/ The Commission has taken the position that the Commerce Department, not the Commission, decides questions of standing. See, e.g., Laser Light-Scattering Instruments, USITC Pub. 2282 at 16, n.52.

and unfinished articles; and (5) whether the article at an earlier stage of production embodies or imparts to the finished article an essential characteristic or function. 38/

In this case, there is evidence that subassemblies are dedicated for use in finished HIC flat panel displays and that there is no independent market or use for these components. 39/ Producers generally manufacture a significant portion of the subassemblies, especially display glass panels, themselves. Other subassemblies are contracted out, but they are designed by the HIC flat panel display producers, who often supply the contractor with the parts for the subassembly. 40/ Each of the individual components at issue possesses or incorporates an essential characteristic to an HIC flat panel display. For example, the glass panel is critical for displaying text and graphics.

The subassemblies under investigation require further processing, i.e., assembly, before they become flat panel displays. The parties disagree on whether the process of assembling an HIC flat panel display from its various components is a simple operation. 41/ The components are not interchangeable

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38/ E.g., Phototypesetting and Imagesetting Machines and Subassemblies Thereof from the Federal Republic of Germany, Inv. No. 731-TA-456 (Preliminary), USITC Pub. 2281 at 6 (May 1990); Certain Residential Door Locks and Parts Thereof from Taiwan, Inv. No. 731-TA-433 (Final), USITC Pub. 2253 at 8, n.16 (Jan. 1990).

39/ Certain domestic producers sell display glass panels separately, but to customers who add electronics to make complete HIC flat panel displays. Tr. at 61, 87; Japanese respondents' brief at 105. Because we find one like product, we do not reach the question of whether subassemblies are dedicated to one technology. We will revisit the issue of dedication to use in any final investigation.

40/ Petitioner's brief at 22.

41/ Petitioner affirms that the operation is very simple, can be done in a matter of seconds, and adds virtually no value. Petitioner's brief at 22. Respondents counter that assembly is an exacting and expensive job. Japanese respondents' brief at 103.

at different stages of production. However, there also appears to be little interchangeability among assembled displays.

We do not find that there are clear dividing lines establishing which subassemblies should be separate like products from each other or from finished articles, particularly in view of the fact that subassemblies are not always produced separately but are often produced together in a variety of combinations. 42/ Based on the above, we find that all dedicated subassemblies of HIC flat panel displays are included within the like product.

Domestic Industry

Based on our finding concerning the like product, we determine that the domestic industry is composed of the domestic producers of HIC flat panel displays and subassemblies thereof.

An issue was raised as to whether certain firms, called "integrators," are domestic producers. Whereas petitioning companies manufacture the display glass for HIC flat panel displays, integrators purchase the display glass from other companies and produce HIC flat panel displays by producing and adding to the display glass their own electronics.

In addition to assembling completed HIC flat panel displays, the firms at issue may actually produce a significant component of the displays, i.e., the electronics. According to petitioning firms, the cost of the display glass and the cost of the electronics are often similar. 43/ Consequently, the display glass is not necessarily the more important cost component. However, only a small amount of information was available on integrator operations in this preliminary investigation. As a consequence, we are unable

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42/ Report at A-6-8.

43/ Tr. at 79.

to evaluate this issue in a comprehensive manner. 44/ We find for the purposes of this preliminary investigation that the integrators are part of the domestic industry, but we will revisit this issue in any final investigation.

Condition of the Domestic Industry

In assessing the condition of the domestic industry, the Commission considers, among other factors, domestic consumption, production, capacity, capacity utilization, shipments, inventories, employment, and financial performance. The statute further provides for the Commission to consider, if relevant, the effects on the existing development and production efforts of the domestic industry. 45/ No single factor is dispositive, and in each investigation we consider the particular nature of the industry involved and the relevant economic factors which have a bearing on the state of the industry. 46/ Before describing the condition of the industry, we note that much of the information on which we base our decision is business proprietary, and our discussion of the condition of the industry must necessarily be

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44/ In determining whether a firm's operations rise to the level required for inclusion of the firm in the domestic industry, we have considered: (1) the overall nature of production-related activities in the United States, including the extent and source of a firm's capital investment, (2) the technical expertise involved in production activity in the United States, (3) the value added to the product in the United States, (4) employment levels, (5) the quantity and type of parts sourced in the United States, and (6) any other costs and activities in the United States directly leading to production of the like product. See, e.g., Generic Cephalexin Capsules from Canada, Inv. No. 731-TA-423 (Final), USITC Pub. 2211 at 10-11 (Aug. 1989); ATVs, USITC Pub. 2163 at 12.

45/ 19 U.S.C. § 1677(7)(C)(iii).

46/ See 19 U.S.C. § 1677(7)(C)(iii), which requires us to consider the condition of the industry in the context of the business cycle and conditions of competition that are distinctive to the domestic industry. See also H.R. Rep. No. 317, 96th Cong., 1st Sess. 46 (1979); S. Rep. No. 249, 96th Cong., 1st Sess. 88 (1979).

general in nature.

Apparent consumption of HIC flat panel displays and subassemblies rose sharply and steadily from 1987 to 1989, and from the interim period January-June 1989 to the comparable period of 1990. 47/ Domestic capacity also expanded from 1987 to 1989, and further increased from interim 1989 to interim 1990 as well. 48/ Total domestic production of HIC flat panel displays also rose steadily throughout the period of investigation, but did not keep up with the expansion of domestic capacity. 49/ Consequently, capacity utilization remained at low levels during the period, decreasing steadily from 1987 to 1989, although it increased in January-June 1990 as compared to January-June 1989. 50/

The quantity and value of domestic shipments of HIC displays increased steadily from 1987 to 1989 and during the interim period as well. 51/ Available data show end-of-period inventories decreased minimally from 1987 to 1989, but then increased during the interim periods. 52/ All employment indicators posted increases throughout the period of investigation, although average hourly wages were relatively stable from 1988 to 1989. 53/

Net sales of flat panel displays increased from 1987 to 1988, then

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47/ Report at A-23, Table 7.

48/ Id. at A-33, Table 10.

49/ Id.

50/ Id. Available data on this factor are problematical. Id. at A-33. We will seek further information on this point in any final investigation.

51/ Id. at B-22, Table E-2.

52/ Id. at A-35.

53/ Id. at A-37, Table 13.

decreased in 1989. Net sales for the 1990 interim period then increased. 54/ However, the financial experience of the domestic industry was negative during the period of investigation. The industry had operating losses of steadily increasing magnitude from 1987 to 1989 as well as during the 1989-1990 interim periods. 55/ Cash flow between 1987 to 1989 and January-June 1989 to January-June 1990 also remained negative and declined from 1987 to 1988, increased only slightly from 1988 to 1989, and fell again in the interim periods. 56/ Total capital expenditures by U.S. producers declined steadily throughout the period of investigation. 57/

With respect to the existing development and production efforts of the domestic industry, petitioner argues that its members have been denied financing for growth and research and development. 58/ According to petitioner, the domestic industry's efforts to develop a derivative or more advanced version of the like product have been severely hampered by the lack of resources for research and development. 59/ Ability to carry out research and development with respect to HIC flat panel displays is an important consideration in evaluating the condition of the domestic industry in this investigation.

Based upon the record in this preliminary investigation, we find that

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54/ Report at A-39, Table 15.

55/ Id.

56/ Id.

57/ Id. at A-41, Table 21.

58/ See, e.g., the experience of Plasmaco, which had difficulty raising capital even though it had obtained both production equipment and experienced staff from long-time producer IBM. Petitioner's brief at 51.

59/ Id. at 28.

there is a reasonable indication that the domestic industry producing HIC flat panel displays and subassemblies thereof is materially injured.

Reasonable Indication of Material Injury by Reason of the Subject Imports

In this preliminary investigation, the Commission must determine whether there is a reasonable indication of material injury to the domestic industry "by reason of" the imports under investigation. 60/ The Commission considers the volume of imports, their effect on prices of the like product, and their impact on domestic producers. 61/ In doing so, the Commission examines whether import volumes or increases in volume are significant, whether there has been significant underselling by imports, whether imports significantly depress or suppress prices for the like product, and affect such factors as domestic production, sales, capacity utilization, inventories, employment, and profits. 62/

The Commission may take into account information concerning other causes of harm to the domestic industry, but it is not to weigh causes. 63/ The imports need only be a cause of material injury, and the Commission need not determine that imports are the principal or a substantial cause of material injury. 64/

Imports of HIC flat panel displays from Japan were present in large

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60/ 19 U.S.C. § 1673b(a).

61/ 19 U.S.C. § 1677(7)(B)(i).

62/ 19 U.S.C. § 1677(7)(C). The Commission may consider other factors it deems relevant, but must explain why they are relevant. 19 U.S.C. § 1677(7)(B)(ii).

63/ S. Rep. No. 249, 96th Cong., 1st Sess. 57-58, 74 (1979).

64/ LMI-La Metalli Industriale, S.p.A. v. United States, 13 CIT ___, 712 F. Supp. 959, 971 (1989); Citrosuco Paulista, S.A. v. United States, 12 CIT ___, 704 F. Supp. 1075, 1101 (1988).

volumes throughout the period of investigation. Their share of the U.S. market also was very large during the period, never falling below about 90 percent. Such imports also posted large and steady increases in both volume and value during the period. Although the subject imports lost market share from 1987 to 1988 and from interim 1989 to interim 1990, they gained market share somewhat from 1988 to 1989 and the declines were relatively small. 65/ We find that the volume of the subject imports was significant.

The Commission received only limited pricing data in this preliminary investigation. In those few instances for which price comparisons were available, the Japanese products were priced below the U.S. products. With respect to price depression and suppression, the record indicates that domestic prices generally declined or remained flat during the period of investigation. 66/

The Commission received a number of lost sales and lost revenue allegations from domestic producers that the Commission's staff attempted to confirm. When contacted by the staff, one purchaser of HIC flat panel displays confirmed that one of petitioner's members lost revenue because it was forced to lower its price by Japanese competition. 67/ Respondents argue that the domestic industry lost sales only due to factors other than price, such as technology and product availability, and that purchasers generally do not make buying decisions based on price. However, the record suggests that at least one major purchaser who eventually bought from the Japanese declined to purchase a domestic display principally because of financial

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65/ Report at A-49-51 and B-22.

66/ Id. at A-35-57.

67/ Id. at A-57.

considerations. 68/

The bid process described by respondent Sharp shows that technical specifications and prices are involved at each stage of the process. 69/ This suggests that purchasers consider design feature and price tradeoffs throughout the bidding process, and accord a "design win" to the vendor offering the best design features per dollar of the bid price. In this type of bid process, with HIC flat panel displays forming a major component of computer products sold in a highly competitive market, it is difficult to envision price not being an integral part of the bid process for a particular set of technical specifications desired by a computer manufacturer.

Petitioner claims that Japanese low prices led to significant "design wins" for the Japanese, in that they were able to persuade customers to choose Japanese displays at the design stage. Petitioner provided extensive correspondence between U.S. producers and original equipment manufacturers which supports its allegations of stiff competition with Japanese producers at the design stage. In petitioner's view, this stunted the domestic industry's growth by drying up funding for both building capacity and increasing research and development. 70/

According to petitioner, lost sales and lost revenue have been particularly damaging because they occurred at a crucial point in the industry's growth cycle, when the industry was seeking the large purchases that would permit commercial production to begin. 71/ Many of petitioner's

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68/ Petitioner's brief at Confidential Appendix 3.

69/ Report at A-53-54.

70/ Tr. at 64; petitioner's brief at 50 and Confidential Appendices.

71/ Tr. at 39-40.

members have sold mostly to niche markets such as military applications, allegedly because Japanese competition foreclosed their expansion into the larger commercial market. Also, restricted sales appear to have limited domestic producers' opportunities for important manufacturing experience. This experience is crucial to building the confidence of purchasers in buying from domestic producers. 72/

The record shows that several firms left the domestic industry during the period of investigation. One of those companies stated that its departure was due in significant part to Japanese competition, which discouraged investors from considering investment in the domestic industry. 73/

In this preliminary investigation, we find that (1) the record as a whole does not contain clear and convincing evidence that there is no material injury or threat of material injury; and (2) additional and perhaps contrary evidence is likely to arise in a final investigation. 74/ In conclusion, we determine based on the record in this preliminary investigation that there is a reasonable indication that the domestic HIC flat panel display industry is

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72/ Report at A-7, n.22. See, e.g., Mechanical Transfer Presses from Japan, Inv. No. 731-TA-429 (Final), USITC Pub. 2257 (Feb. 1990).

73/ Report at A-30.

74/ In a preliminary investigation, the Commission must make an affirmative determination unless "(1) the record as a whole contains clear and convincing evidence that there is no material injury or threat of material injury; and (2) no likelihood exists that contrary evidence will arise in a final investigation." American Lamb v. United States, 785 F.2d 994, 1001 (Fed. Cir. 1986).

Should this investigation return for a final phase, we intend to seek further information on important unanswered issues raised in this preliminary investigation, such as the developmental history of the subject product; the operations of integrators and subassembly makers; and the roles of price and learning curves in the bid process.

experiencing material injury by reason of the subject imports. 75/

75/ Respondents argue that the Commission should disregard any effect that imports for military uses may have on the domestic industry, citing 19 U.S.C. § 1677(20)(B) that prevents the imposition of antidumping duties on products imported for use by the Department of Defense. However, that provision simply bars the imposition of duties and does not relate to the Commission's consideration of such imports, which remain subject to investigation.

ADDITIONAL VIEWS OF ACTING CHAIRMAN ANNE E. BRUNSDALE

High Information Content Flat Panel Displays and Subassemblies Thereof from Japan

Inv. No. 731-TA-469 (Preliminary)

September 4, 1990

I join in the Commission's unanimous determination finding a reasonable indication that a domestic industry is materially injured by reason of the importation of high information content (HIC) flat-panel displays (FPDs) from Japan. I write separately to emphasize certain points and to elaborate on nuances that are inevitably lost in the preparation of a unanimous opinion but that, in my view, will likely be key issues in any final investigation.

In this regard, it is important to state the basis on which I have made an affirmative preliminary determination. As I have stated in prior cases, the Commission's practice, consistent with the dictates of our governing statute[1] and controlling precedent,[2] has been to issue negative determinations only when the evidence supporting a petition does not, standing alone,

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[1] 19 U.S.C. § 1673b(a) (the Commission in a preliminary determination must decide whether there is a "reasonable indication" of material injury or threat of material injury to a domestic industry, or material retardation of the development of a domestic industry, "by reason of" the subject imports).

[2] American Lamb Co. v. United States, 785 F.2d 994, 1001 (Fed. Cir. 1985) (the Commission should issue a negative determination only when the record as a whole contains no clear and convincing evidence of injury and there is no likelihood that contrary evidence will be developed in a final investigation).

provide a reasonable indication of injury, threat, or retardation by reason of the subject imports, or because the evidence contrary to the petition is so clear and convincing that any evidence supporting the petition does not amount to a reasonable indication of an affirmative case.[3]

At this preliminary stage of the proceedings, I find that both of these criteria militate in favor of continuing the investigation. The petitioning HIC FPD industry presents us with a case involving highly complex technology. The dynamics of this industry are very much like that of the semiconductor industry, with producers -- domestic and foreign -- anticipating losses on early production runs until commercial yields are achieved. The industry is characterized by complicated commercial relationships as well as technology that changes almost daily. Finally, all parties appear to agree that the data collected on the state of the industry today reflect business decisions made almost two years ago based on technology that is, by now, becoming obsolete. These characteristics hamper any effort to capture a clear snapshot of the industry at this time. My preliminary decision thus is based on my belief that the Commission does not yet have a sufficiently complete understanding of the dynamics of this

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[3] See, e.g., New Steel Rails from Canada, Inv. Nos. 701-TA-297 and 731-TA-422 (Preliminary), USITC Pub. 2135 at 67-68 (November 1988)(Views of Acting Chairman Anne E. Brunsdale).

industry to choose from among the conflicting conclusions that might be drawn from the preliminary record.[4]

On that basis, I submit following a few thoughts on the case presented thus far, with the expectation that the parties will in any final investigation provide constructive criticisms and additional insights.

"Like Product" and Like Matters

Two matters related to the like product issue in this case are worth considerable attention in any final investigation: (1) the distinctions among the different technologies of HIC FPDs, and (2) the Commission's decision to include subassemblies as part of the like product. I address these matters briefly below, without prejudice to any final determinations the Commission may be called upon to make.

Both petitioner and respondents offer extreme views on the choice of an appropriate like product. Petitioner would include within one like-product category all forms of the four FPD technologies currently available: passive matrix liquid crystal

[4] The dynamics of high-tech industries like the semiconductor and HIC FPD industries also tend to blur the distinction between injury, threat, and retardation. Petitioner here, for example, does not complain that the imports in question are hampering sales of identical products -- indeed, the domestic industry does not even make a product identical to a major portion of the imports. The issue is whether today's imports -- based on business conditions and technology available more than a year ago -- materially affect the domestic industry's ability to develop and produce in commercial quantities a new generation of FPDs. I will address the issue under the rubric of injury on the simple grounds that the injury approach is the easiest and, in any event, the choice makes no difference to the ultimate result.

display (passive LCD), active matrix LCD, plasma technologies, and electroluminescent (EL) display. Respondent argues for four separate like-product categories, noting that each technology satisfies different criteria by which FPDs are judged and purchase decisions are made, including (among others) contrast, power usage, speed, color, and viewing angle.

Evidence that appears to be uncontroverted, however, suggests that an alternative, intermediate position is worth exploring in any final investigation. Passive LCD technology, developed for HIC FPDs in the early- to mid-1980s, was one of the first commercially successful technologies incorporated into FPDs and was derived principally from technology developed in connection with non-HIC displays. The strength of passive LCDs is its proven technology that utilizes relatively little power and thus is particularly useful in consumer items like lap-top and portable computers. The technology is deficient in nearly every other commercially important feature.

The other three technologies are rapidly coming to the forefront of the HIC FPD market and will likely displace passive LCD technology because each of them provides a solution to one or more of the technical problems associated with passive LCD displays, though usually at some cost (most typically the need for a large power supply). A purchaser of HIC FPDs thus must make a series of choices. The first is between the "old," tried-and-true passive LCD technology and one of the "new" technologies. The second is among the different types of new

technology. Evidence suggests, however, that the three new technologies are converging very quickly and many of the problems originally associated with them are being resolved.[5] Recently, computer manufacturers -- the principal purchasers of HIC FPDs -- have ordered and taken delivery of displays incorporating one of the newer technologies. The computer manufacturers sell computers with these displays as options alongside traditional passive LCD displays. In any final investigation, therefore, I will consider whether a two like-product approach that separates passive LCD FPDs from FPDs incorporating other technologies is supported by the evidence and, in fact, makes any difference to the outcome of the case.[6]

As for including FPD subassemblies within the like product, petitioner admits that there are no imports of subassemblies to speak of and that it has included subassemblies in the petition solely for the purpose of preventing circumvention of any antidumping order.[7] Respondents contend with some force that a recently enacted amendment to the antidumping laws captioned "Prevention and circumvention of

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[5] Staff Report at A-16.

[6] The term "like product" means "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation." 19 U.S.C. § 1677(10). Although the domestic industry does not make FPDs incorporating passive LCD technology, the domestic product "most similar" to imported passive LCD FPDs would presumably be FPDs incorporating the technologies made by the domestic industry. This is the result advocated by the petitioner, even if it does not follow petitioner's reasoning.

[7] Transcript at 69-70.

antidumping orders"[8] obviates the need for such a practice and draws into question the propriety of prophylactic measures such as those advocated by petitioner.[9]

Subassemblies are included within the scope of the investigation as defined by the Department of Commerce. The Commission must deal with subassemblies in some fashion, therefore, despite the undisputed fact that there are no substantial imports of subassemblies and any imports that do exist are not harming the domestic industry. The only consideration left to the Commission, therefore, is whether subassemblies are part of the same like product as the finished product, or whether they occupy a separate like-product category of their own. Viewed another way, the Commission must decide whether the producers of subassemblies are part of the same domestic industry that produces HIC FPDs, or are part of a separate, upstream industry that should not be considered in this case.[10]

The anticircumvention measure, however, does not address this question. Rather, it assumes the answer. By its terms, the

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[8] 19 U.S.C. § 1677j.

[9] Joint Post-Conference Brief of Apple Computer Inc., Compaq Computer Corp. [etc.] at 36-37 (hereinafter "Computer Respondents' Brief").

