

***Case No COMP/M.4696 -
KKR / HARMAN***

Only the English text is available and authentic.

**REGULATION (EC) No 139/2004
MERGER PROCEDURE**

Article 6(1)(b) NON-OPPOSITION
Date: 18/09/2007

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COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 18-IX-2007

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In the published version of this decision, some information has been omitted pursuant to Article 17(2) of Council Regulation (EC) No 139/2004 concerning non-disclosure of business secrets and other confidential information. The omissions are shown thus [...]. Where possible the information omitted has been replaced by ranges of figures or a general description.

PUBLIC VERSION

MERGER PROCEDURE
ARTICLE 6(1)(b) DECISION

To the notifying party

Dear Sir/Madam,

**Subject: Case No COMP/M.4696 - KKR/Harman
Notification of 13/08/2007 pursuant to Article 4 of Council Regulation
No 139/2004¹**

1. On 13 August 2007, the Commission received a notification of a proposed concentration pursuant to Article 4 of Council Regulation (EC) No 139/2004 ('the Merger Regulation') by which the undertaking KHI Manager LLC, controlled by Kohlberg Kravis Roberts & Co ('KKR', USA) acquires within the meaning of Article 3(1)(b) of the Council Regulation control of the whole of the undertaking Karman International Industries, Incorporated ('Harman', USA) by way of purchase of shares.
2. After examination of the notification, the Commission has concluded that the notified operation falls within the scope of the Merger Regulation and does not raise serious doubts as to its compatibility with the common market and the EEA Agreement.

¹ OJ L 24, 29.1.2004, p. 1.

I. THE PARTIES

3. KKR is a private equity business whose affiliated funds have investments in a range of different businesses. KKR has joint control with Silver Lake Partners, which is also a private equity firm, of Avago Technologies ('Avago'). Avago produces an extensive range of analogue, mixed-signal and optoelectronic components and subsystems to manufacturers around the world. On 1 July 2007, Avago completed the purchase of Infineon Technologies AG's Polymer Optical Fiber (POF) business unit which is a leader in the fast growing market for automotive multimedia infotainment networks and transceivers for safety systems. In addition, KKR has a controlling interest in Auto-Teile-Unger Holding ('ATU'). ATU is Germany's leading automotive car parts retailer and service centre operator.
4. Harman manufactures high fidelity audio products and electronic systems for the automotive, consumer and professional industries. Harman's automotive segment designs, manufactures and markets infotainment products and systems for OEMs and aftermarket vehicle applications. Harman's consumer segment designs, manufactures and markets audio, video and electronic systems for home, mobile and multimedia applications. Harman's professional segment designs, manufactures and markets loudspeakers and electronic systems including mixing consoles used by audio professionals.

II. THE OPERATION

5. On 26 April 2007, the parties to the transaction signed an Agreement and Plan of Merger whereby KKR will ultimately acquire sole control of Harman. [...]. Existing Harman shareholders will have the right to elect to receive in exchange for each share either (i) cash consideration (without interest) totaling US \$120.00 per share, or (ii) one fully paid and non-assessable share [...] (the "Merger Consideration").
6. [...]
7. [...]

III. CONCENTRATION

8. As a result of the operation, KKR will acquire sole control, within the meaning of Article 3(1)(b) of the Merger Regulation, over KHI Manager LLC, and, therefore, indirectly over Harman.

IV. COMMUNITY DIMENSION

9. The undertakings concerned have a combined aggregate world-wide turnover of more than EUR 5 000 million ([...] million for KKR, [...] million for Harman). Each of them has a Community-wide turnover in excess of EUR 250 million, but they do not achieve more than two-thirds of their aggregate Community-wide turnover within one and the same Member State. The notified operation therefore has a Community dimension within the meaning of Article 1(2) of the Merger Regulation.

V. COMPETITIVE ASSESSMENT

10. Harman is a leading supplier of infotainment systems to OEMs in the EEA and is also active in the manufacture of mixing consoles. As none of KKR's portfolio companies is

active in these sectors, the proposed transaction does not result in any horizontal overlaps.

