Sailing turbulent seas

Semiconductor sector

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Sailing turbulent seas

Semiconductors are used in a wide variety of electronic applications from washing machines to sophisticated communication satellites. While wave upon wave of negative news has affected the entire sector, we draw investors' attention to a number of technology adoption cycles that should see double-digit growth rates in 2009 and that can drive long-term returns. We highlight ARM Holdings, CSR and IQE as companies that are strongly poised to capitalise on these cycles and increase shareholder value.

Demand contracts, but the worst appears to be over

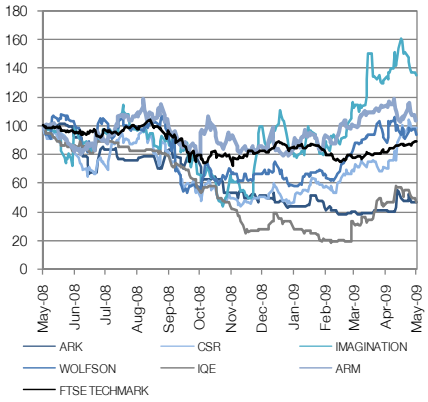
Our checks indicate that the worst is probably over for the sector in terms of sequential and year-on-year comparisons. However, the severity of the downturn should not be underestimated and its duration is still unknown. The big picture is that improving macro conditions are normally the pre-cursor to improving semiconductor stock performance. Until we see sustainable evidence of the former, current conditions necessitate a careful and selective approach to stock picking.

Five criteria to look for

We believe there are five criteria by which companies in the semiconductor sector can be assessed: (1) **technology adoption cycles:** we prefer companies that are leveraged to end-market growth in 2009; (2) **competitive strength:** we seek a leading position either in licensing technology to chipmakers, or in designing and making products that have an edge in the marketplace; (3) **strategy for long-term growth:** we prefer companies that are capitalising on mega-trends such as digital convergence, solar technology or higher levels of functionality per chip; (4) **focus on cost control:** we seek companies that have aligned their costs to the demand outlook, while maintaining appropriate investments in core R&D programmes; (5) **balance sheet strength:** a net cash position is desirable, as is the ability to generate cash in 2009.

Companies profiled

We profile ARC International, ARM Holdings, CSR, Cyan Holdings, Imagination Technology, IQE and Wolfson Microelectronics. Of these, we highlight ARM, IQE and CSR. The downturn will hardly leave a trace on ARM's 2009 financials and, so long as royalties keep growing, margin expansion is a fundamental characteristic of the business. IQE has reduced operating costs, slashed capital expenditure and is operationally geared to favourable technology adoption cycles. CSR faces a c 29% revenue decline in 2009 (after an 18% decline in 2008). However, we believe it can stage a comeback in 2010, and drive upside to consensus estimates. On the short side, we highlight Imagination, where the shares are priced for perfection in an imperfect world where ARM's Mali technology is gaining traction.



COMPANIES FEATURED IN THIS REPORT

ARC International
ARM Holdings
CSR
Cyan Holdings*
Imagination Technologies
IQE
Wolfson Microelectronics

**Edison research client*

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Introduction: Focus on technology adoption cycles

Recent economic cross currents have threatened to blow the entire semiconductor industry off course in 2009 and have already claimed some high profile casualties in the bankruptcies of Qimonda and Spansion. Volume shipments of many types of semiconductors – particularly those destined for the desktop PC market – will decline this year and price erosion will impact sales even more. However, it is not all doom and gloom. Some end-markets will not only perform better than others in 2009 but should grow. We highlight the following:

- **Smartphones.** These include Apple's 3G iPhone, Research In Motion's BlackBerry phones and Nokia's E-series, ie high-end handsets that provide enhanced functionality including email and internet browsing capability. The segment saw explosive growth in 2008, and we forecast 15% shipment growth in 2009.
- **Notebook PCs.** Notebooks PCs are becoming increasing popular with consumers and business users. Against a backdrop of falling desktop PC shipments, notebook PCs will be a bright spot for the PC industry in 2009. Netbooks, ie low-cost notebooks that facilitate on-the-move internet browsing, are flying off the shelves and are expected to post double-digit growth rates in 2009.
- **LCD TVs.** This segment of consumer electronics has seen explosive growth in recent years, and has already crushed plasma in the battle for flat-panel TV dominance. Annual LCD TV shipments were 105m units in 2008 (up 29% year-on-year). The major players in the LCD TV market expect unit shipment to grow c 20% in 2009.
- **Set-top boxes.** Continuing the trend of recent years, cable, satellite and internet protocol television (IPTV) operators around the global are seeing increased demand for pay-monthly and pay-per-view TV services. In 2009 and beyond, we see increased demand for set-top boxes that facilitate multi-channel high-definition TV services.

In this report, we profile the principal UK-listed semiconductor stocks: ARC International, ARM Holdings, CSR, Cyan Holdings, Imagination Technologies, IQE and Wolfson Microelectronics. Broadly, we favour companies with significant exposure to the above-mentioned product segments. We also draw investors' attention to companies with a sustainable competitive advantage, either in the form of intellectual property or economies of scale and cost structures.

Exhibit 1: Peer comparison of profiled companies

Note: * Figures are in £m (p for EPS) except for CSR and WLF which report in $. ** Based on CY10 estimates.

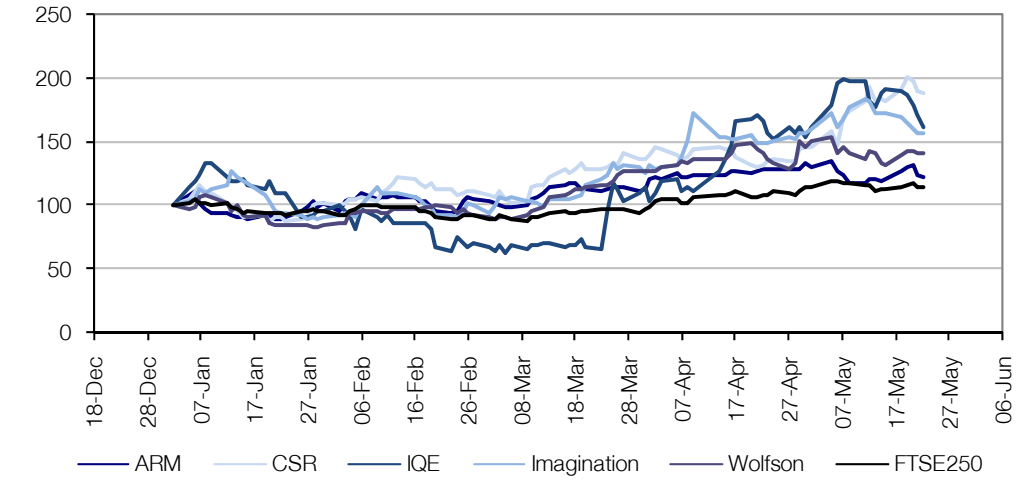
Company	Code	Share price	Market cap	Revenue*	EBITDA*	EPS*	EV/sales	EV/EBITDA	P/E
		p	£m	2010	2010	2010			
ARC	ARK	11	17	17.7	(2.0)	(2.7)	0.3	N/A	N/A
ARM	ARM	106	1,340	349.7	128.6	6.9	3.2	8.8	15.4
CSR	CSR	339	452	761.2	104	25	0.5	7.0	21.5
Cyan	CYAN	1.6	8	7.6	0.5	0.2	0.8	16.0	8.0
Imagination**	IMG	100	228	74.2	6.9	2.5	3.1	34.3	39.3
IQE	IQE	9	39	62.2	9.9	1.0	0.8	4.9	9.0
Wolfson	WLF	113.8	131	161.3	9.7	2.9	0.7	11.5	61.4
Median							0.8	10.15	18.5
Average							**1.3**	**13.8**	**25.8**

Source: Edison Investment Research, Bloomberg

Share prices are off their recent lows

Our list of profiled companies (with a market capitalisation of more than £40m) has outperformed the FTSE250 year-to-date, with CSR, IQE and Imagination the top three performers (see Exhibit 2). These three stocks have surged 100%, 70% and 58%, respectively, versus a 14% performance from the FTSE250. In both absolute and relative terms, the semiconductor sector has been a star performer year-to-date. To an extent, this reflects a cessation of the selling pressure that came to the fore in Q408, and a recovery of sentiment, which has yet to be matched by a recovery in quarterly corporate earnings. Clearly, the market is doing what the market does best in looking past recent negative newsflow and discounting a recovery of sorts. The Q208 reporting season, which kicks off in July, will be pivotal in determining whether the rally has further to go in the near term and by how much. We feel investors should position themselves towards companies that have significant exposure to our favoured product cycles, and towards companies that score highly against our five investment criteria and where valuations are not excessive. We highlight ARM, IQE and CSR.

Exhibit 2: Year-to-date share price performances versus FTSE250



Source: Edison Investment Research, Semiconductor Industry Association

Five investment criteria to look for

Our strategy is to look at companies that optimise the risk-to-reward balance for shareholders through meeting the following five criteria:

1) Technology adoption cycles

   As noted above, certain product cycles are still looking promising in 2009, such as 3G/smartphones, set-top boxes, LCD TVs, and notebook and netbook PCs. We prefer companies that derive the majority of their revenues from one or more of these segments. Ideally, we seek companies that are leveraged to growth in a particular segment. This can take the form of higher semiconductor content per smartphone compared with earlier generation handsets, for example. Desktop PCs, digital cameras, navigation devices and systems for the automotive markets are much less appealing products.

2) Competitive strength

   Broadly, there are two forms of competitive strength that we look for: the first is in the form of intellectual property, ie whether the company has a leading position either in licensing its technology to chipmakers, or in designing and making products that have an edge in the marketplace. The second relates to a company's cost structure, ie whether the company's cost structure is such that its margins are among the highest in the industry for a business of its type. This characteristic often depends on the scale of the business, ie the largest producer often has advantages of scale over its competitors.

3) Strategy for long-term growth

   We like companies that are looking beyond the current downturn, and that have one or more catalysts for growth beyond their immediate products. This can take various forms, but the important point is that the company has a strategy for capitalising on mega-trends such as digital convergence, solar technology, smartphones or higher levels of functionality per chip. We like companies that have allocated their R&D budgets appropriately so that they can capitalise on future growth opportunities.

