

18. VALUATION CERTIFICATE (Cont'd)

C H Williams Talhar & Wong

C H Williams Talhar & Wong Sdn Bhd (18149-D)
 Juruukur Berkenun Perunding Harta Antarabangsa
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28th May 2002

The Board of Directors
 AE Multi Holdings Berhad
 51-8-B, Menara BHL Bank
 Jalan Sultan Ahmad Shah
 10050 Pulau Pinang

Dear Sirs

VALUATION OF LANDED PROPERTIES

This Certificate has been prepared for inclusion in the Prospectus of AE Multi Holdings Berhad to be dated 7 June 2002 issued in connection with the public issue of 12,000,000 new ordinary shares of RM0.50 each at an issue price of RM0.80 per ordinary share of RM0.50 each pursuant to the listing of and quotation for its entire issued and paid-up share capital on the Second Board of Kuala Lumpur Stock Exchange.

In accordance with your instruction, we have inspected the landed properties set out below on 13 February 2000, 9 April 2001 and 8 June 2001, and have assessed the open market value of the said landed properties, the details of which were set out in our valuation reports bearing reference number 1129/KV/2000/FA, 1132/KV/2000/FA and 1107/KV/01/MM, all dated 1 June 2001, and reference number 1011222003 dated 5 July 2001.

The valuation has been carried out in accordance with the Guidelines on Asset Valuation for Submission to the Securities Commission (1995) issued by the Securities Commission and in compliance with the valuation standards prescribed by the Board of Valuers, Appraisers & Estate Agents, Malaysia with necessary professional responsibility and due diligence.

The summary of the valuation of the landed properties, all of which are held for owner occupation are as follows:-

Property	Registered/ Beneficial owner	Description	Tenure	Approximate age of building (years)	Market value '000	Methods of valuation	Date of inspection	Material date of valuation
Lot No. P.T. 8565 Mukim Sungai Pasir, District of Kuala Muda, Kedah Darul Aman held under No. H.S.M. 171/90	Perbadanan Kemajuan Negeri Kedah (Subleased to AFC for 60 years commencing 24 March 1990)	14,213 square metres of industrial land with a factory complex erected thereon with a total built- up area of 4,450 square metres	99 years expiring on 24 March 2089	9	RM6,060	Comparative, cost and investment	13 February 2001	1 June 2001

Kuala Lumpur Petaling Jaya Penang Johor Bahru Kuantan Malacca Ipoh Alor Setar Butterworth Kota Bharu Batu Pahat Kuala Terengganu Seremban
 Kota Kinabalu Sandakan Tawau Lahad Datu Labuan Kuching Sibul Miri Bintulu Brunei

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Property	Registered/ Beneficial owner	Description	Tenure	Approximate age of building (years)	Market value '000	Methods of valuation	Date of inspection	Material date of valuation
Lot No. 9998 Mukim Sungai Pasir, District of Kuala Muda, Kedah Darul Aman held under GRN 29629	AEC	156 square metres of residential land with a single storey low cost terrace house erected thereon with a built-up area of 61 square metres	Freehold	16	RM60	Comparative and cost	13 February 2001	1 June 2001
Lot No. P.T. 25833 Sungai Petani Town, District of Kuala Muda, Kedah Darul Aman held under H.S.D. 131/95	MWSB	916 square metres of industrial land with a 1½ storey semi- detached light industrial factory building erected thereon with a built-up area of 423 square metres	Freehold	5	RM390	Comparative and investment	9 April 2001	1 June 2001
					<u>RM6,510</u>			
Lots 304 and 305, Title No. 85367 and 85368, Praksas Sub- District, Muang District, Samutprakam Province, Thailand	AET	5,760 square metres of land with a double storey factory building, two (2) single storey guardhouses and a water treatment plant erected thereon with a combined built-up area of 3,731 square metres	Freehold	2	THB42,100 (RM3,430)*	Sale comparison, cost and income capitalisation	8 June 2001	3 July 2001

Note:-

* Based on an exchange rate of RM1.00:THB12.2785 as at 3 July 2001 as adopted in the Valuation Report.

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We certify that in our opinion the total open market value for the existing use of the above properties using the valuation methods stated above amounts to RM9,940,000 (Ringgit Malaysia: Nine million nine hundred and forty thousand)

Yours faithfully

C H WILLIAMS TALHAR & WONG SDN BHD

MUHAMMAD BAHARUDDIN MUSTAFA
B. Surv. (Hons) MISM, MMIM
Registered Valuer (V-215)

19. DIRECTORS' REPORT

(Prepared for inclusion in this Prospectus)



AE MULTI HOLDINGS BERHAD

(Company No. : 539777-D)