11. There are however a number of vertical relationships between Harman and Avago, a company over which KKR exercises joint control, in relation to the supply of fiber optic transceivers ('FOTs') for use in OEM automotive infotainment systems and optocouplers for use in mixing consoles². There is also a vertical relationship between Harman and ATU, a KKR portfolio company, in respect of the supply and sale of GPS navigation systems to the independent aftermarket.

A. Market definition

a) Infotainment systems (downstream market)

12. Advances in technology have enabled OEMs to offer an increasing number of entertainment and communication devices in their vehicles. These devices were initially offered as individual units that usually required separate processing power, driver controls and human interfaces.³ As the spectrum of these devices grew, installing them in the vehicle so that they worked reliably, efficiently and unobtrusively became both a technical and operational challenge. OEMs eventually asked Tier 1 electronic suppliers, such as Harman, for integrated systems capable of coordinating and integrating a broad range of information and entertainment functions and/or devices in vehicles, including GPS navigation, traffic information, voice-activated telephone and climate control, rear seat entertainment, wireless Internet access, hard disk recording, MP3 playback, backup camera and audio. These have become known as 'infotainment' systems within the industry.

Relevant product market

13. The number and type of peripherals that are included and the way they are set up within an infotainment system depends on the level of functionality that a given OEM wants to offer within a given physical architecture of the car and that OEM's given design requirement. The notifying party submits that dividing OEM infotainment systems by the functionalities they provide or the devices they use to provide such functionalities would artificially create a myriad of product markets that would not capture the competition among OEM infotainment system providers to meet the demands of OEMs and consumers for integrated solutions. The notifying party submits that all infotainment systems possess the following common characteristics which distinguish them from the markets for the individual components or peripherals that may be included in such systems:
 - certain hardware: *i.e.*, a central computing platform, commonly known as the "head unit"
 - certain software: *i.e.*, Operating System, software which enables the driver to command and control the various entertainment and information devices that

² The vertical relationship between Harman and Avago in respect of FOTs for infotainment systems is potential in that Harman currently purchases these components from another supplier. [...]

³ Aftermarket devices still operate this way, employing separate user interfaces, and they cannot be integrated into an OEM installed infotainment system.

connect to the 'head unit' so that they can all operate together as an integrated system via a common driver interface,

- a control or gateway interface function to the overall vehicle network.

14. All infotainment system competitors in the Commission's market investigation agreed that infotainment systems share certain hardware and software including the 'head unit'. One respondent however did not agree that all such systems have a control or gateway interface function to the overall vehicle network. For the purposes of the present case, however, the exact product market definition for infotainment systems may be left open as the proposed transaction does not raise serious doubts.

Relevant geographic market

15. The notifying party submits that the market for OEM infotainment systems is EEA-wide for the following reasons. First, OEM infotainment systems are sold throughout the EEA and there are no barriers to their sale in any EEA country. Second, the OEM infotainment systems that are sold throughout the EEA all provide similar functions. Third, the major suppliers of infotainment systems are active throughout the EEA. Finally there are transmission standards for mobile phones and dynamic traffic information that differentiate the European market from other markets.
16. Responses in the market investigation from both infotainment system suppliers and OEM customers indicated that the geographic market for such systems may in fact be global as suppliers are active in all main markets and major customers source such systems on a global basis. One respondent nuanced this view by noting the widespread use of the MOST⁴ data communication protocol in European manufactured vehicles as opposed to those manufactured elsewhere. It therefore suggested that the customer base for infotainment systems using the MOST protocol could be EEA.
17. For the purposes of the present case, however, the exact geographic market definition may be left open as the proposed transaction does not give rise to serious doubts.

b) Mixing consoles - (downstream market)

18. A mixing console is an electronic device for combining (or "mixing"), routing, and changing the level, tone, and/or dynamics of audio signals.