4) Focus on cost control

   We seek companies that have aligned their costs to the demand outlook, while maintaining appropriate investments in core R&D programmes. We also like to see evidence of good working capital management, particularly with regard to inventories. Finally, we like companies that have planned ahead, and can articulate how they would reduce costs further if end-markets were to take a turn for the worse.

5) Balance sheet strength

   Given poor visibility of demand and the unknown duration and severity of the downturn, we prefer companies that are unlikely to encounter a liquidity crisis or rights issue. A net cash position is desirable, as is the ability to generate cash through the downturn. If a company has net debt, then we want to see evidence that it has ample headroom to trade well within its covenants.

Class of 2009: ARM first, IQE second, CSR third

On an absolute basis, all of the companies we profile should weather the downturn and benefit once macroeconomic conditions start to improve. However, these companies can be divided according to how well they satisfy our investment criteria (see Exhibit 2).

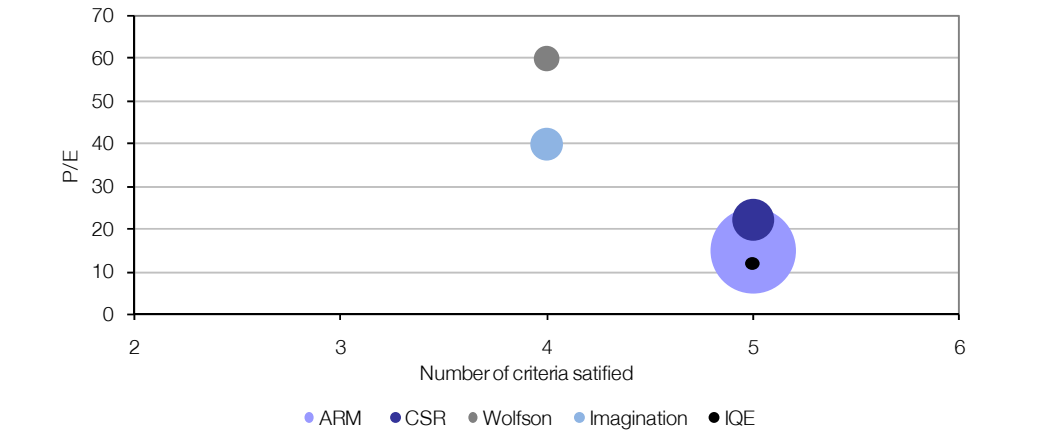
Overall, **ARM** leads the pack. The downturn will hardly leave a trace on ARM's 2009 financials (partly thanks to favourable currencies), and we see three solid pillars to ARM's 2010 outlook: 1) continued dominance of the processor market for mobile handsets; 2) rapid growth in new markets including digital TVs, netbook PCs and microcontrollers; and 3) leverage to growth in smartphone volumes. ARM's business model is highly profitable and cash generative and so long as royalties keep growing, margin expansion is a fundamental characteristic of the business. ARM has net cash and marketable securities totalling c £91m and is on track to generate c £45m of cash in 2009.

IQE earns its number two spot for several reasons. Since Q408, it has reduced operating costs by c 17% and slashed capital expenditure. Like ARM, IQE is operationally geared to smartphone volumes due to the fact that smartphones contain several times more GaAs-based chips than previous generations. While the company has net debt of c £18m, we believe it will reduce this to £13m by year-end and continue to trade well within its covenants. Furthermore, IQE has developed new products for the solar cell and solid-state lighting markets, initial sales of which are expected in H209. We estimate that these new products could create revenue streams totalling £50-70m by 2014. This potential is absent from the current share price.

CSR faces a 29% revenue decline in 2009 (after an 18% fall in 2008). However, we believe it can stage a comeback in 2010, and drive upside to consensus estimates. The company is on track for share gains at Nokia, and is investing for growth beyond its core Bluetooth market. CSR is also well placed to benefit from growth in smartphone shipments, since Bluetooth attach rates are typically 100% on these high-end phones compared with 40% or less for mid- and low-end handsets. CSR's soon-to-be-closed acquisition of SiRF diversifies its revenues by technology and customer, and enhances its competitive positioning. The company has net cash of c $91m and cost cutting is a focus of attention in 2009.

Exhibit 3: Relative merits based on our criteria and 2010 EPS forecasts

Note: Bubble size is relative to market cap.



Source: Edison Investment Research

Sensitivities

Dependence on macro economy

The semiconductor industry is heavily dependent on three end markets, namely personal computers, consumer electronics and mobile handsets, and overall demand is strongly correlated with the macroeconomic backdrop. Other major markets include automotives, military and networking equipment.

Visibility of demand

The semiconductor sector is characterised by a lack of forward visibility, typically no more than six to eight weeks. Some companies have no backlog in any meaningful sense of the word. Thus there can be considerable uncertainty in relation to financial forecasting. Such is the nature of this uncertainty that some companies have declined to forecast revenues on a quarterly or annual basis for 2009.

Share shifts

The semiconductor sector is highly competitive. Companies can see portions of their market share eroded very quickly, with occasionally disastrous consequences. Equally, companies can gain share and deliver positive surprises. For investors, being on the right side of share shifts can be rewarding.

Currencies

Weak sterling is generally a positive for the UK semiconductor sector due to the fact that revenues are typically billed in US dollars, whereas a large portion of the operating costs are sterling denominated. The range of currency estimates for 2009 that companies and analysts are using at this point is quite broad, which could have an effect on consensus estimates as the year progresses. Our estimates err on the side of caution and assume an average exchange rate of $1.60/£ in 2009.

1. Industry background

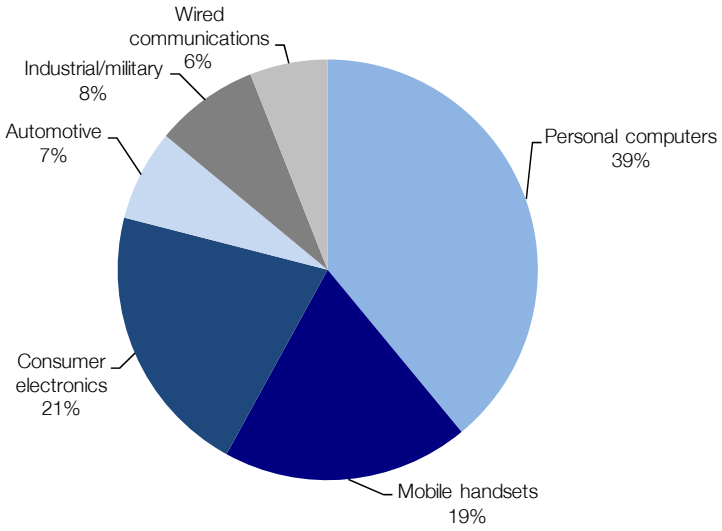
Semiconductors are used in a wide variety of electronic applications from washing machines to sophisticated communication satellites. They spur economic growth, enhance worker productivity and improve the quality of life. For these reasons, semiconductors have been dubbed the crude oil of the 21st century. The industry started life in 1959, when Jean Hoerni and Robert Noyce developed 'planar technology' at Fairchild Semiconductor, which enabled them to carefully deposit various layers onto the surface of a silicon wafer to make a transistor. This process allowed metal interconnections to be evaporated onto the flat transistor surface, and made possible the commercial production of integrated circuits (ICs). Today the semiconductor industry has annual revenues of c $200bn.

What are semiconductors?

Semiconductors can be thought of as tiny electronic circuits typically embedded in a silicon substrate (chip). They are the brains and the decision maker of all electronic devices, and as such can perform numerous functions.

Semiconductors can be classified according to application segment: for example, consumer electronics, personal computers, automotive, industrial and communications (see Exhibit 4). These are broad headings. Within consumer electronics, for example, there are a wide range of applications, including digital cameras, portable media players, games consoles, digital TVs, set-top boxes and blu-ray DVD players, to name a few.

Exhibit 4: Semiconductor demand drivers in 2009



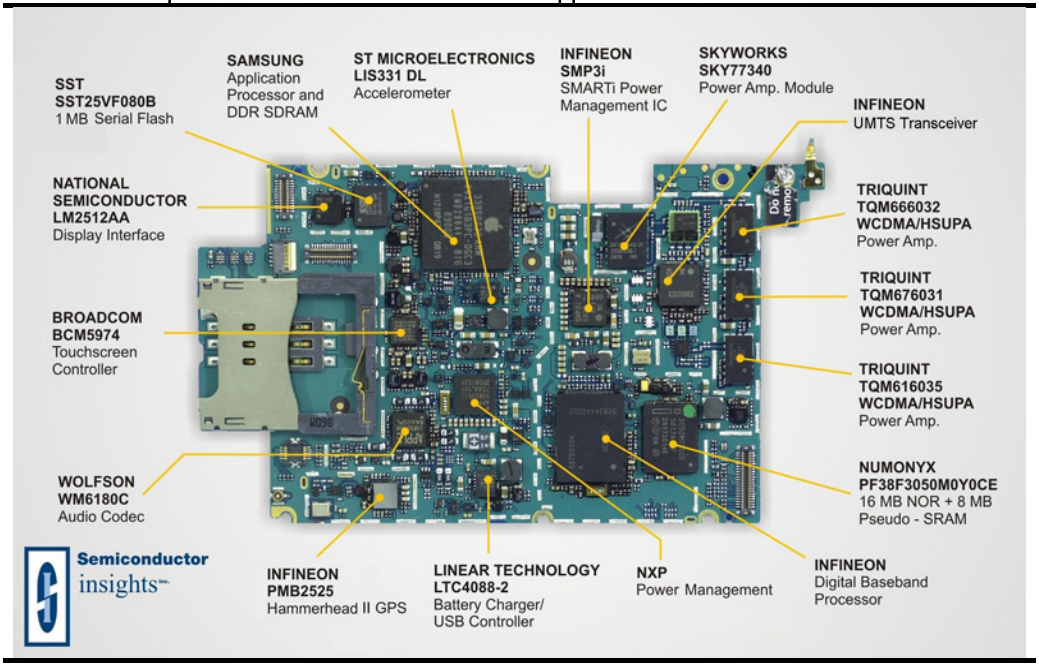
Source: Edison Investment Research, Semiconductor Industry Association

Semiconductors can also be classified according to technology, either broadly as digital, analogue or mixed signal (according to the way in which information is processed), or according to the function they serve: for example, there are semiconductors that function as electronic memories, ie so-called memory chips; there are semiconductors that process bits of information and carry out logic instructions, so-called microprocessors; there are application-specific integrated circuits

(ASICs) that handle a variety of application-related tasks; and finally, there are System-on-Chip (SoC) semiconductors, which are designed to incorporate an entire system's capability.