Registered Office :-

51-8-B, Menara BHL Bank
Jalan Sultan Ahmad Shah
10050 Pulau Pinang

29 May 2002

The Shareholders,
AE Multi Holdings Berhad

Dear Sir/Madam

On behalf of the Directors of AE Multi Holdings Berhad ("AEM"), I report after due inquiry that during the period from 31 December 2001 (being the date to which the last proforma audited financial statements of AEM and its subsidiaries ("Group") have been made up) to 29 May 2002 (being a date not earlier than fourteen (14) days before the issue of this Prospectus):-

- (a) the business of the Group has, in the opinion of the Directors, been satisfactorily maintained;
- (b) in the opinion of the Directors, no circumstances have arisen subsequent to the last audited financial statements of AEM and its subsidiaries which have adversely affected the trading or the value of the assets of the Group;
- (c) the current assets of the Group appear in the books at values which are believed to be realisable in the ordinary course of business;
- (d) there are no contingent liabilities by reason of any guarantees or indemnities given by the Group; and
- (e) there have been no changes in the published reserves nor any unusual factors affecting the profits of the Group.

Yours faithfully
For and on behalf of the Board of Directors of
AE MULTI HOLDINGS BERHAD

Yang Wu-Hsiung
Managing Director

20. INDEPENDENT MARKET RESEARCH REPORT

(Prepared for inclusion in this Prospectus)



VITAL FACTOR CONSULTING
Creating Winning Business Solutions

Vital Factor Consulting Sdn. Bhd.
(Company No: 266797-T)

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Damansara Jaya
47400 Petaling Jaya
Selangor Darul Ehsan, Malaysia

Tel (603) 7728 0248
Fax (603) 7728 7248

28th May 2002

The Board of Directors
AE Multi Holdings Berhad
51-8-B, Menara BHL Bank
Jalan Sultan Ahmad Shah
10500 Pulau Pinang

Dear Sirs

Assessment of the Electronics Industry Focusing on the Manufacture of Printed Circuit Boards

The following is an extract of the Assessment of the Electronics Industry prepared by Vital Factor Consulting Sdn Bhd for inclusion in the Prospectus of AE Multi Holdings Berhad (AEM) to be dated 7th June 2002 issued in connection with the public issue of 12,000,000 new ordinary shares of RM0.50 each at an issue price at RM0.80 per ordinary share of RM0.50 each pursuant to the listing of and quotation for its entire issued and paid-up share capital on the Second Board of the Kuala Lumpur Stock Exchange.

1. Background

- The objective of the report is to provide an independent assessment of the Electronics Industry focusing on the Manufacture of Printed Circuit Boards (PCB) in Malaysia.
- AE Corporation (M) Sdn Bhd, the Malaysian subsidiary of AEM is focused in the manufacturing of rigid PCB servicing multinational corporations in Malaysia. Its products can be segmented into:
 - single-sided PCB;
 - double-sided PCB.
- AE Corporation (M) Sdn Bhd's double-sided PCB are for non-plated Through-Hole, whereby holes are created on the PCB to enable slender wire leads of components to be inserted through the holes. As they are non-plated, these holes do not have a deposition of metal on the inside surface of the Through-Hole. AE Corporation (M) Sdn Bhd currently produces a very small quantity of double-sided non-plated Through-Hole PCB.

2. Overview of the Electronics Industry

- The Electronics Industry plays a significant role in contributing to the growth of the Malaysian economy.
- The Electronics Industry is the leading sub-sector within the manufacturing sector in Malaysia in terms of employment, output and exports (*Source: The Electrical and Electronics Industries in Malaysia, Industry Brief, February 2001, Malaysian Industrial Development Authority*).
- The manufacture of Semiconductors and Other Electronic Components, and Communication Equipment and Apparatus (ex-factory sales value) grew at an average annual rate of 12.4% between 1997 and 2001. In 2001, the manufacture of Semiconductors and Other Electronic Components, and Communications Equipment and Apparatus reached RM92.3 billion, representing a decrease of 19.0% over the previous year (*Source: Monthly Manufacturing Statistics, December 2001, Department of Statistics*).

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- The Electronics sector is also the highest export earner contributing 48.9% of Malaysia's total export earnings in 2001 (Source: *Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- In 2001, gross export of Electronics declined by 16.3% to RM139.6 billion. The electronics sub-sector comprises semiconductors, and electronics equipment and parts (which are mainly automatic data processing machines). Gross export of Electronics grew at an average annual rate of 14.7% between 1997 and 2001 (Source: *Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- The structure of the Electronics Industry is highly fragmented with a proliferation of players.
- As at December 1999, there were 925 companies in operation manufacturing a wide range of electronic products in Malaysia (Source: *The Electrical and Electronics Industries in Malaysia, Industry Brief, February 2001, Malaysian Industrial Development Authority*).