Relevant product market

19. The notifying party submits that mixing consoles could be split into four sub-categories: public address systems (i.e. amplification products used as a communication system in a public area; tour sound systems; installed sound systems and for recording and broadcasting.
20. Mixing console competitors in the market investigation agreed that the categorisation mentioned above was a reasonable basis on which to classify mixing consoles. For the

⁴ MOST (Media Oriented Systems Transport) is the de facto standard for multimedia and infotainment optical networking in the automotive industry. The technology was designed to provide an efficient and cost-effective mechanism to transmit audio, video, data and control information between devices in a car.

purposes of the present case, however, the exact product market definition may be left open as the proposed transaction does not raise serious doubts (see below).

Relevant geographic market

21. The notifying party submits that the market for mixing consoles in each of the above mentioned segments is worldwide. This view was endorsed by respondents in the market investigation. For the purposes of the present case, however, the exact geographic market definition may be left open as the proposed transaction does not raise serious doubts (see below).

c) Fiber optic transceivers ('FOTs') – (upstream market)

22. Many electronic devices, including OEM infotainment systems and audio equipment, must transmit and receive data to operate. Typically, this data is transmitted either over optical fibers or electronically over more conventional electrical wires and cables. Harman's products use transceivers which are devices that are capable of both transmitting and receiving data (in other words they contain both a transmitter and a receiver using common circuitry). Fiber optic transceivers ('FOTs') are transceivers that use an optical fiber to carry data between the transmitter and receiver.

Relevant product market

23. The notifying party considers on the basis of certain supply and demand considerations that FOTs can be divided into three categories: automotive, general purpose (or networking) and industrial. Automotive FOTs can be distinguished from other types of FOT in that they comply with standard specifications used in the automotive industry (namely the Byteflight or MOST specifications⁵). Although automotive FOTs can in theory be used in a number of non-automotive applications, customers in the automotive industry will not accept non-automotive FOTs. This was confirmed by respondents in the market investigation.
24. Industrial and general purpose FOTs are differentiated from automotive FOTs in that they are not required to meet the Byteflight or MOST specifications. General purpose (or networking) FOTs have different optical solutions from automotive and industrial FOTs as they use different lasers/detectors and combine the transmitting and receiving function into a single package and operate on either a multimode or single mode optical fiber. As industrial FOTs are not used by Harman in any of its applications, they are not considered further. Similarly, as the Byteflight data protocol is being phased out and because Harman uses only MOST automotive FOTs in its infotainment systems, the subsequent analysis focuses on MOST automotive FOTs.
25. For the purposes of the present case however the precise product market definition may be left open as the proposed transaction will not result in a significant impediment to effective competition even on the basis of the narrowest product market definition of automotive FOTs where Avago's market share is the highest.

Relevant geographic market

⁵ These two standards are not substitutable. Byteflight is an older data communication protocol designed by BMW for safety-critical applications such as airbags. Harman, and certain of its infotainment system competitors, rely on the MOST data communication protocol.

26. The notifying party submits the market for automotive FOTs is worldwide in that suppliers sell to customers located all around the world, there are no significant price differences between countries and transport costs are low. It submits that this is in line with previous Commission decisions concerning electronic components.⁶
27. The majority of automotive FOTs are ultimately incorporated into vehicles manufactured in Europe, and Germany in particular. Respondents in the market investigation indicated that competitive conditions for the supply of MOST certified FOTs are similar between the Member States of the EEA and also between the EEA and other markets, thereby supporting the view that the market for automotive FOTs is indeed worldwide.
28. The precise geographic market may be left open in the present case however as the proposed transaction does not give rise to serious doubts either at an EEA or worldwide level⁷.

d) Optocouplers – (upstream market)

29. Harman purchases optocouplers for use in mixing consoles equipment, where they are used to isolate signals from external devices and therefore prevent ground loops which may cause an audio hum. An optocoupler is a device that uses a short optical transmission path to transfer a signal between elements of a circuit, typically a transmitter and a receiver, while keeping them electrically isolated.

Relevant product market

30. The notifying party submits that optocouplers have a broad range of uses; they are differentiated, but not to a significant degree. From a supply-side perspective, there are no barriers to supplying optocouplers for any end use.
31. On the basis of the responses to the Commission's market investigation, it has not been possible to determine with certainty the precise product market definition for optocouplers. Whilst one of the largest optocoupler manufacturers expressed the view that all producers supplied a broad range of optocouplers, another believed that producers tended to specialise in certain types. At the same time, the majority of mixing console competitors indicated they did not have sufficient knowledge to say whether all optocoupler producers supply broadly similar ranges. For the purposes of the present case however the precise product market definition may be left open as the proposed transaction does not give rise to serious doubts (see below).