Exhibit 5 shows the semiconductor content of Apple's 3G iPhone for illustrative purposes. Here Samsung's applications processor is based on ARM11 processor technology from ARM Holdings, TriQuint's power amplifiers incorporate IQE's GaAs wafer technology, and Wolfson provides the audio codec technology. On the reverse side of the circuit board (not shown) can be found a Bluetooth chip and a flash memory chip from CSR and Toshiba, respectively.

Exhibit 5: Example of the semiconductor content of Apple's 3G iPhone



Source: Semiconductor Insights

Traditional semiconductor business models

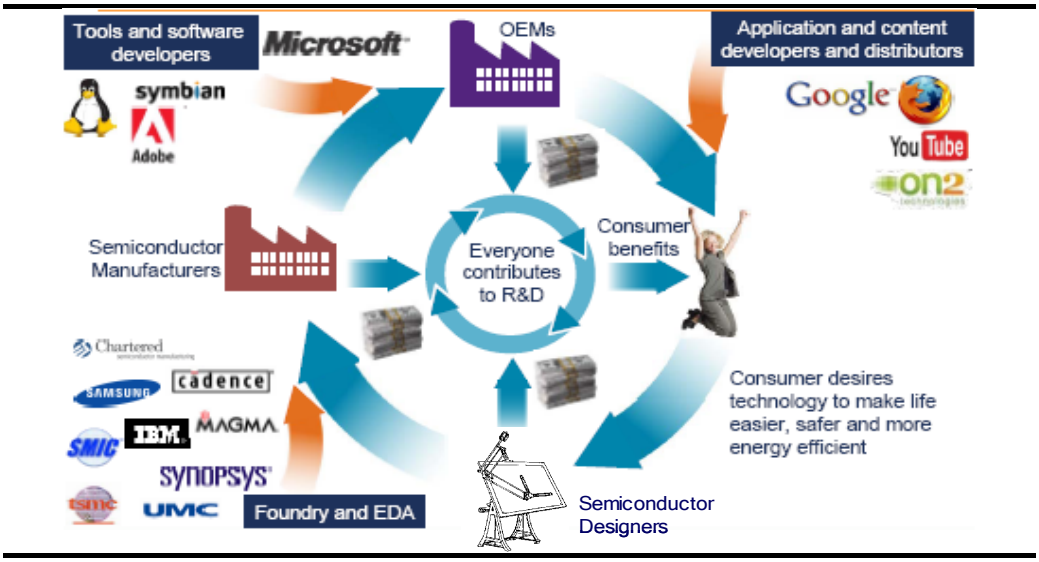
Semiconductor businesses have a nomenclature of their own. Companies such as ARM, CSR and Wolfson, which design semiconductor chips and have no involvement in the manufacturing process, are dubbed 'fabless'. This business model emerged in the 1990s, partly as a result of the fragmentation of the then personal computer (PC) market.

Companies that solely focus on manufacturing are known as 'foundries', for example, Taiwan Semiconductor Manufacturing Corporation (TSMC) and United Microelectronics Corporation (UMC). Their customers include original equipment manufacturers (OEMs) and some fabless companies, such as Wolfson and CSR.

Then there are the so-called integrated device manufacturers (IDMs), also know as chipmakers, such as Intel, Texas Instruments and STMicro. These companies are involved in everything from chip design to manufacturing; some IDMs also outsource a portion of their manufacturing to the foundries.

Finally, there are the equipment suppliers, such as ASML and Applied Materials, which supply the semiconductor manufacturing equipment used by the foundries and the IDMs. Exhibit 6 illustrates the 'circle of innovation' among semiconductor companies and application developers.

Exhibit 6: Circle of innovation



Source: ARM Holdings

Who has earnings power?

The companies that have seen the highest return on equity (ROE) in the semiconductor sector have been those that license intellectual property (IP) and collect royalties. These include ARM Holdings, Qualcomm, Nvidia and Broadcom. The fabless business model brings three distinct advantages: the ability to focus on chip design and development expertise, and thereby reinforce barriers to entry; relatively low fixed costs and capital expenditure; and finally a highly flexible and responsive design team. Profitability, ROEs and barriers to entry can be high; consequently, these companies typically trade at a premium to the sector average.

Some equipment manufacturers such as ASML and Applied Materials, which dominate their particular niche markets, have also delivered double-digit ROEs and have good track records of consistent cash generation. ASML is the world's leading supplier of immersion lithography equipment, a key roadmap technology for chipmakers. Overspending on equipment by memory chipmakers in the past three years presents a generally gloomy outlook for the equipment sector in 2009. Our checks suggest equipment spending could fall by as much as 40%, after a 30% decline in 2008.

Manufacturers of commodity memory chips for PCs and flash memory for mobile phones have seen the lowest ROE. The current downturn has pushed Spansion and Qimonda into bankruptcy, although memory chip prices have recently shown signs of stabilisation. The memory chip market is likely to remain highly competitive and cyclical.

There is a long list of chipmakers that specialise in logic and mixed-signal chips (including Intel, STMicro and Infineon). Here profitability is variable and depends on many factors including the positioning of the company's technology versus its competitors, the efficiency of its cost-base and general market conditions.

Exhibit 7 shows the top 10 semiconductor companies in 2008 (by revenues). Intel remains number one after 17 years at the top; Qualcomm had the fastest growth rate in 2008 of 15%. Hynix and Infineon suffered most, with revenues down 30% and 21%, respectively. The price drop of DRAM and NAND memory chips hit Hynix; Infineon's problems were more convoluted, but also related to the fall in memory chip prices.

Exhibit 7: Top 10 worldwide semiconductor companies by revenues (US$m)

Company	2008 revenues	2007 revenues	y-o-y change	2008 market share
Intel	34,187	33,800	1%	13%
Samsung Elecrtronics	17,900	20,464	(13%)	7%
Toshiba	10,510	11,820	(11%)	4%
Texas Instruments	9,792	11,768	(17%)	4%
STMicroelectronics	9,652	9,966	(3%)	4%
Infineon Technologies	8,078	10,194	(21%)	3%
Renesas	7,849	8,001	(2%)	3%
Qualcomm	6,463	5,619	15%	3%
Hynix Semiconductor	6,400	9,100	(30%)	2%
NEC	5,889	5,593	5%	2%
Others	145,180	147,586	(2%)	55%

Source: Edison Investment Research, Gartner

UK-listed semiconductor companies

UK-listed semiconductor companies vary in market cap from c £1bn to £1m (see Exhibit 8). Note that this list includes companies that focus on photovoltaic (ie solar cell) and LED (light emitting diode) technology; these are closely aligned but non-traditional semiconductor markets.

Exhibit 8: UK-listed semiconductor stocks

Company	Market cap (£m)	Comment
ARC International	17	Licensing IP for audio processing
ARM Holdings	1,340	Licensing a wide range of semiconductor IP
CSR	452	Bluetooth chip design
Enfis	13	Opto-electronic design for light emitting diodes
Imagination Technologies	228	Licensing IP for graphics and video
IQE	39	Manufactures compound semiconductor wafers
PV Crystalox Solar	338	Manufactures silicon ingots and wafers for solar power
ReneSola	159	Manufactures wafers for solar power
Wolfson Microelectronics	131	Designs mixed-signal semis for consumer electronics

Source: Edison Investment Research

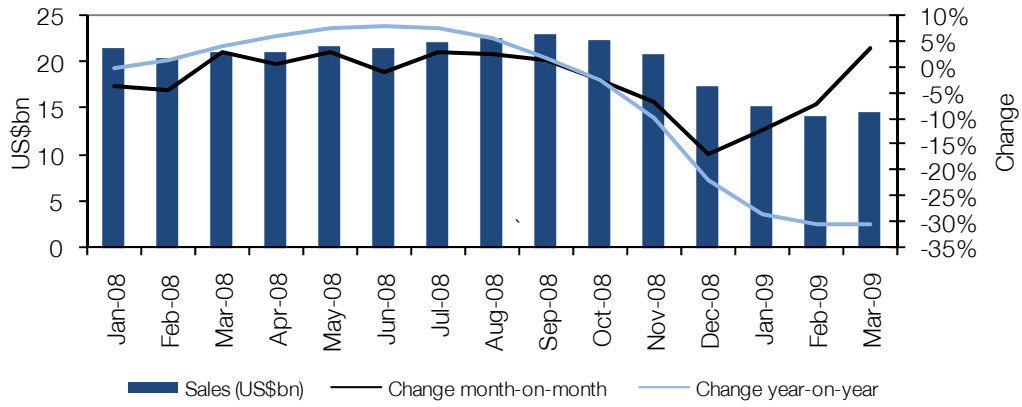
2. End-markets health check

Is the worst over? The short answer probably yes, however the severity of the current downturn should not be underestimated. It has already claimed some high profile casualties in the bankruptcies of Qimonda and Spansion, and the distressed financial conditions of Infineon and Chartered Semiconductor. Even industry giant Samsung Electronics is losing money in semiconductors at the moment. Many end-markets still face the twin headwinds of weak demand and channel inventory de-stocking. The big picture is that improving macro conditions are normally the pre-cursor to improving semiconductor stock performance. Until we see sustainable evidence of the former, current conditions necessitate a careful and selective approach to stock picking.

Demand contracts in 2009

Exhibit 9 shows monthly worldwide semiconductor sales, and the sharp decline since October 2008. The slump in sales has led to correspondingly low (sub-60%) utilisation levels at many chipmakers and foundries. While some chipmakers are better placed than others in terms of supply/demand (eg Intel better than Powerchip), the big picture is that both the average selling prices of various kinds of semiconductors and chipmaker margins will be under downward pressure to a greater or lesser extent until industry-wide capacity utilisation returns to 80%+ levels.