[10] See n.6, supra. The definition of the appropriate like product is not an end in itself; rather, it is a means by which the scope of the domestic industry is ascertained. The statute requires the Commission to ascertain whether an "industry in the United States" is entitled to relief. 19 U.S.C. §§ 1673, 1673b. The term "industry" is defined as "the domestic producers as a whole of a like product." 19 U.S.C. § 1677(4)(A).

anticircumvention provision can apply only to the importation of parts and components produced by separate upstream producers, not by members of the domestic industry whose product is already covered by an antidumping order. The petitioner contends that finished FPDs and dedicated subassemblies are the same like product. Thus, if petitioner properly includes dedicated subassemblies in the same like-product category as finished LPDs, any antidumping order on FPDs must cover dedicated subassemblies. The anticircumvention provision would then come into play only if importers were bringing into the United States parts and components of the merchandise covered by the antidumping order -- including, perhaps, parts and components of subassemblies -- for finishing operations here. If respondents are correct and the producers of subassemblies are part of a separate upstream industry, then the importation of subassemblies could trigger the anticircumvention provision. The provision itself, however, has no bearing on which side's like- product argument should prevail.

Are subassemblies the same like product as a final FPD and are producers of subassemblies members of the domestic FPD industry? Witnesses for petitioner testified that the glass portion of an FPD (i.e., the glass substrates and the incorporated pixel technology) is the real heart of an FPD and that every producer of FPDs manufactures at least the glass subassembly.[11] Though FPD manufacturers will almost always design the electronic gear that powers, drives, and controls the

[11] Transcript at 86-89.

display -- as they practically must since the electronic gear must fit perfectly with the particular display characteristics -- the electronics are sometimes produced by contractors in facilities not dedicated to the manufacture of FPD components.[12] As petitioner describes the domestic industry, the role of the manufacturer in producing the electronics gear is very different from the role of the manufacturer in producing the glass subassembly -- only the latter is clearly a part of the domestic industry. In any final investigation, therefore, I will consider especially carefully whether the electronic gear, even if it is dedicated to incorporation into an FPD, satisfies the Commission's traditional test for inclusion of a subassembly within the same like product as the completed product.

Injury to a Moving Target

One key fact in this investigation that is worth repetition and emphasis is that the domestic industry does not produce HIC FPDs incorporating passive LCD technology, the product that to date comprises the largest share of HIC FPD imports.[13] The domestic industry has produced HIC FPDs incorporating the three other technologies, most particularly EL displays, but not in commercial quantities. In the past year or two, computer companies have become more interested in FPDs incorporating the

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[12] Id. Staff Report at A-25 - A-26.

[13] Staff Report at A-18.

newer technologies and have called upon Japanese producers to begin production runs in commercial quantities.

Respondents argue that the domestic industry cannot in these circumstances be materially injured by reason of the subject imports. As discussed above, they rely heavily on the contention that the different technologies are not substitutable for many applications, e.g., small portable computers and other applications that require low power usage. They argue further that, were the imports sold at "fair" value, the market for HIC FPDs would dry up because the domestically manufactured products in which they are incorporated -- lap-top computers, notebook computers, etc. -- would become too expensive for most users. Alternatively, they argue that they could lose market share to foreign computer producers who have access to the lower priced displays.[14] Either way, say respondents, the domestic producers are largely irrelevant to the purchasing decisions of major computer manufacturers, are not affected by the dumped Japanese imports, and would not benefit from an antidumping order.

While respondents' arguments are persuasive in the abstract, they do not take fully into account the dynamics of this industry. Respondents base their argument on the premise that, "Regardless of the price in the U.S. for Japanese imports, there cannot have been any transmission to the prices of the non-

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[14] The evidence indicates that a display accounts for between 25 and 40 percent of the cost of a portable computer and that the cheaper the computer overall the larger the percentage of the cost attributable to the display.

substitutable domestic like products."[15] Thus, they dismiss any possibility that the dumped imports, including passive LCD displays, can have an impact on the domestic industry producing a similar product with a more advanced technology.

At this preliminary stage of the investigation, the record does not allow one to conclude definitively that respondents' premise is correct. Some domestic computer companies are offering products with different display technologies so as to provide their customers with different display options. Respondents themselves point out that, in 1989, 10 percent of all portable computers sold in the United States (85,000 units) had EL displays,[16] the technology at which domestic producers are most proficient. The contention that the different technologies are not substitutable thus requires further investigation.

Even assuming a lack of perfect substitutability, dumped passive LCD displays could nonetheless affect the domestic industry producing other types of displays in many different ways. I outline possible scenarios below not to imply that the petitioner can necessarily demonstrate the facts to support these theories in any final investigation, or that petitioner might not demonstrate a theory equally plausible to those outlined below, but rather to show that the record as it now stands does not allow for any firm conclusions on this matter.

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[15] Computer Respondents' Brief at 57.

[16] Computer Respondents' Brief at 62.

As all parties thus far agree, production of HIC FPDs (like production of semiconductors) is characterized by a steep learning curve in which manufacturers achieve greater production yields as they gain manufacturing experience and produce larger quantities. Manufacturers can expect to generate losses early in the product cycle when yields are low as they effectively "pay" for production experience.[17] Hopefully, these early losses are offset as production quantities increase, even to the point where manufacturers can lower the price of the product and still generate a profit. A producer of HIC FPDs, therefore, can only be profitable in commercial markets (as opposed to niche markets such as military sales) if it has the opportunity to make large quantity production runs over a sustained period of time.

There is evidence on the record that suggests that imports of HIC FPDs at dumped prices, even imports incorporating passive LCD technology, have hampered the domestic industry's ability to attract orders in commercial quantities sufficient to move down the learning curve of the new technologies now produced in small quantities in the United States. As respondents themselves point out, experience in producing one type of technology in commercial quantities is of enormous benefit when an attempt is made to manufacture a product incorporating a new technology in commercial quantities.[18] Furthermore, respondents point out

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[17] By definition, of course, when sold abroad these products are dumped.

[18] Respondents' Post-Conference Statement at 90.

that, when the Japanese producers moved into HIC FPDs they had the advantage of their prior experience in producing low information content displays in commercial quantities.[19] It is not too much of a leap to suspect that the experience in producing HIC FPDs using passive LCD technology and exporting the FPDs at dumped prices permitted the Japanese to increase the quantity produced and to move farther down the learning curve than would have been possible had they exported at non-dumped prices. Under this scenario, the dumping injured the domestic industry because it permitted the Japanese producers to move into commercial production of HIC FPDs incorporating new technologies in which the domestic producers would otherwise have been competitive.[20]

Alternatively, even assuming that large-volume production in one technology provides no specific advantage when producing in a new technology, the fact that passive LCD technology is sold at a dumped price might have an inhibiting effect on the willingness of purchasers to place large commercial orders incorporating the new technology. Respondents point out that, "for the end use segment of the market in which passive matrix LCDs [sic] sales are concentrated . . ., other FPD types are

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[19] Id. at 75.

[20] As respondents' note, "[A] primary factor inhibiting the ability of the U.S. industry to raise capital to finance commercial production is not the existence of imports from Japan, but the fact that the U.S. industry would be entering an industry in which the primary suppliers are well advanced on the production learning curve." Id. at 86.

simply not viable substitutes due to their higher cost."[21] That statement begs the question, however, of whether the unit costs of displays using the new technologies are too high because, given the ready availability of passive LCD displays at dumped prices, they have not yet been manufactured in sufficiently high quantities, or whether the new technologies would be substitutable if the passive LCD displays were available only at non-dumped prices. The record indicates that the unit costs of HIC FPDs produced and sold by the domestic manufacturers dropped precipitously in periods in which their production runs were larger -- and these sales did not even approach the size or the duration of commercial runs generally called for in the contracts offered by the major computer companies.[22]

Finally, the parties share common ground in noting that at the core of this case is a classic chicken-and-egg problem. Petitioner attributes domestic producers' inability to attract the substantial capital required to build the capacity necessary to generate commercial yields and profitable runs to the fact that it cannot compete for contracts with dumped Japanese imports. It alleges that no producer, not even a Japanese producer, builds capacity until it is fairly certain of attracting a commercial order.[23] The respondents argue that domestic manufacturers will not qualify prototype displays for

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[21] Respondents' Post-Conference Statement at 81.

[22] Staff Report at A-35.

[23] Petitioner's Post-Conference Brief at 39.

commercial production unless the prototypes were produced on the same production lines that will be used to satisfy the order.[24] At this point, the record provides no basis for discerning where the truth lies.

The foregoing is not intended to suggest that petitioner's case is water tight. On the contrary, it contains many holes. For example, the contention that Japanese producers have dumped imports so as to achieve the benefits of large commercial runs and to gain the experience necessary to move into new technologies ignores the fact that over 70 percent of Japanese HIC FPDs are sold in markets other than the United States.[25] It is by no means clear, therefore, that the Japanese would not have an overwhelming competitive advantage even without dumping and that the dumped imports are irrelevant to the fortunes of the domestic industry as respondents allege.

Petitioner also refutes its own case by acknowledging that HIC FPD manufacturers that produce for commercial applications are price takers -- that is, they must agree to sell displays at a price set by the purchaser. Petitioner cites approvingly a statement by a representative of respondent Hosiden that the price at which Hosiden agreed to produce displays for Apple was derived from the market price at which Apple expected to offer its computers.[26] Petitioners point out that computer companies

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[24] Computer Respondents Brief at 64.

[25] Staff Report at A-45, Table 25.

[26] Petitioner's Post-Conference Brief at 32.

generally set a target price for their product, and then negotiate a price for a display based on that figure.[27] If this is true, it goes a long way to establishing respondents' contention that dumping is irrelevant to the computer companies' purchase decisions[28] and that an antidumping order would only dry up the market for HIC FPDs by making U.S.-manufactured computers with HIC FPDs uncompetitive on world markets.

Conclusion

As I mentioned at the outset of these views, my comments are not intended to be a pre-evaluation of the evidence that might arise in a final investigation. They are merely intended, first, to highlight some of the issues that I believe should be resolved in any final investigation and, second, to demonstrate my conclusion that the record compiled thus far compels an affirmative determination under standard Commission practice solely because no definitive determination on the merits of the petition is possible at this point. I therefore find a reasonable indication of material injury to a domestic industry by reason of the subject imports.

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[27] Id.

[28] That is, computer companies will set the display cost they believe is necessary to meet their computer market price and will look for the best possible display that meets these terms.

INFORMATION OBTAINED IN THE INVESTIGATION

Introduction

On July 18, 1990, a petition was filed with the U.S. International Trade Commission (Commission) and the U.S. Department of Commerce (Commerce) by counsel for the Advanced Display Manufacturers of America (Washington, DC) and its individual member companies, Planar Systems, Inc., Plasmaco, Inc., OIS Optical Imaging Systems, Inc., The Cherry Corporation, Electro-Plasma, Photonics Technology, Inc., and Magnascreen Corporation, alleging that an industry in the United States is being materially injured, is threatened with further material injury, or is materially retarded from being established by reason of imports from Japan of high-information content (HIC) flat panel displays and subassemblies thereof, however provided for in the Harmonized Tariff Schedule of the United States (HTS), that are alleged to be sold in the United States at less than fair value (LTFV). [1] Accordingly, effective July 18, 1990, the Commission instituted antidumping investigation No. 731-TA-469 (Preliminary) under section 733(a) of the Tariff Act of 1930, to determine whether there is a reasonable indication that an industry in the United States is materially injured, or threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports of such merchandise into the United States.

The statute directs the Commission to make its preliminary determination within 45 days after receipt of the petition or, in this investigation, by September 4, 1990. Notice of the institution of this investigation was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the Federal Register of July 24, 1990 (55 F.R. 30042). Commerce published its notice of initiation in the Federal Register of August 14, 1990 (55 F.R. 33146). [2] The Commission held a public conference in Washington, DC, on August 7, 1990, at which time all interested parties were allowed to present

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[1] For purposes of this investigation, "HIC flat panel displays" are large area, matrix addressed displays, no greater than 4 inches in depth, with a picture element ("pixel") count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Included are monochromatic, limited color, and full color displays. Displays may utilize, but are not limited to, the following technologies: liquid crystal, plasma, and electroluminescence. HIC flat panel displays are used to display text, graphics, and video. Subassemblies of a display that are exclusively dedicated to or designed for use in HIC flat panel displays are also covered by this investigation.

The following merchandise is excluded: segmented flat panel displays, matrix addressed flat panel displays with less than 120,000 pixels, and cathode ray tubes.

The appropriate Harmonized Tariff Schedule (HTS) subheadings under which the subject merchandise is classifiable cannot be specified because (1) Customs rulings are not available on such goods, and (2) numerous provisions appear potentially applicable.

[2] Copies of the Commission's and Commerce's Federal Register notices are presented in app. A.

information and data for consideration by the Commission. [3] The Commission has not conducted a previous investigation on the subject product. [4]

The Product

Description

The imported products subject to this investigation are HIC flat panel displays and subassemblies thereof. HIC flat panel displays are electronic devices that are designed to display text or graphics when integrated into such end-user systems as laptop and portable computers, medical and office equipment, and instrumentation for the military. The subject displays are large area, matrix addressed displays, no greater than 4 inches in depth, with a picture element ("pixel") count of 120,000 or greater. [5] Displays include, but are not limited to, those produced using the following technologies: liquid crystal, plasma, and electroluminescence. HIC flat panel displays may be monochromatic, limited color, or full color. They may also include such options as backlights, interface cards, and/or touch switches. Subassemblies that are exclusively dedicated to or designed for use in a HIC flat panel display are also covered by this investigation. [6]

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[3] A list of the participants in the conference is presented in app. B.

[4] However, liquid crystal display (LCD) television receivers were the subject of a section 751(b) review investigation instituted by the Commission effective August 20, 1987 (inv. No. 751-TA-14). This review investigation was instituted pursuant to a request to exclude LCD television receivers from the scope of the dumping order issued following the Commission's determination on March 4, 1971 that an industry in the United States was being injured by reason of imports of television receivers from Japan that were being, or were likely to be, sold at less than fair value (inv. No. AA1921-66). The petitioner in inv. No. 751-TA-14 argued that LCD televisions do not compete with television receivers using a cathode ray tube (CRT) and that the development of LCD receivers subsequent to the Commission's determination in inv. No. AA1921-66 warranted changed circumstances. The Commission determined that it was not appropriate to modify or revoke the existing antidumping order covering television receivers from Japan to exclude LCD televisions. Its report and findings for inv. No. 751-TA-14 can be found in USITC Publication 2042, December 1987. The HIC flat panel displays currently under investigation include LCDs; however, HIC LCD flat panel displays are not at present used in LCD television receivers (which use flat panel displays with fewer than 120,000 pixels).

[5] There are no known HIC flat panel displays that are not matrix addressed or that are greater than 4 inches in depth.

[6] Petitioners requested coverage of subassemblies not out of any present concern that subassemblies of HIC flat panel displays are being sold at LTFV in the United States, but in order to prevent circumvention of any import relief granted in this investigation. Petitioners' postconference brief, p.

(continued...)

HIC flat panel displays.--Finished HIC flat panel displays are a type of electronic display that converts information received as electrical signals into visible images on the display glass. Displays are subdivided into rows and columns of dot-like pixels [7] connected to the edge of the display by grids of very fine electrical conductors. In most displays, when a given row and column are electrically activated, the pixel at the intersection is turned on (activated); such activated pixels may deactivate on their own or remain on until turned off by another signal. [8] Figure 1 in appendix C shows the letters A and B formed by individual pixels (magnified many times compared to an actual HIC flat panel display).

For purposes of this investigation, flat panel displays have "high-information content" if they contain 120,000 or more pixels. Thus, their definition is a function of both pixel density and screen size. That is, a small display having the same pixel density as a large one may not be "high-information content," while the large one may be. Once the technological challenge of increasing pixel density was met, the focus has been on increasing screen size. Although displays have been built with a diagonal measurement of a meter or more for special applications, the most common are less than 10 inches due to current production technology limitations. [9]

At this time, almost all HIC flat panel displays in the U.S. market are monochrome. Monochrome displays may be classified as nongray scale or gray-scale. [10] Color displays are being developed and may be available in

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[6] (...continued)
22. In a joint postconference brief (pp. 33-35), OEM users argue that, except for display glass, the Commission should exclude subassemblies from the scope of this investigation.

[7] A pixel may be monochromatic or color. Color pixels consist of three or more separate subpixels of the primary colors which, when selectively activated, provide color to the image.

[8] For those displays in which the pixels cannot be locked on, the complete display must be repainted or "refreshed," pixel by pixel, about 30 times a second in order to eliminate flicker such as that associated with early motion pictures.

[9] Certain applications such as text and graphics displays for computers require resolutions in common formats, such as 640 x 200 pixels (CGA resolution), 640 x 350 pixels (EGA resolution), or 640 x 480 pixels (VGA resolution), all of which are high-information content (i.e., 120,000 pixels or more).

[10] In gray scale displays, the intensity of each pixel varies, producing "shades of gray" which permit the display of photograph-like images. (In nongray scale displays, the pixels are simply on or off and can only be used to display text or graphics.) Gray scale displays are produced with various "levels" of gray scale. Currently, products with up to 16 levels are available. In its questionnaire response, IBM notes that * * *.

increasing quantities in the near future. [11] HIC flat panel displays consist of display glass (i.e., the glass display assembly or transducer which contains the pixels and row and column electrodes) and associated electronic systems, which drive the electrodes on the glass display assembly and interpret the incoming information-bearing signals. More specifically, a finished HIC flat panel display consists of (1) the display glass assembly, (2) drive electronics, (3) control electronics, and (4) a mechanical frame or package. A power supply may be included. The arrangement of the components (except for the power supply) is shown in figure 2 in appendix C. [12] They are further described below:

(1) Display glass--a processed glass substrate that typically incorporates patterned row and column electrodes orthogonal to each other, a material that reacts to a change in voltage (e.g., liquid crystal, gas, thin film phosphor, powder phosphor), and contact pads for interconnecting the drive electronics to each row and column electrode.

(2) Drive electronics--integrated circuits which provide voltages to drive the row and column electrodes. Drive electronics are customized according to the type, size, and capability of the glass display assembly.

(3) Control electronics--integrated circuits that decode and interpret the signals sent by the end-user system and transmit the signals to the drive electronics. Control electronics are also customized for the individual display.

(4) Mechanical package--the frame which mounts the printed circuit boards for the drive and control electronics to the display glass. The mechanical package also adds strength and protection to the display glass and provides the means whereby the user mounts the display into the end-user system.

(5) Power supply--an electronic circuit that provides appropriate voltages for the HIC flat panel display. Many of the voltages required by the displays are not standard and require customized power supplies. The power supply may be placed on a module separate from the other electronic boards.

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[11] Color thin-film transistor (TFT) LCDs are just arriving in the marketplace. In March 1990, Sharp Electronics and Hitachi America, Inc. publicly committed to the delivery of color TFT-LCDs in the U.S. market. Other color displays are expected from IBM/Toshiba, NEC, and Epson in late 1991. "Color panels coming," Electronic Engineering Times, Mar. 12, 1990. A color passive matrix (see the following section for description) LCD is also available.

[12] These components can be characterized as separate subassemblies and, in fact, were so defined by the petition. However, Commerce, in its initiation notice, simply stated that the covered product includes "subassemblies that are exclusively dedicated to or designed for use in high information content flat panel displays" and did not specify individual components.

HIC flat panel displays are classified by the technology which is used to produce the display glass. The most common display technologies, and the ones for which data were collected by the Commission, are liquid crystal displays (LCDs), plasma displays, and electroluminescent (EL) displays. [13] [14] They are described below.

LCDs.--There are two different ways that LCD technology is currently being applied to HIC flat panel displays: passive matrix and active matrix. In both cases, liquid crystals are sandwiched between two sheets of glass, called substrates, where the liquid crystals, in essence, act as optical shutters. [15] In passive matrix LCD technology, the pixel positions are energized by voltages applied via intersecting row and column drivers. [16] However, as passive matrix LCDs become larger, the contrast ratio of the display decreases and the viewing angle becomes smaller. These disadvantages can be overcome, however, by what is known as active matrix technology. [17] Active matrix LCDs utilize an active element, usually a thin-film transistor (hence the name thin-film transistor or TFT-LCD) located on the glass substrate at each pixel cell. The transistor acts as a local switch and provides better control of the voltage applied to the liquid crystal material.

In recent years, there have been a number of performance improvements that increase the angle from which the LCD may be viewed, provide added

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[13] There are a number of other flat panel display technologies that are being researched or that are in the early stages of development. These include such technologies as electrochromic, electrophoretic, electro-optic-ceramic, electromechanical, field emission spun cathode, etc.

[14] Displays may also be characterized as non-emissive or emissive. Non-emissive displays do not emit light and cannot be viewed in the dark. In emissive displays, each pixel emits light when electrically activated and is thus visible without natural or ambient light or a backlight. LCDs are non-emissive; plasma and EL displays are emissive. Emissive technologies reportedly require twice the power of LCDs, which increases the weight of the product.

[15] The physical mechanism whereby light is blocked or passed involves the twisting of polarized light by the liquid crystal located between two polarizing filters, which are orthogonally oriented.