3. Industry Segmentation

- The manufacturing of electronic products can be segmented into various sub-sectors within the three main categories of Upstream, Midstream and Downstream:

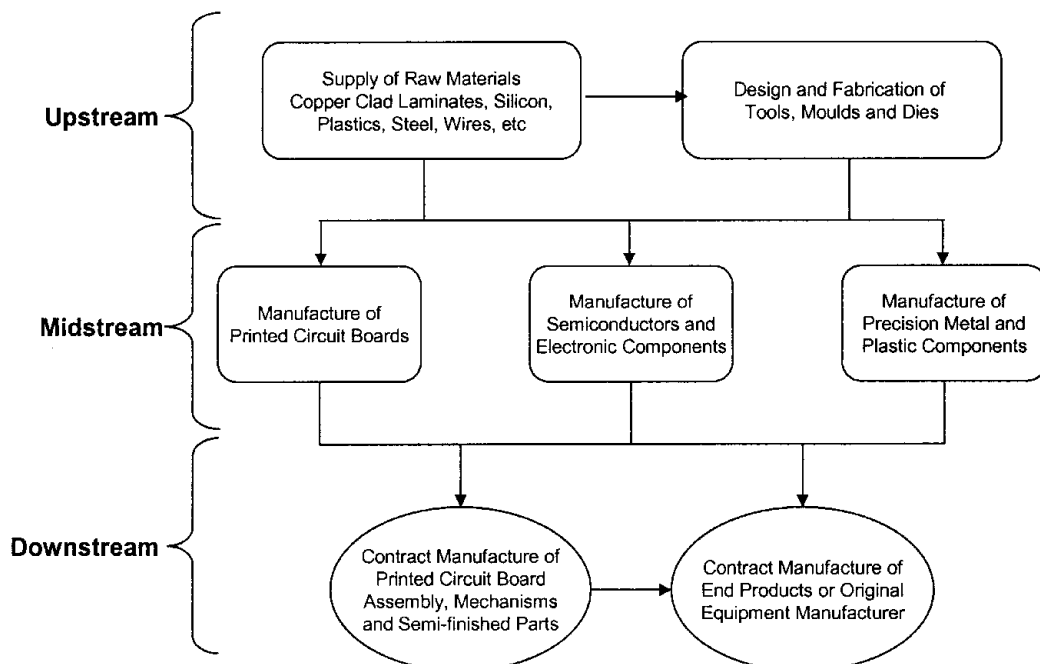


Figure 1.1 Vertical Structure of Manufacturing of Electronic Products

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4. Government Legislation, Policies and Incentives

- The Government regards the Electronics Industry as a key industry in assisting Malaysia to achieve growth and development as an industrialised nation. Some of the strategies that the Malaysian Government has put in place for the Electronics Industry are to:
 - accelerate growth of the non-semiconductor components, consumer and industrial sub-sectors;
 - foster the development of supplier and supporting linkages for the Electronics Industry;
 - encourage greater investment in research and development with the aim of encouraging the production of higher value-added products;
 - increase local participation by encouraging joint-ventures between foreign and local investors;
 - improve technology used in semiconductor assembly in order to increase productivity.
- To provide a conducive environment to support and nurture the industry, the Government will continue to provide the following incentives:
 - Pioneer status scheme and investment tax allowance under the Promotion of Investments Act, 1986 whereby:
 - a partial tax exemption for 5 years for selected range of electrical and electronic products, including high technology industries; or
 - investment tax allowance on capital expenditure incurred within 5 years
 - Reinvestment allowance for expansion of production capacity, modernising and upgrading of plant and machinery and, diversification into related products.
(Source: Malaysian Industrial Development Authority)
- Apart from the normal manufacturing licence, there are no material government laws, regulations and policies that may impede on the performance and growth of manufacturers within the Electronics Industry.

5. Barriers to Entry

- The barriers to entry into the manufacturing of PCB are **relatively high**. This is mainly predicated by the capital cost required for setting-up the manufacturing facility for PCB manufacturing.
- The capital cost of setting-up a small manufacturing plant (excluding land and building) is approximately RM15 million. This is broken down into the following:
 - Machinery (1 line, fully automated) = RM8 million
 - Computer software = RM2 million
 - Working capital = RM5 million*(Source: AE Corporation (M) Sdn Bhd)*
- The PCB manufacturing business will involve start-up costs in terms of lead-time and effort in breaking into the market as a new entrant. Developing new customers usually involves a cycle of at least six to nine months. However for Japanese clients, it could commonly take one and a half to two years before customers are willing to take on a new supplier of PCB. This is due to the long process of verification on quality of the products.