Exhibit 9: Worldwide semiconductor sales (US$bn)



Source: Edison Investment Research, SIA

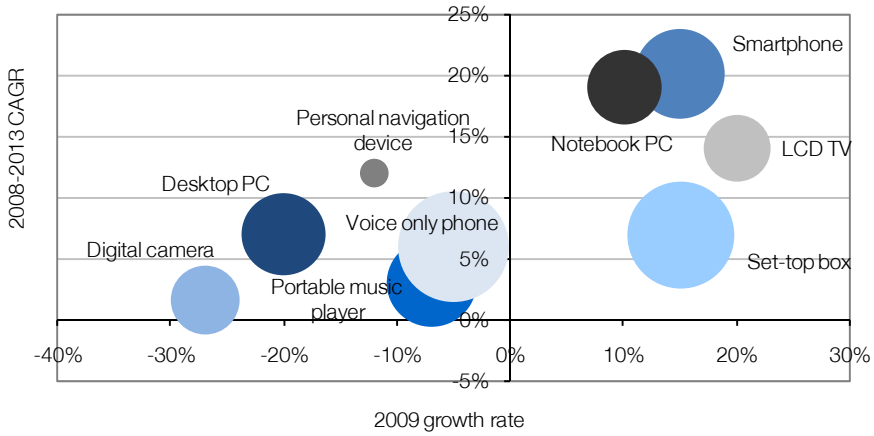
The stark fact is that many demand indicators continue to point firmly downwards at this point, although there are some positive signs as evidenced by the recent stabilisation of monthly sales. In recent weeks, we have heard cautious remarks from many of the world's leading semiconductor companies, but also comments to the effect that the worst may be over.

Ingram Micro, which bills itself as the 'world's largest technology distributor' provides a good read on end-demand for technology products worldwide. It distributes PCs, software and networking products and peripherals from almost all the big vendors to smaller corporate resellers and retailers around the world. On its 30 April Q109 conference call, Ingram noted: "With the recession now affecting all regions, we do not expect a pick up in sales for several more months, perhaps for the remainder of the year." However, it noted signs of stabilisation: "We don't feel the market is getting worse at this stage and expect second-quarter sales to follow a historical seasonal pattern."

Declining sales are common enough themes, and will likely remain so for many semiconductor companies during Q209 if not also H209. However, our checks suggest supply chain management has greatly improved since the 2001 dot-com crash, and current inventory levels do not pose serious risks to margins at this point. Additionally, there are signs from Taiwanese original design manufacturers (ODMs) and foundries that demand for some products – such as notebook PCs and smartphones – and some types of semiconductors improved slightly month-on-month during March and April. This is good. However, demand for semiconductors is likely to continue well below 2008 levels for the next few quarters, and the earnings of many semiconductor companies will remain depressed until there is a significant and sustainable improvement in one or both sides of the supply/demand equation.

Exhibit 10: Shipment growth forecasts for 2009 and medium-term CAGRs

Note: Bubble size is relative to 2008 unit shipments.



Source: Edison Investment Research, DisplaySearch, iSuppli, ARM

Factors steering growth

As noted above, volume shipments of many types of semiconductors will decline this year and price erosion will impact sales even more. However, it is not all doom and gloom: some end-markets will perform better than others in 2009 and beyond. We highlight our views in Ehibit 9.

- **Notebook PCs.** Notebooks PCs are becoming increasing popular with consumers and business users. Unit shipment surged 22% year-on-year in 2008, driven by lower prices and better performance (faster processors and longer battery life), while desktop PC shipments declined by 4%. Against a backdrop of falling desktop PC shipments (down c 30% year-on-year), notebook and netbook PCs will be a bright spot for the PC industry in 2009 (rising c 10%).
- **Smartphones.** These include Apple's iPhone, Research In Motion's BlackBerry phones and Nokia's E-series, ie high-end handsets that provide enhanced functionality including email and internet browsing capability. The segment saw explosive growth in 2008, and we believe the smartphone segment can grow by at least a low-double digit percentage in 2009 (our base-case is 15%). Mobile operators have become progressively more open to raising subsidies within this segment, which is one factor spurring growth.

- **LCD TVs.** This type of flat-panel TV has seen explosive growth in recent years, and has already crushed plasma in the battle for flat-panel dominance. Annual LCD TV shipments for 2008 totalled 105m units (up 33% year-on-year). Most consumer electronics majors expect LCD TV unit shipment to grow c 20% in 2009, and growth should accelerate once global economies recover. Demand drivers include lower prices, high-definition broadcasting and packaged content (eg blu-ray DVD), slim form-factor and low penetration rates (currently c 20% of the global installed base).
- **Set-top boxes.** Continuing the trend of recent years, cable, satellite and IPTV operators around the global are seeing increased demand for pay-monthly and pay-per-view TV services. Growth catalysts include growing public awareness of High Definition (HD) broadcasting, free-to-view services such as FreeSat in the UK and the deployment of ultra-fast broadband, fiber-to-the-home (FTTH) services in Europe, the US and Far East. This is driving increased demand for set-top boxes that facilitate multi-channel, high-definition TV services.

Below, we discuss our health check of key semiconductor end-markets.

Personal computers

The PC market is the largest end-market for semiconductors (by revenues) and also one of the most storm-damaged in the current environment. Worldwide PC unit sales (including notebooks and netbooks) declined by 2% quarter-on-quarter in Q408, marking a steep decline in what is normally a seasonally strong quarter (typically 10-15% growth). Sales declined by 6% sequentially in Q109, and by 7% year-on-year. In 2008, PC unit shipments increased by 11% compared with 2007, reaching 293m units, driven by 22% growth in notebook PCs.

Globally, shipments of notebook PCs exceeded desktop PCs for the first time in Q308, and should handily outstrip desktop PCs in 2009. Quanta Computer, the world's largest contract manufacturer of notebook PCs, recently said it expects its notebook shipments to grow 10% in 2009 to reach 40m units, with shipments set to increase quarter-on-quarter starting from Q209.

Gartner's 2009 forecast for PC shipments is 257m units, a 12% decline from 2008 levels. This compares with the 3% contraction witnessed in 2001, after the dot-com crash and the 9/11 terrorist attacks. Within this forecast, a total of 101m desktops are expected to ship in 2009, down 32% compared with 2008, while mobile PC shipments (including notebooks and netbooks) are expected to reach 156 million units, a 9% increase from 2008.

Dell's desktop PC unit sales slumped 21% year-on-year in the fourth quarter of FY09 (the three months ending 31 January 2009). While it has not given any guidance on 2009 revenues, on its February 26 conference call, Dell noted: "We cannot predict how long or how deep the slowdown will be, though we are planning on it being protracted". Sell-side consensus has pencilled in a 16% decline in Dell's revenues in 2009. Many Taiwan-based ODMs – which are key suppliers to top PC brands such as HP, Dell and Acer – are also braced for a difficult 2009 with regard to desktop PCs. None of the companies we profile have significant exposure to the faltering desktop PC market.

Consumer electronics

Consumer electronics covers a wide variety of products, but the largest categories, and therefore the most relevant for semiconductors, are flat-panel TVs, set-top boxes, personal navigation devices and MP3 players. The conventional wisdom is that in a recession more people spend more time at home, which leads to more spending on home entertainment systems, and this appears to be the case to some extent.

Despite economic headwinds, LCD TV unit shipments increased by 18% year-on-year in Q408 and 33% in 2008. Samsung, the number one brand in the global LCD TV market, and other leading players, including LG Electronics and Philips, expect the LCD TV market to grow c 20% on a unit basis in 2009. Demand catalysts include lower prices, growing consumer awareness of high-definition broadcasting and low penetration of the global installed base of TVs.

While growth rates will slow from 2008 levels, the market for LCD TV peripherals such as Blu-Ray DVD players, set-top boxes and games consoles are also in comparatively good shape. Pace, the number three in the set-top box market, which acquired Philips's set-top box business in 2008, recently said that it has seen "little impact" on demand for its products; it also raised expectations for 2009 and announced a maiden dividend.

Exhibit 11: LCD TV market

Unit shipment (m)	2007	2008	2009e	2010e	2011e	2012e
50"+	1.6	3.2	3.7	4.5	7.0	9.7
40"-49"	19.8	26.3	33.2	42.4	50.9	58.4
31"-39"	37.1	48.3	55.4	66.6	77.2	83.8
21"-30"	11.1	14.7	16.0	21.2	22.8	23.4
10"-20"	9.5	12.6	14.8	16.6	17.5	19.5
Total	**79.0**	**105.0**	**123.0**	**151.3**	**175.5**	**194.8**

Growth rates	2007	2008	2009e	2010e	2011e	2012e
50"+	N/A	99.4%	17.1%	23.0%	54.7%	38.8%
40"-49"	N/A	32.9%	26.5%	27.6%	20.1%	14.8%
31"-39"	N/A	30.1%	14.6%	20.3%	16.0%	8.5%
21"-30"	N/A	32.9%	8.8%	32.5%	7.7%	2.5%
10"-20"	N/A	32.9%	17.1%	12.8%	5.5%	11.0%
Total	N/A	**32.9%**	**17.1%**	**23.0%**	**16.0%**	**11.0%**

Source: Edison Investment Research, Samsung, DisplaySearch

Our checks confirm that cable, satellite and terrestrial operators worldwide are seeing increasing consumer demand for the type of TV services that set-top boxes facilitate, such as high-definition TV and IPTV. Kludelski, a leading provider of content protection for the delivery of digital pay-per-view TV, expects improved operating profits and "substantially better" cash flows from its digital TV business in 2009.

STMicro and Broadcom are the leading suppliers of encoder/decoder and related semiconductors for set-top boxes. ARM is also exposed to set-top boxes and digital TVs via its processors, which are frequently used to manage the user interface.

After strong growth rates in recent years we think navigation devices, MP3 players and digital cameras will have a much tougher time in 2009, partly due to cannibalisation from other devices

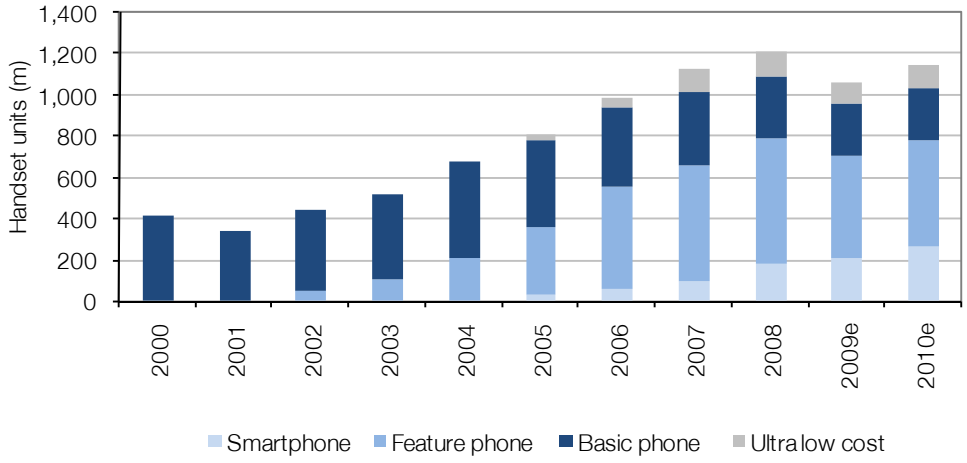
(eg mobile handsets – navigation, MP3 and camera functionality are now a common feature of phones and smartphones) – and the impact of maturing adoption curves. Overall, we believe the consumer segment is a comparatively bright spot for the semiconductor industry in 2009. Moreover, the segment should be highly geared to any recovery due to declining prices and the willingness of consumers to spend on entertainment and information devices.