[16] There are a number of variations on the design and chemistry of the passive matrix LCDs that affect the performance of the technology. Variations generally add to the complexity of the LCD construction and include twisted nematic (TN), supertwisted nematic (STN), and double supertwisted nematic (DSTN) technologies.

[17] Active matrix technology also improves the poor response speeds of passive matrix LCDs, enabling active matrix products to be used in applications requiring video animation.

contrast between active and inactive pixels, increase pixel response speed, and permit the display of full-color images. [18]

Plasma displays.--In plasma displays, the pixels are minute cells of a compound gas sandwiched between two glass substrates that give off a red-orange glow when ionized by direct current (DC). There are also more complex variations of the plasma displays which involve the use of alternating current (AC) and AC/DC combinations to improve performance and create displays with memory, that is, not requiring refreshing.

EL displays.--EL displays use light-emitting pixels constructed of a solid material. When excited by electricity [19] from the row and column electrodes, the solid material gives off visible light of a color determined by the chemistry of the material used. EL displays are differentiated by whether they use AC thin film (ACTFEL) or DC powder technologies.

Subassemblies.--With the exception of some of the parts used in printed circuit boards that are common to all electronic products, subassemblies for HIC flat panel displays appear to be dedicated for use in a specific type of display (i.e., LCD, plasma, or EL). [20] [21] Subassemblies are manufactured and

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[18] In color LCDs, each pixel is divided into three or four subpixels and is coated with a primary color filter making it possible to produce a large range of colors at each pixel location. The intensity of the light passing through each subpixel determines the final color of the composite pixel. Color TFT-LCDs require an auxiliary backlight that, due to the addition of color filters, must be considerably brighter than that used with a monochromatic LCD. The color TFT-LCD is much more complex than the monochrome TFT-LCD both because of the addition of the color filters and the resulting three- or four-fold increase in the number of cells and transistors.

[19] The exact light-emitting mechanism involves a complex relationship between the quantum physical behavior of excited ions and certain phosphors. The process is closely related to the physics of solid-state electronic devices such as light-emitting diodes.

[20] The discussion of subassemblies in this report refers only to the (1) display glass, (2) drive electronics, (3) control electronics, (4) mechanical packages, and (5) power supplies for HIC flat panel displays because the petitioners only identified those subassemblies as dedicated. (They qualified their assertion somewhat with reference to power supplies.) Data on subassemblies were collected and are presented only for these components. If, however, any other "part" of a HIC flat panel display is dedicated or designed for use in such displays, it would constitute a "subassembly" under the scope of this investigation.

[21] There is some disagreement, or perhaps difference of emphasis, regarding interchangeability of subassemblies among technologies. Planar states in its questionnaire response that subassemblies are generally designed and built for each type of technology and are thus specific to that technology.

(continued...)

distributed in various combinations prior to final assembly into a finished HIC flat panel display. There is a trend, for example, to place the drive and control electronics directly onto the display glass. The drive and control electronics may also be placed on separate printed circuit boards or mounted onto a common one.

Manufacturing process

The manufacturing and supply of HIC flat panel displays are influenced by two factors: (1) current technology and (2) availability of capacity and experience in commercial manufacturing. [22] [23] Substantial capital investment is required to build manufacturing plants for HIC flat panel displays. Although research in flat panel display technology has been under way for over 20 years, it is only since the early to mid-1980s that applications for wide-scale commercial use have been developed. Most of the development work was

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[21] (...continued)
OEM user respondents do not disagree that the display glass assembly is technology-specific and indicate the drive electronics are also normally designed for a specific type of glass technology. However, they state that some control electronics are usable across glass technologies and, in fact, can, with certain modifications, also be used with cathode ray tubes. (Also, according to OEM user respondents, the drive electronics may be used on displays of the same glass technology that are low-information content (i.e., below 120,000 pixels) and have limited use in such devices as printers or plotters.) OEM users postconference brief, p. 30; response by * * * to the Commission's questionnaire.

In a postconference brief, the co-counsel for Japanese manufacturers also agrees that each type of display glass is dedicated for use in a specific type of display and cannot be used in others and adds that the "circuit connections, AC data timing signals, DC voltage levels, display control functions, and color and gray-scale emulation controls are unique for each FPD technology. They cannot be interchanged without significant hardware and software modifications." Postconference brief, p. 13 and p. 105.

[22] A July 1990 Congressional Budget Office study states, "Given the difficulty that producers of flat-panel displays experience in scaling up to full production, manufacturing experience is likely to be the leading driver of technology." Congress of the United States, Congressional Budget Office, Using R & D Consortia for Commercial Innovation: SEMATECH, X-ray Lithography, and High-Resolution Systems, p. 50.

[23] Technologies have continued to evolve and become available during the period of investigation. According to the response by U.S. OEM computer manufacturers to the Commission's questionnaire, the following technologies were available for purchase in the U.S. marketplace in January 1987: LCD TN, LCD STN, plasma AC/DC, plasma DC, and EL ACTFEL. During the period of investigation, the following technologies became available: DSTN-LCD (Jan. 1988), TFT-LCD monochrome (Jan. 1988), TFT-LCD color (Apr. 1989), film STN-LCD (second quarter 1989), and NTN-LCD (Mar. 1990).

pioneered in the United States or Europe; [24] however, it has generally been applied first in Japan. [25] [26]

The production technology for HIC flat panel displays is principally derived from the processes used to manufacture solid-state integrated circuits. In fact, a HIC glass substrate (most specifically for active matrix LCD) can be characterized as being a single, large integrated circuit. [27] The production processes for HIC flat panel displays can generally be divided into two major parts: (1) display glass production, and (2) electronics assembly and testing.

The display glass assembly for the various HIC flat panel displays is generally manufactured using similar but distinct manufacturing processes in separate production facilities. [28] There are, however, several generic manufacturing steps for all types of displays. These steps, i.e., glass cleaning, assembly, [29] aging, and testing, presumably could be accomplished in

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[24] The petitioners' postconference brief points out that U.S. firms continue to hold key patents to the technology (p. 49).

[25] Stix writes "The early Japanese domination of markets for wristwatch-sized LCDs and small television receivers established what appears to be an unshakeable lead. (The low end of the market has been taken over by Taiwan, Hong Kong, and other production sites, but the Japanese still have a firm grip on the display market for technology-intensive LCDs)." "Manufacturing hurdles challenge large-LCD developers," IEEE Spectrum, September 1989.

[26] Patton writes "The strong demand for portable TVs in the Asian markets has spurred TFT technology and helped justify the significant investment dollars required to produce products." "Market analysis: color TFT-LCDs," Information Display, October 1989.

[27] There are, however, important differences between manufacturing HIC flat panel displays and integrated circuits. The output of a HIC flat panel display production line is a single substrate; in contrast, the output of an integrated circuit production line is a substrate or wafer that contains multiple integrated circuits which are divided and sold separately. In a HIC glass substrate each pixel or transistor is interconnected and must be operating; the entire glass substrate is scrapped if several are defective. (In contrast, when manufacturing integrated circuits, defective chips can be discarded and the remaining ones encapsulated and sold.) The scrapping of defective substrates reduces the "manufacturing yield" and is one of the more difficult and costly manufacturing problems to solve.

[28] No domestic manufacturer of HIC flat panel displays produces more than one technology type. Japanese manufacturers that do produce multiple technologies, manufacture them in completely separate production facilities using different machinery. OEM end users postconference brief, p. 19.

[29] The petitioner states that the actual assembly of the component parts into a finished HIC flat panel display is relatively easy: "The final assembly

(continued...)

common facilities operated by HIC flat panel display producers that produce more than one type of display. The distinguishing production steps, which require different facilities, are the electrode formation, material filling, and sealing processes. All HIC flat panel displays, however, are produced in a clean-room environment. Differences in raw materials occur primarily in the material activated by the electronics either to emit or modulate the light. [30] A brief description of the manufacturing process for each technology is presented below. [31]

LCDs.--In the manufacture of LCDs, one glass substrate is joined to another glass substrate with an adhesive around the perimeter, except for one small gap. A vacuum is pulled in the space between the two pieces of glass and liquid crystals are injected through the gap. Once the panels are completely sealed and polarizers have been applied to the glass surface, the drive and control electronics are attached to the perimeter of the panel. Passive matrix LCD panels are the easiest HIC flat panel displays to manufacture; in contrast, the manufacture of active matrix LCDs is complex and currently characterized by low manufacturing yields. An active matrix LCD display is made in several steps, the most critical of which is the application of a grid of transistors to a glass substrate through a process called photolithography. The layering process is done 6 to 10 times to build up the grid of transistors that act as electrodes. A dielectric coating must be applied on top of the grid by either sputtering or evaporation techniques. [32]

Plasma displays.--Plasma displays are made in a similar way to LCD displays, where two glass substrates that have had layers of electrodes and dielectrics applied are sandwiched together. However, gas rather than liquid crystals is injected into the vacuum between the glass substrates. [33] Also,

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[29] (...continued)
process can be done in most cases independent of the glass technology used in less than one minute, using relatively inexpensive semi-automated equipment requiring less than 100 square feet of floor space." Petition, pp. 10-11.

Japanese manufacturers disagree, stating that the assembly process is extremely difficult and can "have as much effect on the yield rate as the process of making the glass display itself." Japanese manufacturers' post-conference brief, p. 103.

[30] Based upon responses to Commission questionnaires.

[31] Cost of manufacture among technologies varies. The following unit cost calculations by Stanford Resources, Inc. were provided by the co-counsel for the Japanese manufacturers: LCD-STN ($191.20), DC plasma ($203.15), LCD-NTN ($223.38), AC plasma ($235.06), EL ($245.01), and LCD-TFT ($324.76). Exhibit 1 to the postconference brief submitted by Japanese manufacturers.

[32] USITC, Liquid Crystal Display Television Receivers from Japan, USITC Publication 2042, December 1987.

[33] L.E. Tannas, Jr., Flat-Panel Displays and CRT's, ed. Lawrence Tannas, Jr. (New York: Van Nostrand Reinhold Co., 1985), pp. 237-288.

plasma panel production requires a thick-film process to create ribbed barriers between the glass panels.

EL displays.--The production of EL displays also utilizes similar technology as that used in LCD displays, but to achieve a different result. The electroluminescent pixels and the connecting electrode grids are deposited on a single glass substrate by thin film deposition, electron beam, and sputtering techniques used in the manufacture of solid-state integrated circuits. Thin-film EL is the only major flat panel display technology where the entire display is manufactured on a single substrate. It is the solid-state construction of EL displays that makes them especially rugged and durable.

Uses

Any electronic apparatus that requires a continuous, visible display of text, images, or graphics can use flat panel displays. However, the specific uses to which HIC flat panel displays have been put at any point in time is largely dependent upon currently available technology. Today, HIC flat panel displays are found most frequently in portable and laptop computers. The HIC technology is also used in a new generation of overhead projection panels that are used during presentations to project full-color computer graphics onto wall screens. Military applications are also a significant market, as are small-format applications, such as industrial control equipment. [34] [35]

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[34] A partial list of known applications and products amenable to HIC flat panel display technology includes electronic publishing and composing, word processing, automatic data processing, computers, machine tool controllers, indicators, aircraft instrumentation, test instrumentation, oil well exploration apparatus, telecommunications, radar and radio navigational apparatus, television, night vision apparatus, x-ray machines, computer-aided manufacturing apparatus, and medical monitoring instruments.

[35] As the technology is further developed, flat panel displays will be used for the larger-screened High Definition Television (HDTV). Also, industry observers predict that flat panel displays will replace the CRTs currently used in televisions and desktop computers.

The Commission received a letter, dated Aug. 10, 1990, from D. Joseph Donahue of Thomson Consumer Electronics, the successor company to the RCA and General Electric consumer electronics businesses. Thomson is a large-scale producer of color television cathode ray tubes (CRTs). In his letter, Mr. Donahue stated that Thomson is conducting research and development work in flat panel displays and is interested in the product as a potential future replacement for CRTs in television receivers, especially in Advanced Television receivers.

In its questionnaire response, IBM states: * * *. * * *. * * *. * * *.

Finally, petitioners write that, in the future, " 'the screen will become the computer' " and will be "the key to the entire personal computer market." Postconference brief, p. 44.

Substitute products

Cathode ray tubes.--Cathode ray tubes (CRTs) are also used extensively to display text, images, and graphics. CRTs are devices in which an electron beam is directed onto a phosphorescent coating on a glass screen, causing the surface to phosphoresce or give off light. CRTs are composed of a thick-glass envelope, electron gun, and phosphor screen and are frequently used in televisions, desk-top computer terminals, and specialty applications such as radar, cockpit displays, and instrumentation. [36] The question of whether CRTs can be substituted for HIC flat panel displays is addressed in the next section of this report. Responses by firms completing the Commission's questionnaires to the question of whether CRTs compete for sale with HIC flat panel displays are presented in table D-2 of appendix D to this report. Available data on the U.S. market for CRTs are presented in table 1.

Table 1
Cathode ray tubes: U.S. shipments, imports, exports, and apparent consumption, 1985-89

(In millions of units)

Item	1985	1986	1987	1988	1989
U.S. shipments	10.3	12.6	13.0	13.9	15.3 1/
Imports	3.0	3.6	1.7	2.3	4.2
Exports	0.4	0.5	0.5	1.6	1.9
Apparent U.S. consumption	12.9	15.7	14.2	14.6	17.6 1/

1/ Estimated.

Source: Official statistics of the U.S. Department of Commerce.

Low-information content flat panel displays.--There are also a number of low-information content (LIC) flat panel display technologies, including segmented LCD displays, [37] character LCD modules, [38] and low-information content display modules. LIC display modules are similar to HIC flat panel displays in that they have the ability to address individual pixels (i.e., are matrix addressed, with a series of semiconductors attached to the rows and columns of the electrodes). They typically range in pixel count from 16,000

[36] A CRT is an analog device with a single electron gun. In contrast, each pixel in a HIC display can be activated simultaneously.

[37] Segmented flat panel displays are units which typically display segmented digits in 1-line formats. These displays are used in such items as watches and automotive instrument panels.

[38] Dot matrix displays are limited in format by 5 x 7 and 5 x 10 dot character fonts. They are available in sizes ranging from 1 to 4 lines and used in such office automation equipment as printers, fax machines, and calculators.

to 64,000 pixels and are used in calculators, hand-held televisions, and other instruments that do not require high-information content. Whether a LIC or HIC flat panel display is used depends upon the amount of information to be presented and the resolution needed. The resolution of the LIC flat panel display is too coarse to be commercially acceptable for the presentation of large amounts of text and graphics. Also, such displays do not have a sufficient number of addressable rows and columns to be compatible with the standard software packages currently being used in computer systems. Although a HIC flat panel display could theoretically be used in place of a LIC display (e.g., for a calculator), it would be unnecessarily expensive and thus not commercially viable. [39] [40] Additional information from individual firms on whether LIC flat panel displays compete for sales with the HIC product is presented in table D-1 in appendix D.

Like product considerations and comparison of technologies

Responses to Commission questionnaires by respondents have emphasized that the various technologies have unique features or performance characteristics that are matched to or correlated with the requirements for the varying applications. [41] Petitioners (each of whom manufactures only LCD, plasma, or EL displays) have reported that each of their products compete for sale with all the major technologies used to produce HIC flat panel displays. [42]

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[39] Like HIC flat panel displays, low-information content applications are produced using LCD, plasma, and EL technologies and may be manufactured within the same facilities as HIC displays. However, such manufacturing requires different masking techniques, tools, fixtures, assembly, and testing.

The reverse, however, is not true. HIC flat panels cannot be produced on a production line designed for LIC flat panels. (Response by Optrex to question by Commission staff.)

[40] Neither the petitioner nor the respondents are arguing that the Commission find that LIC flat panel displays are "like" the subject product.

[41] Numerous statements have been made by respondents that only LCDs are commonly used in laptop computers, a key end-use application. As reported: * * *. * * *. * * *. * * *. Response to Commission's questionnaire by Kyocera Industrial Ceramics Corp.

Also, respondents have emphasized that HIC flat panel displays are not generic products. As reported: "For each product, Computer OEMs chose the display technology that has the best potential for meeting its product design and technical specifications at the time. In each case, no pre-existing display was available: the displays were created to meet cutting-edge specifications, and the technology and vendors were chosen based on best judgment as to which was likely to succeed in the future." Response to Commission's like-product questionnaire by U.S. OEM computer manufacturers.

[42] Planar, a petitioner in this investigation, has begun supplying EL HIC flat panel displays to * * * for use in computer workstations. In a letter dated

(continued...)

Responses to the Commission's "like-product" questionnaire.--To further address the issue of comparability between CRTs and HIC flat panel displays (and among specific HIC flat panel technologies), the Commission sent a "like-product" questionnaire to U.S. producers, Japanese producers, and users of flat panel displays requesting that they discuss the characteristics and uses of each technology. The following discussion is based upon information provided to the Commission in response to this questionnaire.

Table 2 compares HIC flat panel display and CRT technologies. The chief similarity between HIC flat panel displays and CRTs is that both are used to display images by means of electronically generated information; however, it seems that the particular intended application dictates which technology is chosen. In general, HIC flat panel displays are the technology of choice when a smaller physical profile [43] and lower power consumption are deemed a necessity. [44] In fact, it was noted that if HIC flat panel displays had not been developed, products such as laptop computers and others that require the distinct features of flat panel displays simply would not exist. For applications in which size, weight, and power consumption are not considerations, CRTs seem to be the current technology of choice. This is due to the superior overall display quality of the CRT.

Information comparing HIC passive matrix LCD, active matrix LCD, plasma, and EL displays is presented in table 3. As shown, all types of HIC flat panel displays are capable of displaying text, graphics, and images, but each may possess different physical and technological characteristics. These differences currently dictate the type of display chosen for a particular end-use application.

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[42] (...continued)
Aug. 6, 1990 to the Commission, * * *, * * * of * * *, stated that, * * *. * * *. * * *.

In their postconference brief, the petitioners state that "The major reason for Digital Equipment's choice of AC thin film EL for its new workstation display is low power consumption as compared to plasma, and the increased speed and optical performance as compared to all different types of LCD displays." (p. 9.)

[43] Figure 3 in appendix C illustrates the size difference between a CRT display and an equivalent-sized flat panel display.

[44] It is also believed that HIC flat panel displays emit lower levels of radiation than CRTs.

Table 2
Comparisons of HIC flat panel display and CRT technologies

Item	HIC flat panel display	CRT
Channels of distribution.....	OEM component sales	Private label, distributors
Customer and producer perception.....	State-of-the-art technology/ integrated circuit	Old technology/separate element
End uses.....	Used when thin, mobile systems are required (e.g., overhead projectors; laptop computers; notebook and handheld computers; medical instruments; military applications; portable TVs; etc.)	Used when space, weight, and power requirements are not considerations (e.g., non-transportable personal computers, TV, instruments, etc.)
Interchangeability.....	Currently, certain application restrictions dictate the use of CRTs or HIC flat panel displays; however, as the performance of HIC flat panel displays improves in the future, they may likely replace CRTs in more and more applications. This interchangeability is expected to be "one-way."	
Manufacturing 1/.....	Small space Highly skilled employees Clean room environment Semiconductor production process High density interconnects	Large areas Semi-skilled employees No clean room required Vacuum tube production process Low density interconnects
Physical characteristics.....	Small (flat panel) Lightweight Low power requirements Rugged construction Digital device	Large (cubic tube) Heavy High power requirements Susceptible to shock damage Analog device
	With the exception of power consumption, weight, and thickness, CRTs possess physical characteristics that are equal or superior to those of HIC flat panel displays.	

1/ CRTs and flat panel displays are manufactured by different producers.

Source: Compiled from data submitted in response to the Commission's "like-product" questionnaire.

