

Beijing Beida Jade Bird Universal Sci-Tech Company Limited (Jade Bird Universal)

| Year to | Net profit | EPS | PER | DPS | Yield | CFPS | P/CF | BVPS | P/BVPS |
|---------|------------|--------|------|------|--------|------|--------|------|--------|
| 31 Dec | (HK\$m) | (HK\$) | (%) | (x) | (HK\$) | (%) | (HK\$) | (x) | (x) |
| 1999A | (4.2) | (0.06) | (8) | nm | 0.0 | na | na | 0.11 | 165.4 |
| 2000E | 23.6 | 0.29 | nm | 53.8 | 0.0 | na | 0.22 | 81.5 | 3.72 |
| 2001E | 41.4 | 0.43 | 48.3 | 42.5 | 0.0 | na | 0.36 | 50.5 | 4.15 |
| 2002E | 91.3 | 0.95 | 121 | 19.3 | 0.0 | na | 0.81 | 22.6 | 5.09 |
| 2003E | 187.5 | 1.94 | 104 | 9.4 | 0.0 | na | 1.81 | 10.2 | 7.04 |

Recommendation: BUY

Price
HK\$18.30

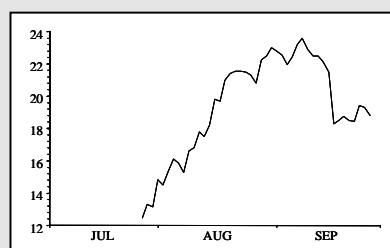
Date 5 October 2000

Reuters code: 8095.HK

Bloomberg: 8095 HK

Website: www.china-jbu.com

GEI : 396.31*
 Issued Shares : 96.4 million
 Market Cap : HK\$1768.9m
 Major Shareholders : Peking University – The Four Domestic Promoters (23.55%)



*Hong Kong SE Growth Enterprise Market

Developing revolutionary new technologies with Peking University Institute of Microelectronics

Company background: The core operation is embedded system development. The company was spun off from the Peking University and continues to enjoy technical support from that institution.Page 4

Growth drivers: A booming IT sector and strong government support will drive future growth.Page 9

Revolutionary new technologies: Jade Bird is tapping on Peking University's expertise on two new MEMS technologies, using micro-mirrors and sensors that could lead to new products development. The markets for these new technologies are worth a few billions of dollars.Page 12

Financial analysis: We expect strong earnings growth given a largely untapped domestic IT market.Page 14

Valuation: Upside potential of 40.1% from the current level using DCF model.....Page 15

| Comparative Analysis | | | | | | |
|----------------------|---------------------|-----------|----------------|---------------------------|----------------------------|---------------------------|
| | Jade Bird Universal | Arcontech | Shanghai Fudan | Internet Security Average | Embedded Prod/Syst Average | Embedded Software Average |
| Reuters code | 8095.HK | 8097.HK | 8102.HK | | | |
| Price | (HK\$) 18.30 | 1.14 | 1.71 | | | |
| Recommendation | Buy | na | na | | | |
| Market cap | (HK\$m) 213.8 | 820.8 | 1764.1 | | | |
| Average daily T/O | (HK\$m) 64.0 | 8.8 | 57.0 | | | |
| PER (FY00) | (x) 53.8 | 28.5 | na | 77.3 | 92.1 | 35.5 |
| PER (FY01) | (x) 42.5 | 7.1 | na | 58.2 | 52.8 | 23.9 |
| P/S (FY00) | (x) 21.3 | 5.3 | 3.2 | 18.2 | 6.6 | 5.3 |
| P/S (FY00) | (x) 9.1 | 2.6 | 0.7 | 12.5 | 5.4 | 3.9 |

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Executive summary

A leading player in embedded systems development

Jade Bird Universal is a pioneer of embedded systems development in the PRC. The operations were spun off from the Peking University and today it designs, develops, manufactures and installs five products using embedded systems: ASIC (application specific integrated circuit), JB-SG2 Security Gateway, smart card application system, GPS (global positioning systems) and WFAS (wireless fire alarm system). It serves industry majors, the Chinese government and related agencies.

The market potential for embedded systems in the PRC is huge, especially in the networking and communications markets. Chinese companies have only recently begun to recognise the importance of network security. Jade Bird Universal, through its official connections, has a head start over potential competitors, and is further protected by entry barriers to the data protection embedded products business.

Strong earnings potential

The market for embedded products in China is large. The development of the IT sector will have a direct impact on China's electronics applications market, driven by robust growth in the computer, communications and consumer markets. According to Dataquest, embedded microprocessor CAGR in China is estimated at about 11% for 1999-2004 to US\$2.13bn. The ASIC market is projected to record a CAGR of 26% over the same period to US\$2bn. And as more Chinese go online, it will boost demand for Jade Bird Universal's network security systems. Based on the latest statistics from the China Internet Network Information Centre (CNNIC), there were 16.9m Internet users in China at the end of June 2000, almost double the figure six months earlier.

R&D support from Peking University

Before the incorporation of Jade Bird Universal, Peking University was carrying out R&D on embedded systems since the formation of Jade Bird Software in November 1992. After the injection of the core businesses into the company in April this year, Jade Bird Universal continues to tap into the R&D capability of Peking University in embedded system development, based on the software development system – Jade Bird System or JB-CASE developed by Peking University. The company has signed an agreement with Peking University to have the first right over the embedded technology already developed or to be developed by the Peking University Institute of Software Engineering and Institute of Microelectronics. We see this support as helping Jade Bird Universal keep abreast of new technology developments. Besides, the group has 25 in-house researchers specialising in software engineering and microelectronics and 46 staff in embedded system products R&D.

Expansion strategy

To ride the trend, the company is expanding its market presence and reinforcing its R&D capabilities by setting up a technology and marketing centre in Beijing and a product research and development centre in Shenzhen. The company has initiated product development, such as the instruction processing module of the embedded system chips. Jade Bird Universal has launched its "IC card in one" for several universities and government units, and new products coming on stream include network security firewall and e-mail filter software. The company is also building capabilities in IT outsourcing, although it is still at an early stage, and investing in companies with strong technology backing or established market presence for new products. All these growth plans will be funded from the IPO proceeds of HK\$274m.

New technology development with Peking University

We believe the scope and potential for the technology based on micro-mirror and accelerometer is enormous. The Peking University Institute of Microelectronics is currently carrying out studies on MicroElectroMechanical Systems (MEMS), which could lead to new products. At present, many companies in the world are trying to develop an all-optical cross-connect system for the telecommunications sector, using the micro-mirror technology. A recent acquisition by Nortel has placed a price tag of US\$3.25bn on this micro-mirror technology. The second relates to the accelerometer sensors, which may lead to future application in the robotic and healthcare sector. Although Jade Bird Universal will not sell the technology outright, we believe there will be some value when the new technologies are put into commercial use.

Financial projections show strong CAGR

The company has turned around, reporting a maiden profit of Rmb9.4m in 1H00, compared to losses of Rmb4.8m in FY98 and Rmb4.5m in FY99. Earnings projections remain buoyant, as the IT industry has just taken off in the PRC. We project 2000-04 net profit CAGR of 184% due to strong demand for its products.

Valuation

We have used discounted free cash flow projections to arrive at the intrinsic value of Jade Bird Universal. The valuation ranges from HK\$2661.72m to HK\$3535.41m, depending on the discount rates. However, our bias is towards 20%, which translates into HK\$2661.72m. Our valuation has not factored in the potentials from the new technologies based on MEMS, which could add further upside on the valuation and share price. Using the PER and price-to-sales ratio analysis of peers, the valuation range is equally wide, because there is no close comparison to Jade Bird Universal's business (in embedded systems) in the PRC. Our valuation using 20% discount rate translates into HK\$25.64 per share, an upside of 40.1% from current levels.

Company background

***Jade Bird Software
founded by the Peking
University***

The Peking University incorporated Jade Bird Software in November 1992 to engage in the business of computer hardware and equipment, to develop technology related to functional equipment, and provide technology services. In the seven years to 1999, Peking University incorporated several more companies engaged in the development of embedded products.