Mobile handsets

Like other semiconductor end-markets, the handset market felt the full force of the downturn in Q408, when worldwide mobile handset shipments slumped 13% year-on-year in a quarter that has historically seen double-digit growth. This decline was mostly attributable to lower demand for low- and mid-range handsets in both developed and BRIC countries. For 2008, there was modest growth of 4% compared with 2007 shipments, but within that smartphones shipments were up 23%. In aggregate, handset makers shipped approximately 14% fewer phones in Q109 compared with Q108 – a sharp decline due to weak demand and channel inventory de-stocking – however smartphone volumes were up 4%. During Q109 the distribution and retail channels, already holding low inventory, were reluctant to re-stock, however a degree of re-stocking has been underway in recent weeks. Although we feel it is too early to say whether this marks a sustainable demand recovery, to the extent that inventory levels are being replenished, the entire channel can breath a collective sigh of relief.

On its 16 April Q109 conference call, Nokia noted that the "vast majority" of channel inventory de-stocking appears to be over and that demand in a number of regions is showing signs of stabilising. Nokia expects 2009 industry handset volumes to decline c 10% from 2008 levels. Samsung expects overall handset volumes to fall 5-10% in 2009 and sees double-digit growth in smartphone shipments. As previously noted, we think smartphones will be an important growth driver for the handset industry in 2009 and 2010 as user expectations continually rise and attractive price points are reached. Exhibit 12 shows our handset market forecasts for 2009/2010.

Exhibit 12: Mobile handset annual shipments



Source: Edison Investment Research, CSR, Samsung

Implications for semiconductor companies

At the risk of stating the obvious, near-term visibility in semiconductor markets is generally poor; however, inventory levels are low and there are signs that the supply chain is rebounding to some extent, particularly with regard to our favoured product categories: smartphones, LCD TVs, notebook/netbook PCs and set-top boxes.

Products faring less well because of maturing adoption curves and/or cannibalisation from other devices include: desktop PCs, personal navigation devices (PNDs), digital cameras, mid-range handsets and portable music players (PMPs).

The big picture is that improving economic indicators are normally a precursor to improving semiconductor fundamentals. We believe that the economic stimulus programmes that are currently in place should spur higher demand quarter-on-quarter in H209. Additional catalysts for semiconductor sales in H209 will include:

- The typical seasonal strength in the semiconductor industry.
- Pent-up demand for electronics during the worst part of the global recession (ie, Q408-Q209).

Overall, we believe that demand will improve sequentially in Q209 and will pick up further in Q309. However, worldwide semiconductor industry revenues will likely shrink c 20% in 2009 compared with 2008, driven by lower demand for desktop PCs and mid-range handsets.

Given that distributors and retailers are fearful of holding excess inventory, and inventories are being kept low, there could be a whiplash effect on semiconductor demand when demand starts to improve. This could be particularly powerful in relation to our favoured product categories.

The bottom line is that the semiconductor cycle is alive and well and many companies will emerge from the downturn with improved earnings power, thanks to recent streamlining and cost savings.

The long-term fundamentals of the industry will remain attractive if, as we expect, there remains a continual increase in the complexity and variety of digital electronic devices, which rely on semiconductors of various kinds.

3. Restructuring: Almost everyone is doing it

Our discussions give us confidence that industry executives are well aware of the present-day challenges and are managing their businesses accordingly. Cost cutting and greater streamlining have been common themes since Q408. Concurrently, capacity has dropped out of most semiconductor markets. Together, these actions set the stage for improved returns once the recovery gets underway. Importantly, many companies are continuing to invest in critical development programmes. This is good because it means that the companies that are investing should remain competitive; it should also spur innovation, and innovation is a key catalyst of demand for consumer electronics.

Costs are shrinking

To paraphrase one semiconductor industry executive: "You know it's a downturn when your competitor is restructuring; it's a recession when you're restructuring too". Almost everyone is doing it these days, although there are different approaches (see Exhibit 13). Imagination is the only company on our radar that has so far avoided cost cutting. The background to this is that it expects year-on-year profit growth in FY09/10 and it says it cannot find significant cost savings without endangering development programmes. ARM has undertaken only modest cost reductions to date as it tries to strike the right balance between short-term cost controls and investment for longer-term growth. Wolfson has reduced its 2009 cash break-even revenue by c 20% compared with 2008, which should be sufficient to see it through the downturn without a drain on its cash. IQE acted quickly to reduce overheads in Q408, reducing 2009 operating costs by c. 15% compared with 2008 levels. Importantly, IQE completed its capital investment programme in 2008. As a result, capital expenditure is expected to fall from £6.3m in 2008 to £1.5m in 2009. CSR is in the process of implementing savings that should translate into a 15% reduction in operating costs compared with 2008 levels. Cyan and ARC have also cut costs in recent months and re-focused on 'hero' products.

Exhibit 13: Recent restructuring announcements

Company	Comment
ARM	SG&A is being carefully managed. Implemented a pay freeze. No plans to reduce headcount at this time although it would re-visit this option if the outlook were to take a further turn for the worse. Maintaining a balance between short-term cost controls and investment for longer-term growth.
CSR	Total cost savings of $60m in 2009, at least $35m of which is to be implemented within 60 days of completing the SiRF acquisition. Annual operating expenses reduced by c 15% compared with 2008.
Wolfson	Cash overheads reduced by 20% in H109 versus H108 through a combination of cost reduction and foreign exchange benefits. Reduced 2009 cash breakeven revenue to $125-130m; not cutting development programs.
Imagination	No plans to reduce its cost base as it is confident it can increase profits in FY09. R&D spending will likely rise 15% year-on-year going forward.
IQE	Swift action to streamline and consolidate some of the operations resulting in short-time working arrangements, temporary pay reductions for employees and directors and the transfer of a number of production tools between sites to balance capacity and loading.
Cyan	Cost savings of 40% implemented since year-end 2008, which, combined with lower capex, will lower the cost base by £2m in 2009.
ARC	Restructuring announced in Q308. Annual cost savings of 25% in FY09.

Source: Edison Investment Research, Company information

M&A could return once conditions improve

The flipside to restructuring is that it can make companies more attractive to potential acquirers. The past six months has seen a merger-of-equals type combination in the form of CSR and SiRF, aimed at pooling IP and streamlining costs. Many of the stocks we profile have highly diversified customer relationships, strong IP and/or a coveted market position. This makes them standout on the global stage. However, we believe M&A activity will likely be muted until conditions improve. Bolt-on acquisitions could return when conditions stabilise and deals will likely be strategic rather than value-based, and about creating scale in a market with too many players. Of the companies profiled, we see CSR, Wolfson and Cyan as possible targets (see Exhibit 14).

Exhibit 14: Potential targets

ARM	Highly unlikely	Intel, AMD	Small list of potential buyers. Any acquisition would not be welcomed by ARM licensees.
CSR	Possible	Atheros, Broadcom Marvell, TI	Coveted Nokia relationship and combo BT/Wi-Fi/GPS expertise.
Wolfson	Possible	TI, Broadcom	Solid engineering expertise and Audio brand, but many companies believe they can grow in-house expertise.
Imagination	Unlikely	Intel, Apple	Bid specualtion already in the price but unlikely to materialise.
IQE	Unlikely		Possibly a silicon wafer supplier but unlikely.
Cyan	Possible	Freescale, STM	Cyan's design traction could attract interest.
ARC	Unlikely		Not strategic or finanically meaningful.

Source: Edison Investment Research, Samsung

4. Valuation: Five criteria to look for

Investors in the UK semiconductor sector should look for the five criteria that we believe are likely to differentiate successful companies in the sector. These criteria include competitive strength, either in the form of intellectual property or economies of scale, exposure to favourable technology adoption cycles, such as smartphones or LCD TVs, and the ability to capitalise on mega-trends such as digital convergence, solar technology or system-on-chip. Of the seven companies profiled in this report, we draw investors' attention to ARM, IQE and CSR.

Semiconductor companies can be valued by any number of methods depending on their stage of development and the stability of their earnings. For loss-making companies (and for comparisons of loss-making companies with profitable companies), EV/sales is appropriate. For companies with earnings, P/E and EV/EBITDA are perhaps the easiest ways to compare the expected returns of different companies, and EV/EBITDA has the advantage of being a de-geared metric that implicitly allows comparisons of balance sheet strength. Using discounted cash flow (DCF) analysis is another useful valuation method, although subject to a number of assumptions (including semiconductor average selling prices, market share gains and losses, long-term growth rates, operating costs and capital investment). For the companies we profile, we have applied a combination of these valuation methods. In addition, we have identified the five key criteria against which, we believe, investors should assess UK-listed semiconductor companies.

1) Investors should look out for companies that have some kind of **competitive strength.** There are various forms. The first that we look for is intellectual property, ie whether the company has an edge in licensing its technology to chipmakers, or in designing and manufacturing its products. The second relates to a company's cost structure, ie whether the company's products are competitively priced and its cost structure is such that its margins are among the highest in the industry for a business of its type. This second characteristic often depends on the scale of the business, ie the largest producer having advantages of scale over its competitors.

2) Even in the current downturn there are certain **technology adoption cycles** that are still looking promising and we feel investors should look for exposure to products such as smartphones, IPTV set-top boxes, LCD TVs, and notebook and netbook PCs. We believe demand for these products will hold up comparatively well in 2009 and will accelerate once the macro economy recovers. We therefore prefer companies that derive the majority of their revenues from one or more of these segments. We think investors should steer clear of products such as desktop PCs, digital cameras, navigation devices and semiconductor systems for the automotive market.