Relevant geographic market

⁶ See *Hitachi/ST Microelectronics/SuperH JV*, Case No. COMP/M.2439, paragraph 24; *ST Microelectronics/Alcatel Microelectronics*, Case No. COMP/M.2820, paragraphs 22-23.

⁷ According to the notifying party's estimates, Avago's share of automotive FOTs in 2006 was [45-55]% in value terms and [55-65]% in volume terms at both an EEA and worldwide level with the Japanese company, Hamamatsu, accounting for the remainder of the market.

32. The notifying party considers the geographic scope of optocouplers markets to be worldwide for the following reasons. First, suppliers of optocouplers sell to customers located all around the world, and there are no barriers to their global sale. Second, optocouplers are easily shipped and transportation costs are low. Third, there are no significant price differences between countries throughout the world.
33. In any event, the precise definition of the relevant market in this case can be left open because the proposed transaction will not result in a significant impediment to effective competition (see below).

B Competitive assessment

(i) Infotainment systems and FOTs

34. The notifying party estimates that the total European sales of OEM infotainment systems were between €2.2 and €2.6 billion in 2006. Harman's total European sales of OEM infotainment systems were approximately [...] during this period resulting in a market share of between 30% and 35%. Other major competitors are Siemens VDO (30-40%), Robert Bosch (10-20%) and Magneti Marelli (<10%). Other competitors including Alpine, Melco, Denso Wave, Clarion and Matsushita are estimated to account for the remaining 10-20% of the market.
35. Avago estimates its market share for all types of FOT to be in the region of [5-15]% on a worldwide basis and [0-5]% at an EEA level. However, if automotive FOTs are considered in isolation, Avago has a market share of [45-55]% at both a global and EEA level. Prior to the purchase of the POF business of Infineon Technologies on 1 July this year, Avago did not have a viable FOT in its range that could meet the standards required by the automotive industry. The other main supplier of automotive FOTs is the Japanese based company, Hamamatsu Photonics K.K. ('Hamamatsu'). Harman purchases all of its automotive FOTs directly from Hamamatsu whereas its infotainment system competitors purchase connectors that incorporate automotive FOTs from third party manufacturers or distributors.
36. Harman purchased [...] of automotive FOTs in 2006, or [20-30]% of worldwide supply and [25-35]% of European supply for use in its OEM infotainment systems. According to the notifying party, automotive FOTs account for a negligible part of the total cost of Harman's infotainment systems⁸.
37. With regard to input foreclosure, the market investigation has demonstrated that automotive FOTs are viewed as a key component by OEM customers as they ensure the interoperability of the devices forming the infotainment system.
38. However, automotive FOT producers and large competitors in the infotainment systems market did not express concerns as regards the ability for the merged entity to foreclose the supplies of such components. Indeed, although Tier 1 suppliers are not permitted to change these components in their infotainment systems without the prior approval of their OEM customers, such requirements would not prevent switching to an alternative

⁸ Infotainment system competitors indicated that automotive FOTs represent a higher proportion of the overall cost of an infotainment system (up to [0-5]% on average). Information gathered from automotive FOT producers in the market investigation indicated that automotive FOT prices have been falling at a rate of [10-20]% per annum.

automotive FOT supplier if necessary, as interoperability is one of the principal motivations behind the MOST protocol. One respondent to the market investigation involved in the manufacture of connectors incorporating automotive FOTs nevertheless expressed the concern that post-merger Harman might be able to obtain automotive FOTs from Avago at a lower price than competitors due to the presence of KKR as a shareholder in both companies.