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- In addition, the long verification process and building up of trust in product quality would also mean that once customers are satisfied, they are less likely to switch suppliers.
 - Quality also poses as one of the major barriers to entry. In PCB manufacturing, quality is critical as it forms one of the most essential components in the function of an electronic product. Therefore, with the requirements for quality, there is a need to gain accreditation to the various recognised quality regulatory bodies before a customer will accept the goods. Some of these accreditations include Acceptable Quality Level (AQL) in the United States, Military Standard (MIL), safety standards as in Underwriters Laboratory (UL) and ISO 9000 series.
 - All these accreditations take a considerable length of time, as samples would need to be submitted for approval. As an example, it could take approximately eight months to twelve months to receive accreditation for UL.
 - As such, this process of accreditation could pose a barrier to entry for any new entrant who will have to comply with these regulations before selling its PCB.
 - Technical skills and experience also pose as a barrier to entry particularly in the following areas:
 - Optimise on processes to maximise on production efficiency as this will increase the volume of output and increase profitability.
 - Maintenance of quality standards to reduce reject rate. This is critical as a faulty PCB could lead to the total rejection of the finished electronic product.
- 6. Supply of Semiconductors and other Electronic Components and Communications Equipment and Apparatus**
- According to the Malaysian Industrial Development Authority, PCB is a sub-sector of the Electronics Industry classified under 'Other Electronic Components'.
 - The ex-factory sales value of Semiconductors, Other Electronic Components and Communications Equipment and Apparatus grew at an average annual rate of 12.4% between 1997 and 2001 (*Source: Monthly Manufacturing Statistics, December 2001, Department of Statistics*).
 - In 2001, ex-factory sales value of Semiconductors, Other Electronic Components and Communication Equipment and Apparatus reached RM92.3 billion, representing a decrease of 19.0% compared to the previous year (*Source: Monthly Manufacturing Statistics, December 2001, Department of Statistics*).
- 7. Supply Dependencies**
- The main supply dependencies of raw materials for the manufacturing of PCB are:
 - copper clad laminates (CCL);
 - industrial chemicals;
 - printing ink.
 - Of these, CCL is the most significant accounting for approximately 90% of total costs of raw materials used for PCB manufacturing.

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- The remainder of the raw materials are minor whereby industrial chemicals and printing inks account for approximately 5% and 4% of total costs of raw materials respectively.

Supply of Copper Clad Laminates

- Currently the two main local suppliers of CCL in Malaysia are:
 - Hitachi Chemical (Johor) Co. Ltd;
 - SNC Industrial Laminates Sdn Bhd.
- However the main source of supply of CCL is through imports.
- Some of the reasons manufacturers continue to import CCL are:
 - Cost of imported CCL is more competitive compared to local suppliers;
 - Customers request for specific brands of laminates that are only available through imports.
- There are only a few local producers of CCL and this is attributed to the fact that capital investment is high. In addition, Malaysia as a country is not a primary producer of copper. Therefore it is more cost effective to import CCL from various copper producing countries and for Malaysia to focus on areas of core competencies. This is in line with the Malaysian Government's intention, which is to focus manufacturers into higher value-added manufacturing activities.
- In 2001, imports of copper plates, sheets and strips of thickness more than 0.15mm of refined copper in coils, which include CCL, reached RM136.5 million. Imports under this category declined by 28.2% in 2001. (Source: Unpublished Data, Department of Statistics)
- Some of the major sources of imports are from:
 - Japan;
 - France;
 - Germany;
 - Korea;
 - Hong Kong;
 - Singapore;
 - Netherlands.
- Of these, Japan accounted for 43.5% followed by France at 20.0% of total imports in 2001. (Source: Unpublished Data, Department of Statistics)

Implication

- The main raw material for the manufacturing of PCB is CCL and this material is available through local sources and especially imports. With ample sources of supply overseas, the threat of shortages in CCL is minimised.

Supply of Industrial Chemicals

- The industrial chemicals used in PCB manufacturing include hydrochloric acid, sodium hydroxide and sulphuric acid, which are classified under inorganic chemicals.
- Generally, Malaysia is self-sufficient in inorganic chemicals as these are mainly produced locally. In 2001, there were:

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- Three companies producing chlorine, hydrochloric acid, sodium hydroxide (caustic soda) and sodium hypochlorites;
- Four companies producing sulphuric acid and related products.
(Source: The Chemical Industry in Malaysia, Industry Brief, February 2001, Malaysian Industrial Development Authority).
- Malaysia is a net exporter of hydrochloric acid, sodium silicate, phosphoric acid and titanium dioxide. Imports of inorganic chemicals are restricted to only special grades of chemicals, which are not produced locally *(Source: The Chemical Industry in Malaysia, Industry Brief, February 2001, Malaysian Industrial Development Authority).*
- Imports of hydrogen chloride (hydrochloric acid) declined at an average annual rate of 19.2% between 1997 and 2001 *(Source: Unpublished Data, Department of Statistics).*
- Imports of sodium hydroxide grew at an average annual rate of 34.0% between 1997 and 2001 *(Source: Unpublished Data, Department of Statistics).*
- In 2001, imports of sodium hydroxide reached RM46.0 million, representing an increase of 119.0% compared to the previous year *(Source: Unpublished Data, Department of Statistics).*
- Imports of sulphuric acid grew at an average annual rate of 3.3% between 1997 and 2001. In 2001, imports of this chemical decreased by 3.2% compared to the previous year *(Source: Unpublished Data, Department of Statistics).*

Implication

- Local supplies of hydrochloric acid, sodium hydroxide and sulphuric acid will be adequate to service the local PCB manufacturing sector.