3) The presence of **growth catalysts** beyond the immediate products is also important. This can take various forms, but the important point is that the company is able to articulate a strategy for capitalising on trends such as digital convergence, solar technology, smartphones or system-on-chip, for example. We seek evidence that R&D budgets have been allocated accordingly.

4) **Cost control** is important in the current environment, ie the ability to align the cost base to the demand outlook, while maintaining appropriate investments in core R&D programmes. We like to see evidence of good working capital management, particularly with regard to inventories. We also like companies that have planned ahead, and can articulate how they would reduce costs further if end-markets were to take a turn for the worse.

5) Given poor visibility of demand and the unknown duration of the downturn, we prefer companies that have a **strong balance sheet** and are therefore not likely to encounter a liquidity crisis or rights issue. A net cash position is desirable, as is the ability to generate cash through the downturn. If a company has net debt, then we want to see evidence that it has ample headroom to trade well within its covenants.

Exhibit 15: Summary of investment criteria

	Product cycle	Competitive strength	Growth strategy	Cost control	Balance sheet strength
ARM Holdings	✓	✓	✓	✓	✓
CSR	✓	✓	✓	✓	✓
Wolfson Microelectronics		✓	✓	✓	✓
Imagination Technologies	✓	✓		✓	✓
IQE	✓	✓	✓	✓	✓
Cyan Holdings	✓		✓	✓	
ARC International			✓	✓	

Source: Edison Investment Research

Exhibit 16 shows our peer comparison for the companies we profile. IQE and CSR trade at a discount to the sector averages on all of the valuation metrics. ARM trades below the sector averages of EV/EBITDA and P/E, despite superior returns and an above-average growth profile. Imagination trades on a whopping premium to the sector on all three metrics. Arguably, this is justified if Imagination can deliver strong royalty revenue growth on the back of a doubling of partner chip unit shipments between FY09 and FY10. However, we feel Imagination may have to pull a rabbit from a hat to justify an even greater premium to the sector. Only ARM and Imagination are trading above 1x EV/sales, which suggests that sector valuations remain quite depressed despite recent share price rallies. CSR is the cheapest stock, undeservedly so in our view, while Imagination is by far the most expensive.

Exhibit 16: Peer comparison of profiled companies

Note: * All figures are in £ except for CSR and WLF which report in $ and cents. ** Based on CY10 estimates.

Company	Code	Share price	Market cap	Revenue*	EBITDA*	EPS*	EV/sales	EV/EBITDA	P/E
		p	£m	2010	2010	2010			
ARC	ARK	11	17	17.7	(2.0)	(2.7)	0.3	N/A	N/A
ARM	ARM	106	1,340	349.7	128.6	6.9	3.2	8.8	15.4
CSR	CSR	339	452	761.2	104	25	0.5	7.0	21.5
Cyan	CYAN	1.6	8	7.6	0.5	0.2	0.8	16.0	8.0
Imagination**	IMG	100	228	74.2	6.9	2.5	3.1	34.3	39.3
IQE	IQE	9	39	62.2	9.9	1.0	0.8	4.9	9.0
Wolfson	WLF	113.8	131	161.3	9.7	2.9	0.7	11.5	61.4
Median							0.8	10.15	18.5
Average							**1.3**	**13.8**	**25.8**

Source: Edison Investment Research, Bloomberg

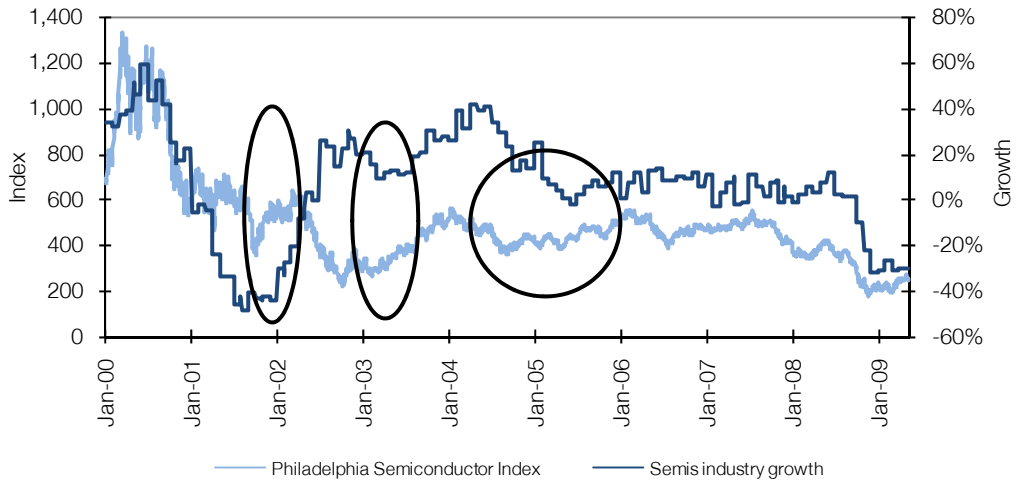
5. Semiconductor cycle: Is it safe to buy the sector?

Historically, investors have witnessed the highest returns by buying the semiconductor sector ahead of year-on-year fundamental troughs, then selling out as earnings upgrades peter out. The correlation between peaks and troughs of growth rates and share price movements has been clear (see Exhibit 17), although the period of relatively muted growth from 2005-2008 led to correspondingly subdued share price volatility. The sector looks primed for upside in some respects, however not all of the ingredients are in place; without revenue growth or the prospect of this in the near term, the odds are that shares may move sideways for a period.

The Philadelphia Semiconductor Index is now c 40% below its May 2008 peak, and year-on-year industry growth could be nearing a trough. Recent share price upside reflects a growing confidence that we may not far from the bottom, with the SOX up c 20% from its November 2008 lows. These are important data-points for the bulls, however we feel that a pause is likely until there is evidence of two consecutive quarters of sequential revenue growth, which should be seen (albeit at modest levels) during the Q209 reporting season, ie sequential growth in Q209 and the realistic expectation of sequential growth in Q309. This sequential growth should translate into a deceleration of year-on-year revenue declines, which could act as an upside catalyst for shares. Nevertheless, any 'no news' rally of c 20% between here and the Q209 reporting season would make us wary of downside risks, which could come to the fore if sequential growth in Q2 and Q3 proves to be lacklustre. To invest in the semiconductor sector in the midst of a downturn remains synonymous with the expression 'to catch a falling knife' and we are still probably four quarters away from any year-on-year growth.

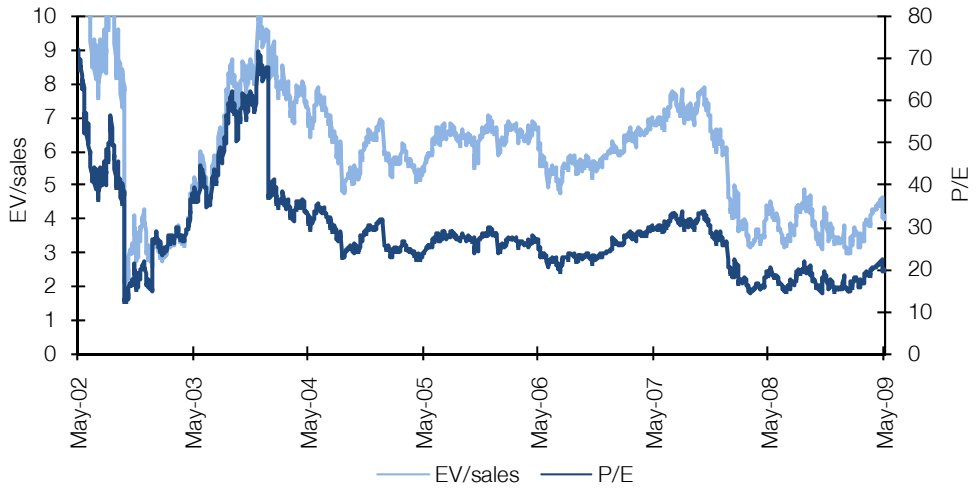
Of the companies we profile, we take ARM as a proxy for the UK sector. As Exhibit 18 shows, ARM's valuation is relatively depressed, limiting downside risks. ARM trades on 3.9x EV/sales based on our 2009 sales forecast of £305m. This is 34% below its average EV/sales multiple since May 2002 and 47% below its average peak cycle multiple since 2002.

Exhibit 17: Philadelphia Semiconductor Index vs industry growth



Source: Edison Investment Research, WSTS, Datastream

Exhibit 18: Historical P/E and EV/sales ratios for ARM Holdings



Source: Edison Investment Research, ARM Holdings

We may not be far from the point at which we may see sustainable upside, for both ARM and the sector. However, we feel that a careful and selective approach to stock picking is justified. As we discuss in the company profiles section, some shares are much more attractive than others at this point, and if the sector rallies then our top picks – ARM, CSR and IQE – should be among the top performers.

6. Companies focused on in this report

ARM Holdings

Strategy: ARM Holdings looks set to remain the leader in reduced instruction set computing (RISC) microprocessor technology. ARM is strongly poised in multiple product categories, and the trend to more sophisticated devices and applications requiring ARM-based processors – including but not limited to smartphones and netbook PCs – underpins licensing and royalty revenues in 2009 and beyond. In addition, we believe its physical IP division can build on initial sub-65nm design-win momentum in 2009 and emerge from the downturn with an enlarged base of chipmaker customers.

Valuation: ARM's business model is highly profitable and so long as royalties keep growing, operating leverage is a fundamental characteristic of the business. On our estimates, ARM trades on 15x 2010 P/E and 9x EV/EBITDA, and we believe the earnings outlook more than justifies this rating. While further upside may await positive news on handset volumes, ARM looks strongly poised to leverage its leading franchise in multiple end-markets and increase shareholder value. Our DCF yields a 140p price target (30% upside), equivalent to 20x 2010e P/E.

CSR

Strategy: CSR is aiming to be a one-stop-shop for wireless connectivity technology. It currently boasts the leading Bluetooth technology and market share (c 50%), even though it lost share at Nokia in 2008. Bluetooth is a short-range radio communications technology that enables devices to exchange data. CSR's customers include many of the world's leading handset makers, including Nokia, Samsung and Sony-Ericsson. It is currently in the process of merging with US-based SiRF, a leader in Global Positioning Systems (GPS) technology. The acquisition is expected to close in June 2009, and CSR expects SiRF to be earnings accretive in H209 and 2010.