***Incorporation of Jade Bird
Universal as the listing
vehicle***

Beijing Beida Jade Bird Universal (Jade Bird Universal) was incorporated as a Sino-foreign company on 29 March 2000. Its predecessors transferred the technological materials, R&D staff, assets and liabilities and business operations into the company. The reorganisation was completed in April 2000. The following table shows a chronological development of the Jade Bird Group by Peking University.

| HISTORY OF JADE BIRD UNIVERSAL | | |
|--------------------------------|--|--|
| Date | Company formed | Activities |
| Nov 92 | Jade Bird Software (JBS) (100%) | R&D of fundamental software and investment in IT related business. |
| Feb 93 | Yu Huan (100%) | R&D of ASIC designs and development of advanced micro-electronic instrument for IC measurement. |
| Nov 94 | Jade Bird (JB) (46% through JBS) | R&D of JB-CASE and network security products. |
| Jan 95 | BBJB Fulin Communication Co Ltd (50% through JB) | R&D, manufacture and marketing of GPS applications systems. |
| Aug 95 | BBJB Communication Technology Co (100% through JB) | Fulin Wind Power sold its 50% in BBJB Fulin to JB and the company changed its name. |
| Sep 96 | Jade Bird Software Co Ltd (40% by JB and 60% by JBS) | R&D of JB-CASE software development tools which were previously developed and owned by Peking University. |
| Sep 98 | | Peking University transferred the ownership in Factory to JBS. The factory engaged in the manufacture and marketing of smart card application systems, WFAS and other security products. |
| Dec 98 | | JB acquired the Factory from JBS. |
| Dec 98 | Beijing Tianqiao (16.76% by JB) | Designs, develop, manufacture and markets business automation systems and bank funds clearing and payment systems. |
| Jun 99 | BBJB Communication | Beijing Tianqiao acquired 100% from JB. |
| Mar 00 | Jade Bird Universal | JBS, JB, Beijing Tianqiao and Yu Huan decided to transfer their operations to the company. |

*Source : Company
The numbers in brackets are equity stakes*

Core competence in embedded systems development. It has launched five products

The principal activities of Jade Bird Universal are developing and designing embedded technology and incorporating such software into its embedded system products, including the company's integrated circuits (ICs) in the PRC. At present, it has more than 70 R&D staff in its Beijing and Shenzhen offices, conducting various research and development of embedded technology and embedded system products. Currently, the company has five embedded system product lines in the market, all using its own software and ICs. They are ASIC, network security products, smart card application systems, GPS application systems and WFAS. These products are applicable to network facilities, car electronics, systems exchange, automated industrial machineries, information appliances, electronic products and fuzzy logic appliances. The five products developed by Jade Bird Universal are listed in the table.

| EMBEDDED PRODUCTS AND SYSTEMS | |
|---|--|
| Type | Comments |
| ASIC (Application Specific Integrated Circuit) | A special type of chip designed for a particular application. These ICs are used by professionals for data encryption and decryption. |
| GPS Application Systems | Used for security control and monitoring of vehicles, thus prevent theft to efficient and cost effective control of vehicle fleet. |
| Network Security Product | Provides security control of information in external and internal network. |
| Smart Card Application System | The system serves as access control management, identification security systems, and authentication security systems. It is used in the banking and finance industry, retail, fare collection and e-commerce transactions. |
| WFAS (Wireless Fire Alarm System) | Provides reliable protection for fire hazards. The advantages of WAFS are low cost of installation and minimal false alarm rate. |

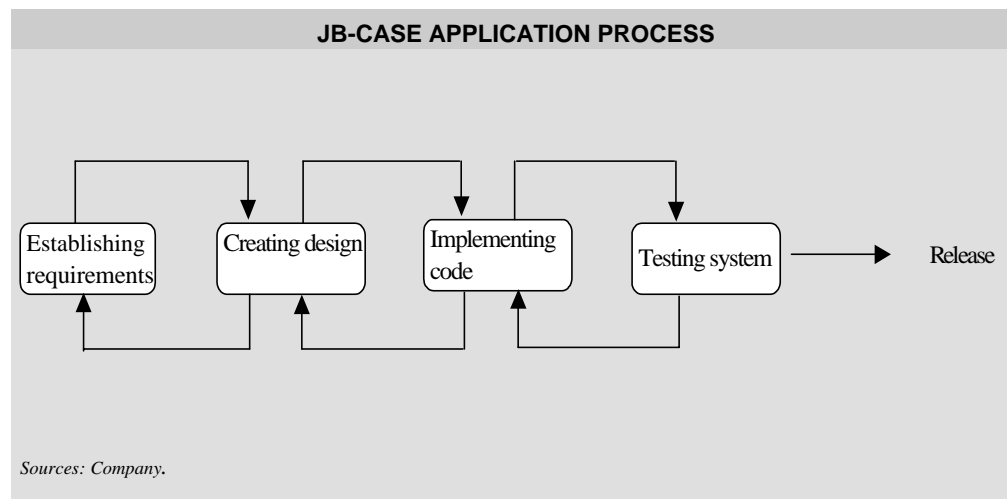
Source: Company

Software development stems from its software tools – JB-CASE. This set of tools allows software developers to flexibility in design the software codes

Software development

Jade Bird Universal's development capability is based largely on its software development system – Jade Bird System (also known as JB-CASE), a software development tool developed by the Peking University to support the development and protection of systems and application software. Two key advantages of JB-CASE are its ability in streamlining the software development process thereby lowering complexity, and its efficiency and reliability. JB-CASE has received several awards, including The Second Prize of State Technological Achievement, "Eighth Five" State's Substantial Technology Achievement Award, and the China Software Industry Association's Honorary Award of China.

Since software development involves several programming steps, JB-CASE allows the software developer to repeat through the steps several times before achieving the end result. The following chart shows the JB-CASE application process.



Software development involves the following steps:

1. Establishing requirement: it specifies what function a program must accomplish;
2. Creating design: lays out the classes and objects needed in a program and defines how they interact;
3. Implementing code: the process of writing source code, translating the design into a particular programming language; and
4. Testing system: involves running the programme multiple times with various inputs and observing results.

Embedded technology development

Jade Bird Universal's key strength lies in its ability to embed software into the hardware. The company designs the hardware architecture and the positioning of the PCB as well as designing ASIC and advanced microcomputer components.

Jade Bird Universal designs the hardware

Convergence in computing, communicating and consumer products stimulates new demand for embedded systems

The rise in demand for devices equipped with several functions has promoted the growth of embedded products, due to the convergence of computing and communicating functions into the consumer products. This requires complex design of ICs technology and R&D activities to be carried out. As the market is characterised by frequent technological improvements, Jade Bird Universal is in a favourable position to compete with other manufacturers in the PRC, a position strengthened by the R&D support from Peking University.

Tapping on the Institute of Microelectronics on chip design

In chip design, the company uses electronics design automation software design tools (EDA). The company is able to shorten the product development and design cycle of the ICs because it is able to utilise the cell/module library developed by the Institute of Microelectronics of Peking University. This cell library contains a wide selection of logic gates that can be reused.

Company products

Develops customised integrated circuits catering to the consumer electronics market. The key strength is in data protection

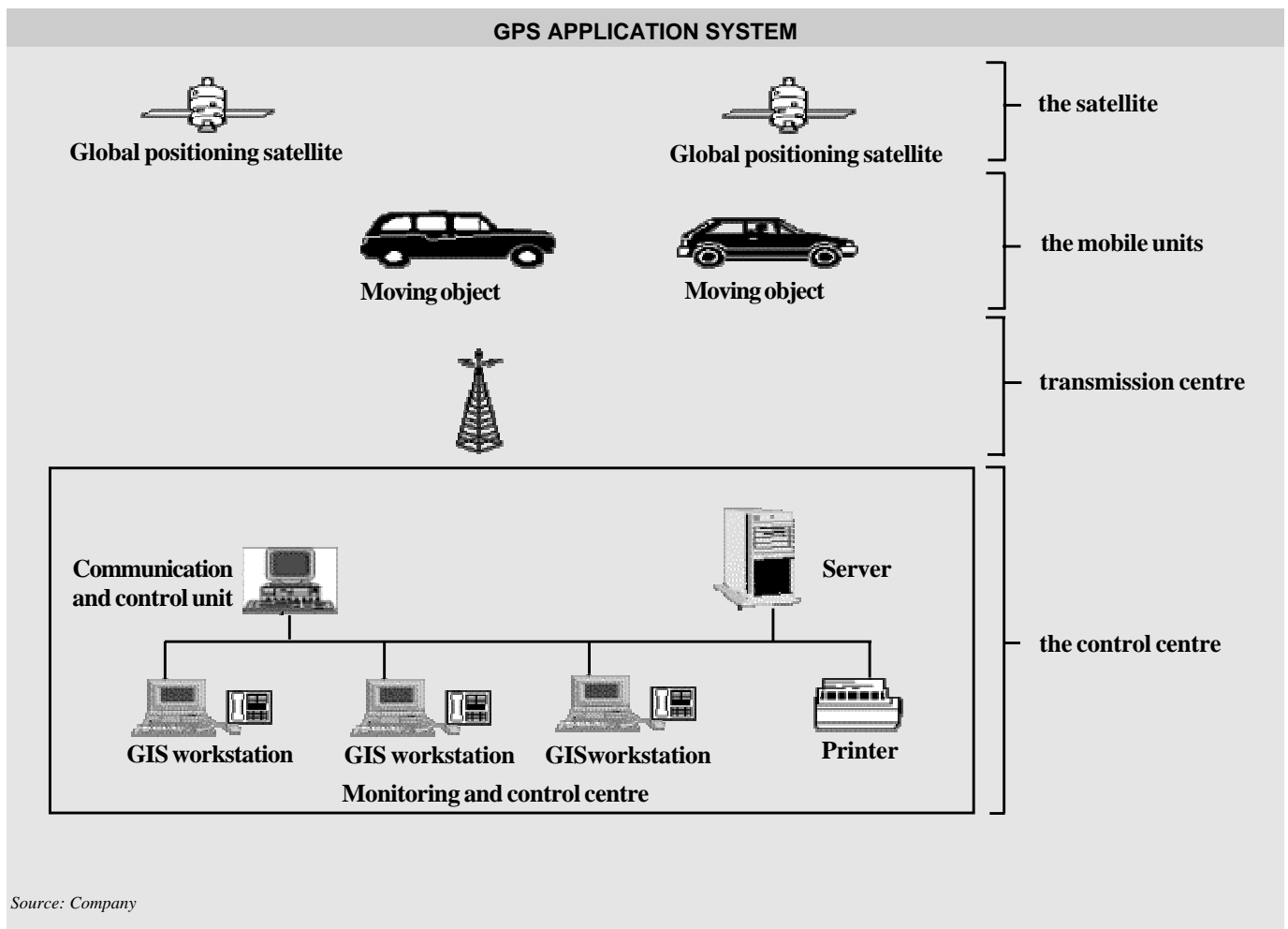
Application specific integrated circuit (ASIC)

The company provides its customers – electronic systems manufacturers – with technologies and engineering design services in customised circuits. At a more sophisticated level, Jade Bird Universal also designs and develops ASIC with a security function that has cryptographic ability. The Integrated Circuits (ICs) can carry out data encryption and decryption, and key management in the ASIC products. The target markets for these enhanced ASIC products with security function are financial institutions and operations that run network terminals. However, all cryptographic productions and sales require the approval of the State Cryptographic Control authorities.