39. The market investigation however did not lead the Commission to consider such scenario as being likely. Indeed, demand for automotive FOTs has been increasing steadily during recent years at up to 25% per annum according to one respondent in the market investigation⁹ and is expected to continue to increase as MOST based systems are introduced into more car models and potentially in new markets. As a result, although there are only two companies currently active in the supply of automotive FOTs (Avago and Hamamatsu), the market investigation has confirmed that several companies, including Firecomms Ltd and Sharp Electronics, will enter the market with MOST certified FOTs in the short term. Automotive FOT customers, some of which confirmed the possibility to switch to these new entrants, will therefore have a wider range of suppliers to choose from all with products that meet the MOST specification. This will prevent Avago from being able to foreclose without running the risk of losing sales to competitors.
40. Moreover, it should be recalled that Avago is jointly-controlled by KKR and Silver Lake Partners. KKR will therefore not be in a position to integrate or coordinate the behaviour of Avago and Harman post-merger. The market investigation confirmed that Silver Lake has a fiduciary duty to its investors to maximise Avago's profit. Consequently, Silver Lake has no economic incentive to favour a strategy by which Avago would take the risk of foregoing sales of automotive FOTs to Harman's competitors given that it has no shareholding in Harman. In addition, Silver Lake intends to keep joint control of Avago in the immediate future and consequently there can be no vertical integration of Avago and Harman. In addition, it should be recalled that Harman, in contrast to its infotainment system competitors, currently purchases its automotive FOTs directly from the manufacturer rather than through the intermediary of a connector maker. Consequently, the impact of any change in Harman's purchasing pattern post transaction on connector makers would be limited.
41. During the investigation, one infotainment system competitor suggested that Harman's position as a partner of the MOST Cooperation ('MOSTCo') could enable it to influence the standard setting organisation to adopt a technology that would be favourable to it. The objective of MOSTCo is the development and promotion of the MOST technology. MOSTCo is open to any company, including customers, suppliers and competitors of Harman. Currently, there are more than 80 member companies worldwide. According to MOSTCo's Organisational Procedures, the Members consist of partners and the associated partners.
42. Harman is a co-founder and partner of the MOST Cooperation. This situation will not be change as a result of the proposed transaction. As a partner, it is a member of the MOSTCo's Steering Committee along with three car makers (Audi, BMW, DaimlerChrysler) and one other supplier (SMSC). The MOSTCo is mainly driven by the automotive OEMs, which make up an overwhelming majority of the participants of

⁹ Other respondents indicated the market growth rate was 10-20% per annum.

MOSTCo's technical coordination group ("TCG") that defines and reviews the technical direction of MOSTCo. The TCG consists currently of two suppliers (Harman and SMSC) and 15 car makers. Harman's vote share is only 1/17 of the complete group so its ability to influence the TCG is limited.

43. All MOST specifications are defined by the working groups set up by the TCG. Working groups are initiated by car makers through the TCG and any Member may join such working groups. A working group of MOSTCo is currently developing a specification for the next speedgrade of MOST FOTs ('MOST 150'). There are three companies representing FOT suppliers in this working group. These companies, as well as the market entrants referred to previously are intending to offer FOTs for MOST 150. The specification will be available to all Members as soon as it is approved by the TCG.
44. As regards customer foreclosure, it is recalled that Harman's purchases of automotive FOTs for use in its OEM infotainment systems represent [20-30]% of worldwide supply and [25-35]% of European supply. Consequently, even if Harman were to source its automotive FOTs from Avago post-merger, the majority of automotive FOT sales (approximately [65-75]% at a European level) would remain open to competition. Although automotive FOT competitors expressed concern that post-merger, Harman would choose to work solely with Avago and would therefore be lost as a customer, the investigation also confirmed that the potential loss of Harman as a customer would not alter competitors' plans to enter the automotive FOT market and/or increase production to respond to increasing demand. In addition, it should be noted that as the optical interface differs between the automotive FOTs supplied by Hamamatsu and Avago, any switch by Harman to Avago's automotive FOTs would necessitate expensive product redesign by Harman as well as the prior consent of its OEM customers.
45. In the course of its investigation, the Commission was informed that there are general purpose FOTs that can support the so-called MADI¹⁰ protocol, which is a high speed digital audio transmission standard with a raw data channel capability of 125Mbits/sec. In 2006 Harman purchased a *de minimis* amount (less than [...]) of general purpose FOTs from Avago and others to support, among other things, MADI transmissions. Besides Avago, the following general purpose FOT producers supply MADI-capable general purpose FOTs that are substitutes for the FOTs supplied by Avago: Infineon (not the part of the Infineon business that Avago recently purchased), Luminent, WTD, Hitachi Cable, AMP, OCP, Delta, APAC, Opto Electronics and Finisar.
46. In light of the above considerations, the Commission considers that the proposed transaction is not likely to lead to customer or input foreclosure with regard to the sale of automotive FOTs or general FOTs supporting the MADI protocol.