Valuation: On our estimates, CSR trades on 22x 2010 P/E and 7x EV/EBITDA even though the shares are up 81% year-to-date. These multiples do not reflect pending share gains at Nokia, nor the growth potential in CSR's non-cellular markets. While CSR may be singing the blues in 2009, it should not be long before the music changes.

Imagination Technologies

Strategy: The group has two divisions: Technology and PURE. Technology creates and licenses embedded graphics, video, multi-standard receiver and other semiconductor SoC technologies, and is currently the market leader in embedded 3D graphics for mobile handsets. PURE is Imagination's brand-name digital radio business, which also licenses digital-radio technology to third-party manufactures such as Grundig and Roberts.

Valuation: With the shares are trading on 39x CY10 P/E and 34x EV/EBITDA, Imagination is far and away the most expensive stock we profile. To some extent, Imagination's earnings outlook justifies a premium rating, if it can deliver royalty revenue growth on the back of a doubling of partner chip unit shipments. However, ARM is rising through the ranks with its Mali graphics processor, and for this reason we believe Imagination's days as a growth stock may be numbered.

Wolfson Microelectronics

Strategy: Wolfson specialises in the design of mixed-signal semiconductors for the consumer electronics market. It has a renowned brand for audio technology, and its products can be found in mobile handsets, portable media players, digital cameras, flat-panel TVs and a raft of other devices. The company is in the process of increasing its competitive positioning in its core markets while trying to diversify its end-markets. Key to this is AudioPlus, which spans a range of functionality (including integrated power management and silicon microphones). Wolfson expects initial revenues from AudioPlus products in 2009, and a 'meaningful contribution' in 2010.

Valuation: The share trade on 61x 2010 P/E and a more reasonable 12x 2011. Clearly the market is looking past a challenging 2009, and discounting earnings growth in FY10/11 on the back of design-win momentum for AudioPlus. With this in mind, and given the lacklustre near-term outlook for many of Wolfson's end-markets, we would stay on the sidelines until management can be more specific about AudioPlus design wins and the likely revenue implications.

IQE

Strategy: IQE's strategy is to focus on high-volume, high-growth markets, and we feel this has been executed successfully in recent years. While maintaining its leading position in wireless markets, the group has realistic plans to establish and grow new revenue streams in the emerging markets of solar cells and solid-state lighting.

Valuation: On our estimate IQE trades on 9x 2010 P/E and 5x EV/EBITDA. This looks undemanding and represents a misappraisal the group's competitive positioning, its operational leverage to the smartphone market, and its long-term potential in solar cells and solid-state lighting. The stock could rally strongly if handset volumes positively surprise in H209.

Cyan Holdings

Strategy: Cyan has developed a microcontroller design and a suite of software tools that have major cost and product development benefits for its target customers. Over the last 12 months management has delivered on a low-cost, high-value technology strategy, and has opened up key new partnerships as well as major end-customer discussion. The challenge is to translate this interest into revenue and in the medium term to fund the investment as the business scales.

Valuation: While the recent trebling of the share price off recent lows reflects growing confidence that Cyan can survive, there is still little in the current capitalisation to reflect the investment in the intellectual property or the massive target markets.

ARC International

Strategy: Having ceased to invest in its legacy microprocessor business, ARC's Sound-to-Silicon represents a key licensing opportunity. Here it competes with Wolfson and other large chipmakers.

Valuation: ARC still has much to do in securing Sound-to-Silicon design wins and spurring revenue growth if it is to achieve profitability. Arguably this is reflected in its current EV/sales multiple of 0.3x. However, in the absence of earnings in 2009 or 2010, and given the resignation of the group's long-time CEO in May 2009, we fail to see the attraction at this point.

7. Other companies we have met

Dialog Semiconductor

Dialog designs energy-efficient, mixed-signal semiconductors that are optimised for personal mobile and automotive applications. Its focus and expertise lies in system power management, and the company has a lot of experience in power and motor control, and audio and display processing. Dialog's power management chips can extend the battery life of hand-held devices. They allow the integration of multiple power management functions on a single chip, allowing chipmakers to transition from discrete power management components to a single highly integrated chip. Applications include Intel's Atom processors and Samsung smartphones. Its automotive applications include intelligent motor control for comfort and safety systems. Dialog also provides driver ICs for next-generation, low-power displays.

- Strategy. Dialog is a successful turnaround story as evidenced by six consecutive quarters of profitability and 86% revenue growth in 2008. The company is focused on leveraging its power management expertise in the mobile handset market, and offering both standard products and custom solutions. Power management is one of the largest and highest growth segments of the analogue market, and Dialog's recent market share gains and growth have been driven by design wins on leading smartphones, 3G/HSPA mobile platforms and portable media players. In 2008, Dialog's revenue share of its power management markets was c 15%, and the company believes it can continue to increase its market share via customer diversification.
- Valuation. Dialog's recent results have shown consistent improvement across a wide range of key performance indicators. The Q109 results highlighted 14% year-on-year revenue growth and a sixth consecutive quarter of profitability. Dialog is debt-free and has cash and equivalents totalling c $40m. The shares have surged c 160% year-to-date, and now trade on 14x FY09 P/E and 0.5x EV/sales (on consensus estimates). The company's recent operational performance is turning erstwhile critics into faithful followers, yet the valuation remains attractive in the context of Dialog's operating leverage and recent market share gains. We see upside if the company can continue to transition to a more balanced portfolio of standard products and further diversify its customer base.

Company profiles

ARC International

Year End	Revenue (£m)	PBT* (£m)	EPS* (p)	DPS (p)	P/E (x)	Yield (%)
12/07	14.4	(5.3)	(1.7)	0.0	N/A	N/A
12/08	17.0	(7.0)	(4.9)	0.0	N/A	N/A
12/09e**	17.7	(5.7)	(3.6)	0.0	N/A	N/A
12/10e**	18.0	(2.7)	(2.7)	0.0	N/A	N/A

Note: *PBT and EPS are normalised, excluding goodwill amortisation and exceptional items.
** Consensus estimates.

Investment summary: Forever young

Companies such as ARM Holdings have demonstrated how profitable the fabless part of the semiconductor food chain can be when based upon the licensing of intellectual property. Despite pursuing this business model during its nine-year history as a public limited company, ARC is still loss-making, and in respect of opex/sales resembles an early-stage start-up. Having ceased to invest in its legacy microprocessor business, due to chronic lack of profitability, ARC's Sound-to-Silicon represents the key licensing opportunity going forward.

Sound-to-Silicon

The Sound-to-Silicon strategy and product portfolio have developed over a number of years, but received an impetus in the past 12 months after the acquisition of US-based Sonic Focus in February 2008. ARC has won Sound-to-Silicon sockets in products such as notebook PCs, digital cameras and portable media players, albeit on a small scale.

Operational focus: Sales growth and costs

In response to economic conditions, ARC completed a restructuring in Q109. As a result, the company lowered its cost base by c 25% compared with 2008, mainly through a 17% reduction in headcount. ARC also undertook to improve its planning and execution with regard to worldwide sales, and with this in mind hired several sales and marketing executives.

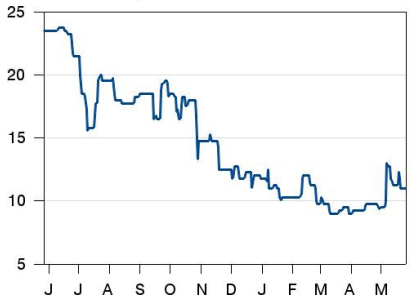
Valuation: Undemanding but lacking catalysts

Recent corporate activities are steps in the right direction to positive cash flow. However, ARC still has much to do in securing Sound-to-Silicon design wins and spurring revenue growth if it is to achieve profitability. In markets that ARC itself describes as "challenging" this may be prone to delays and disappointments. Arguably this is reflected in its current EV/sales multiple of 0.3x. However, in the absence of earnings in 2009 or 2010, and given the resignation of the group's long-time CEO in May 2009, we fail to see the attraction at this point.

Price*	11.0p
Market Cap	£17m

*Priced as at 26 May 2009

Share price graph



Share details

Code	ARK
Listing	FULL
Sector	IT Hardware
Shares in issue	154.1m

Price

52 week	High	Low
	23.8p	9.0p

Balance Sheet as at 31 December 2008

Debt/Equity (%)	N/A
NAV per share (p)	14.5
Net cash (£m)	12.7

Business

ARC is a fabless company specialising in the design and licensing of consumer IP to OEM and semiconductor companies. Sound-to-Silicon represents the key licensing opportunity going forward.

Valuation

	2008	2009e	2010e
P/E relative	N/A	N/A	N/A
P/CF	N/A	N/A	N/A
EV/Sales	0.3	0.3	0.3
ROE	N/A	N/A	N/A

Geography based on revenues

Europe	Nth America	Asia
20%	55%	25%

Analyst

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Company description: Design & licensing of IP

ARC is a fabless company specialising in the design and licensing of consumer IP to OEM and semiconductor companies. During an earlier period in its history, the company developed a suite of RISC-based configurable microprocessors for applications ranging for embedded microcontrollers to digial TVs, which in some ways rival similar offerings from ARM Holdings. ARC's 150+ customers collectively ship hundreds of millions of ARC-based chips annually in products such as mobile TVs, portable media players, flash storage and digital cameras. ARC maintains a worldwide presence with corporate and research and development offices in California, England, Russia, and India.

Strategy: Go to market with Sound-to-Silicon

Having ceased to invest in its legacy microprocessor business, due to a chronic lack of profitability, ARC's Sound-to-Silicon represents the key licensing opportunity going forward. The Sound-to-Silicon strategy and product portfolio have developed over a number of years, but received an impetus in the past 12 months after the acquisition of US-based Sonic Focus in February 2008. While it is difficult to affirm whether Sound-to-Silicon is as competitive as ARC claims, it has won some sockets in products such as notebook PCs, digital cameras and portable media players, albeit on a small scale compared with the global market for such devices.