Political sensitivity will help Jade Bird Universal's position in the GPS market

GPS application systems

Global positioning system (GPS) is a satellite navigation system used by industries such as transportation and defence. To ensure national interest, certain precautions are required to protect the information from being accurately obtained using the GPS. These again involve encryption and other necessary techniques embedded into the GPS systems. Jade Bird Universal has developed the JB-230M Satellite Monitoring System, applying GPS, GIS (geographic information system) and wireless communication technologies. The company has an advantage over foreign players due to political reasons and thus benefits from a captive market created by the Chinese government. The GPS application system is used mainly in fleet management, allowing effective control of vehicles.



Growing Internet data traffic pose potential risk to users

Network security systems

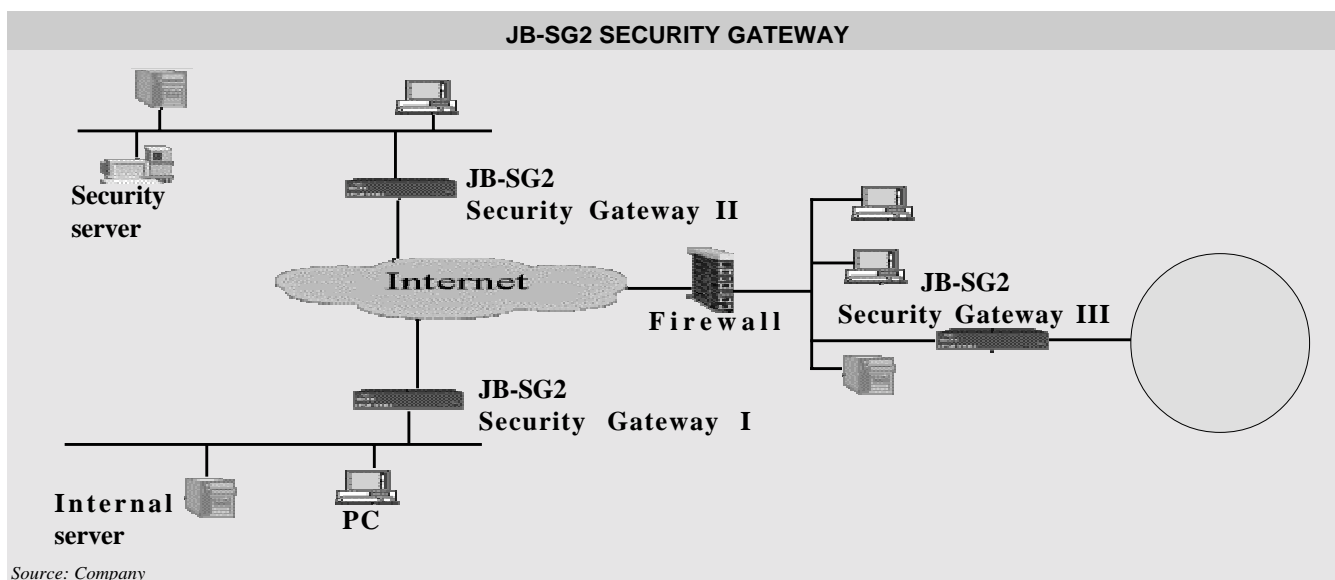
The rapid adoption of the Internet protocol as a delivery platform of both communications and data traffic has created demand for data encryption and network monitoring. Unencrypted information transmitted over the Internet “open” system poses risks. To ensure security over the Net, cryptography is employed as an algorithm to transform messages into a series of random bits. Upon receiving the encrypted data, it will then be decrypted to become a meaningful message.

State regulation on data encryption by the Chinese government

In China, the State Council introduced the Commercial Cryptography Management Regulation in October 1999 to strengthen Net security, especially for the state to prevent hacking. With this new regulation, Jade Bird Universal has a head start given the support it receives from the Chinese government.

The company network security system performs three functions

The company’s JB-SG2 Security Gateway systems (JB-SG2) employs digital signature and network passport technology to prevent information and data from being removed or unauthorised access from the Internet. JB-SG2 serves three functions: access controls, data encryptions and access verification. JB-SG2 can also be incorporated into third party encryption devices and encryption algorithms.



Its smart card system using a proprietary interface technology to ensure high reliability of the system

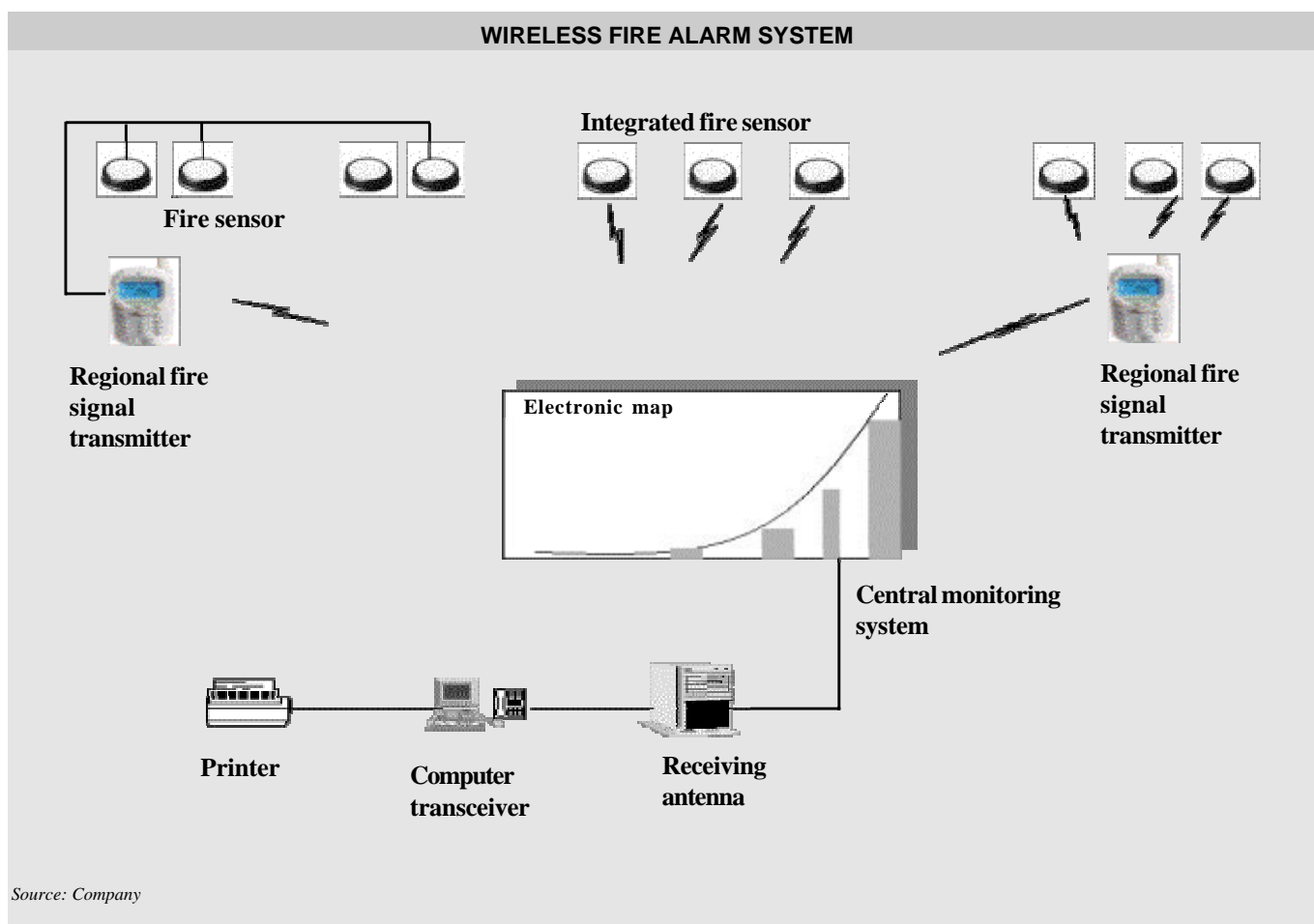
Smart card application system

The smart card is essentially a credit card-sized plastic card with an embedded computer chip. The company develops, designs, manufactures and sells the whole smart card system, comprising smart card readers and related computing systems. Jade Bird Universal possesses its own proprietary interface technology, which makes the smart card systems more reliable in providing a high level of security checks, fast transmission time and significant memory capability allowing for multi-purpose applications. The company has also developed a wireless smart card system that utilises radio frequencies in the transmission of information. Wireless smart card reduces installation and maintenance costs and is commonly used in fare collection, office automation and other high-level security application system.