Table 3
Comparison of HIC flat panel display (FPD) technologies

Item	Passive LCD	Active LCD	Plasma[1]	EL[1]
Channels of distribution..	The channels of distribution are similar in that all HIC FPDs are sold by the producer to OEMs that incorporate the HIC FPD in another product. Since the HIC FPD is designed to fit specific uses, marketing efforts to OEM computer manufacturers and others typically precede the design stage.			
Customer/OEM perception...	Widest current use	Most promising technology for future growth	Appropriate for special applications	Appropriate for special applications
End uses.....	Monochrome laptop Overhead projectors Notebook computer Handheld computer Medical instruments	Monochrome laptop Color laptop Some military Medical instruments	Portable computers Transportable PC Industrial Large screen displays Specialized military Medical instruments	Portable computers Laptops Ruggedized PC Avionics Specialized military Medical instruments
Interchangeability.....	Although certain HIC FPD technologies may perform better than others in specific applications, it is seemingly possible (but not necessarily commercially desirable) to interchange HIC FPDs before the design stage of their use in the end product. Interchanges beyond this point, however, are uncommon.			
Manufacturing[2].....	Generally, for all types of HIC FPD producers, certain differences and similarities exist in manufacturing employees, facilities, processes, and raw materials.			
Physical characteristics:				
Brightness.....	Medium to high with backlighting	Medium to high with backlighting	Low (DC) to medium (AC)	Low (DC) to medium (AC)
Color.....	Monochrome and gray scale (poor multi-color)	Monochrome and gray scale (multi-color available)	Monochrome and gray scale	Monochrome and gray scale
Contrast.....	Low	Medium	High	High
Environmental stress....	Sensitive to heat and humidity	Sensitive to heat and humidity[3]	Good for harsh environment	Excellent for harsh environment
Power requirements.....	Low	Low to moderate	High	Medium to high
Response time.....	Slowest (no animation)	Moderate (animation)	Fast	Fast
Screen size.....	Moderate	Smallest	Largest	Moderate
Transparency.....	High	High	Low	Low
Viewing angle.....	Narrow	Medium	Wide	Medium
Weight/volume.....	Low	Low (monochrome) High (multi-color)	Medium to high	Medium to high

[1]Information was collected on the subcategories, AC and DC, but due to the similarities reported on each item, the subcategories were consolidated.

[2]Comparative information is presented in the section of this report titled "Manufacturing process."

[3]Can be ruggedized for specialized military use by additional production steps.

Source: Compiled from data submitted in response to the Commission's "like-product" questionnaire.

The nature of the HIC flat panel display marketplace is extremely volatile, characterized by the evolution of the "state of the art" in both technology and manufacturing processes for each type of HIC flat panel display. [45] None of the different HIC flat panel display technologies appears to have reached its theoretical limit. With the movement toward higher performance display technologies, the appearance and power requirements of the HIC flat panel displays have been converging, erasing historically dichotomous relationships. It is reported that:

> "LCDs have continually mutated to meet the market's readability requirements, albeit at the cost of higher price, bulk and power. Certain plasma and EL panels have implemented power conservation or reclamation schemes and, with plasma's success in high-volume markets, economies of scale have come into play. What was formerly a low-end/high-end market has become a continuum." [46]

Determining whether a display has become competitive with another for a specific end use is complicated by the reported difficulty in converting prototypes into products suitable for commercial production. [47] Also, design decisions for end-use systems are made approximately 18 months prior to the date of manufacture of the system (and the subsequent shipment of the required components). Thus, data reported may reflect decisions that were made based upon a technological marketplace which is not necessarily identical to the marketplace today.

End use of HIC flat panel displays.--Generally, different types of HIC flat panel displays are used for the manufacture of different end-user systems. Information on the reported use of such displays by U.S. manufacturers and importers in 1989 is presented in tables 4 and 5. With four exceptions, only LCDs were used for laptop computers. [48] [49] Also, only LCDs

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[45] Industry analysts generally agree that the ability to produce high-resolution color, at marketable prices, is essential for the future wide-spread marketability of any technology and often characterize the technologies as being in a competitive "race" toward this goal. Color CRTs now account for about 85 percent of CRT shipments.

[46] "Flat-Panel Technologies Go For Gray Scale, Color," Electronic Engineering Times, July 17, 1989.

[47] Thus, caution should be exercised when reviewing industry reports which may focus on technological advances and not reflect the production realities that also govern product availability and substitutability.

[48] In 1989, Tandy reported using *** EL displays in laptop computers; Toshiba America Information Systems reported using *** plasma displays in laptops. In addition, World Products reportedly imported * * * plasma displays designed for laptops and Plasmaco, a domestic manufacturer, reported that *** of its plasma displays were for laptops.

Table 4
HIC flat panel displays: U.S. shipments of U.S.-produced displays, by firms, by types of displays, and by key end uses, 1989

(Shipments in units, shares in percent)

Firm	Type of display produced	Total U.S. shipments	End use of displays	Share
Cherry Corp.....	EL	***	***	***
Electro-Plasma, Inc...	Plasma	***	***	***
OIS Optical Imaging Systems, Inc.....	Active matrix LCD	***	***	***
Photonics Technology..	Plasma	***	***	***
Planar Systems, Inc...	EL	***	***	***
Plasmaco, Inc.....	Plasma	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 5
HIC flat panel displays: U.S. shipments of imported displays, by firms, by types of displays, by share of each firm's total U.S. shipments, and by key end uses, 1989

* * * * * * *

were used in overhead projectors. [50] Plasma displays were frequently found in computers other than laptops. EL displays were generally used in industrial

[49] (...continued)
[49] In their postconference brief (p. 11), petitioners state that these exceptions refute directly "the claims of respondents that only LCD technology can be used for applications calling for portability because of LCD's relatively lower power requirements, and is yet another example of how industry innovations continue to blur the distinctions in performance characteristics among the technologies."

[50] The development of overhead projectors was only made possible by the advent of passive LCD technology. OEM end users postconference brief, p. 17.

equipment, medical instruments, and computers other than laptops. [51] In contrast to imported displays, a significant number of HIC flat panel displays manufactured by U.S firms were designed for use in specialized military or aerospace equipment. Japanese imports were oriented towards the bulk computer market. [52]

Types of HIC flat panel displays shipped.--Table 6 presents shipments for U.S. and Japanese-manufactured displays. The HIC flat panel displays shipped by the U.S. industry were * * * nongray scale monochrome AC plasma and AC EL. Importers from Japan also shipped AC EL displays (***-percent of which were gray scale in January-June 1990), [53] but, unlike the U.S. industry, were more strongly focused on DC plasma, which better permits gray scale. [54] (There were also * * * numbers of AC plasma and * * * amounts of AC/DC plasma displays imported from Japan.) U.S. importers were the only source of shipments of passive matrix LCDs; also, an increasing number of active matrix

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[51] The distinction between "laptops" and "other computers" is not clear; there are no standard definitions. OEM end users state that "portable computers" include, in order of diminishing weight and volume: luggables, transportables, portables, laptops, notebooks, and hand-helds. Key differences among them are weight and whether or not they can be battery operated. Luggables and transportables do not have batteries; laptops do. OEM end users postconference brief, p. 59.

Petitioners agree that "end uses might be differentiated as between those that require plugging into an electrical outlet and those that do not." Petitioners' postconference brief, p. 12.

[52] OEM user respondents argue in their postconference brief that "there is a complete separation between specialized low-volume end-uses and mass-volume end-uses." (p. 56.) Focusing on LCDs, co-counsel for the Japanese manufacturers points out that "Military LCDs typically cost several times as much as commercial LCDs, which are made on equipment allowing very low flexibility to shift to another model, but which in turn, permit production of high volumes at significantly lower per unit cost." Postconference brief, p. 50.

[53] The only supplier to ship DC EL displays was Cherry, a U.S. manufacturer.

[54] Co-counsel for the Japanese manufacturers argues that imports are concentrated in DC plasma displays--for the commercial computer market--while domestic production is focused on the market for the military. According to Mr. Walters, DC plasma displays are inappropriate for military applications because of their limited temperature tolerance and limited size-range. They are, however, simpler and less expensive to produce (thus lending themselves more readily to mass production), with the ability to provide 16 gray levels and meet the VGA computer format, thus making them "the technology of choice" over AC plasma displays for use in transportable computers. Postconference brief, pp. 52-58.

OEM users note in their postconference brief (p. 78) that gray scale (for all technologies) "is now extremely important to OEMs so that their portable computers can make full use of software originally written for desktop computers with color CRTs."

LCDs were shipped. During the period under investigation, gray scale monochrome LCDs assumed greater importance and, beginning in 1989, color units from Japan entered the U.S. marketplace.

Table 6
HIC flat panel displays: U.S. shipments, by producers and importers and by types of displays, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

U.S. tariff treatment

Commerce stated in its notice of initiation that the appropriate HTS subheadings under which the subject merchandise is classifiable cannot be determined at this time. Commerce is investigating this issue and, based upon Customs' advice, will identify the appropriate HTS subheadings in any preliminary determination. [55]

HIC flat panel displays and subassemblies thereof specifically designed as or for automatic data processing machines are entered under HTS subheadings 8471.92.30 and 8471.92.40. [56] Flat panel displays, including high information content displays, having a visual display diagonal not exceeding 30.5 cm, if designed as a unit of automatic data processing machines, are provided for in subheading 8471.92.30 [57] of the HTS at a most-favored-nation (MFN) or column 1-general rate of free duty, which does not apply to certain countries which receive the column 2 rate. [58] Flat panel displays, including HIC displays having a visual display diagonal exceeding 30.5 cm, if designed as a unit of automatic data processing machines, are provided for in subheading 8471.92.40 of the HTS at a MFN rate of duty of 3.7 percent ad valorem. Subassemblies, including glass assemblies, control electronics, and drive electronics, but excluding power supplies, of flat panel displays designed for automatic data processing machines are provided for in subheading 8473.30.40, and enter free

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[55] HTS subheadings are provided in determinations for convenience and for U.S. Customs Service purposes. The written description remains dispositive.

[56] Automatic data processing machines are defined in note 5 to chapter 84 of the HTS.

[57] In order to not incur the special 100-percent rate of duty on certain computers having non-CRT displays imported from Japan (HTS subheadings 9903.41.15 and 9903.41.20), it is a common practice for importers to enter the major subassemblies of these computers (which include HIC flat panel displays) in separate shipments and on different days. The subassemblies are then assembled into a complete computer in the United States.

[58] Those countries are enumerated in general note 3(b) of the HTS, and the column 2 rate of duty is 35 percent ad valorem for the articles of all headings and subheadings unless otherwise specified.

of duty from MFN countries. Power supplies are provided for in HTS subheading 8471.99.30 at an MFN rate of 3 percent ad valorem.

HIC flat panel displays and subassemblies thereof not specifically designed as or automatic data processing machines but rather as parts of machines "performing a specific function," are generally classified with those machines. [59] If a HIC flat panel display or its subassemblies are designed for a number of different applications or if they are at a stage of manufacture where the end use cannot be known, then the proper HTS classification is believed to be "indicator panels" and parts under subheadings 8531.20, 8531.80, and 8531.90. [60]

The Nature and Extent of the Alleged Sales at LTFV

In order to obtain the estimated dumping margins for HIC flat panel displays imported from Japan, the petitioner compared the United States price of the HIC flat panel displays with their foreign market value (FMV). The United States price was based on representative U.S. prices for several products and technologies.

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[59] For example, a HIC flat panel display designed as part of a radar set would fall under the subheading for parts of radar apparatus, 8529.10.40. The following is a partial list of the additional headings and subheadings of the HTS under which HIC flat panel displays might be entered: 8473.40.40, 8473.10.00, 8473.21.00, 8442.40.00, 8466, 8517.90, 8528.10.80, 8529.90, 8543, 8548, 8529.10, 8803, 9013, 9014, 9017.90, 9018, 9022, 9026, 9027, 9030, 9031, and 9033.

[60] For instance, a glass assembly equally suitable for use in an electronic publishing display, a radar display, or a heart monitor display should be classified under one of the subheadings of heading 8531.

The petitioners' estimate of FMV is based on constructed value. [61] Petitioners determined the constructed value by using a manufacturing cost model for the following products:

640 x 400 TFT LCD
640 x 400 DC plasma
640 x 480 DC plasma with 16 gray levels
640 x 480 STN LCD
640 x 480 DSTN LCD with 16 gray levels
640 x 480 ACTFEL with 16 gray levels.

The comparison of the constructed value to the United States price yields dumping margins that range from approximately 70 to 318 percent, depending upon the product.

The petitioner also requested that Commerce investigate whether the foreign manufacturers are selling HIC flat panel displays in their home market at prices below their production costs. [62]

The U.S. Market for HIC Flat Panel Displays

Apparent U.S. consumption

The data on apparent U.S. consumption of finished HIC flat panel displays are composed of the sum of U.S. producers' U.S. shipments (domestic and intracompany) and U.S. importers' U.S. shipments (domestic and intracompany) reported in response to the Commission's questionnaire. Data are thus understated to the extent that all producers or importers did not respond to the questionnaires. [63]

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[61] The petitioner notes that the Japanese manufacturers cited in the petition are vertically integrated and consume a significant amount of their production of HIC flat panel displays internally in the manufacture of end-use products. Pricing for such transfers is not available to petitioners. Also, flat panel displays may be sold, and thus priced, together with other components. Petition, p. 21.

[62] In its notice of initiation, Commerce stated that there is not sufficient evidence for it to begin a cost of production investigation at this time.

[63] Producer questionnaires were sent to all known U.S. manufacturers of finished HIC flat panel displays that have display glass production capability. (These firms were identified in the petition and comprise the petitioning group.) Each firm responded to the Commission's questionnaire. Additional producer questionnaires were sent to firms that do not have display glass production capability, but instead manufacture HIC flat panel displays using purchased display glass. Incomplete data were received from this group of firms. These firms are identified and discussed further in the next section of this report.

(continued...)

As shown in table 7, there has been a steady increase in consumption of HIC flat panel displays. Domestic consumption of all HIC flat panel displays (whether LCD, plasma, or EL) almost * * * from 1987 to 1989 and increased again, by *** percent, from January-June 1989 to January-June 1990. [64] The following tabulation shows the share (by quantity) of total apparent U.S. consumption accounted for by the various types of HIC flat panel displays (in percent):

	1987	1988	1989	Jan.-June 1990
LCD	***	***	***	***
Plasma	***	***	***	***
EL	***	***	***	***
Total	100.0	100.0	100.0	100.0

The bulk of the U.S. market consists of LCD and plasma displays; EL displays have accounted for * * * percent of domestic consumption since at least 1987. LCDs, however, have increased their market share relative to both plasma and EL displays: in 1987, LCDs accounted for *** percent of the U.S. market; for the January-June 1990 period they had captured a nearly *** percent market share. Apparent consumption of LCDs increased from *** units in 1987 to *** units within 2 years.

Imports of displays (almost all of which are manufactured in Japan) play a major role in supplying the U.S. market: imports of all types accounted for *** percent of the quantity of domestic consumption of all HIC flat panel displays from 1987 through June 1990. For EL displays alone, however, domestic manufacturers commanded a greater share of the domestic market, capturing *** percent from 1987 through 1989.

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[63] (...continued)

Additional producer questionnaires were sent to firms that manufacture subassemblies which are dedicated for use in HIC flat panel displays. Incomplete data were also received from this group.

Importer questionnaires were sent to the companies identified in the petition as importers of HIC flat panel displays from Japan. Importer questionnaires were also sent to significant U.S. importers from Japan, Finland, Mexico, and Taiwan that reported imports into the United States under the two principal HTS classifications where HIC flat panel displays are entered (i.e., flat panel displays (non-CRT) as output peripherals: 8471.92.30 and 8471.92.40). Additional questionnaires were also sent to firms importing from Japan under other HTS classifications where it is believed HIC flat panel displays could be entered. It is believed that the data received represent the great majority of imports of HIC flat panel displays from Japan and all imports from Finland. It is not believed that there are significant imports of the subject products from other countries into the United States at this time.

[64] Discussion based upon data on apparent U.S. consumption that include reporting only by U.S. firms that produce the display glass assembly.

Table 7
HIC flat panel displays: Apparent U.S. consumption, by types, 1987-89, January-June 1989, and January-June 1990

(In units)

Type and period	U.S. producers' shipments	Shipments of imports	Apparent consumption
LCD HIC flat panel displays: 1/			
1987	***	***	***
1988	***	***	***
1989	***	***	***
Jan.-June--			
1989	***	***	***
1990	***	***	***
Plasma HIC flat panel displays: 1/			
1987	***	***	***
1988	***	***	***
1989	***	***	***
Jan.-June--			
1989	***	***	***
1990	***	***	***
EL HIC flat panel displays: 1/			
1987	***	***	***
1988	***	***	***
1989	***	***	***
Jan.-June--			
1989	***	***	***
1990	***	***	***
Total (LCD, plasma, and EL HIC flat panel displays): 1/			
1987	***	***	***
1988	***	***	***
1989	***	***	***
Jan.-June--			
1989	***	***	***
1990	***	***	***
Total (LCD, plasma, and EL HIC flat panel displays): 2/			
1987	***	302,228	***
1988	***	429,631	***
1989	***	609,520	***
Jan.-June--			
1989	***	310,880	***
1990	***	378,620	***

1/ Includes only finished displays shipped by firms that also manufacture the display glass assembly. U.S. producers' shipments by firms that do not manufacture the display glass assembly are excluded. Shipments of imported display glass assemblies sold separately are also excluded.
2/ Includes U.S. producers' shipments for firms that manufacture the display glass assembly and U.S. producers' shipments for firms that do not manufacture the assembly. Also included are shipments of imported display glass assemblies sold separately. (Such imports of display glass are not incorporated into any of the domestically-produced finished displays for which data are reported.)

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The demand for HIC flat panel displays is generally defined by the extent to which flat panel technology meets the requirements of and can be used in various end-user systems. Products that met defined HIC text and graphic requirements for computers were first commercially manufactured in the mid-1980s, a development that led to the appearance of the laptop or portable computer market. The increase in U.S. consumption of HIC flat panel displays, and, more specifically, of LCDs, is largely a result of this development. [65] [66] [67]

U.S. producers

The petition identifies two groups of U.S. manufacturers of HIC flat panel displays: (1) producers that produce for the civilian commercial market (Cherry, Electro-Plasma, Planar, and Plasmaco); and (2) producers that specialize in military sales (Photonics and, to a degree, OIS and Electro-Plasma). These firms are involved in researching the technology and designing prototypes as well as producing for commercial sale. With the exception of Cherry, the petitioners focus their business operations on the development and/or manufacture of only flat panel displays. [68] The petition also named three firms that are attempting to obtain financing to begin producing prototypes and building commercial-volume manufacturing facilities (specifically, Coloray, Magnascreen, and Standish (Hamlin LCD Division)). [69]

The following tabulation shows the date each firm began developing HIC flat panel technology and the date production started:

Firm	Date began developing technology	Date began full production
Cherry	* * *	* * *
Electro-Plasma	* * *	* * *
OIS	* * *	* * *
Photonics	* * *	* * *
Planar	* * *	* * *
Plasmaco	* * *	* * *

[65] In its questionnaire response, Planar notes * * *.

[66] Epson America states: * * *. * * *. * * *.

[67] Compaq states in its response to the Commission's questionnaire that, * * *. * * *. * * *. * * *.

[68] Petitioners' postconference brief, p. 48.

[69] The petition also states that there are additional firms that ceased producing or which were researching HIC flat panel displays but failed to move from the prototype stage to commercial production. Petition, p. 29. Information on these firms is presented in the section of this report entitled "U.S. firms that have exited the HIC flat panel display industry."

There are also additional firms such as Tektronix in Beaverton, OR, that are continuing to research HIC flat panel display technology.

The petitioners maintain that to be considered a manufacturer of finished HIC flat panel displays, a firm must, at minimum, have display glass production capability. [70] Additionally, there are firms known as "integrators" which purchase display glass (typically from the petitioners, but reportedly also from Japanese sources), produce or assemble purchased electronics components, and perform the final assembly. These firms generally concentrate on HIC flat panel displays designed for military and aerospace applications and, in some cases, also produce the end-user system into which the flat panel display is inserted. [71] [72]

There are also a number of firms that manufacture the electronic subassemblies used for the drive and control electronics. [73] Generally, only the petitioners have the capability to produce the display glass assembly in the United States. [74] The remaining components are also produced by the petitioners, or, more frequently, are manufactured or assembled by outside vendors. The extent of the "manufacturing activity" by the vendors is not clear, and varies by manufacturer and transaction. [75] The Commission sent

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[70] Petition, p. 10.

[71] The display glass assembly that is purchased by such firms is packaged in various forms, namely (1) as part of a "finished" HIC flat panel display, (2) as a subassembly with drive and/or control electronics attached, or (3) as a simple display glass assembly. The value added by such operations and the extent to which such firms are manufacturers of essential component parts or only assemblers of purchased components is not clear and, in fact, appears to vary among firms and, possibly, within firms. Moreover, there are often multiple layers of subcontractors and thus of sales of display glass before the glass assembly is converted into final form as a "finished" HIC flat panel display and inserted into an end-user system.

[72] The Commission requested that the petitioners supply them with the names of firms that purchase display glass from them. * * *. The Commission sent 19 questionnaires to such firms: 6 firms were able to report at least some data; 9 firms did not respond. The remaining firms were * * *, * * *, * * *, and * * *. * * *. * * *. * * *.

[73] As described earlier, covered subassemblies (i.e., those subassemblies that are dedicated or designed for use with HIC flat panel displays) include such components as the display glass assembly, the drive and control electronics, mechanical package, and power supply.

[74] * * *. * * *. * * *.

[75] In its questionnaire response, Planar noted that * * *. * * *.

questionnaires to firms identified by the petitioners as vendors. [76] * * * was the only firm to respond to the Commission's questionnaire.