Supply of Printing Ink

- Printing ink for use in the manufacturing of PCB is mainly sourced through imports. There are no local sources available as these are specialised printing ink.
- Malaysia imports approximately RM94.4 million worth of Other Inks including printing ink for use in PCB manufacturing in 2001. The value of imports decreased by 23.3% over the previous year in 2000. *(Source: Unpublished Data, Department of Statistics)*
- Some of the major countries of imports include:
 - Japan;
 - United States;
 - Singapore.
- In 2001, Japan accounted for 52.8% followed by United States at 22.0% of total imports of Other Inks. *(Source: Unpublished Data, Department of Statistics)*

Implication

- With ample supply of printing inks and the small amount required, there is minimum threat of supply to the PCB manufacturing industry.

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- Demand for electronic components and finished consumer electronic products will predominantly come from global markets.
- Although many local PCB manufacturers supply a major proportion of their PCB to the local market, these are mainly to Multinational Corporations who ultimately export their products. As such, demand for PCB will predominantly come from global demand for finished electronics and electrical products.
- In 2001, gross exports of Electronics declined by 16.3% to RM139.6 billion. The electronics sub-sector comprises semiconductors, and electronics equipment and parts (mainly automatic data processing machines). Gross exports of Electronics grew at an average annual rate of 14.7% between 1997 and 2001 (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- Within the Electronics sub-sector, gross exports of Semiconductors, and Electronic Equipment and Parts grew at an average annual rate of 10.3% and 18.7% respectively between 1997 and 2001. In 2001, gross exports of Semiconductors, and Electronic Equipment and Parts amounted to RM60.5 billion and RM79.1 billion respectively (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- Export of Printed Circuit Board Assemblies (PCBA) grew at an average annual rate of 19.7% between 1997 and 2001, amounting to RM6.8 billion in 2001 (*Source: Unpublished Data, Department of Statistics*).
- Between 1997 and 2001, gross exports of Electrical Machinery and Appliances grew at an average annual rate of 12.2%. Gross exports of Electrical Machinery and Appliances amounted to RM60.7 billion in 2001. The Electrical Machinery and Appliances sub-sector comprises Consumer Electrical Products (mainly audio-visual products), Industrial and Commercial Electrical Products (mainly telecommunications equipment), Electrical Industrial Machinery and Equipment (mainly air-conditioners) and Household Electrical Appliances (mainly rice-cookers, washing machines, refrigerators) (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- Gross exports of Consumer Electrical Products (mainly audio-visual products) grew at an average annual rate of 7.3% between 1997 and 2001, amounting to RM23.6 billion in 2001 (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- Gross exports of Industrial and Commercial Electrical Products (mainly telecommunications equipment), and Electrical Industrial Machinery and Equipment (mainly air-conditioners) grew at an average annual rate of 18.3% and 12.7% respectively from 1997 to 2001. In 2001, gross exports of Industrial and Commercial Electrical Products, and Electrical Industrial Machinery and Equipment reached RM23.5 billion and RM12.5 billion respectively (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- From 1997 to 2001, gross exports of Household Electrical Appliances (mainly rice cookers, washing machines and refrigerators) grew at an average annual rate of 10.8%. In 2001, gross export of Household Electrical Appliances, which amounted to the value of RM1.1 billion increased by 22.3% compared to 2000 (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).

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- United States continued to be Malaysia's largest export market accounting for 24.9% of total exports of Electronics in 2001. Total exports of Electronic products to the United States for 2001, amounted to RM34.8 billion. This is followed by Singapore, which accounted for 21.7% of total exports of Electronics at RM30.3 billion for 2001 (*Source: Bank Negara Malaysia, Annual Report 2001*).

9. Competitive Nature of the Industry

- Manufacturers of PCB operate under **moderate** competitive intensity. This is predicated by the following:
 - In 2001, it was estimated that there were 17 manufacturers of rigid PCB in Malaysia with total output valued at approximately RM750 million (*Source: Primary Market Research undertaken by Vital Factor Consulting*).
 - However the level of intensity of competition is higher at the global level particularly from lower cost producing countries. Generally competition for single-sided PCB comes from China and Thailand, while competition for double-sided and multi-layer PCB comes from Taiwan.
- In 1999, China and Thailand's exports of PCB into the United States accounted for USD168.0 million and USD70.9 million respectively (*Source: IPC Association Connecting Electronics Industries, US*). These countries with their comparatively lower labour cost are able to compete against Malaysia.
- However, Malaysian electronic manufacturers will continue to be competitive compared to lower cost production countries based on the following advantages:
 - superior infrastructure in terms of transportation and telecommunications;
 - capable of producing significantly higher quality products;
 - strong support industries for supply of raw material, parts and components, in particular electrical and electronic components, plastic parts and packaging material;
 - large pool of trained resources, covering senior management and technically skilled and semi-skilled labour. This resulted from the many years of development of the Electronics Industry.
- Although in the short term, competition from lower production cost countries continues to be moderate, in the longer term, these countries may improve to become major competitors to Malaysia.
- As such, the Government has urged and provided incentives for local manufacturers to move into higher value areas and increased complexity and integration. This will ensure that Malaysia will always be at least one step ahead of lower production cost countries that competes only on price.
- With the world PCB market valued at USD42.7 billion in 2000 including rigid and flexible PCB, the market is large, representing significant opportunities for Malaysian manufacturers (*Source: IPC Association Connecting Electronics Industries, US*).