One of the few WFAS manufacturers in the PRC

Wireless fire alarm system

Jade Bird Universal is one of the few wireless fire alarm system (WFAS) manufacturers in the PRC. It develops, produces and sells the systems mainly to the government and is planning a second-generation WFAS for public use. At present, most of the fire systems installed in the country are wired systems. The two main advantages of WFAS over wired systems are lower installation costs and false alarm rate. Jade Bird’s WFAS is versatile, economical and easily installed in buildings or structures that pose difficulties to wired systems.



Growth drivers

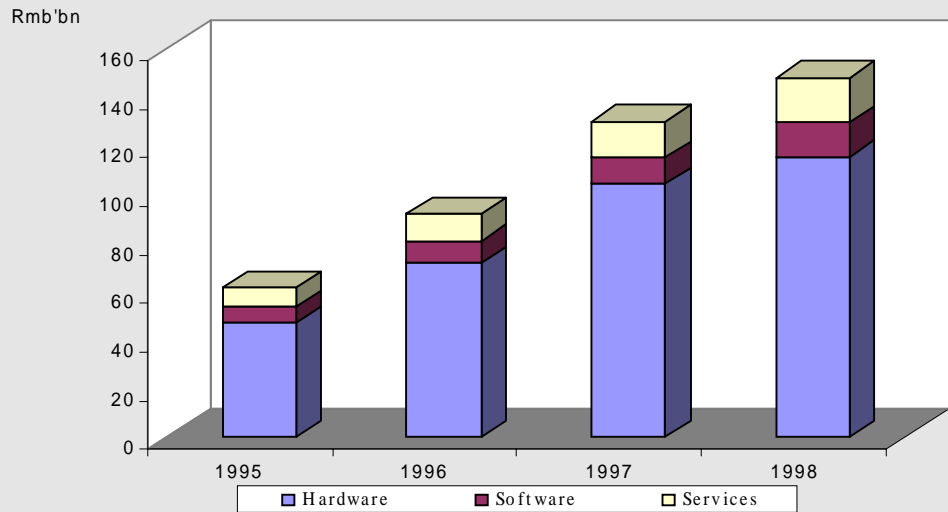
We have identified several earnings growth drivers.

The Chinese IT sector is projected to grow at 25-30% pa over the next three to five years

Booming IT sector in the PRC

China is experiencing strong growth in the IT sector with sales of computers and related products posting a 1995-98 CAGR of 34% to Rmb148bn. The sector is being driven by the government's initiative to modernise the economy through the use of IT, one of the objectives laid down in the Ninth Five-Year Plan. We expect the Chinese government's efforts to encourage IT development in the country to continue, with more initiatives to come. At present, attractive tax rates and other incentives are offered to IT companies operating in the PRC. Over the next three to five years, the sector is expected to remain robust with growth of 25-30% pa. By 2003, the PRC is expected to account for about one-third of the total Asia Pacific (ex-Japan) IT market, with strong growth in the data communications equipment, packaged software and IT services areas.

ANNUAL SALE OF COMPUTER, RELATED PRODUCTS AND SERVICES



Source: Almanac of China's Economics 1996-1999

Focus on the networking and communication software development

Strong software market

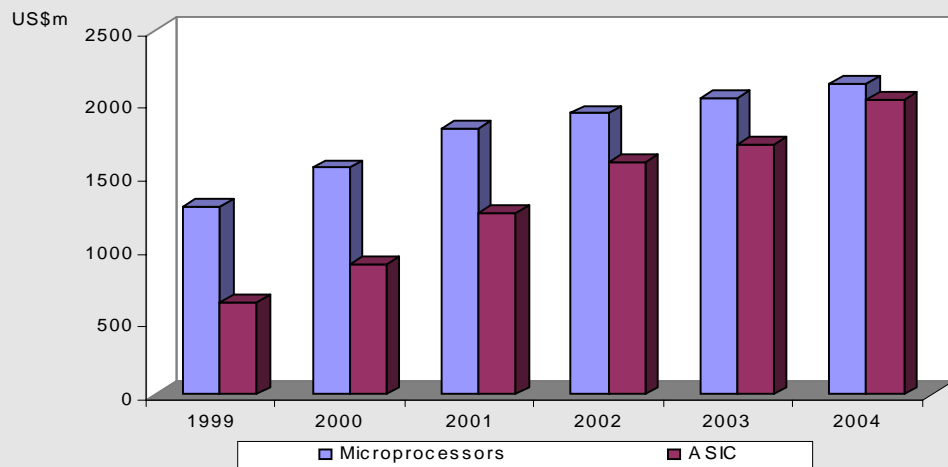
Jade Bird Universal operates in the networking/communication field, which is largely untapped as most domestic software products mainly focus on software applications. The software market was worth RMB13.8bn in 1998 and is expected to enjoy growth of over 40% in the next five years.

ASIC prospect riding on the strong growth trend of CAGR of 26% till 2004

Demand for IC is promising

During 1995-98, the CAGR of IC annual production was 74.5%. Total imports and exports of ICs (including microelectronics components) in 1998 were 14,760 million units, of which imports accounted for about 80%. The future is promising for Jade Bird Universal, especially with expected strong demand for microelectronics components in the PRC. According to Dataquest, microprocessor demand is estimated to grow by 11% pa till 2004 to US\$2.13bn. In the ASIC market, market potential is equally encouraging, at CAGR of 26% to US\$2bn by 2004.

MICROPROCESSOR AND ASIC PROJECTIONS

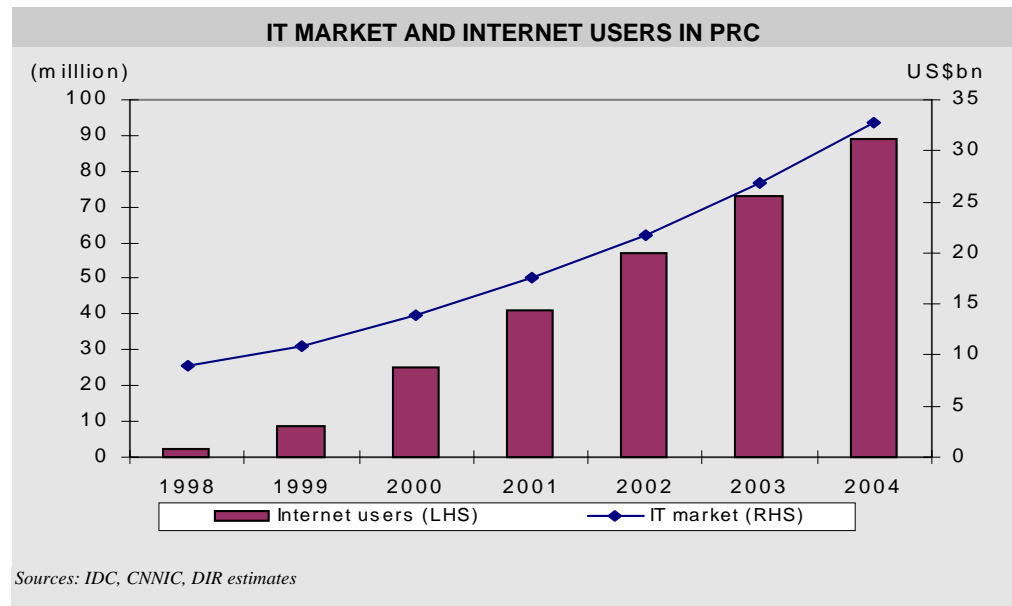


Source: Dataquest

Explosion in Internet user base

Growing Internet penetration

Demand for Internet services in China is booming and demand for data encryption will increase as a result.



Jade Bird Universal's network security system provides more layers of protection to end-users

According to the latest China Internet Network Information Centre (CNNIC) data, there were 16.9m Internet users at the end of June 2000, double the end-1999 figure. We project there will be 90m Internet users by 2004. The trend means a growing importance of network security. Hackers have developed techniques to circumvent firewalls (the most common form of network security), hence a need for higher level security. Jade Bird Universal's security network products provide several layers of protection to users.

Growth strategy

The company has adopted the following strategies to expand its business.

A new R&D centre to establish a reusable library for software and hardware tools

- **R&D centre in Shenzhen**

The centre will conduct research and development on embedded system and related products. This is in line with the company objective to establish a reusable software and hardware library that will support future expansion. The local government of Shenzhen actively promotes and encourages the IT industry by offering tax relief, preferential residential and commercial property and immigration assistance to IT companies operating there.