The capability of the reporting firms to manufacture subassemblies is described in the following tabulation:

	Capacity to produce display glass	Capacity to produce "other" components
Cherry	* * *	* * *
Electro-Plasma	* * *	* * *
OIS	* * *	* * *
Photonics	* * *	* * *
Planar	* * *	* * *
Plasmaco	* * *	* * *
Texas Instruments	* * *	* * *

1/ Not provided.

Reporting firms, their position taken on the petition, and their shares of production in 1989 are shown in table 8.

[76] Planar supplied the names of * * * of its suppliers to the Commission, one of which was * * *, * * *. The other * * * firms, * * *, did not respond to the Commission's questionnaires. Planar was the only petitioning firm to respond to the Commission's request for the names of its vendors. (OIS supplied * * *.)

Table 8
HIC flat panel displays and subassemblies thereof: Current U.S. producers, plant locations, types produced, shares of total U.S. production in 1989, and position on the petition, by firms that produce display glass, firms that do not produce display glass, and firms that produce only subassemblies

Firm	Plant location	Type of display	Share of total U.S. production (percent)	Position on the petition
Firms that produce display glass:				
Cherry Corp	Waukegan, IL	EL	***	Supports
Electro-Plasma, Inc	Milbury, OH	Plasma	***	Supports
OIS Optical Imaging Systems, Inc	Troy, MI	LCD	***	Supports
Photonics Technology	Northwood, OH	Plasma	***	Supports
Planar Systems, Inc	Beaverton, OR	EL	***	Supports
Plasmaco, Inc	Highland, NY	Plasma	***	Supports
Firms that do not produce display glass:				
* * *	* * *	* * *	***	* * *
* * *	* * *	* * *	***	* * *
* * *	* * *	* * *	***	* * *
* * *	* * *	* * *	***	* * *
* * *	* * *	* * *	***	* * *
Firms that produce only subassemblies:				
* * *	* * *	* * *	***	* * *

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Reporting firms do not manufacture more than one type of HIC flat panel display. A discussion of the various producers follows:

Cherry Corp.--Cherry, and its subsidiaries, manufacture electro-mechanical devices, electronic assemblies and displays, and semiconductor devices. It is currently developing * * *.

Electro-Plasma, Inc.--Electro-Plasma is *** percent-owned by Grossenbacher Elektronik, St. Gallen, Switzerland. It is currently developing * * *.

OIS Optical Imaging Systems, Inc.--OIS has entered into an agreement with New York State agencies to finance a factory for the production of active matrix LCDs in a location near Rochester, NY. However, OIS must first raise an additional $12 million to meet the terms of the funding package offered by New York. [77] (The manufacturing facility is estimated to cost over $30 million.) The factory will primarily produce displays for military and avionic applications. Customer shipments are planned to begin in * * *. [78]

Photonics Technology.--Photonics was founded in 1978. * * * have been to the military market. [79] Photonics is developing * * *. [80]

Planar Systems, Inc.--Planar was incorporated in April 1983 to commercialize EL technology for HIC flat panel display products. The firm is an industry leader spearheading the development of EL technology and expects * * *. It also produces LIC flat panel displays. Planar has * * *.

Plasmaco, Inc.--Plasmaco is ***-percent owned by Grossenbacher AG (St. Gallen, Switzerland), [81] ***-percent owned by University Patents (Westport, CT), ***-percent owned by Crown Life (Toronto, Ontario, Canada), and ***-percent owned by Globus Growth Group (New York, NY). Plasmaco was founded in August 1987; it currently has * * *. The Highland, NY, company acquired its manufacturing equipment and a patent license for the plasma technology from

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[77] Transcript, p. 48.

[78] * * *'s postconference statement cites * * *. * * *. * * *.

[79] Photonics was not able to provide a complete response to the Commission's questionnaire.

[80] Photonics has reportedly received $1.6 million to develop flat panel displays from the U.S. Department of Defense's Defense Advanced Research Projects Agency (DARPA), and an additional $6.1 million to develop larger displays. Defense News, May 21, 1990, as cited in the postconference brief submitted by the co-counsel for Japanese manufacturers, p. 29.

[81] * * *.

IBM. (Mr. Kehoe, the CEO and President of Plasmaco, was the program manager responsible for the production of plasma displays at IBM.) [82]

Firms still in the developmental stage.--Firms identified by the petitioners include Coloray, [83] Standish (Hamlin LCD Division), and Magnascreen. Magnascreen was founded in July 1988 for the purpose of * * *. * * *. Hamlin is * * * U.S. manufacturer of instrument-type LCD LIC flat panel displays. It is currently * * *. The two firms are * * *.

Firms which do not produce display glass.--* * * produces ruggedized/militarized EL displays for aerospace or defense applications. * * * is a high-technology electronics firm that designs and manufactures EL displays for specialized military use. * * * both sells EL displays to OEM end-user customers and uses HIC flat panel displays in terminals that it manufacturers. * * * sells only EL military displays to * * *. * * * sells fully militarized plasma HIC displays to * * *. [84]

Information was also provided to the Commission by * * *. * * *. * * *. * * *. * * *. [85]

U.S. firms that have exited the HIC flat panel display industry

The petition states that during the last several years, U.S. firms have ceased manufacturing operations or been unable to move from research into production of HIC flat panel displays. [86] The Commission contacted representatives from those firms that the petitioners cited as having ceased work in the field during the period of investigation (i.e., after 1986).

AT&T.--* * *. * * *.

Babcock Display.--* * *. * * *.

Dale Electronics, Inc.--* * *. * * *. * * *.

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[82] IBM ceased manufacturing plasma displays in 1986; additional information on IBM's operations is presented in the section of this report titled "U.S. firms that have exited the HIC flat panel display industry."

[83] Coloray did not respond to the Commission's questionnaire.

[84] In its questionnaire response, * * * notes * * *. * * *.

[85] * * *. * * *. * * *. * * *. * * *.

[86] A Congressional Budget Office study, dated July 1990, states: "Unlike the DRAM business, which was a market created and then relinquished by U.S.-owned firms, a U.S. flat-panel industry never existed. The U.S. industry largely moved out of solid-state displays while they were still relatively simple. The Japanese firms took over this market by making simple consumer displays."

GTE.--* * *. * * *. [87]

General Electric (GE).--* * *. * * *. [88]

IBM Corporation.--* * *. * * *. [89] * * *.

Lucitron, Inc.--* * *. * * *.

Sigmatron Nova.--* * *. * * *. * * *.

Representatives from Alphasil, Inc. and LC Systems could not be located by the Commission. However, information on both firms was provided as part of the Commission's investigation on Liquid Crystal Display Television Receivers from Japan (inv. No. 751-TA-14). The following information is drawn from the Commission's December 1987 report in that investigation.

Alphasil, Inc.--* * *. * * *. * * *. * * *.

LC Systems.--* * *. * * *. * * *.

U.S. importers

Most of the importers are wholly-owned U.S. divisions of Japanese manufacturers or U.S-owned original equipment manufacturers that import HIC flat panel displays for use in their manufacturing facilities (primarily computer). [90] The importers and their respective share of imports in 1989 are presented in table 9.

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[87] * * *. * * *.

[88] Letter dated Aug. 7, 1990 from * * *, former manager, GE's Advanced Display Project. * * * further notes that, * * *. * * *. (* * *.)

[89] * * *. * * *. * * *. * * *. (Postconference brief of IBM Corporation, p. 15). * * *.

[90] Also, several Japanese importers (i.e., * * *) import HIC flat panel displays for use in their U.S. computer-manufacturing facilities.

Table 9
HIC flat panel displays: U.S. importers from Japan and share of total U.S. imports from Japan, by types and by firms, 1989

(Imports in units; shares in percent)

Firm	Total quantity of U.S. imports from Japan	Share of total U.S. imports from Japan
LCD:		
* * * * * * *		
Plasma:		
* * * * * * *		
EL:		
* * * * * * *		

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Channels of distribution

HIC flat panel displays manufactured by U.S. firms were shipped directly to nonrelated end users. [91] No U.S. manufacturer reported any intracompany consumption of the displays it produced. In contrast, U.S. importers (specifically, computer manufacturers) are themselves significant end users. The following tabulation lists the quantity of U.S. shipments of HIC flat panel displays that were imported from Japan in 1989 (in percent):

Shipments to related distributors.....	***
Shipments to unrelated distributors....	***
Shipments to related end users.....	***
Shipments to unrelated end users.....	***
Total.....	100.0

[91] Information is provided only for those firms that produce display glass. Consequently, the distribution and use of HIC flat panel displays produced by integrators is not addressed here.

Consideration of Alleged Material Injury or Material Retardation to an Industry in the United States

The products subject to the investigation are shipped both as finished HIC flat panel displays and as separate subassemblies. Data in the following sections are shown separately for finished HIC flat panel displays and, where available, for subassemblies. [92] Also, data are presented only for manufacturers who produce display glass, unless otherwise noted. [93]

Additional inclusions and exclusions to the data presented in this report are as follows:

(1) Except for an estimate of capacity, end use of shipments, reductions in work force, and financial information, data are not included for Photonics. In lieu of completing the Commission's questionnaire, Photonics submitted its financial statements.

(2) * * *. * * *. * * *. * * *. * * *. * * *.

(3) * * *. * * *.

(4) * * *. * * *. * * *. * * *. * * *. * * *.

U.S. production, capacity, and capacity utilization

Data for the production, capacity, and capacity utilization of the firms producing LCD, plasma, and EL HIC flat panel displays are summarized in table 10. End-of-period capacity to produce increased for all displays by *** percent from 1987 to 1989 and by *** percent from June 1989 to June 1990. Annualized end-of-period capacity to produce plasma displays * * * by *** percent from 1987 to June 1990 due to * * *. The * * * in annual capacity to produce EL displays (*** percent from 1987 to June 1990) results from * * *. [94] It should be noted that measurement of capacity is not precise for this industry. Capacity is defined by the ability of the firm to produce display glass. Practical capacity will vary according to the size of the glass substrate and the current manufacturing yield. (The manufacturing yield

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[92] The Commission requested data on subassemblies from domestic producers in order to be able to derive totals for finished displays and subassemblies. The producers were unable to provide the majority of the information requested in usable form. Available data (most specifically, shipments of display glass) are presented where appropriate in this report.

[93] Firms that do not produce display glass, i.e., "integrators," that responded to the Commission's questionnaire were all able to provide quantity data for production or shipments. However, the integrators generally did not provide usable data on other indicators.

[94] Planar states in its questionnaire response * * *. * * *. * * *.

is the number of finished displays produced divided by the number of displays started (i.e., glass starts)). [95] [96]

Table 10
HIC flat panel displays: U.S. capacity, production, and capacity utilization of firms producing display glass, by types, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Production of HIC flat panel displays rose steadily from 1987 to 1989, increasing by *** percent. Between January-June 1989 and January-June 1990, production soared, increasing almost *** percent from *** units to *** units. The trends are mainly due to * * *: the number of * * * displays produced * * * from *** units in 1987 to *** units in 1988 and to *** units in 1989. During the interim periods, production * * * from *** units in January-June 1989 to *** units in 1990. Production of * * * was * * * from 1987 to 1989, but * * * by ***-percent during the interim period as * * *. All reported production of LCDs is by OIS, which currently manufactures custom-designed displays and develops prototypes under long-term customer development agreements.

* * *. Capacity utilization * * * from *** percent in 1987 to *** percent in 1989, then * * * from *** percent in January-June 1989 to *** percent in January-June 1990. * * *.

The U.S. industry does not currently have sufficient capacity in place to "replace" imports from Japan and respondents maintain that lack of capacity influenced their purchasing decisions. During the period of investigation, the ratio of U.S. capacity to U.S. apparent consumption of all HIC flat panel

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[95] Co-counsel for the Japanese manufacturers states that "the primary factor affecting the amount of capacity necessary to produce the required quantities of an FPD and the cost of those displays per unit is the yield that a manufacturer can obtain. ... Such yields are a function of the initial expertise brought to production, cumulative volume produced, and time in production." (Postconference brief, p. 86.)

[96] Also, firms reported production of products other than HIC flat panel displays on the same equipment and machinery used to produce the HIC product. Specifically, Cherry reported production of * * *; Planar produced * * *. (In its questionnaire response, Planar noted that * * *.)

In addition, firms based their estimate of capacity upon a varying number of operating hours. For end-of-period capacity in June 1990, *** percent of reported capacity to produce was based upon 3 work shifts daily, *** percent was based on 2 shifts daily, and *** percent was based on 1 daily shift. (One firm, accounting for *** percent of capacity, did not report the basis for its capacity calculation.)

displays ranged from *** percent in 1987 to *** percent in January-June 1990. [97]

U.S. producers' shipments and inventories

Shipments by firms that produce display glass.--The quantity and value of U.S. shipments of HIC flat panel displays increased steadily from 1987 to 1989 and from January-June 1989 to January-June 1990 (table 11). Shipments of EL displays, which accounted for *** percent of U.S. shipments of all displays in 1989, * * * by *** percent from 1987 to 1989 and *** percent in the interim periods. Shipments of plasma displays * * * by *** percent from 1987 to 1989, and by *** percent from January-June 1989 to January-June 1990. The number of LCDs shipped is * * *. U.S. shipments by firms and by types of display are presented in table E-1 of appendix E.

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[97] Petitioners state that it is possible to "ramp up" capacity for a particular product during the period between the time of contract negotiation and the date of expected delivery. Mr. Hurd, president of Planar, testified at the conference that "Growth of the HIC flat panel market is mainly driven by major design wins and new improved products. Quite often, with Japanese manufacturers, major design wins are negotiated and committed to well before facilities are in place, or products are in production. ... (U)pon investigation of the major volume orders in the last three years, you will find that production capacity at the time of customer commitments was no more existent in Japan than for those products in the U.S." Transcript, pp. 34-35. Counsel for the petitioners added that at the "design win" stage, U.S. capability to supply is at the very same position as that of the Japanese manufacturers. Transcript, p. 63.

Co-counsel for the Japanese manufacturers replies that "although capacity has been added over time, most, if not all, Japanese producers of FPDs were experienced in servicing commercial FPD markets at the time of entering the U.S. market. Furthermore, capacity is rarely, if ever, added simply to supply a specific customer. Capacity is added to supply expected demand, not specific orders." Postconference brief, pp. 89-90.

OEM users state that "at no point during the period of investigation did they source product (a so-call 'design win') from a Japanese FPD producer that could not already demonstrate an ability to supply the correct technology in the required quantities. ... Aside from a standard non-recurring expense of approximately $50,000 for retooling an existing line for the specific requirements of a new contract, the Japanese producers have been prepared for the commitments they made." Postconference brief, pp. 74-75.

Table 11
HIC flat panel displays: U.S. shipments of U.S. firms producing display glass, by types of shipments and by types of displays, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Unit values for the three types of HIC flat panel displays, as reported in table 11, vary sharply: in 1989 the unit value of U.S. shipments of LCDs was $***, the average unit value of plasma displays was $***, and the average unit value of EL displays was $***. Unit values, as reported, are a function of the following factors: (1) whether a firm is in full production and (2) the number of customized displays or special products sold. A number of U.S. firms are still in the startup stages; most firms' products also include high-unit-value ruggedized displays designed for military use. [98]

No intracompany consumption of HIC flat panel displays was reported by firms. There are, however, a * * * number of export shipments (table 12). Exports, which accounted for *** percent of total shipments, were made to * * *.

Table 12
HIC flat panel displays: U.S. producers' export shipments, by types, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

End-of-period inventories, which were reported by * * *, are presented in the following tabulation:

Period	Inventory (Units)	Share of firm's U.S. shipments (Percent)
1987.....	***	***
1988.....	***	***
1989.....	***	***
Jan.-June--		
1989.....	***	*** 1/
1990.....	***	*** 1/

1/ Computed using annualized shipments.

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[98] The petitioners note that prices of flat panel displays vary "depending upon the size of the panel, number of pixels, and complexity of the display technology used--in addition to the relative advancement of the HIC FPD producer along the cost/production curve." Postconference brief, p. 18.

Shipments by firms that do not produce display glass.--Information on shipments by firms that purchase display glass assemblies and wrap their own electronics around them is presented in table E-1 in appendix E. Shipments by such firms are not insignificant. The following tabulation shows the quantity of total U.S. shipments, by type of producing firm, for 1987 to June 1990 (in percent):

	1987	1988	1989	Jan.-June 1990
Firms that produce display glass	***	***	***	***
Firms that do not produce display glass	***	***	***	***
Total	100.0	100.0	100.0	100.0

Only shipments of plasma and EL displays were reported by firms that do not produce the display glass assembly. [99]

As noted earlier, the Commission does not have complete information on the number of these firms or their manufacturing activities. It is possible, however, to use the number of display glass assemblies sold separately by glass manufacturers to estimate the number of such "finished" HIC flat panel displays. The end use of display glass produced by U.S. manufacturers is presented in the following tabulation: [100]

	Sold as separate display glass (Units)	Share of U.S. shipments of production (Percent)	Used to produce finished display (Units)	Share of U.S. shipments of production (Percent)
1987	***	***	***	***
1988	***	***	***	***
1989	***	***	***	***
1990 1/	***	***	***	***

1/ Annualized.

---

[99] The value-added by the design and customizing of such displays can be considerable. The sales value of the plasma HIC flat panel displays sold by * * * to * * * ranged between $*** and $*** per unit.

[100] In addition, U.S. firms may purchase imported display glass to customize by adding electronics.

The only firm that reported imports of glass subassemblies was * * *. * * *. * * * reported its imports as subassemblies since, without the control electronics, they did not meet the Commission's technical definition of a finished HIC flat panel display. However, * * *'s customers view the product as a basically-completed display. * * *. * * *. * * *.

One integrator that contacted the Commission, * * *, reported buying approximately *** percent of its requirement for glass assemblies from Japan. The firm's representative could not supply the Commission with the number of units it produced, or the source of its imports from Japan, but did state that the firm's revenues for HIC flat panel sales were $*** annually. * * *. * * *'s applications are defense-oriented.

U.S. employment, wages, and productivity

Data on employment and productivity for the U.S. industry are shown in table 13. The number of workers, hours worked, and total compensation paid to workers producing HIC flat panel displays increased steadily by *** percent, *** percent, and *** percent, respectively, from 1987 to 1989. During the interim periods, the number of workers, hours worked, and total compensation paid to workers producing plasma and EL displays continued to increase by *** percent, *** percent, and *** percent, respectively. [101] Hourly wages paid * * * steadily from $*** per hour in 1987 to $*** per hour in January-June 1990. Productivity also * * *, from *** units produced per 1,000 hours worked in 1987 to *** units produced per 1,000 hours worked in January-June 1990. Productivity varied dramatically by type of display produced. [102]

Table 13
Average number of production and related workers producing HIC flat panel displays in establishments that produce display glass, hours worked, total compensation paid, hourly wages, and productivity, by types, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

None of the workers for the U.S. producers are represented by a union. In response to a question on the Commission's questionnaire, * * *. * * *. * * *.

[101] No interim-period data were reported for LCD displays.

[102] Data on productivity are not particularly meaningful since firms generally included time spent on research and development efforts in their employment data. The extent and costs of such efforts vary among firms. See also footnote 7 to table 13.

Financial experience of U.S. producers

Six companies, [103] representing, in 1989, 100 percent of U.S. flat panel display production by firms that produce display glass, submitted financial data [104] on overall [105] operations. Two companies (Cherry and Planar) provided financial data on EL displays, one company (OIS) provided financial data on LCD displays, and three companies (Electro-Plasma, Photonics, [106] and Plasmaco [107]) provided financial data on plasma displays.

Generally accepted accounting principles state that a development-stage company is one in which principal operations have not commenced or principal operations have generated an insignificant amount of revenue. During the development stage, a company devotes most of its activities toward establishing a new business. Plasmaco was designated as a development-stage enterprise by its independent auditors for the 1st year included in this report. OIS was designated as a development-stage enterprise for all periods in this report. Cherry is an established corporation (net sales of $208.4 million for its last fiscal year); however, Cherry considers flat panel displays to be in the development stage and has so indicated in its notes to the financial statements.

Overall establishment operations.--Income-and-loss data of U.S. producers on overall establishment operations in which flat panel displays are produced are shown in table 14. Flat panel displays accounted for *** percent of net sales for overall operations in 1987, *** percent in 1988, and *** percent in 1989.

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[103] The companies are Cherry Corporation; Electro Plasma, Inc.; OIS Optical Imaging Systems; Photonics Technology; Planar Systems, Inc.; and Plasmaco, Inc.