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10. Key Players in the Industry

- In 2001, it is estimated that there were 17 rigid PCB manufacturers for the Electronics Industry in Malaysia as follows:
 - PNE PCB Berhad
 - CMKS (Malaysia) Sdn Bhd
 - Grand United Holdings Bhd
 - Hokuden (M) Sdn Bhd
 - Nippon Elec (Malaysia) Sdn Bhd
 - AE Corporation (M) Sdn Bhd
 - GG Circuits Industries Sdn Bhd
 - Innovation Electronics Sdn Bhd
 - Qualitek Electronics (M) Sdn Bhd
 - Circuit Plus Sdn Bhd
 - NHK Manufacturing (M) Sdn Bhd
 - Sheng Kuang PCB Printing
 - Elna PCB (M) Sdn Bhd
 - Yachi Enterprise Sdn Bhd
 - Throtech Industries Sdn Bhd
 - Asia Printed Circuit Sdn Bhd
 - Posh Image Sdn Bhd
- All the above mentioned companies manufacture single-sided and double-side rigid PCB with the following exceptions:
 - NHK Manufacturing (M) Sdn Bhd manufactures single-sided rigid PCB only
 - Hokuden (M) Sdn Bhd manufactures double-sided rigid PCB only
- In 2001, the following companies manufactured rigid double-sided Silver-Through-Hole PCB for the Electronics Industry:
 - Throtech Industries Sdn Bhd
 - Yachi Enterprise Sdn Bhd
 - Sheng Kuang PCB Printing
 - Innovation Electronics Sdn Bhd
 - Nippon Elec (Malaysia) Sdn Bhd
 - Hokuden (M) Sdn Bhd
 - CMKS (Malaysia) Sdn Bhd
 - PNE PCB Berhad.
- In 2001, it is estimated that there were four rigid PCB manufacturers servicing other industries apart than the Electronics Industry:
 - Vision Industries Sdn Bhd
 - TCK Electronics Sdn Bhd
 - VDO Instruments (Malaysia) Sdn Bhd
 - MSL Technology Services (Malaysia) Sdn Bhd.
- The above four companies manufacture single and double-sided PCB, and only VDO Instruments (Malaysia) Sdn Bhd manufactures double-sided Silver-Through-Hole PCB.
- In 2001, it is estimated that there were six flexible PCB manufacturers for the Electronics Industry:
 - QDOS Flexicircuits Sdn Bhd
 - Innovation Electronics Sdn Bhd
 - Qualitek Electronics (M) Sdn Bhd
 - M-Flex Malaysia Sdn Bhd
 - Chang Hsin Circuits (M) Sdn Bhd
 - Denshi Maruwa Industries (M) Sdn Bhd.

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- In 2001, VDO Instruments (Malaysia) Sdn Bhd is the only flexible PCB manufacturer servicing Industries other than the Electronics Industry.

(Source: Primary Market Research undertaken by Vital Factor Consulting)

11. Industry Outlook and Growth Forecast

- The outlook for the Electronics Industry is **favourable**.
- The Industry is expected to grow at an average rate of **10% per annum** for the next five years.
- This forecast is based on the following main observation and assumption:
 - In 2001, the United States and Malaysian economies experienced a slowdown, which impacted on the Electronics Industry;
 - However, it is envisaged that once Malaysia and the United States overcome their respective economic slowdown, growth within the Electronics Industry in Malaysia will follow the growth trend prior to the slowdown in 2001.
- The following demonstrates the slowdown within the Electronics Industry in Malaysia in 2001:
 - In 2001, the ex-factory sales value of Semiconductors and Other Electronic Components, and Communications Equipment and Apparatus reached RM92.3 billion, representing a decrease of 19.0% over the previous year *(Source: Monthly Manufacturing Statistics, December 2001, Department of Statistics)*;
 - In the first ten months of 2001, sales value of PCBA decreased by 11.2% compared with the corresponding period of 2000 *(Source: Unpublished Data, Department of Statistics)*;
 - In 2001, import value of PCBA decreased by 18.8% to reach approximately RM5.2 billion *(Source: Unpublished Data, Department of Statistics)*;
 - For the year 2001, the Production Index of the Electrical and Electronics Industries registered a decrease of 15.6% over the previous year *(Source: Monthly Statistical Bulletin, December 2001, Bank Negara Malaysia)*;
 - In 2001, gross export of Electronics declined by 16.3% to RM139.6 billion. The electronics sub-sector comprises semiconductors, and electronics equipment and parts (which are mainly automatic data processing machines). Gross export of Electronics grew at an average annual rate of 14.7% between 1997 and 2001 *(Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia)*;
- However, the past five-year trend, even including the slowdown in 2001 demonstrates the robustness of the Electronics Industry in Malaysia that will continue to provide the impetus for growth over the next five years. This is conditional on the improvement in the US and the general global economies from 2002 onwards:

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- The ex-factory sales value of Semiconductors and Other Electronic Components, and Communication Equipment and Apparatus grew at an average annual rate of 12.4% between 1997 and 2001. (Source: *Monthly Manufacturing Statistics, December 2001, Department of Statistics*);
- Sales value of PCBA grew at an average annual rate of 68.7% between 1996 and 2000, amounting to RM19.2 billion in 2000 (Source: *Unpublished Data, Department of Statistics*);
- Production of semiconductors in terms of number of units has been growing at an average annual rate of 21.7% between 1997 and 2001 (Source: *Monthly Manufacturing Statistics, December 2001, Department of Statistics*);
- Production of electronic transistors in terms of number of units has been growing at an average annual rate of 10.3% between 1997 and 2001 (Source: *Monthly Manufacturing Statistics, December 2001, Department of Statistics*);
- Production of integrated circuits in terms of number of units has been growing at an average annual rate of 8.6% between 1997 and 2001 (Source: *Monthly Manufacturing Statistics, December 2001, Department of Statistics*);
- Import value of PCBA grew at an average annual rate of 14.7% between 1997 and 2001. (Source: *Unpublished Data, Department of Statistics*);
- Gross exports of the total Electrical and Electronic Industries have been growing at an average rate of 13.9% per annum between 1997 and 2001 (Source: *Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*);
- Export of PCBA as a sub-sector of Electronics Industry increased at an average annual rate of 19.7% between 1997 and 2001 (Source: *Unpublished Data, Department of Statistics*). This surpassed the average annual growth rate of gross exports of total Electronics (semiconductors and electronic equipment and parts) at 14.7% between 1997 and 2001 (Source: *Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).

12. Areas of Growth and Opportunities

Import Replacement

- Currently, Malaysia is a net importer of electronic components particularly in high-end semiconductor such as integrated circuits. In 2000, imports of Electronics into Malaysia amounted to RM105.6 billion (Source: *The Electrical and Electronics Industries in Malaysia, Industry Brief, February 2001, Malaysian Industrial Development Authority*).
- The large size of imports provides opportunities in import replacement for local manufacturers.

Convergence of Computers, Telecommunications and Consumer Electronics Industries

- The introduction of digital electronic products that are essentially the result of the convergence of computers, telecommunications and consumer electronics technologies will provide significant opportunities to manufacturers of Electrical and Electronic Products.

18. VALUATION CERTIFICATE (Cont'd)



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- The digitisation of sound and pictures will create a whole host of new Electronic products, which will increase the demand for electronic components and finished end-products. Audio-visual equipment will have increased functionality by merging with the functions of a computer.
- This trend in Electronics will provide enormous opportunities for operators in the industry.

Maximising on the Development of Multimedia Supercorridor (MSC)

- The development of the MSC in Malaysia has attracted multinationals and foreign operators of Information Technology and high technology related goods and services. This development opens up many opportunities for local Electronics manufacturers to provide support to MSC companies.
- Local manufacturers in the Electronics Industry can capitalise on the proximity and opportunities in manufacturing electronic parts and components or in providing subcontracting or assembly services to MSC companies.

Higher Value Electronic Products and Components

- Currently, local manufacturers of Electronics are mainly in manufacturing of lower value components and parts. There are opportunities for manufacturers to move up and down the production chain and provide higher value adding. This could include the full spectrum of services from product design to manufacture of finished goods.
- This is supported by Government incentives to promote development in this area by encouraging local manufacturers to acquire international expertise in technology and skills through joint-venture partnerships with foreign companies.
- With the increasing demand for digitalisation of electronic products, the manufacturing of digital audio recorders and players, and parts is also an industry that is encouraged as a promoted activity under consideration for Pioneer Status and Investment Tax Allowance under the Promotion of Investments Act 1986 (*Source: Malaysian Industrial Development Authority*).
- The Government has also been encouraging the manufacturing of higher value added PCB such as double-sided, multi-layer and flexible PCB. This is in line with the increasing complexity and miniaturisation of electronic products, which will increase the demand for higher value PCB.
- Similarly the manufacture of PCB (excluding rigid single-sided circuit board) is also recognised as a promoted activity and is eligible for consideration for Pioneer Status and Investment Tax Allowance (*Source: Malaysian Industrial Development Authority*).

Computer Peripherals, Consumer Electronics, Telecommunications and Office Equipment

- Growth opportunities exist within these sectors, primarily due to their good overall growth trends as follows:
 - Gross exports of Electronics grew at an average annual rate of 14.7% between 1997 and 2001 (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).