(ii) Mixing consoles and optocouplers

47. Avago's global market share for optocouplers in 2006 was [20-30]% and approximately [35-45]% at a European level.

¹⁰ Multi-channel Audio Digital Interface

48. There are a number of alternative competitors in the market such that Avago is unlikely to have market power (these include Toshiba which has a global market share of [20-30]%, NEC, Sharp, Vishay and Matsushita all with [5-15]%¹¹). The presence of these competitors would also rule out the possibility of Harman's competitors being foreclosed.
49. Harman's market share for all types of mixing consoles is [5-15]% at a global level, behind the market leader, Yamaha, ([20-30]%) but ahead of Mackie ([0-10]%) and Behringer ([0-10])%¹². Moreover, the amount of optocouplers purchased by Harman is negligible ([...]), therefore probably ruling out an incentive to foreclose. Again, for the reasons already noted, as KKR exercises joint control of Avago with Silver Lake Partners, KKR will not be in a position to integrate or coordinate the behaviour of Avago and Harman post-merger.

(iii) Supply of GPS navigation systems to the independent after market

50. An actual vertical relationship exists between Harman and ATU, a KKR portfolio company, for the supply of GPS navigation systems to the independent aftermarket.
51. In 2006, ATU purchased a small number of “after-market” GPS navigation systems from Harman (*i.e.*, GPS navigation systems that consumers install in their cars only after having purchased their cars), totalling only [...]. ATU's total retail sales of GPS navigation systems in 2006 were approximately [...]. ATU estimates that the total retail sales of after-market GPS navigation systems in Germany (where ATU makes almost all of its after-market GPS navigation sales) exceeded €560 million in 2006. ATU sold [...] in Germany during 2006, representing approximately [0-5]% of national sales of after-market GPS navigation systems. ATU estimates that its share of retail after-market GPS sales in Austria, the Czech Republic and the Netherlands in 2006 was less than [0-5]%. Although the notifying party does not have precise data regarding total EEA-wide retail sales of after-market GPS navigation systems, given ATU's small share of German retail sales and the fact that it makes *de minimis* sales outside Germany, and no sales at all in major markets such as France, Italy, Spain and the UK, it estimates that its 2006 EEA-wide share of retail sales was less than [0-5]%.
52. Harman does not retail GPS navigation systems. Harman's total European wholesale sales of after-market GPS navigation systems to distributors were approximately [...] in 2006. Harman's competitors include TomTom, Sony, Blaupunkt, Garmin, Falk and L&S. Harman estimates that total European sales of after-market GPS navigation systems were approximately €3 billion. Therefore, Harman's share of EEA-wide supply of GPS navigation systems is approximately [0-5]%.
53. In view of the above, it is concluded that the proposed transaction will not result in any vertically affected market in relation to after-market GPS navigation systems and does not give rise to any competition concerns.

¹¹ The notifying party estimates the market shares of these optocoupler manufacturers at an EEA level to be as follows: Toshiba [15-25]%, NEC [0-10]%, Sharp [0-10]%, Vishay [0-10]% and Matsushita [0-10]%.

¹² The notifying party submits that even at an EEA level, Harman's market share would not exceed [20-30]% in any of the four possible sub-segments for mixing consoles described previously.

VI. CONCLUSION

54. For the above reasons, the Commission has decided not to oppose the notified operation and to declare it compatible with the common market and with the EEA Agreement. This decision is adopted in application of Article 6(1)(b) of Council Regulation (EC) No 139/2004.

For the Commission
signed
Neelie KROES
Member of the Commission