[104] Data were requested for the companies' accounting years 1987-89 and for the interim periods January-June 1989-90. All six firms provided data for their accounting years 1987-89. With regard to the interim periods, Electro-Plasma and Planar provided January-June data; Cherry provided interim financial data for the four months ended June 30, 1989 and June 30, 1990; Plasmaco provided interim financial data for the 6 months ended January 31, 1989 and January 31, 1990; and OIS and Photonics did not provide comparative financial data for the interim periods.

[105] Cherry is developing flat panel displays in * * *. Contrary to Commission instructions, Cherry presented flat panel display operations as total operations because company personnel believed that total operations for * * * would not be meaningful.

[106] Photonics did not complete the financial section of the questionnaire. The company did, however, provide financial statements which were used by the ITC staff to complete the tables included in this report.

[107] Plasmaco provided 10 months financial data ended May 31, 1990 for the fiscal year of 1989. These data were annualized for this report.

Table 14
Income-and-loss experience of U.S. producers of flat panel displays on their overall establishment operations, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

HIC flat panel display operations.--Income-and-loss data on combined EL, LCD, and plasma flat panel display operations are shown in table 15. Net sales of flat panel displays increased by *** percent from $*** in 1987 to $*** million in 1988, then decreased by *** percent to $*** in 1989. The combined companies experienced operating losses of $*** in 1987, $*** in 1988, and $*** in 1989. Operating loss margins were *** percent in 1987, *** percent in 1988, and *** percent in 1989. Net sales for the 1990 interim period were $***, an increase of *** percent over the 1989 interim period sales of $***. Operating losses were $*** in interim 1989 and $*** in interim 1990. Operating loss margins were *** percent in interim 1989 and *** percent in interim 1990.

Table 15
Income-and-loss experience of U.S. producers on their operations producing flat panel displays, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Operations on EL displays.--Net sales of EL displays (as shown in table 16) * * * by *** percent from $*** in 1987 to $*** in 1988 and * * * an additional *** percent to $*** in 1989. Operating * * * $*** in 1987, $*** in 1988, and $*** in 1989. Operating * * * as a share of sales * * * *** percent in 1987, *** percent in 1988, and *** percent in 1989. Net sales for the 1990 interim period were $***, an * * * of *** percent over the 1989 interim period sales of $***. Operating * * * $*** in interim 1989 and $*** in interim 1990. Operating * * * margins were *** percent in interim 1989 and *** percent in interim 1990. Net sales, operating * * *, net * * *, and the operating and net * * * margins for EL displays are presented in table 17 for Cherry and Planar separately.

Table 16
Income-and-loss experience of U.S. producers on their operations producing EL displays, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Table 17
Income-and-loss experience of U.S. producers on their operations producing EL displays, by firms, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Operations on LCD displays.--OIS was the only reporting producer of LCD displays. Net sales of LCD displays * * * over *** percent from $*** in 1987 to $*** in 1988 and * * * an additional *** percent to $*** in 1989 (table 18). Operating * * * $*** in 1987, $*** in 1988, and $*** in 1989. Operating * * * as a share of sales * * * *** percent in 1987, *** percent in 1988, and *** percent in 1989. OIS did not report comparative financial data for the 6 months ended June 30, 1989 and June 30, 1990.

Table 18
Income-and-loss experience of OIS on its operations producing LCD displays, accounting years 1987-89

* * * * * * *

Operations on plasma displays.--Net sales of plasma displays * * * by *** percent from $*** in 1987 to $*** in 1988, and * * * an additional *** percent to $*** in 1989. Operating * * * $*** in 1987. Operating * * * $*** in 1988 and $*** in 1989 (table 19). Operating * * * as a share of sales * * * *** percent in 1987, *** percent in 1988, and *** percent in 1989. Net sales for the 1990 interim period were $***, an * * * of *** percent over the 1989 interim period sales of $***. The operating * * * was $*** in interim 1989 and $*** in interim 1990. The operating * * * margins were *** percent in interim 1989 and *** percent in interim 1990. Net sales, operating * * *, net * * *, the operating * * * margins, and the net * * * margins for plasma displays are presented in table 20 for Electro-Plasma, Photonics, and Plasmaco separately.

Table 19
Income-and-loss experience of U.S. producers on their operations producing plasma displays, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Table 20
Income-and-loss experience of U.S. producers on their operations producing plasma displays, by firms, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Breakeven analysis.--The breakeven point for a firm is that level of sales at which total revenues and total expenses are equal. Profits result when sales exceed this level and losses occur when this point is not achieved. Therefore, a net loss indicates that a firm did not break even and net income indicates that a firm surpassed the breakeven point. A summary of the net income (loss) for flat panel displays, EL displays, LCD displays, and plasma displays is presented in the following tabulation (in thousands of dollars) for the fiscal years of 1987, 1988, and 1989:

Item	1987	1988	1989
EL displays:			
Cherry	***	***	***
Planar	***	***	***
Total EL displays	***	***	***
LCD displays:			
OIS	***	***	***
Plasma displays:			
Electro-Plasma	***	***	***
Photonics	***	***	***
Plasmaco	***	***	***
Total plasma displays	***	***	***
Total displays	***	***	***

* * * * * * *

Capital expenditures.--Capital expenditures for land, buildings, and machinery and equipment used in the manufacture of flat panel displays are shown in table 21.

Table 21
Capital expenditures by U.S. producers on their operations producing flat panel displays, by firms, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Investment in productive facilities.--The investment in productive facilities and the annual return on total assets are presented in table 22 for overall establishments, EL, LCD, and plasma displays.

Table 22
Value of property, plant, and equipment of U.S. producers on their operations producing flat panel displays, as of the end of accounting years 1987-89, and as of June 30, 1989, and June 30, 1990

* * * * * * *

Research and development expenses.--Research and development expenses are presented in table 23. * * *.

Table 23
Research and development expenses of U.S. producers on their operations producing flat panel displays, accounting years 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Impact of imports on capital and investment.--The Commission requested U.S. producers to describe any actual or potential negative effects of imports of flat panel displays from Japan on their growth, development and production efforts, investment, and ability to raise capital (including efforts to develop a derivative or improved version of their products). Their comments are presented in appendix F.

Consideration of the Question of Threat of Material Injury

Section 771(7)(F)(i) of the Tariff Act of 1930 (19 U.S.C. § 1677(7)(F)(i)) provides that--

> In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of any merchandise, the Commission shall consider, among other relevant factors [108]--

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[108] Section 771(7)(F)(ii) of the act (19 U.S.C. § 1677(7)(F)(ii)) provides that "Any determination by the Commission under this title that an industry in the United States is threatened with material injury shall be made on the basis of evidence that the threat of material injury is real and that actual injury is imminent. Such a determination may not be made on the basis of mere conjecture or supposition."

(I) If a subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the subsidy is an export subsidy inconsistent with the Agreement),

(II) any increase in production capacity or existing unused capacity in the exporting country likely to result in a significant increase in imports of the merchandise to the United States,

(III) any rapid increase in United States market penetration and the likelihood that the penetration will increase to an injurious level,

(IV) the probability that imports of the merchandise will enter the United States at prices that will have a depressing or suppressing effect on domestic prices of the merchandise,

(V) any substantial increase in inventories of the merchandise in the United States,

(VI) the presence of underutilized capacity for producing the merchandise in the exporting country,

(VII) any other demonstrable adverse trends that indicate the probability that the importation (or sale for importation) of the merchandise (whether or not it is actually being imported at the time) will be the cause of actual injury,

(VIII) the potential for product-shifting if production facilities owned or controlled by the foreign manufacturers, which can be used to produce products subject to investigation(s) under section 701 or 731 or to final orders under section 736, are also used to produce the merchandise under investigation,

(IX) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both), and

(X) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the like product. [109]

Information on the volume, U.S. market penetration, and pricing of imports of the subject merchandise (items (III) and (IV) above) is presented in the section entitled "Consideration of the causal relationship between imports of the subject merchandise and the alleged material injury;" and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts (item (X)) is presented in the section entitled "Consideration of alleged material injury or material retardation to an industry in the United States." Item I, regarding subsidies, and item IX, regarding agricultural products, are not relevant in this case. Parties and staff are unaware of any dumping findings in third countries concerning HIC flat panel displays or subassemblies thereof. Available information on U.S. inventories of the subject product (item (V)); foreign producers' operations, including the potential for "product-shifting" (items (II), (VI) and (VIII); and any other threat indicators, if applicable (item (VII) above), follows.

U.S. inventories of HIC flat panel displays from Japan

U.S. importers' inventories of HIC flat panel displays that were held in the United States are reported in table 24. * * *.

Table 24
HIC flat panel displays: U.S. importers' end-of-period inventories of displays produced in Japan, by types, 1987-89, January-June 1989 and January-June 1990

* * * * * * *

[109] Section 771(7)(F)(iii) of the act (19 U.S.C. § 1677(7)(F)(iii)) further provides that, in antidumping investigations, ". . . the Commission shall consider whether dumping in the markets of foreign countries (as evidenced by dumping findings or antidumping remedies in other GATT member markets against the same class or kind of merchandise manufactured or exported by the same party as under investigation) suggests a threat of material injury to the domestic industry."

Ability of Japanese producers to generate exports and availability of export markets other than the United States

All HIC flat panel displays.--Twelve Japanese producers provided data on their foreign operations producing HIC flat panel displays. [110] Data received by the Commission on these firms are presented in table 25. For total HIC flat panel displays, every absolute indicator on which data were reported reveals increases in every period covered by the investigation, with further increases projected for 1990 and 1991. Capacity utilization, however, generally fell from 1987 to 1989, while reaching its zenith of *** percent in January-June 1990. It is projected that capacity utilization will continue to rise in 1990 and 1991. End-of-period inventories remained at *** to *** percent of production throughout the period of investigation, and projections indicate no future change is expected. U.S. exports as a share of total shipments fell from *** percent in 1987 to *** percent in 1989, with a decrease observed for the partial-year periods. Projections indicate that U.S. exports as a share of total shipments will continue to decline in 1990 and 1991.

Table 25
HIC flat panel displays: Japanese capacity, production, inventories, capacity utilization, and shipments, 1987-89, January-June 1989, January-June 1990, and projected 1990 and 1991

* * * * * * *

LCD HIC flat panel displays.--Eleven Japanese producers provided data on their foreign operations producing LCD flat panel displays. Data received by the Commission on these firms are presented in table 26.

Table 26
LCD HIC flat panel displays: Japanese capacity, production, inventories, capacity utilization, and shipments, 1987-89, January-June 1989, January-June 1990, and projected 1990 and 1991

* * * * * * *

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[110] Data were received from all known major foreign manufacturers of HIC flat panel displays in Japan, except for * * *. U.S. imports by * * * represented *** percent of the quantity of imports from Japan in 1989. * * *, which produces only subassemblies, accordingly did not report data for finished displays. Reported exports to the United States by foreign manufacturers are somewhat lower than reported imports by U.S. importers. This is due to the sale of displays within Japan (i.e., home market sales) which are then exported to the United States. Most specifically, * * *.

Japanese production of LCD flat panel displays grew at an increasing rate in every period of the investigation, and projections for calendar years 1990 and 1991 indicate that the present increasing trend will likely continue. Although at a decreasing rate, the capacity to produce LCD flat panel displays reported by Japanese firms also increased in every period. The increase is partially explained by the overall expansion of the Japanese HIC LCD flat panel display industry. [111] Projections for calendar years 1990 and 1991 indicate that the present increasing trend will likely continue. In fact, * * * Japanese producers indicated expansion plans for HIC LCD flat panel displays targeted for completion in 1991. Capacity utilization fell irregularly from *** percent in 1987 to *** percent in 1989, but rose from *** percent in January-June 1989 to *** percent in January-June 1990. Projections indicate that an increase is expected in calendar years 1990 and 1991. End-of-period inventories grew in every period of the investigation, and increases are forecasted for 1990 and 1991. End-of-period inventories as a share of production remained at approximately *** percent for 1987 through 1989, increasing to *** percent in the partial year periods. This ratio is expected to fall to a lower level in 1990 and 1991.

Shipments to the United States and their share of total shipments of Japanese LCD flat panel displays increased from 1987 to 1989, although a decrease was reported from January-June 1989 to January-June 1990. This decline is attributable not only to a relatively small decline in the actual quantity of exports to the United States, but also to a relatively large increase in total worldwide shipments. Projections for 1990 and 1991 indicate an expected increase in absolute quantities of U.S. shipments, but a decrease in relative share of total shipment quantity. Home market shipments and shipments to markets other than the United States have increased in every period of investigation, and this trend is expected to continue through 1991.

Plasma HIC displays.--Four Japanese firms provided the Commission with data in response to its request (table 27). [112] Actual production and the capacity to produce the subject product in Japan * * * in all periods of the investigation. Projections indicate a * * * in 1990, with * * * expected in 1991. Capacity utilization * * * from *** percent in 1987 to *** percent in 1988, with * * * to *** percent in 1989. In January-June 1990, this level * * * to *** percent, and it is expected to * * * further in 1991. End-of-period inventories * * * in every period covered by the investigation although the levels are expected to * * * during calendar years 1990 and 1991. Inventories as a share of production have remained at *** to *** percent throughout the period of investigation.

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[111] In particular, capacity increases are explained by * * *. The remaining firms indicated that either there were no plans to expand capacity or that the subject was not out of the question.

[112] One of the four firms, Oki, which represented *** percent of reported Japanese production in 1989, did not provide the Commission with data for January-June 1989 and January-June 1990, nor with projections for 1990 and 1991. Therefore, data presented for these time periods may be slightly understated.

Table 27
Plasma HIC flat panel displays: Japanese capacity, production, inventories, capacity utilization, and shipments, 1987-89, January-June 1989, January-June 1990, and projected 1990 and 1991

* * * * * * *

Home market shipments and export shipments to markets other than the United States * * * in every period throughout the investigation, with additional * * * expected from 1990 to 1991. Exports to the United States, however, * * * as the other indicators examined. An overall * * * was reported from 1987 to 1989, with the lowest amounts of exports to the United States taking place in * * *. A * * * was also reported from January-June 1989 to January-June 1990. Projections for 1990 and 1991 reveal an expectation of * * * exports to the United States during this time period. U.S. exports as a share of the total quantity of shipments generally * * * throughout the period, with further * * * expected in 1990 and 1991.

EL HIC flat panel displays.--One firm, Sharp, provided the Commission with data concerning its production of EL flat panel displays in Japan (table 28). There was a * * * in capacity, as well as production, in each period under investigation, while projections indicate * * *. Capacity utilization * * * around *** to *** percent for the period 1987 through 1989, while * * * from *** to *** percent between the periods January-June 1989 and January-June 1990. Capacity utilization is * * *. End-of-period inventories * * *.

Table 28
EL HIC flat panel displays: Japanese capacity, production, inventories, capacity utilization, and shipments, 1987-89, January-June 1989, January-June 1990, and projected 1990 and 1991

* * * * * * *

Total shipments * * *, with home market shipments * * * and U.S. exports * * *. In fact, the projections for 1990 and 1991 reveal an expectation of * * * exports to the United States, while 1990 levels for home market shipments and export shipments to markets other than the United States are * * * than 1989 levels. As a share of total shipments, U.S. exports * * * from 1987 to 1989 and * * * during January-June 1990. Projected levels for 1990 and 1991 are * * *.

Investment by Japanese manufacturers.--Japanese manufacturers of HIC flat panel displays are vertically integrated firms that produce a wide variety of other electronic products. The responding Japanese firms that produce HIC flat panel displays reported that, on the average, less than 2 percent of total sales for the firms is accounted for by the product under investigation. Like the U.S. firms, most Japanese HIC flat panel display firms produce the display glass internally. Five of the responding Japanese firms also produce

other subassemblies, while all others tend to seek outside sources for these components.

The Commission gathered information on planned research and development expenses for the subject product by Japanese firms. Seven of the 12 firms reported full budgeted research and development data for 1990 through 1992. These firms project a steady increase in the amount of research and development funds available over the 3-year period.

Plans of Japanese manufacturers to invest in and market flat panel displays are frequently announced. The tabulation below (for active matrix LCDs, not necessarily limited to HIC) is drawn from a Nikkei Sangyo Newspaper survey on active matrix LCDs (February 15, 1990). [113]

Company	Investment plan	Production plans/display size
Sharp	$700 million from 1990 to 1993	3,000 to 5,000 per month from April 1990; 10 inches and above
Hitachi	$210 million in 1991	500 units of 10 inches and above from April or May 1990
Toshiba/IBM	$140 million	Beginning production in April 1991
NEC	$70 million	8 inches in August 1990 10 inches from November 1990
Mitsubishi	$70 million	Sampling in 1991
Hoshiden	$140 million by 1992	10-inch color units in 1990
Matsushita	$350 million by 1992	Not available
Sanyo	$560 million by 1992	Not available

In response to a Commission inquiry, * * *.

World market

The same forces which have driven the U.S. market are found on a worldwide basis. In its questionnaire response, Plasmaco states:

* * * * * * *

Countries other than Japan are setting up production lines for HIC flat panel displays. Both Korea and Taiwan are reportedly planning manufacturing operations and, as noted earlier in the report, * * *. The incentive for other countries to produce displays increases as they develop manufacturing

[113] This information was also cited in the petition.

capability for the end-user systems, specifically computers. [114] Compaq writes: * * *. * * *. [115]

Consideration of the Causal Relationship Between Imports of the Subject Merchandise and the Alleged Material Injury

U.S. imports

U.S. imports of finished HIC flat panel displays.--The quantity of imports of HIC flat panel displays from Japan increased from *** units in 1987 to *** units in 1989, or by *** percent (table 29). Imports increased again from *** units in January-June 1989 to *** units in 1990, a rise of *** percent. The value of U.S. imports of HIC flat panel displays imported from Japan followed a similar trend as the quantity of U.S. imports from 1987 to 1989, increasing by *** percent, but rose more sharply, by *** percent, during the interim periods. The increase in imports is largely due to imports of LCDs from Japan: such imports rose from *** units in 1987 to *** units in 1989, an increase of over *** percent. LCD imports increased again during the interim periods from *** units to *** units, or by *** percent. In contrast, imports of plasma displays decreased irregularly by *** percent from *** units in 1987 to *** units in 1989, then increased by *** percent during the interim periods. U.S. imports of EL displays * * * by *** percent from 1987 to 1989, then * * * by *** percent from January-June 1989 to January-June 1990.

Table 29
HIC flat panel displays: U.S. imports from Japan, by types, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Shipments of imported LCDs primarily consisted of passive matrix technology, although in 1989 active matrix LCDs began entering the U.S. market in significant numbers from Japan. The following tabulation shows the quantity of U.S. shipments of imports for passive matrix and active matrix LCDs (in percent): [116]

	1987	1988	1989	Jan.-June 1990
Passive matrix.....	***	***	***	***
Active matrix.....	***	***	***	***

[114] Currently, complete computers imported into the United States generally include Japanese-manufactured HIC flat panel displays. * * *.

[115] Response to Commission's questionnaire.

[116] All shipments are from Japan.

Unit values of U.S. imports of HIC flat panel displays, in aggregate, remained relatively constant. However, reported unit values for the three types of displays vary: in 1989 the average value of U.S. imports of imported LCDs was $***, the average value of plasma displays was $***, and the average value of imported EL displays was $***.

The only additional source of imports (and then only EL displays) was Finland. The following tabulation shows the quantity, value, and unit value of U.S. imports of EL displays from Finland: [117]

Item	1987	1988	1989
Quantity (units).....	***	***	***
Value (1,000 dollars).....	***	***	***
Unit value (per unit).....	$***	$***	$***

* * *.

Imports from all sources are reported in table 30.

Table 30
HIC flat panel displays: U.S. imports from all countries, by types, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

U.S. imports of subassemblies.--U.S. importers also reported separate imports of subassemblies of HIC flat panel displays. The only significant source of such imports was * * *. * * *. [118] * * * shipped *** units to the United States in 1987, *** units in 1988, and *** units in 1989. During January-June 1989 *** units were shipped, compared with *** units in January-June 1990. In 1989, * * *'s shipments comprised *** percent of total U.S. shipments of display glass, whether or not part of a finished display. The unit value of the components imported by * * * was equal to or even exceeded the unit values of imports of finished HIC flat panel displays reported by all firms.

Additional firms reported imports of drive electronics, control electronics, mechanical packages, and power supplies from Japan. The total

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[117] Data are reported on a fiscal-year basis (March 1 to February 28). Data for the interim periods are not available.

[118] In its questionnaire response, * * *. * * *.

value of such imports is presented in the following tabulation (in 1,000 dollars): [119]

	1987	1988	1989	January-June-- 1989	1990
From * * *.....	***	***	***	***	***
From all other firms..	***	***	***	***	***
Total.....	***	***	***	***	***

Imports of separate subassemblies were minor in comparison to imports of finished displays from Japan: such imports accounted for *** percent of total imports in 1987, *** percent in 1988, *** percent in 1989, and *** percent in January-June 1990. As shown above, the great majority of the subassemblies consisted of * * * imported by * * *. No imports of subassemblies from any country other than Japan were reported.