18. VALUATION CERTIFICATE (Cont'd)



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- Within the Electronics sub-sector, gross exports of Semiconductors, and Electronic Equipment and Parts grew at an average annual rate of 10.3% and 18.7% respectively between 1997 and 2001 (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- Between 1997 and 2001, gross exports of Electrical Machinery and Appliances grew at an average annual rate of 12.2% (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- Gross exports of Consumer Electrical Products (mainly audio-visual products) grew at an average annual rate of 7.3% between 1997 and 2001, amounting to RM23.6 billion in 2001 (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- Gross exports of Industrial and Commercial Electrical Products (mainly telecommunications equipment), and Electrical Industrial Machinery and Equipment (mainly air-conditioners) grew at an average annual rate of 18.3% and 12.7% respectively from 1997 to 2001 (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).
- From 1997 to 2001, gross exports of Household Electrical Appliances (mainly rice cookers, washing machines and refrigerators) grew at an average annual rate of 10.8% (*Source: Monthly Statistical Bulletin, January 2002, Bank Negara Malaysia*).

13. Threats and Risks Analysis

Cost Competitiveness in Asian countries

- The cost of labour in Malaysia is relatively higher compared to some other Asian countries especially compared to Thailand, Indonesia and China. In addition, Malaysia has to import labour for many of its manufacturing sectors, which may impede on the overall cost competitiveness of manufacturing in Malaysia.
- Malaysia may lose its comparative advantage to other developing countries with lower operational costs and overheads. This may encourage the relocation of manufacturing operations away from Malaysia to other more attractive locations such as China, Philippines, Indonesia, Thailand, Vietnam and India.
- This situation may impact on the manufacturing of lower value components and parts. Manufacturers, who are able to add value to their products either through turnkey Original Equipment Manufacturer or increase product specialisation, are less likely to be threatened by these problems.
- In this situation, manufacturers are also assured of the Government support in providing numerous incentives to ensure the competitiveness of Malaysia's Electronics Industry in the global market.

Dependency on Imports

- The lack of backward linkages in the Electronics Industry in Malaysia has meant a strong dependency on imports particularly in higher value electronic components such as semiconductors and integrated circuits.

18. VALUATION CERTIFICATE (Cont'd)



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- However currently, Malaysia has approved 6 wafer fabrication projects. Of these, the Government has investments in 2 of the wafer fabrication plants, First Silicon (Malaysia) Sdn Bhd in Sarawak and Silterra Malaysia Sdn Bhd in Kulim. This will provide manufacturers with a more integrated semi-conductor component industry in Malaysia and reduce its reliance on imports.
- The other dependency is in the imports of CCL. Currently there are only a few local suppliers of CCL due to the high capital set-up cost. In addition, Malaysia is not a primary copper producer and as such, there is little advantage in manufacturing CCL locally.
- However, there is ample supply of copper plates globally, therefore the threats in shortages of this raw material is minimised.

Slowdown in Global Demand

- In the event of a global economic downturn, demand for manufactured goods particularly consumer electronics will be affected. In particular, the health of the economies of Malaysia's major trading partners such as the United States and Japan will have a direct impact on the Malaysian Electronics Industry. This is evident in the slowdown in the United States economy for 2001, which not only impacted on Malaysia but also on other nations and this will inadvertently reduce demand for Malaysian exports.
- However, Malaysia is a manufacturing based economy and is highly export oriented. Manufacturers that service the export markets, directly or indirectly would have a diverse and large customer base to minimise exposure to any one or a small group of economies.

14. Market Size

- In 2001, the market size for rigid PCB Manufacturing in Malaysia was estimated at **RM750 million**.

15. Market Share

- In 2001, based on AE Corporation (M) Sdn Bhd's revenue of RM53.6 million, **AE Corporation (M) Sdn Bhd's market share was approximately 7%** among rigid PCB manufacturers in Malaysia.

16. Market Ranking

- In 2001, based on AE Corporation (M) Sdn Bhd production of 1.1 million square metres of PCB, **AE Corporation (M) Sdn Bhd was ranked sixth** among rigid PCB manufacturers in Malaysia.

18. VALUATION CERTIFICATE *(Cont'd)*



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Note: Where information and data are requested directly from the source and which are not normally available in any publications, the source will be acknowledged as "Unpublished Data" followed by the name of the source of information.

Vital Factor Consulting Sdn Bhd has prepared this report in an independent and objective manner and has taken all reasonable consideration and care to ensure the accuracy and completeness of the report. It is our opinion that the report represents a true and fair assessment of the industry within the limitations of, among others, secondary statistics and information, and primary market research. Our assessment is for the overall industry and may not necessarily reflect the individual performance of any company. We do not take any responsibilities for the decisions or actions of the reader(s) of this document. This report should not be taken as a recommendation to buy or not to buy the shares of any company or companies.

Yours sincerely

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