Aggressive marketing to promote embedded products in China

- **Technology and marketing centres in Beijing and expanded marketing activities**

The technology centre will help to attract new talent while the marketing centre will serve to enhance brand name awareness. The company intends to expand its sales force and marketing programmes.

| MANPOWER PROJECTIONS | | | | |
|-----------------------------|------------|------------|------------|------------|
| Period | 1999A | 2000E | 2001E | 2002E |
| Management | 13 | 14 | 21 | 41 |
| Technical support | 15 | 54 | 90 | 104 |
| R&D | 77 | 107 | 165 | 235 |
| Sales and marketing | 9 | 35 | 60 | 118 |
| Finance & administration | 19 | 20 | 23 | 32 |
| | ----- | ----- | ----- | ----- |
| Total | 133 | 230 | 359 | 530 |
| | === | === | === | === |

Source: Company

Strong technical support from Peking University Research Institute to remain in the forefront of technological changes

- **Maintaining technical support relationship with Peking University**

The company has signed an agreement with Peking University giving it first rights past and future embedded technology developed by the Peking University Institute of Software Engineering and Institute of Microelectronics. It is positive as the deal will help the company to keep abreast with trends in embedded systems. The ability to develop highly reliable software and integrated circuits for use in embedded systems is a key future success factor for Jade Bird Universal.

Set plans to guide the new technology and product development

- **New products and technologies**

The company has implemented its technology roadmap to guide its future R&D programmes up to 2002 (see Appendix 4 for full details). In summary, Jade Bird Universal plans to carry out two objectives: to improve its current embedded systems technology and to build a reusable components (software and hardware) library. Beyond that, new development will cater more towards the e-commerce market.

To set up joint venture companies to further enhance its capability

- **New investments**

This involves acquiring companies with related technologies or strong product presence. This strategy also includes joint ventures with strong IT companies to ride on the rising outsourcing trend in China, although it is still at an infancy stage. However, we view this as a medium-term objective of the company.

A controlled market for its security network systems, thus we expect limited competition

Competition

China is at its early stage of IT development and, being a virgin market, there is huge potential. Jade Bird Universal focuses mainly on the PRC to market its products. We see minimum level of competition to Jade Bird Universal especially for security-related embedded system products in the PRC, such as Network Security Product, Security ICs and encryption devices. These products are considered technologically sensitive and critical to the State security and thus require approval. In addition, Jade Bird Universal has both the technological and design know-how which are lacking in some domestic players.

Smart card business has more players

In the smart card application system segment, the main source of competition is from domestic players, due to sensitivity issue.

Entry into the WTO expects to have limited impact on security systems

Although China's entry into the WTO may mean a removal of entry barriers, we believe the Chinese government will continue to impose certain controls on imported embedded security products.

Exciting new technologies to fuel long-term growth

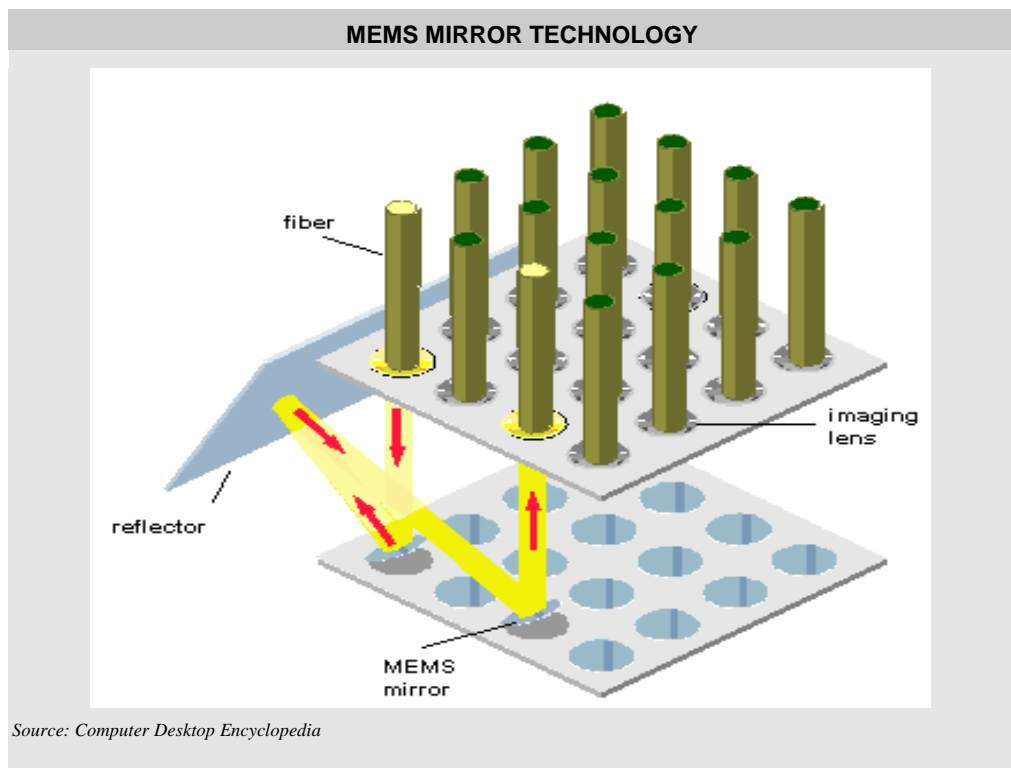
Research into MEMS chips

Based on our understanding, the Peking University Institute of Microelectronics Research centre is carrying out studies on MicroElectroMechanical Systems (MEMS) chips using micro-mirror technology and fluid sensor, which could be a major breakthrough for Jade Bird Universal in launching future embedded products.

Conversion of electronic signals over different fibre network is tedious. With the micro mirror technology, signals which travel in light beams, can be switched via the strategically positioned microscopic mirrors to direct traffic flow

Data transmission over fibre-optic systems based on micro-mirror technology could become the next generation building block for telecom and Internet service providers. Currently, all traffic has to be converted into electronic signals when being routed to different fibre networks and then reconverted to photons. This conversion process is time consuming and adds complexity. Under an all-optical network, signals travel in light beams and no conversion is required, thus simplifying the process. Using the MEMS-based switch fibre, microscopic mirrors act as switches to route data flows. In MEMS, there are two sets of levers (usually constructed out of reflective silicon), some being coated with gold to create the mirror effect. When current flows through the non-coated levers, the movable levers will flip the mirrors up and down, sending light down different paths. Companies are trying to invent their own MEMS mirrors for

telecommunications, use mainly as optical cross connects. The advantages of an all-optical network are a large amount of information (voice, text, and video) can be delivered over the system, increase in speed as the information travels in the form of light, and greater flexibility as there is no need for conversion of optical signals to electrical signals and back again.



Nortel acquired micro-mirror technology development for US\$3.25bn

Several companies are rushing into the MEMS or optical cross-connect developments for the telecommunication sector but three companies have decided on the micro-mirror technology. They are Lucent Technologies (done at its R&D arm, Bell Labs), Optical Micro Machines and Xros. In March 2000, Nortel, the Canadian telecoms equipment company, announced it was acquiring Xros for US\$3.25bn in shares. This was followed by JDS Uniphase Corporation purchase of Cronos Integrated Microsystems for US\$750m.

Developing the accelerometers using a micro-sensory chip which has potential applications in the healthcare and robotic industries

The second MEMS development relates to accelerometers, which can have many applications including automotive, industrial control, medical, home appliance and games. In fact, the level of development goes beyond MEMS to include other micro-engineered systems known as microsystems technology (MST). In the future, these accelerometers could be used as sensors whereby the tiny mechanical devices could be used for drug monitoring in the body, or a microfluidic chip could be embedded in an instrument to analyse blood samples.

No commercial implementation of new technologies yet Jade Bird Universal is the beneficiary of the new development by the Institute

Although these new technologies have yet to reach commercial implementation, global market potential is huge (see following table).

The success of Peking University Institute of Microelectronics in developing both technologies will be a major break-through for Jade Bird Universal's long-term earnings potential. It also highlights the fact that the level of R&D activities in the PRC has advanced greatly in international terms. Being in the forefront of new technology development will enhance Jade Bird Universal's prospects.