U.S. market penetration by imports

Data on U.S. market penetration by imports are presented for HIC flat panel displays and subassemblies thereof (table 31), HIC flat panel displays (table 32), LCD HIC flat panel displays (table 33), plasma HIC flat panel displays (table 34), and EL HIC flat panel displays (table 35). [120] With the exception of EL displays, imports from Japan dominate the market. The market shares of imports from Japan do not fall below *** percent (for value) during any period for finished displays and subassemblies combined, for all finished displays for LCD displays, or for plasma displays. For LCDs, imports from Japan * * *. Market share by quantity is even more dramatic: for each time period, Japanese-produced displays account for over *** percent of U.S. apparent consumption of all displays, for almost *** percent of domestic consumption of LCDs, and for over *** percent of domestic consumption of plasma displays.

[119] None of the imports reported here are known to be shipped to a U.S. manufacturer of HIC flat panel displays (whether a firm that produces display glass or an integrator) and are thus not otherwise included in value data of finished flat panel displays.

[120] Data, as presented, include only U.S. producers' domestic shipments for those firms that produce display glass. (Data on U.S. market penetration by imports for HIC flat panel displays and subassemblies thereof that include shipments by U.S. producers that do not produce display glass are presented in table E-2 of appendix E.)

Table 31
HIC flat panel displays and subassemblies thereof: Domestic consumption and U.S. market shares, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Table 32
HIC flat panel displays: Domestic consumption and U.S. market shares, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Table 33
LCD HIC flat panel displays: Domestic consumption and U.S. market shares, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Table 34
Plasma HIC flat panel displays: Domestic consumption and U.S. market shares, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Table 35
EL HIC flat panel displays: Domestic consumption and U.S. market shares, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

The market shares accounted for by imports from Japan of EL displays, in terms of quantity, have * * * from *** percent in 1987 to *** percent in 1988 and *** percent in 1989. The trend for value is comparable. This * * *, however, * * *, as imports from Finland * * * from *** percent in 1987 to *** percent in 1988 and *** percent in 1989. [121]

[121] U.S. importers' domestic shipments from Finland are not available for the interim periods. Relative to U.S. producers' domestic shipments only, the penetration of imports from Japan of EL displays * * * in January-June 1990.

Prices

HIC flat panel displays are an important component in a wide range of electronic equipment, including electronic publishing and composing equipment, word processing equipment, laptop computers, aircraft instrumentation, machine tool controllers, and medical monitoring instruments. [122] Thus, the demand for flat panel displays depends upon the demand for the products in which they are used.

Flat panel display prices are generally negotiated. They are typically quoted on an f.o.b. warehouse basis, and standard sales terms are net 30 days. Some firms offer price lists specifying quantity discounts. Prices for a particular type of flat panel display can also vary depending on the special features required.

A large percentage of Japanese flat panel displays are imported directly by computer companies, including IBM, Apple, Compaq, Toshiba, etc., for their own use in products such as laptop computers. Most of these firms reported that buying flat panel displays entails a detailed selection process. Sharp, an importer of Japanese flat panel displays who sells to computer companies, outlined the bid process that they must undergo in order to sell to OEMs. [123] Sharp reported that an OEM usually begins its selection process by summarizing the technical specifications that it requires in a formal inquiry to a manufacturer, sometimes referred to as a Request for Information (RFI). An RFI usually specifies the OEM's expected production date, a projected schedule for production of sample prototypes, a request for a "budgetary price" for a range of production levels, a total cost breakdown for some of these runs, and a cost breakdown for any development costs that the producer would seek to have the OEM pay.

The OEM typically distributes its RFI only to manufacturers who are thought to have the technical and production capabilities to satisfy the RFI's requirements. In most cases the OEM does not inform a particular manufacturer of how many other manufacturers were sent an RFI.

Based upon the information it receives in response to its RFI, the OEM asks a limited number of manufacturers to respond in writing in a more formal manner to a Request for Quote (RFQ). An RFQ is typically issued by an OEM approximately a month after the OEM has received responses to its RFI. The RFQ stage is the actual formal quotation process, including pricing based on a scale of quantities. At this stage, the OEM provides the manufacturers with a more complete specification asking for unit pricing, nonrecurring engineering costs and tooling charges, lead times, and development schedules.

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[122] For a complete discussion of flat panel display uses see the section of this report entitled "Uses."

[123] The description of the OEM bidding process was provided by Sharp in its response to questions asked by Commission staff during the conference (postconference brief, exhibit 4, pp. 3-6).

The OEM evaluates the responses to its RFQ on the basis of technical merit, its past experience with the suppliers, and the suppliers' ability to provide the required volumes on schedule and at the agreed-upon price. Any one of these criteria might be more important than the others for a particular OEM; the precise mix varies from OEM to OEM and from project to project.

For a month or so after receiving the RFQs, the OEM and one or two potential manufacturers typically negotiate details of the "design" phase, for example, timing and cost for provision of samples and prototypes, last-minute technological modifications, and prices for production runs. After agreeing to these details, the OEM typically awards the business to one or occasionally two suppliers, and a "design win" has taken place.

Questionnaire price data.--The Commission requested U.S. producers and importers to provide quarterly price data between January 1987 and June 1990 for 24 representative flat panel display products. The Commission requested price data for the largest sales and the total quantity sold of four types of flat panel display products; passive LCD, active LCD, EL, and plasma. The selected products have varied applications. Passive matrix LCDs are mainly used in laptop computers, but also in overhead projectors and test equipment. Active matrix LCDs are used in laptop and other computers and aerospace and specialized military applications. EL and plasma flat panel displays are used in laptop and other computers, medical instruments, and aerospace and specialized military applications. [124] Each type of product category was further broken down by pixel matrix configuration (640 x 200, 640 x 400, or 640 x 480) and by gray scale or nongray scale capabilities. The Commission received price data for only 14 of the 24 products. Domestic producers reported prices for sales of EL and plasma displays, but not for sales of any of the specified passive matrix or active matrix LCD products. Importers of Japanese flat panel displays reported prices for sales of EL, plasma, and passive matrix LCD products, but not for the specified active matrix LCD products. The products for which pricing data were reported are listed below:

Product 2: 640 x 200 passive LCD (nongray scale)
Product 8: 640 x 200 EL (nongray scale)
Product 9: 640 x 400 passive LCD (gray scale)
Product 10: 640 x 400 passive LCD (nongray scale)
Product 12: 640 x 400 active LCD (nongray scale)
Product 13: 640 x 400 plasma (gray scale)
Product 14: 640 x 400 plasma (nongray scale)
Product 15: 640 x 400 EL (gray scale)
Product 16: 640 x 400 EL (nongray scale)
Product 17: 640 x 480 passive LCD (gray scale)
Product 18: 640 x 480 passive LCD (nongray scale)
Product 21: 640 x 480 plasma (gray scale)
Product 22: 640 x 480 plasma (nongray scale)
Product 23: 640 x 480 EL (nongray scale)

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[124] For a more complete discussion of flat panel display applications see the section of the staff report entitled "Responses to the Commission's "like-product" questionnaire."

Three U.S. producers and 16 importers reported price data, although most of their price series were not complete for all quarters. [125]

Price trends.--Prices for U.S.- and Japanese-produced flat panel displays are presented in tables 36-41. Tables 36-38 show sales prices reported by U.S. producers and importers of Japanese flat panel displays with 640 x 200, 640 x 400, and 640 x 480 pixel matrix configurations, respectively. Tables 39-41 present prices paid by OEMs who import Japanese flat panel displays directly.

The limited pricing data available indicate that sale prices for U.S.-produced flat panel display products fell during the period January 1987-June 1990. At the same time, sale and purchase prices for Japanese-produced flat panel display products showed mixed upward and downward movement. For many products, the prices are simply price series reported by a single firm rather than weighted averages for the industry. Sometimes, the price series show sharp quarterly changes which are largely the result of changes in reporting firms rather than product price movements. Several examples of these data problems are identified in footnotes to tables 37 and 38.

Domestic producers reported sufficient quarterly weighted-average f.o.b. sales prices to show price trends for products 8 and 16, shown in tables 36 and 37. Prices for both of these products tended to * * * during the investigation period. Prices for product 8 fluctuated between $*** and $*** per unit during 1987. In 1988, prices * * * to a * * *, varying between $*** and $***. Prices continued to * * * in 1989, fluctuating between $*** and $***, and remained in roughly that range during the first two quarters of 1990. Prices for product 16 showed similar * * * movement. During the period October 1987-December 1988, prices ranged from $*** to $***. Prices * * * in 1989, fluctuating between $*** and $***, and then remained at $*** in January-March and April-June 1990.

Table 36
Certain HIC flat panel displays: Weighted-average f.o.b. sales prices of products 2 and 8, having 640 x 200 pixel formations, reported by producers and importers of Japanese flat panel displays, by products and by quarters, January 1987-June 1990

* * * * * * *

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[125] Three domestic producers (Planar, Plasmaco, and Cherry), which account for *** percent of total U.S. production in 1989, reported pricing data. Several U.S. producers reported shipments of flat panel displays but did not report any pricing data. OIS reported shipments of *** flat panel displays primarily for aerospace and specialized military applications. * * *. Photonics reported shipments of plasma displays for aerospace and specialized military applications. * * * reported shipments of *** EL displays for specialized military applications. Electro-Plasma reported shipments of *** plasma displays for various applications, but reported that none of these displays * * *.

The reporting importers accounted for *** percent of reported U.S. imports of Japanese HIC flat panel displays in 1989.

Table 37
Certain HIC flat panel displays: Weighted-average f.o.b. sales prices of products 9, 10, 13, 14, and 16, having pixel formations of 640 x 400, reported by U.S. producers and importers of Japanese flat panel displays, by products and by quarters, January 1987-June 1990

* * * * * * *

Table 38
Certain HIC flat panel displays: Weighted-average f.o.b. sales prices of products 17, 18, 21, 22, and 23, having pixel formations of 640 x 480, reported by U.S. producers and importers of Japanese flat panel displays, by products and by quarters, January 1987-June 1990

* * * * * * *

Importers of Japanese-produced flat panel displays who market these products reported enough sales price data to show price trends for products 2, 9, 10, 13, 14, and 18. During the period of investigation, prices for products 2, 9, and 10 * * *, whereas prices for products 14 and 18 * * *. Prices for product 13 * * *.

Prices for importers' sales of product 2 fluctuated during 1987, but then * * * from January 1988 through June 1990, except for a slight * * * in January-March 1990. Product 9 prices * * * until July-September 1988, then remained at that level during the rest of the investigation period. The product 10 price series * * * during 1987 and the first quarter of 1988, remained * * * from April-June 1988 through April-June 1989, then * * * in October-December 1989. During the investigation period, prices for product 13 generally * * *. Prices for product 14 * * * over the investigation period. Prices for product 18 * * *.

The Commission also requested importers of Japanese-produced flat panel displays to report prices for their largest quarterly purchases of flat panel displays (tables 39-41). Purchase prices were reported by seven computer companies accounting for 26.0 percent of reported Japanese imports in 1989. These firms reported sufficient purchase price data to show price trends for products 2, 8, 9, 14, and 21. During the period of investigation, prices for product 8 and 21 * * *, while prices for products 2, 9, and 14 * * * and * * *.

Table 39
Certain HIC flat panel displays: Weighted-average purchase prices of products 2 and 8, having pixel formations of 640 x 200, reported by computer companies that imported Japanese flat panel displays directly, by products and by quarters, January 1987-June 1990

* * * * * * *

Table 40
Certain HIC flat panel displays: Weighted-average purchase prices of products 8, 9, 10, 12, 13, 14, and 15, having pixel formations of 640 x 400, reported by computer companies that imported Japanese flat panel displays directly, by products and by quarters, January 1987-June 1990

* * * * * * *

Table 41
Certain HIC flat panel displays: Weighted-average purchase prices of products 17, 18, and 21 having pixel formations of 640 x 480, reported by computer companies that imported Japanese flat panel displays directly, by products and by quarters, January 1987-June 1990

* * * * * * *

Prices for purchases of product 2 * * * from the third quarter of 1987 until the second quarter of 1988, then * * * during the remainder of the period. Product 8 prices * * * from the second quarter of 1987 to the first quarter of 1988, then remained at that level. Prices for product 9 * * * from the third quarter of 1987 until the fourth quarter of 1988, * * * each quarter to October-December 1989, * * * in January-March 1990, and * * * in April-June 1990. Product 14 prices * * * between the second quarter of 1987 and the fourth quarter of 1988, then * * * during the remaining time. Reported prices for product 21 were * * *.

Price comparisons.--U.S. producers and importers of flat panel displays reported very few instances of competing sales prices. In the cases for which there are price comparisons, the competing products may not be the same because of differences in individual product characteristics within the requested product categories. The quantity of displays sold can also affect the price of the product.

Comparisons of prices for similar types of U.S.- and Japanese-produced flat panel displays were possible for * * *. In * * *, Japanese flat panel displays were * * * the corresponding U.S. product. * * *. * * *. * * *.

* * * * * * * [126] [127]

Lost sales and lost revenues

* * * * * * *

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[126] * * *.

[127] * * *.

Exchange rates

Quarterly data reported by the International Monetary Fund indicate that during January 1987-June 1990 the nominal value of the Japanese yen fluctuated, depreciating overall by 1.3 percent relative to the U.S. dollar (table 42). [128] Adjusted for movements in producer price indexes in the United States and Japan, the real value of the Japanese currency showed an overall depreciation of 9.6 percent for the period January 1987 through June 1990.

Table 42
Exchange rates: 1/ Indexes of nominal and real exchange rates of the Japanese yen and indexes of producer prices in the United States and Japan, 2/ by quarters, January 1987-June 1990

Period	U.S. producer price index	Japanese producer price index	Nominal exchange-rate index	Real exchange-rate index 3/
1987:				
January-March.....	100.0	100.0	100.0	100.0
April-June.....	101.6	99.2	107.4	104.8
July-September.....	102.8	100.5	104.3	101.9
October-December....	103.2	100.1	112.8	109.5
1988:				
January-March.....	103.8	99.0	119.7	114.1
April-June.....	105.6	98.6	121.9	113.9
July-September.....	107.1	99.5	114.6	106.5
October-December....	107.6	98.7	122.3	112.2
1989:				
January-March.....	109.9	99.2	119.2	107.6
April-June.....	111.8	101.8	110.9	101.1
July-September.....	111.3	102.6	107.6	99.2
October-December....	111.8	102.4	107.1	98.1
1990:				
January-March.....	113.5	102.9	103.6	93.9
April-June.....	113.2	103.6	98.7	90.4

1/ Exchange rates expressed in U.S. dollars per Japanese yen.
2/ Producer price indexes--intended to measure final product prices--are based on period-average quarterly indexes presented in line 63 of the International Financial Statistics.
3/ The real exchange rate is derived from the nominal rate adjusted for relative movements in producer prices in the United States and Japan. Producer prices in the United States increased 13.2 percent between January 1987 and June 1990 compared with a 3.6-percent increase in Japanese prices during the same period.

Note.--January-March 1987 = 100.

Source: International Monetary Fund, International Financial Statistics, August 1990.

[128] International Financial Statistics, August 1990.

APPENDIX A

FEDERAL REGISTER NOTICES

INTERNATIONAL TRADE COMMISSION

[Investigation No. 731-TA-469 (Preliminary)]

High-Information Content Flat Panel Displays and Subassemblies Thereof From Japan

AGENCY: International Trade Commission.

ACTION: Institution of a preliminary antidumping investigation and scheduling of a conference to be held in connection with the investigation.

SUMMARY: The Commission hereby gives notice of the institution of preliminary antidumping investigation No. 731-TA-469 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. 1673b(a)) to determine whether there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan of high-information content flat panel displays and subassemblies thereof, however provided for in the Harmonized Tariff Schedule of the United States (HTS) [1], that are alleged to be sold in the United States at less than fair value. As provided in section 733(a), the Commission must complete preliminary antidumping investigations in 45 days, or in this case by September 4, 1990.

For further information concerning the conduct of this investigation and rules of general application, consult the Commission's Rules of Practice and Procedure, part 207, subparts A and B (19 CFR part 207), and part 201, subparts A through E (19 CFR part 201).

EFFECTIVE DATE: July 18, 1990.

FOR FURTHER INFORMATION CONTACT: Debra Baker (202-252-1180), Office of Investigations, U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436. Hearing-impaired individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-252-1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202-252-1000.

SUPPLEMENTARY INFORMATION:

Background

This investigation is being instituted in response to a petition filed on July 18, 1990 by the Advanced Display Manufacturers Association, Washington, DC.

Participation in the Investigation

Persons wishing to participate in this investigation as parties must file an entry of appearance with the Secretary to the Commission, as provided in section 201.11 of the Commission's rules (19 CFR 201.11), not later than seven (7) days after publication of this notice in the Federal Register. Any entry of appearance filed after this date will be referred to the Chairman, who will determine whether to accept the late entry for good cause shown by the person desiring to file the entry.

Public Service List

Pursuant to § 201.11(d) of the Commission's rules (19 CFR 201.11(d)), the Secretary will prepare a public service list containing the names and addresess of all persons, or their representatives, who are parties to this investigation upon the expiration of the period for filing entries of appearance. In accordance with §§ 201.16(c) and 207.3 of the rules (19 CFR 201.16(c) and 207.3), each public document filed by a party to the investigation must be served on all other parties to the investigation (as identified by the public service list), and a certificate of service must accompany the document. The Secretary will not accept a document for filing without a certificate of service.

Limited Disclosure of Business Proprietary Information under a Protective Order and Business Proprietary Information Service List

Pursuant to § 207.7(a) of the Commission's rules (19 CFR 207.7(a)), the Secretary will make available business proprietary information gathered in this preliminary investigation to authorized applicants under a protective order, provided that the application be made not later than seven (7) days after the publication of this notice in the Federal Register. A separate service list will be maintained by the Secretary for those parties authorized to receive business proprietary information under a protective order. The Secretary will not accept any submission by parties containing business proprietary information without a certificate of service indicating that it has been served on all parties that are authorized to receive such information under a protective order.

Conference

The Director of Operations of the Commission has scheduled a conference in connection with this investigation for 9:30 a.m. on August 7, 1990 at the U.S. International Trade Commission Building, 500 E Street SW., Washington, DC. Parties wishing to participate in the conference should contact Debra Baker (202-252-1180) not later than August 3, 1990 to arrange for their appearance. Parties in support of the imposition of

[1] High-information content (HIC) flat panel displays are electronic devices which are designed to display information or images when integrated into such enduser systems as consumer electronics, office automation, or measuring instruments. The covered displays have 120,000 or more addressable pixels and are no greater than 4 inches in depth. The tariff classification for high-information content flat panel displays includes but is not limited to the following Harmonized Tariff Schedule of the United States (HTS) provisions: subheadings 8471.92.30 and 8471.92.40 and headings of chapters 84, 85, and 90.

antidumping duties in this investigation and parties in opposition to the imposition of such duties will each be collectively allocated one hour within which to make an oral presentation at the conference.

Written Submissions

Any person may submit to the Commission on or before August 10, 1990 a written brief containing information and arguments pertinent to the subject matter of the investigation, as provided in § 207.15 of the Commission's rules (19 CFR 207.15). If briefs contain business proprietary information, a nonbusiness proprietary version is due August 13, 1990. A signed original and fourteen (14) copies of each submission must be filed with the Secretary to the Commission in accordance with § 201.8 of the rules (19 CFR 201.8). All written submissions except for business proprietary data will be available for public inspection during regular business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary to the Commission.

Any information for which business proprietary treatment is desired must be submitted separately. The envelope and all pages of such submissions must be clearly labeled "Business Proprietary Information." Business proprietary submissions and requests for business proprietary treatment must conform with the requirements of §§ 201.6 and 207.7 of the Commission's rules (19 CFR 201.6 and 207.7).

Parties which obtain disclosure of business proprietary information pursuant to § 207.7(a) of the Commission's rules (19 CFR 207.7(a)) may comment on such information in their written brief, and may also file additional written comments on such information no later than August 14, 1990. Such additional comments must be limited to comments on business proprietary information received in or after the written briefs. A nonbusiness proprietary version of such additional comments is due August 15, 1990.

Authority: This investigation is being conducted under authority of the Tariff Act of 1930, title VII. This notice is published pursuant to § 207.12 of the Commission's rules (19 CFR 207.12).

By order of the Commission.

Issued: July 20, 1990.

Kenneth R. Mason,

Secretary.

[FR Doc. 90-17342 Filed 7-23-90; 8:45 am]

BILLING CODE 7020-02-M

DEPARTMENT OF COMMERCE

International Trade Administration

[A-588-817]

Initiation of Antidumping Duty Investigation; High Information Content Flat Panel Displays and Subassemblies Thereof from Japan

AGENCY: Import Administration, International Trade Administration, Commerce.

ACTION: Notice.

SUMMARY: On the basis of a petition filed in proper form with the U.S. Department of Commerce (the Department), we are initiating an antidumping duty investigation to determine whether imports of high information content flat panel displays and subassemblies thereof (FPDs) from Japan are being, or are likely to be, sold in the United States at less than fair value. We are notifying the U.S. International Trade Commission (ITC) of this action so that it may determine whether there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan of FPDs. If this investigation proceeds normally, the ITC will make its preliminary determination on or before September 4, 1990. If that determination is affirmative, we will make a preliminary determination on or before December 26, 1990.

EFFECTIVE DATE: August 12, 1990.

FOR FURTHER INFORMATION CONTACT: Karmi Leiman, Joel Fischl, or Bradford Ward, Office of Antidumping Investigations, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, NW., Washington, DC 20230; telephone (202) 377-8498, 377-1778, or 377-5288, respectively.

SUPPLEMENTARY INFORMATION:

The Petition

On July 18, 1990, we received a petition filed in proper form by the Advanced Display Manufacturers of America and its individual member companies, Planar Systems, Inc., Plasmaco, Inc., OIS Optical Imaging Systems, Inc., The Cherry Corporation, Electro-Plasma, Photonics Technology, Inc., and Magnascreen Corporation. In compliance with the filing requirements of the Department's regulations (19 CFR 353.12), petitioners allege that imports of FPDs are being, or are likely to be, sold in the United States at less than fair value within the meaning of section 731 of the Tariff Act of 1930, as amended (the Act), and that there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan of FPDs.

Petitioners have stated that they have standing to file the petition because they are interested parties, as defined under section 771(9)(C) of the Act, and because they have filed the petition on behalf of the U.S. industry producing the product that is subject to this investigation. If any interested party, as described under paragraphs (C), (D), (E), or (F) of section 771(9) of the Act, wishes to register support for, or opposition to, this petition, please file a written notification with the Assistant Secretary for Import Administration.

Under the Department's regulations, any producer or reseller seeking exclusion from a potential antidumping duty order must submit its request for exclusion within 30 days of the date of the publication of this notice. The procedures and requirements regarding the filing of such requests are contained in 19 CFR 353.14.

United States Price and Foreign Market Value

Petitioners based their estimates of United States price on representative U.S. prices for several FPD technologies and products. The prices were obtained by individuals at the petitioners' companies that have contact with customers, independent market analysts, suppliers, and other knowledgeable persons in the industry. Petitioners adjusted the prices for foreign inland freight, foreign inland insurance, ocean freight, U.S. duty, brokerage, and U.S. inland freight.

Petitoners' estimate of foreign market value is based on constructed value (CV). The CV was developed for several technologies and products and was based on market research studies, articles in trade journals, and petitioners' own cost data.

Baed on a comparison of U.S. price and foreign market value, petitioners allege dumping margins ranging from 70 to 318 percent.

Petitioners requested that the Department investigate whether the respondents are selling FPDs in Japan at less than their cost of production (COP). However, petitioners have not submitted sufficient evidence to provide the Department with reasonable grounds to believe or suspect that home market

sales are being made at prices that are less than COP, as required by section 773(b) of the Act. Therefore, the Department will not begin a COP investigation at this time.

Initiation of Investigation

Pursuant to section 732(c) of the Act, the Department must determine, within 20 days after a petition is filed, whether the petition sets forth allegations necessary for the initiation of an antidumping duty investigation, and whether the petition contains information reasonably available to petitioner supporting the allegations.

We have examined the petition and found that it complies with the requirements of section 732(b) of the Act. Therefore, in accordance with section 732 of the Act, we are initiating an antidumping duty investigation to determine whether imports of high information content flat panel displays and subassemblies thereof from Japan are being, or are likely to be, sold in the United States at less than fair value. If our investigation proceeds normally, we will make our preliminary determination by December 26, 1990.

Scope of Investigation

The products covered by this investigation are high information content flat panel displays and subassemblies thereof.

High information content flat panel displays are large area, matrix addressed displays, no greater than four inches in depth, with a picture element ("pixel") count of 120,000 or greater, whether complete or incomplete, assembled or unassembled. Included are monochromatic, limited color, and full color displays. Displays may utilize, but are not limited to, the following technologies: liquid crystal (LCD); plasma; and electroluminescence (EL). High information content flat panel displays are used to display text, graphics, and video.

Subassemblies of a display that are exclusively dedicated to or designed for use in high information content flat panel displays are also covered by this investigation.

The following merchandise is excluded: segmented flat panel displays; matrix addressed flat panel displays with less than 120,000 pixels; and cathode ray tubes (CRTs).

The appropriate Harmonized Tariff Schedule (HTS) subheadings under which the subject merchandise is classifiable are undetermined at this time. We are investigating this issue and will identify the appropriate HTS subheadings in our preliminary determination. HTS subheadings are provided for convenience and U.S. Customs Service purposes. The written description remains dispositive.

ITC Notification

Section 732(d) of the Act requires us to notify the ITC of this action and to provide it with the information we used to arrive at this determination. We will notify the ITC and make available to it all nonprivileged and nonproprietary information. We will allow the ITC access to all privileged and business proprietary information in the Department's files, provided the ITC confirms in writing that it will not disclose such information either publicly or under administrative protective order without the written consent of the Deputy Assistant Secretary for Investigations, Import Administration.

Preliminary Determination by ITC

The ITC will determine by September 4, 1990, whether there is a reasonable indication that an industry in the United States is materially injured, or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from Japan of FPDs. If its determination is negative, the investigation will be terminated; otherwise, the investigation will proceed according to statutory and regulatory time limits.

This notice is published pursuant to section 732(c)(2) of the Act.

Dated: August 6, 1990.

Eric I. Garfinkel,

Assistant Secretary for Import Administration.

[FR Doc. 90-19098 Filed 8-13-90; 8:45 am]

BILLING CODE 3510-DS-M

APPENDIX B

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE IN THIS INVESTIGATION

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE

Investigation No. 731-TA-469 (Preliminary)

HIGH-INFORMATION CONTENT FLAT PANEL DISPLAYS AND SUBASSEMBLIES THEREOF FROM JAPAN

Those listed below appeared at the United States International Trade Commission's conference held in connection with the subject investigation on August 7, 1990, in Hearing Room 101 of the USITC Building, 500 E Street, SW., Washington, DC.

In support of the imposition of antidumping duties

Collier, Shannon & Scott--Counsel
Washington, DC
on behalf of--

Advance Display Manufacturers of America and its individual member companies (Planar Systems, Inc.; Plasmaco, Inc.; OIS Optical Imaging Systems, Inc.; The Cherry Corp.; Electro-Plasma Photonics Technology, Inc.; and Magnascreen Corp.)

James M. Hurd, President and Chief Executive Officer, Planar Systems, Inc.
Curt Stevens, Vice President, Finance and Administration, Planar Systems, Inc.

Zvi Yaniv, President and Chief Executive Officer, OIS Optical Imaging Systems, Inc.
Lionel Robbins, Vice President, Sales and Marketing, OIS Optical Imaging Systems, Inc.

James L. Kehoe, President and Chief Executive Officer, Plasmaco, Inc.
Ross Pollack, Administrative Assistant to the President, Plasmaco, Inc.

Patrick J. Magrath, Georgetown Economic Services

Paul C. Rosenthal)
Robin H. Gilbert) --OF COUNSEL

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE--Continued

In opposition to the imposition of antidumping duties

PANEL ONE

Graham & James--Co-Counsel
Washington, DC
ICF Consulting Associates
Washington, DC
on behalf of--

Fujitsu Ltd.
Hitachi, Ltd.
Hosiden Electronics Co., Ltd.
Kyocera Corp.
Matsushita Electric Industrial Co., Ltd.
Matsushita Electronics Corp.
NEC Corp.
Optrex Corp.
Seiko Epson Corp.
Seiko Instruments, Inc.
Sharp Corp.
Toshiba Corp.

Dan Klett, ICF Consulting Associates

Lawrence R. Walders)
Brian McGill)--OF COUNSEL
Anjali K. Singh)

Adduci, Mastriani, Meeks & Schill--Counsel
Washington, DC
on behalf of--

Hosiden Electronics Co., Ltd.

Louis S. Mastriani)
Barbara A. Murphy)
Larry L. Shatzer, II)--OF COUNSEL
Cathy S. Neuren)
Anri Suzuki)

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE--Continued

In opposition to the imposition of antidumping duties--Continued

PANEL ONE--Continued

Akin, Gump, Strauss, Hauer & Feld--Counsel
Washington, DC
on behalf of--

Fujitsu Ltd.
Fujitsu Microelectronics, Inc.

Warren E. Connelly)
Valerie A. Slater) --OF COUNSEL

Coudert Brothers--Counsel
Washington, DC
on behalf of--

NEC Corp.
NEC Technologies, Inc.

Mark D. Herlach)
Kay C. Georgi) --OF COUNSEL

Donovan, Leisure, Newton & Irvine--Counsel
Washington, DC
on behalf of--

Sharp Corp.
Sharp Electronics Corp.

Stephen P. Sedaker, Product Marketing Manager, Display Products

David S. Versfelt--OF COUNSEL

Fenwick, Davis & West--Counsel
Washington, DC
on behalf of--

Seiko Instruments & Electronics, Ltd.

Donald R. Davis)
Roger M. Golden)
Preston T. Scott) --OF COUNSEL
Thomas R. Radscliffe)

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE--Continued

In opposition to the imposition of antidumping duties--Continued

PANEL ONE--Continued

Howrey & Simon--Counsel
Washington, DC
Spensley, Horn, Jubas & Lubitz--Counsel
Los Angeles, CA
on behalf of--

Kyocera Corp.
Kyocera Industrial Ceramics Corp.

Michael A. Hertzberg)
Matthew J. Clark)
Paul M. Orbuch) --OF COUNSEL (Howrey)
Lyle B. Vander Schaaf)

Richard J. Codding) --OF COUNSEL (Spensley)
Paul Bangor)

McDermott, Will & Emery--Counsel
Washington, DC
on behalf of--

Hitachi, Ltd.; Hitachi America, Ltd.; and their related companies

Jim Aden, Vice President and General Manager, Electron Tube Division, Hitachi America, Ltd.

Carl W. Schwartz)
Lizbeth R. Levinson) --OF COUNSEL
William H. Barrett)

Morrison & Foerster--Counsel
Washington, DC
on behalf of--

Seiko Epson Corp.

Ronald G. Carr)
G. Brian Busey) --OF COUNSEL
Jonathan Band)

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE--Continued

In opposition to the imposition of antidumping duties--Continued

PANEL ONE--Continued

Mudge, Rose, Guthrie, Alexander & Ferdon--Counsel
Washington, DC
on behalf of--

Toshiba Corp.
Toshiba America Information Systems, Inc.
Toshiba America Electronic Components, Inc.

N. David Palmeter--OF COUNSEL

Wilkie, Farr & Gallagher--Counsel
Washington, DC
on behalf of--

Matsushita Electric Industrial Co., Ltd.
Matsushita Electronics Corp.
Matsushita Electric Corp. of America

Paul N. Wasek, District Manager, Plasma Display Panel Department, Display Components Division, Panasonic Industrial Company Division of Matsushita Electric Corp. of America

William H. Barringer)
William J. Clinton)--OF COUNSEL
Daniel L. Porter)

PANEL TWO

Baker & McKenzie--Counsel
Washington, DC
on behalf of--

Apple Computer

James M. Burger, Chief Counsel-Government

Thomas P. Ondeck)
Kevin M. O'Brien)--OF COUNSEL

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE--Continued

In opposition to the imposition of antidumping duties--Continued

PANEL TWO--Continued

Bishop, Cook, Purcell & Reynolds--Counsel
Washington, DC
Economists, Inc
Washington, DC
on behalf of--

Compaq Computer Corp.

Christopher J. Gintz, Director, Technology Planning & Development, Compaq Computer Corp.

Richard M. Knox, Electrical Research and Development Engineer, Compaq Computer Corp.

Andrew Wechsler, Economists, Inc.

Bill Alberger--OF COUNSEL

Cushman, Darby & Cushman--Counsel
Washington, DC
on behalf of--

Tandy Corp.

Chuck Waggoner, Senior Vice President-Operations of Grid Systems Corp.

Herschel Winn, General Counsel

Arthur Wineburg)
Marcia H. Sundeen) --OF COUNSEL

Sidley & Austin--Counsel
Washington, DC
on behalf of--

DuKane Corp.

Peter Fredriksen, General Manager, Audio Visual Division

Judith H. Bello--OF COUNSEL

LIST OF PARTICIPANTS IN THE PUBLIC CONFERENCE--Continued

In opposition to the imposition of antidumping duties--Continued

NON-INTERESTED PARTY APPEARANCE

Bell, Boyd & Lloyd--Counsel
Washington, DC
on behalf of--

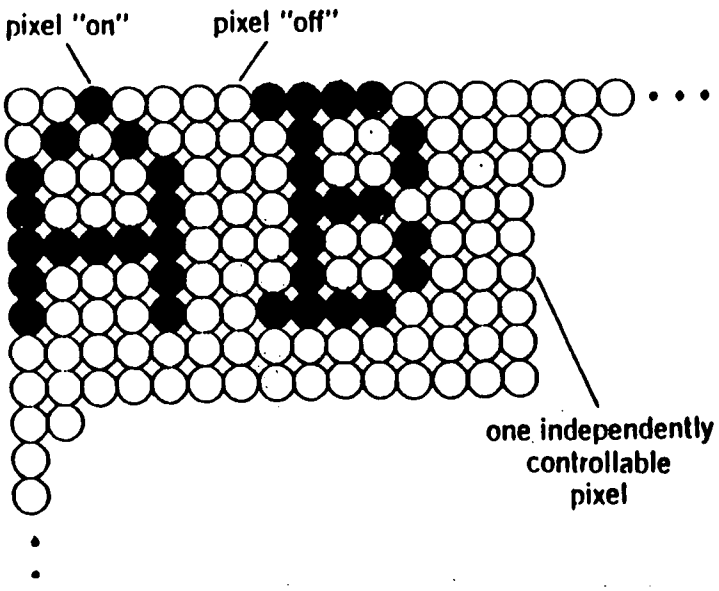
Daewoo Telecom Co., Ltd.

William A. Zeitler--OF COUNSEL

APPENDIX C

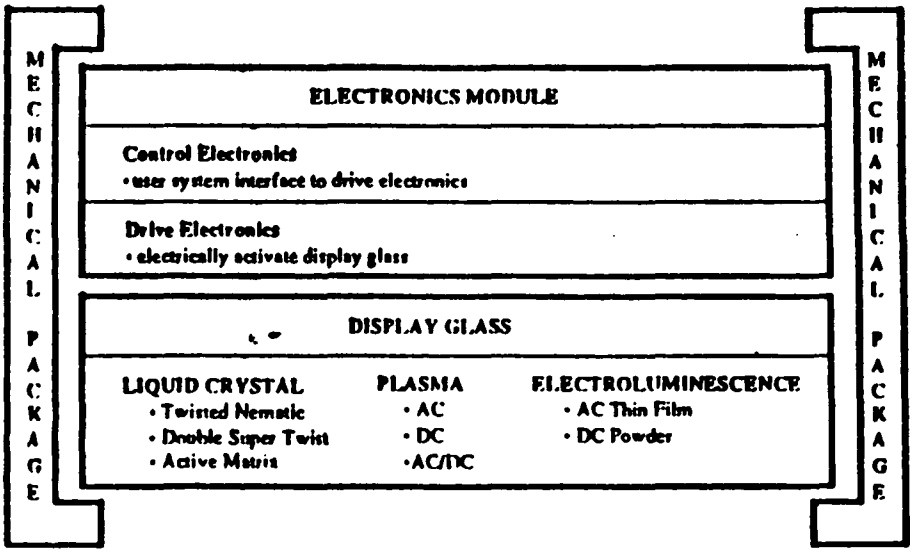
FIGURES

Figure 1.--Illustration showing formation of letters using pixels



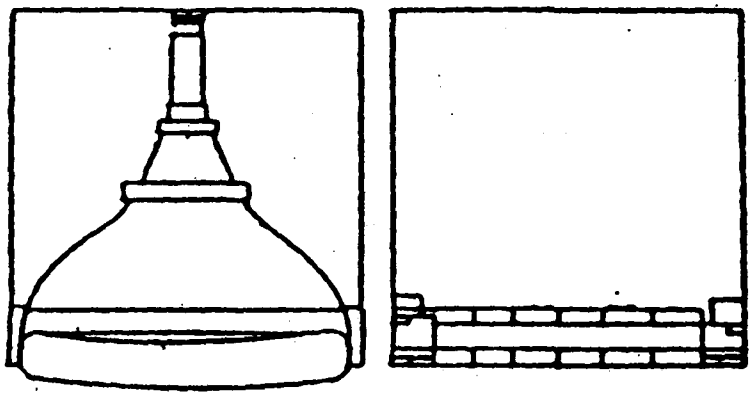
Source: McGraw Hill Encyclopedia of Electronics and Computers.

Figure 2.--Major functional components of a HIC flat panel display



Source: The petition.

Figure 3.--Schematic view of the top of a CRT display and an equivalent-sized HIC flat panel display



CRT HIC flat panel display

Source: Advertisement by Fujitsu.

APPENDIX D

RESPONSES OF FIRMS TO THE QUESTIONS OF WHETHER HIC FLAT PANEL DISPLAYS COMPETE FOR SALE WITH LIC FLAT PANEL DISPLAYS AND/OR CRTS

Table D-1
Responses by firms to question of whether HIC flat panel displays compete for sales with LIC flat panel displays

* * * * * * *

Table D-2
Responses by firms to question of whether HIC flat panel displays compete for sales with CRTs

* * * * * * *

APPENDIX E

U.S. SHIPMENTS AND DOMESTIC CONSUMPTION FOR THE U.S. MARKET CONSISTING OF U.S FIRMS THAT PRODUCE DISPLAY GLASS AND U.S. FIRMS THAT DO NOT PRODUCE DISPLAY GLASS

Table E-1
HIC flat panel displays: U.S. shipments of U.S. producers, by firms and by types, 1987-89, January-June 1989, and January-June 1990

* * * * * * *

Table E-2
HIC flat panel displays and subassemblies thereof: Domestic consumption for the U.S. market that includes U.S. producers' domestic shipments by firms that do not manufacture display glass, and U.S. market shares, 1987-89, January-June 1989, and January-June 1990

Item	1987	1988	1989	January-June-- 1989	1990
	Quantity (units)				
U.S. producers' domestic shipments 1/	***	***	***	***	***
U.S. importers' domestic shipments:					
From Japan 2/	***	***	***	***	***
From Finland 3/	***	***	***	4/	4/
Subtotal	302,228	429,631	609,520	310,880	378,620
Total consumption	***	***	***	***	***
	Market share by quantity (percent)				
U.S. producers' domestic shipments 1/	***	***	***	***	***
U.S. importers' domestic shipments:					
From Japan 2/	***	***	***	***	***
From Finland 3/	***	***	***	4/	4/
Subtotal	***	***	***	***	***
Total	100.0	100.0	100.0	100.0	100.0

1/ Consists of U.S. producers' shipments of finished displays by firms that manufacture the display glass assembly and U.S. producers' shipments by firms that do not manufacture the assembly. No data for domestically-produced subassemblies are included separate from their inclusion in the quantity of shipments of finished displays. Thus, to the extent to which domestically-produced subassemblies are consumed internally in the production of finished HIC flat panel displays that are exported, import penetration will be overstated.
2/ Includes imports of display glass assemblies sold separately. (Such imports of display glass are not incorporated into any of the domestically-produced finished displays for which data are reported.) Quantity data for shipments of subassemblies other than display glass (i.e., drive electronics, control electronics, mechanical packages, and power supplies) are not available. Thus, import penetration ratios are very slightly understated.
3/ Annual data for importers' shipments from Finland, the only source other than Japan, were reported on a fiscal year basis (March 1 to February 28).
4/ Interim data for imports from Finland were not available.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

APPENDIX F

COMMENTS RECEIVED FROM U.S. PRODUCERS ON THE IMPACT OF IMPORTS FROM JAPAN ON THEIR GROWTH, INVESTMENT, ABILITY TO RAISE CAPITAL, AND DEVELOPMENT AND PRODUCTION EFFORTS

The Commission requested U.S. producers to describe and explain the actual and potential negative effects, if any, of imports of flat panel displays from Japan on their firms' growth, investment, ability to raise capital, and development and production efforts (including efforts to develop a derivative or improved version of their products). Their responses are shown below.

Actual negative effects

* * * * * * *

Anticipated negative effects

* * * * * * *

Influence of imports on capital investment

* * * * * * *