MARKET POTENTIALS FOR MEMS-BASED TECHNOLOGY

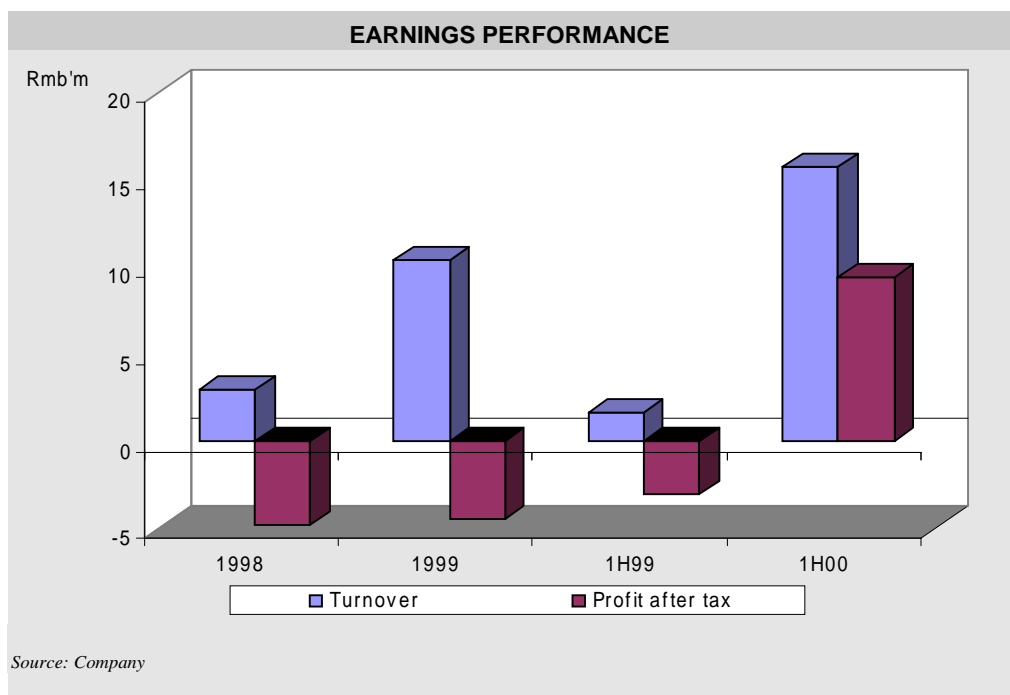
| Source | Types | Amount |
|---------------------------|--------------------------------|------------------------------------|
| CIBC World Markets | Bandwidth wholesale | US\$60bn (2004) |
| Nortel | Micro-mirror technology (Xros) | US\$500m (2001) US\$15bn (2005) |
| Nortel | Global optical equipment | US\$35-40bn (2004) |
| Venture Development Corp. | MST devices | US\$4-7bn (2004) |
| Nexus | MST products | US\$4.2bn (2002) |

Source: Reuters

Financial Analysis

Positive turnaround in performance at 1H00 with Rmb9.4m of net profits

The company reported a maiden net profit of Rmb9.4m in 1H00. Revenue was Rmb15.7m, mainly from strong sales in GPS systems. Gross profit was Rmb14.3m as most development costs had already been accounted for. At the operating level, the company recorded Rmb9.4m of profit, compared to losses of Rmb5.2m, Rmb4.4m and Rmb3.0m in FY98, FY99 and 1H99 respectively.



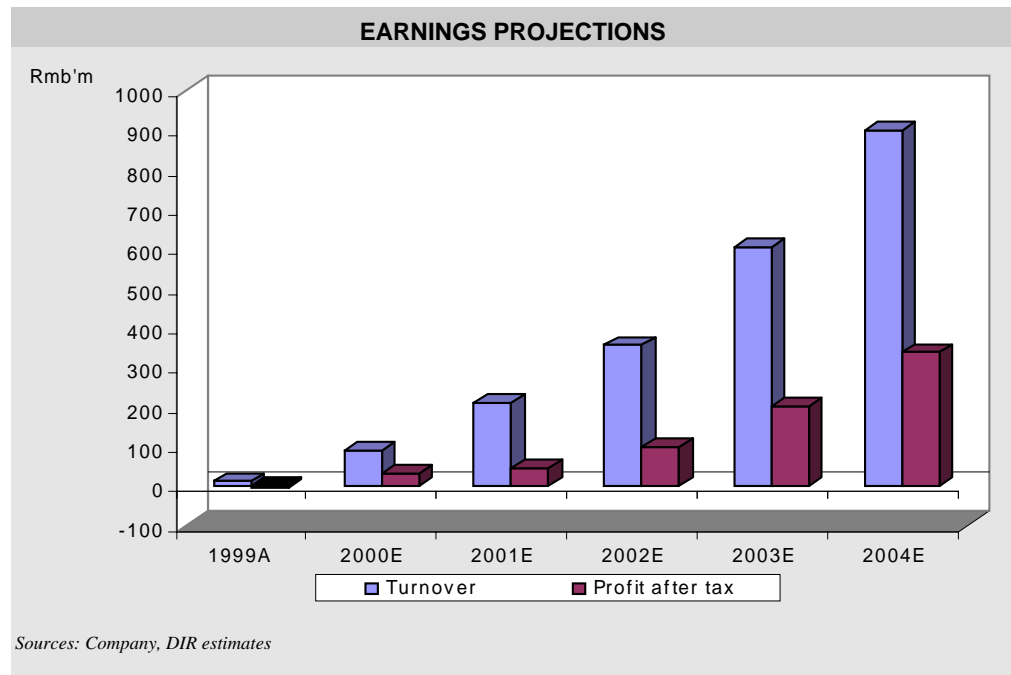
Expect strong support from the Chinese government to continue

Jade Bird Universal's main customer has been the Chinese government (65.4% of total sales in 1998-99) and government-owned enterprises (21.5% of total sales in the same period). We believe this strong support will continue as the Chinese government is actively promoting the IT sector.

Underlying fundamentals for our earnings projections

We are projecting strong earnings growth moving forward for the following reasons:

- Embedded systems were launched in the Chinese market only recently and therefore full potential has yet to be felt
- Constant upgrading and improvement to current product range
- Research and development into new technologies and products
- Strong IT sector growth
- Solid economic fundamentals



CAGR of 178% in sales and 184% in net earnings and we expect medium-term net margins of 25-30%

A sales target of Rmb1bn is achievable for Jade Bird, given the huge market potential. The strong technical support from Peking University will allow it to keep abreast of rapidly changing technologies. Our projection of slightly over Rmb900m of revenue by 2004 is achievable, given the company's aggressive market plans and expected strong demand. This translates into a 2000-04 CAGR of 178%. At the profit level, we are projecting increases in net margins as sales continue to grow, given the current low level. Medium-term net profit margins of 25-30% are considered reasonable, since the company is constantly improving and upgrading its design, manufacturing and distribution capabilities. We are projecting net profit 2000-04 CAGR at 184%, given a low base in 2000.

Valuation

DCF model value the company at between HK\$2661.72m and HK\$3535.41m

Discounted free cash flows

This methodology is based on the net present value (NPV) of its future free cash flow (FCF) projections to calculate the fair value of the company. The table following shows the free cash flows computations and the net present value using different discount rates. As the company has zero gearing, the discount rate is largely its cost of equity. The valuation using different discount rates varies widely, because of the high risk factor common for technology companies. The most optimistic scenario value the company at HK\$3535.41m while the most conservative case value is HK\$2661.72m. However, we are biased towards the 20% discount rate despite its cost of equity is approximately 16.5%, due to the high risk factor. This translates into HK\$25.64 per share or a PE multiple of 59.6x on its FY01 earnings. Although the PE valuation on FY01 contains a premium to its earnings, this reflects three factors: the high growth potential as the company is still in an early stage of development, its unique position as there are no companies carrying out the same range of activities, and its close relationship with Peking University which allows Jade Bird Universal to keep abreast of the latest technologies.

DISCOUNTED FREE CASH FLOW PROJECTIONS

| Rmb'm | FY00 | FY01 | FY02 | FY03 | FY04 |
|-------|--------------------|------------------------------|----------------|--------------------|---------------------|
| FCF | (26.1) | (4.1) | 60.1 | 167.6 | 276.3 |
| | FY05 | FY06 | FY07 | FY08 | FY09 |
| FCF | 271.7 | 307.6 | 386.3 | 466.4 | 562.1 |
| | Total NPV (FCF) | Discounted Terminal value | Total value | Per share (Rmb) | Per share (HK\$) |
| - 15% | 2145.87 | 5621.45 | 3535.41 | 36.67 | 34.06 |
| - 16% | 2127.37 | 5110.41 | 3285.82 | 34.09 | 31.65 |
| - 17% | 2109.19 | 4684.55 | 3083.75 | 31.99 | 29.70 |
| - 18% | 2091.32 | 4324.20 | 2917.52 | 30.26 | 28.10 |
| - 19% | 2073.74 | 4015.32 | 2778.84 | 28.83 | 26.77 |
| - 20% | 2056.46 | 3747.64 | 2661.72 | 27.61 | 25.64 |

Risk-free rate: 9.3%

Equity risk premium: 4.8%

Beta: 1.5 (assumed figure due to higher risk)

Cost of equity: 16.5%

Perpetual growth rate: 5%

Source: DIR estimates

No close comparables to Jade Bird Universal's business. But FY00 PER valuation of "peers" is high

Peer valuation

We have also applied PE and price-to-sales (P/S) ratios to value Jade Bird Universal. However, as there are no close comparables, we have chosen companies with similar characteristics to that of the company. The following table shows the wide range of PE multiples and P/S ratios of the comparables. Using the average PEs of listed Internet security network and embedded system/product companies, the FY00 and FY01 numbers are 77.3x and 58.2x, 92.1x and 52.8x respectively. Jade Bird Universal's forward PEs are 53.8x and 42.5x for FY00 and FY01 respectively, which is lower than the average. On a conservative note and applying HK\$25.64 (which is arrived at using 20% discount rate from the DCF model), it translates to FY01 PE of 59.6x. This figure is comparable to the listed Internet security network companies average PE, although it is slightly higher than the embedded system/product companies average PE.

Applying the average P/S ratio of Internet security network companies of 12.5x to Jade Bird Universal's FY01 sales, we arrive at valuation of HK\$2423.8m. This translates into HK\$25.14 per share, close to our DCF valuation of HK\$25.64 a share.

PEER COMPARISONS

| Product/Company name | Ticker | Price* | Market Cap. | 2000 P/S (x) | 2001 P/S (x) | 2000 PER (x) | 2001 PER(x) |
|-------------------------------------|---------|------------|-------------|-----------------|-----------------|-----------------|----------------|
| Internet security network | | | | | | | |
| - Check Point Software Technologies | CHKP US | US\$154.23 | 23434.3 | 62.3 | 42.9 | 155.0 | 113.1 |
| - Axent Technologies Inc | AXNT US | US\$21.06 | 609.3 | 4.1 | 3.2 | 50.9 | 34.9 |
| - Pilot Network Services Inc | PILT US | US\$9.63 | 145.1 | 2.7 | 1.6 | -7.1 | -7.0 |
| - RSA Security Inc | RSAS US | US\$39.50 | 1577.2 | 5.8 | 4.7 | 43.8 | 34.2 |
| - Secure Computing Corp | SCUR US | US\$23.88 | 600.5 | 18.6 | na | -24.2 | -54.9 |
| - SonicWall Inc | SNWL US | US\$20.13 | 1043.9 | 15.4 | 10.1 | 59.4 | 50.8 |
| Average | | | | 18.2 | 12.5 | 77.3 | 58.2 |
| Embedded system/product | | | | | | | |
| - eXcelon Corp | EXLN US | US\$11.50 | 338.1 | 4.6 | na | -132.2 | 164.3 |
| - ICT Automatisering | ICT NA | Euro 48.00 | 402.6 | 4.7 | 4.0 | 30.9 | 25.6 |
| - Prism Holding Ltd | PIM SJ | Zar 6.99 | 1284.4 | 6.2 | 3.9 | 30.4 | 18.9 |
| - PLX Technology Inc | PLXT US | US\$28.13 | 655.1 | na | na | 49.5 | 32.9 |
| - Radisys Corp | RSYS US | US\$44.94 | 767.3 | 2.1 | 1.7 | 29.0 | 22.3 |
| - Virage Logic Corp | VIRL US | US\$16.50 | 319.9 | 16.5 | 10.3 | 330.0 | 94.3 |
| - Netsilicon Inc. | NSIL US | US\$16.50 | 265.2 | 6.2 | 4.1 | 103.1 | 53.9 |
| - Artisan Components Inc. | ARTI US | US\$10.00 | 145.6 | 7.1 | 5.3 | 142.9 | 55.6 |
| - Insilicon Corp | INSN US | US\$11.50 | 162.0 | 6.4 | 4.7 | 82.1 | 41.1 |
| - Quiklogic Corp | QUIK US | US\$15.88 | 317.3 | 5.4 | 4.0 | 30.8 | 18.9 |
| Average | | | | 6.6 | 5.4 | 92.1 | 52.8 |
| Embedded software solution | | | | | | | |
| - Wind River | WIND US | US\$42.00 | 3041.8 | 6.9 | 5.4 | 85.9 | 53.8 |
| - PC-Tel Inc. | PCTI US | US\$18.00 | 331.9 | 2.9 | 2.2 | 22.4 | 18.9 |
| - Bsquare Corp. | BSQR US | US\$15.00 | 503.1 | 8.2 | 5.9 | 75.0 | 58.6 |
| - Via Technologies | 2388 TT | T\$305.00 | 175908.4 | 5.7 | 3.9 | 28.9 | 19.7 |
| - Sunplus | 2401 TT | T\$134.50 | 49765.0 | 8.3 | 6.4 | 27.5 | 21.0 |
| - QPL Int'l | 243 HK | HK\$5.30 | 2728.6 | 3.1 | 2.7 | 9.3 | 6.9 |
| - ASM Pacific | 522 HK | HK\$16.95 | 6407.1 | 2.0 | 1.7 | 6.8 | 5.3 |
| - Arcotech | 8097 HK | HK\$1.14 | 820.8 | 5.3 | 2.6 | 28.5 | 7.1 |
| Average | | | | 5.3 | 3.9 | 35.5 | 23.9 |
| Beijing Beida Jade Bird | 8095 HK | 18.30 | 1764.1 | 21.3 | 9.1 | 53.8 | 42.5 |

Sources: IBES, DIR estimates

* Asian listed companies: 5/10/2000, others: 4/10/2000

Appendix 1

JADE BIRD UNIVERSAL – EARNINGS FORECASTS

| Year-end 31 Dec | 1999A Rmb'm | 2000E Rmb'm | 2001F Rmb'm | 2002F Rmb'm | 2003F Rmb'm | 2004E Rmb'm |
|---------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Operating Revenue | | | | | | |
| Network security products | 6.1 | 24.3 | 49.3 | 86.3 | 147.0 | 257.2 |
| Smart card | 2.5 | 17.3 | 27.7 | 55.5 | 116.9 | 137.5 |
| WFAS | 1.0 | 11.3 | 22.7 | 45.4 | 97.7 | 171.7 |
| ASIC | 0.7 | 12.0 | 17.9 | 32.3 | 58.1 | 104.6 |
| GPS | 0.1 | 24.4 | 91.2 | 136.8 | 184.7 | 230.9 |
| | ----- | ----- | ----- | ----- | ----- | ----- |
| Total operating revenue | 10.4 | 89.3 | 208.9 | 356.2 | 604.4 | 901.9 |
| Gross profit | | | | | | |
| Network security products | 2.5 | 16.7 | 28.8 | 53.4 | 96.5 | 170.3 |
| Smart card | 0.3 | 9.1 | 12.1 | 29.4 | 66.4 | 78.3 |
| WFAS | 0.3 | 5.2 | 11.4 | 23.8 | 54.1 | 97.2 |
| ASIC | 0.1 | 6.4 | 7.3 | 16.5 | 30.7 | 56.7 |
| GPS | 0.0 | 15.7 | 42.7 | 66.5 | 89.8 | 112.3 |
| | ----- | ----- | ----- | ----- | ----- | ----- |
| Total gross profit | 3.2 | 53.2 | 102.2 | 189.6 | 337.6 | 514.7 |
| Other operating expenses | (7.6) | (27.3) | (63.8) | (96.5) | (123.8) | (154.9) |
| Other non-operating income | (0.1) | 3.8 | 6.3 | 5.3 | 4.7 | 6.1 |
| | ----- | ----- | ----- | ----- | ----- | ----- |
| Pre-tax profit | (4.5) | 29.7 | 44.8 | 98.5 | 218.5 | 365.9 |
| Taxation | 0.0 | 0.0 | 0.0 | 0.0 | (16.4) | (27.4) |
| | ----- | ----- | ----- | ----- | ----- | ----- |
| Profit after tax | (4.5) | 29.7 | 44.8 | 98.5 | 202.1 | 338.4 |
| | ===== | ===== | ===== | ===== | ===== | ===== |
| EPS (Rmb) | (0.06) | 0.37 | 0.46 | 1.02 | 2.10 | 3.51 |
| DPS (Rmb) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Growth rate (%) | | | | | | |
| Turnover | 244 | 757 | 134 | 71 | 70 | 49 |
| Gross profit | 4566 | 1529 | 92 | 85 | 78 | 52 |
| Profit after tax | (7) | nm | 51 | 120 | 105 | 67 |
| EPS | (7) | nm | 24 | 122 | 106 | 67 |
| Gross profit margins (%) | | | | | | |
| Gross profit margins (%) | 31 | 55 | 55 | 55 | 50 | 50 |
| Net profit margins (%) | (43) | 35 | 32 | 32 | 28 | 28 |
| HK\$ Translation* | | | | | | |
| Profit after tax (HK\$m) | (4.2) | 27.6 | 41.6 | 91.5 | 187.7 | 314.3 |
| EPS (HK\$) | (0.06) | 0.34 | 0.43 | 0.95 | 1.95 | 3.26 |
| DPS (HK\$) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

* Exchange rate: Rmb 1.0769 = HK\$1.00 on forecast numbers.

Appendix 2

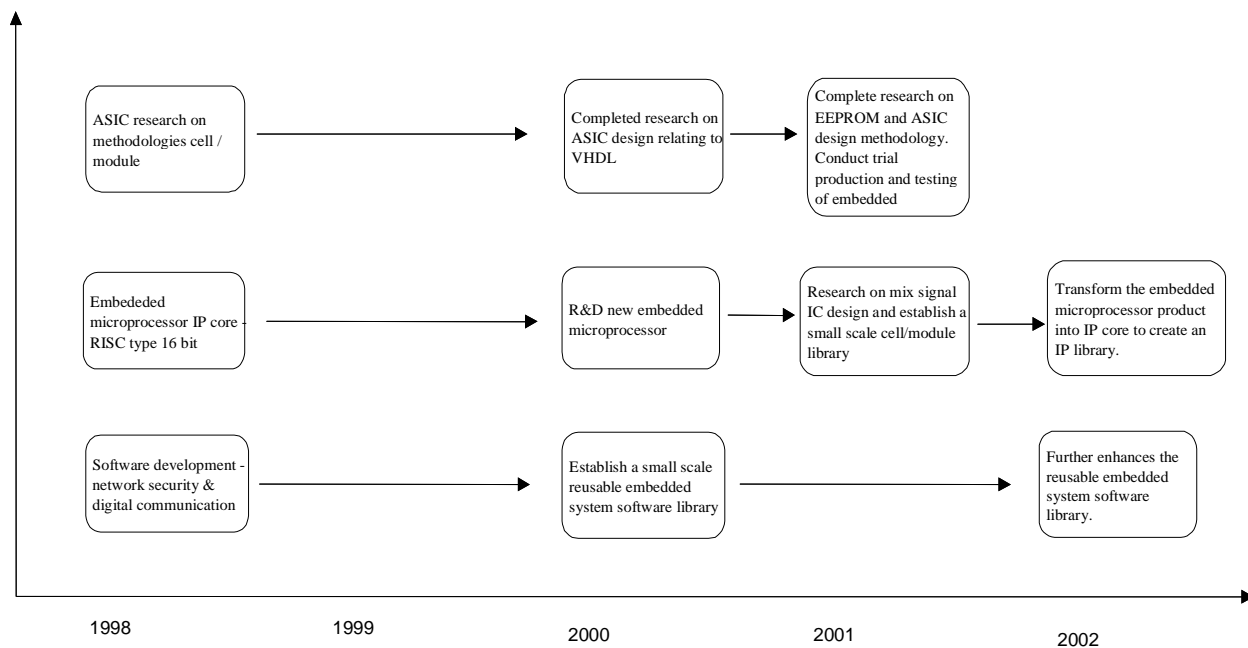
| JADE BIRD UNIVERSAL – CASH FLOW PROJECTIONS | | | | | |
|---|----------------|----------------|----------------|----------------|----------------|
| Year-end 31 Dec | 2000F Rmb'm | 2001F Rmb'm | 2002F Rmb'm | 2003F Rmb'm | 2004F Rmb'm |
| EBIT | 25.9 | 38.4 | 93.1 | 213.8 | 359.8 |
| Depreciation | 9.9 | 15.9 | 19.3 | 22.2 | 25.0 |
| Working capital | (3.6) | (6.3) | (10.7) | (18.1) | (27.1) |
| Tax paid | (8.9) | (10.4) | (17.8) | (30.2) | (61.5) |
| | ----- | ----- | ----- | ----- | ----- |
| Operating cash flow | 23.3 | 37.6 | 83.9 | 187.6 | 296.3 |
| Net financing | 3.8 | 6.3 | 5.3 | 4.4 | 5.9 |
| Capex | (49.5) | (41.8) | (23.9) | (20.0) | (20.0) |
| IPO proceeds | 274.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Capital from promoters | 51.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| Investment | 0.0 | (50.0) | (100.0) | (100.0) | (100.0) |
| | ----- | ----- | ----- | ----- | ----- |
| Net change in cash | 302.9 | (47.8) | (34.7) | 72.1 | 182.2 |
| Net cash/(debt) c/f | 12.3 | 315.2 | 267.3 | 232.7 | 305.0 |
| | ----- | ----- | ----- | ----- | ----- |
| Net cash/(debt) b/f | 315.2 | 267.3 | 232.7 | 305.0 | 487.4 |
| | ===== | ===== | ===== | ===== | ===== |
| CFPS (HK\$) | 0.22 | 0.36 | 0.81 | 1.81 | 2.85 |

Appendix 3

| JADE BIRD UNIVERSAL – BALANCE SHEET FORECASTS | | | | | | |
|---|----------------|----------------|----------------|----------------|----------------|----------------|
| Year-end 31 Dec | 1999A Rmb'm | 2000F Rmb'm | 2001F Rmb'm | 2002F Rmb'm | 2003F Rmb'm | 2004F Rmb'm |
| Fixed assets | 8.5 | 48.0 | 73.9 | 78.5 | 76.3 | 71.3 |
| Investments | 0.0 | 0.0 | 50.0 | 150.0 | 250.0 | 350.0 |
| Intangible assets | 0.0 | 16.4 | 14.6 | 12.8 | 11.0 | 9.2 |
| Current assets | 17.8 | 346.8 | 330.5 | 321.7 | 451.7 | 713.3 |
| | ----- | ----- | ----- | ----- | ----- | ----- |
| Total assets | 26.3 | 411.2 | 469.0 | 563.0 | 789.0 | 1143.8 |
| Less current liabilities | (14.9) | (21.1) | (34.2) | (29.7) | (53.6) | (69.9) |
| | ----- | ----- | ----- | ----- | ----- | ----- |
| Net assets | 11.4 | 390.1 | 434.8 | 533.3 | 735.4 | 1073.9 |
| | ===== | ===== | ===== | ===== | ===== | ===== |
| Share capital | 11.4 | 96.4 | 96.4 | 96.4 | 96.4 | 96.4 |
| Share premium | 0.0 | 264.0 | 264.0 | 264.0 | 264.0 | 264.0 |
| Reserves | 0.0 | 29.7 | 74.4 | 172.9 | 375.0 | 713.5 |
| | ----- | ----- | ----- | ----- | ----- | ----- |
| Shareholders' funds | 11.4 | 390.1 | 434.8 | 533.3 | 735.4 | 1073.9 |
| | ===== | ===== | ===== | ===== | ===== | ===== |
| BVPS (HK\$) | 0.11 | 3.76 | 4.19 | 5.14 | 7.08 | 10.34 |

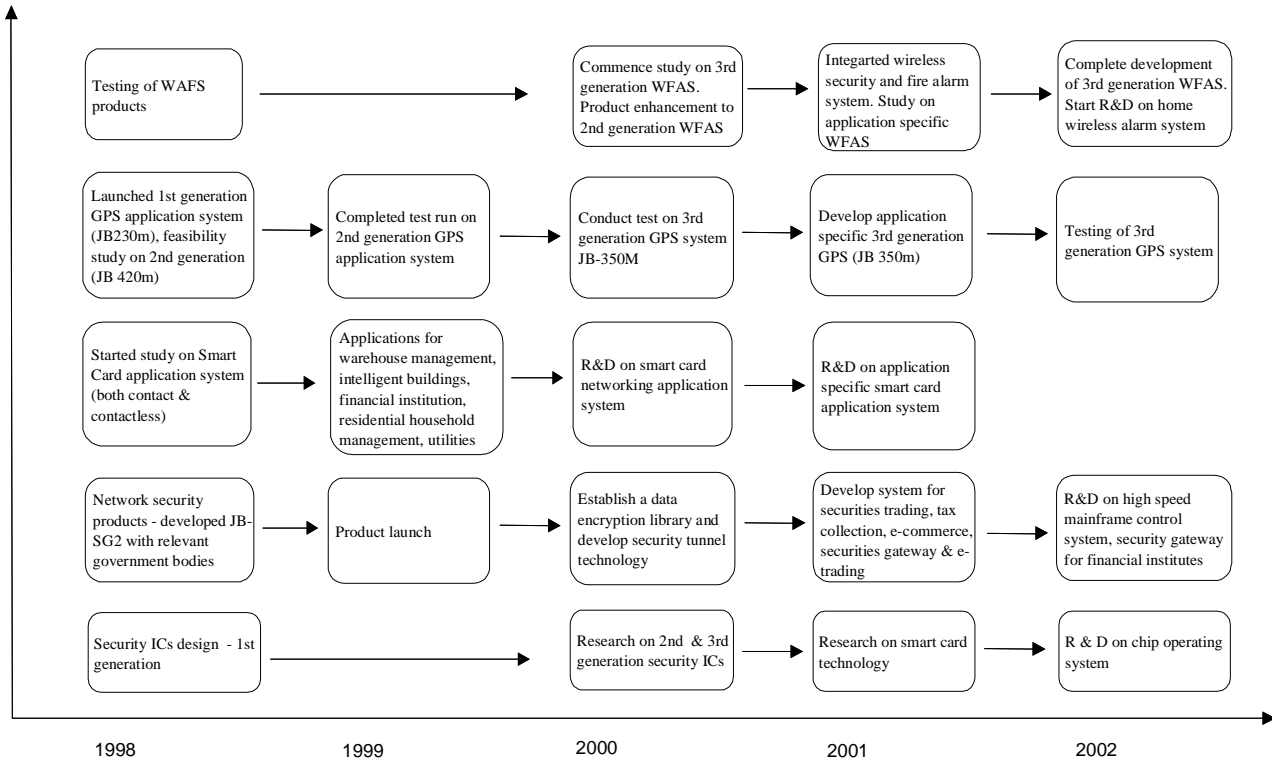
Appendix 4

Technology Roadmap



Appendix 5

Product Roadmap



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