Sound-to-Silicon provides higher average royalties per unit than ARC's legacy processors, a characteristic partly reflected in royalty revenue growth of 47% in FY08 (in constant currencies). With Sound-to-Silicon, ARC's strategy is to monetise the trend towards high-quality multimedia content on a variety of electronics devices. Here ARC has optimised Sound-to-Silicon for a number of product categories and the aim in each is to provide a home entertainment centre listening experience at relatively low cost. We highlight the following deals closed in the past 12 months:

Digital TV and home theatre

- A leading mobile digital TV company signed a multi-use agreement for ARC solutions to provide digital TV reception in nearly every global geographic region.
- Abilis announced it has standardised its mobile DTV product development on ARC technology.
- Fujitsu extended its long-term relationship with ARC and took a new licence for use in its next generation HDTV products.
- ViXS took a licence for ARC's multimedia solutions for use in its Xcode chipset family, which enables the processing of multiple HD video streams.

PC and notebook PC

- Hewlett-Packard introduced its new TouchSmart PC computer, which includes ARC's Sonic Focus technology.
- Lenovo launched the x300 notebook PC running ARC's Sonic Focus technology.
- N-Trig signed a multi-year licence agreement for ARC's processor products for use in its N-trig DuoSense technology for PCs.

Other electronics markets

- A leading flash memory company took an ARC licence for flash applications.
- A top-10 Taiwan chipmaker began to incorporate ARC's low power solution into a wireless handset design.
- A leading smart card provider signed a new licence enabling the existing ARC customer to create new ARC-based solutions for high volume smartcard-related devices.
- Toshiba extended its collaboration with ARC by taking a new licence for the development of a leading-edge processor technology.

Annual results

While ARC reported its 2008 results on 24 February, we feel it makes sense to re-cap the key points here. Revenues increased by 18% in FY08 to £17.0m (8% in dollars), driven by royalties, which surged 61% to £7.9m (47% in dollars). Licensing and engineering revenues fell 11% in dollars and were flat in sterling at £7.3m. Note that the group reports in sterling but most of its sales are in US dollars.

In respect of opex/sales, ARC belies its age, resembling an early-stage start-up, and operating expenses once again grew faster than sales. Excluding the restructuring effects, net operating expenses increased by 25% to £22.8m. Of this, R&D expenses increased by 30% to £9.6m; sales and marketing costs were essentially flat at £5.5m and general and administrative costs increased by 22% to 4.5m. Other non-cash expenses, comprising depreciation and amortisation, increased to £3.1m (2007: £1.7m) due to additional amortisation of intangibles included in the acquisition of Sonic Focus. Net cash fell to £12.7m versus £21.2m in FY07, partly due to a £4.8m cash outflow from operations (excluding a £1.6m outflow related to the restructuring). Its net cash should be sufficient to see ARC through 2009 and 2010, although this is not a given.

Operational focus: Sales growth and costs

In response to economic conditions, ARC completed a restructuring in Q109. As a result, the company lowered its cost base by c 25% compared with 2008, mainly through a 17% reduction in headcount. ARC also undertook to improve its planning and execution with regard to worldwide sales, and with this in mind, hired several sales and marketing executives with in-depth experience. Other outcomes of the restructuring included:

- A new integrated worldwide sales and field organisation.
- The formation of a multimedia software business unit.
- A new system on chip (SOC) business unit.
- The streamlining of the office of the CTO into a single function.
- An increased focus on vertically integrated multimedia solutions.
- The transfer of certain product development to ARC's engineering centres in Russia and India.

Undoubtedly, these actions have enabled the company to reposition itself and are steps in the right direction to profitability and positive cash flow. However, ARC still has much to do in securing Sound-to-Silicon design wins and spurring revenue growth if it is to achieve profitability. In markets that ARC itself describes as "challenging" this may be prone to delays and disappointments.

Sensitivities

- ARC's competitors include major chipmakers that have a larger and more mature product range and a much larger installed customer base.
- The design cycle for ARC's products can take 12-18 months to reach acceptance by its customer base. This long lead-time can incur problems in the timing of product design and the potential to miss market opportunities.
- ARC completed four acquisitions during 2007 and 2008, and there are risks and uncertainties regarding the successful integration of these businesses.
- Most of ARC's sales are in US dollars whereas c 50% of costs are in sterling. The majority of its cash is in sterling and is therefore not subject to currency exchange risk.

Financials and valuation

Sound-to-Silicon bodes well if chipmaker and OEM customers can ramp volumes, and if ARC's legacy royalties, which accounted for c 50% of royalty revenue in FY08, do not slump. These are big asks. Meanwhile, ARC is still burning cash and could need a fund-raising in 2010 if sales do not ramp aggressively. In addition, the recent resignation of long-time president and CEO Carl Schlachte in May 2009, which took immediate effect, does not inspire confidence. Arguably all this is reflected in a current EV/sales multiple of 0.3x. However, in the absence of earnings in 2009 or 2010, we fail to see the attraction at this point.

Management

Exhibit 1: Management

Chairman: Richard Barfield	Richard joined the board as a non-executive director in 2003 and was appointed chairman in April 2007. Previously, he was CEO of Spring Group and served as group finance director of Northgate Information Solutions.
CEO: Dr Geoff Bristow	Geoff was appointed CEO in May 2009 after the resignation of Carl Schlachte. He has a PhD in engineering from Cambridge University and his career has included periods with Texas Instruments, ICL, and Octagon Industries. Under Octagon's umbrella he has been involved in a number of start up companies.
CFO: Victor Young	Victor joined the board as CFO in 2007. He has over 35 years of experience of corporate accounting and management experience with companies such as Selectica, Mobilitech and Tera Systems.

Source: Edison Investment Research, ARC International

ARM Holdings

Year End	Revenue (£m)	PBT* (£m)	EPS* (p)	DPS (p)	P/E (x)	Yield (%)
12/07	259.2	84.8	4.5	1.4	23.6	1.3
12/08	298.9	100.6	5.6	2.1	18.9	2.0
12/09e	305.1	98.1	5.5	2.3	19.3	2.2
12/10e	349.7	124.6	6.9	2.5	15.4	2.4

Note: * PBT and EPS are normalised, excluding goodwill amortisation and exceptional items.

Investment summary: Ample armour

No company does the fabless business model better than ARM. The downturn will hardly leave a trace on ARM's 2009 financials (thanks partly to favourable currencies), and we see three solid pillars to ARM's longer-term outlook: 1) continued dominance of the processor market for mobile handsets; 2) rapid growth in new markets including digital TVs, netbook PCs and microcontrollers; and 3) leverage to growth in smartphone volumes. The valuation does not look demanding and the shares could rally in H209 if handset volumes positively surprise.

Operating leverage: Like few others

ARM's business model is highly profitable and, so long as royalties keep growing, operating leverage is a fundamental characteristic of the business. ARM deserves credit for raising its margins since 2003 while more than doubling headcount in order to capitalise on growth opportunities. We see ARM's operating margin reaching c 35% by H210 (vs 32.6% in 2008).

Leverage to 3G/smartphones; share gains in non-mobile

At this point in the cycle, smartphone volumes are a key variable in linking ARM's royalty revenues to the handset industry. While overall handset volumes are likely to decline by c 12% compared with 2008 levels, the smartphone segment will likely grow c 15%. Here ARM is highly leveraged to growth since smartphones use several times more ARM-based processors compared with earlier generation handsets. We also like ARM's long-term outlook in the netbook PC market and several other high-volume markets such as digital TVs, microcontrollers and autos.

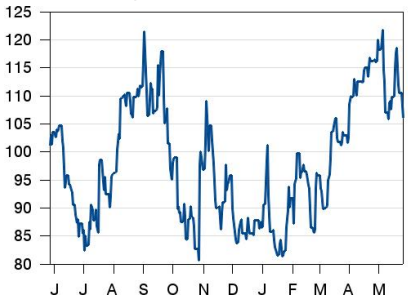
Valuation: Room for multiple expansion

ARM trades on 15x 2010e P/E and 9x EV/EBITDA, and we feel the earnings outlook justifies a higher rating. We see 20%+ EPS growth in 2010/11 and medium-term growth of c 15%, driven by growth in royalty revenues. We like ARM's business model, and believe that ARM can leverage its leading franchise in multiple end-markets and increase shareholder value. Our DCF yields a 140p price target.

Price*	106p
Market Cap	£1,340m

*Priced as at 26 May 2009

Share price graph



Share details

Code	ARM
Listing	FULL
Sector	Semiconductors
Shares in issue	1,264m

Price

52 week	High	Low
	121.8p	80.5p

Balance Sheet as at 31 March 2009

Debt/Equity (%)	N/A
NAV per share (p)	60.3
Net cash (£m)	91.3

Business

ARM Holdings is a leading player in semiconductor intellectual property. Its customers include the world's leading chipmakers.

Valuation

	2008	2009e	2010e
P/E relative	176%	170%	156%
P/CF	13.3	13.2	11.4
EV/Sales	4.2	3.9	3.2
ROE	10%	9%	10%

Geography based on revenues

UK	Europe	US	Other
<1%	17.2%	30.0%	52.4%

Analyst

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Company description: Leader in microprocessor design

ARM Holdings is a leading player in semiconductor intellectual property (IP). Its customers include the world's leading chipmakers, such as Texas Instruments, STMicro and Samsung, and ARM's reduced instruction set computing (RISC)-based processor technology can be found in a raft of digital electronic products. ARM is a design IP provider (no manufacturing) and licenses its chip designs to chipmakers. It receives a royalty every time a chipmaker sells a chip that incorporates an ARM-based processor. This core licensing and royalty business is known as ARM's Processor Division (PD). ARM also licenses physical libraries for foundry use. This business – ARM's physical IP division (PIPD) – was acquired when ARM bought California-based Artisan Inc in 2004. PIPD works with semiconductor foundries to create libraries that contain the basic building blocks for the translation of circuit designs to semiconductor chips.

Processor Division (PD): From acorn to oak

ARM's network of licensees extends to more than 200 chipmakers. These partners pay ARM a licence fee for the initial IP (typically US$1-3m) and then pay a royalty on every chip produced (typically 1-3% of the chip's average selling price). The licence and royalty fees depend on the type of licence, and license fees are not always fully recognised in the quarter a licence is signed. Revenue recognition on new licences can span several quarters, whereas an upgrade licence for a processor that has been shipping for many years would be recognised in the quarter in which the licence is signed. While licence revenues can be lumpy quarter-by-quarter, they have seen a 9% CAGR since 2004.

Once deployed, ARM-based products can yield royalties in perpetuity, which are c 1% of the chip average selling price and which incur zero costs to ARM. As a result, ARM's margins and cash conversion are much higher than many chipmakers. Notably, ARM has signed more than 600 licences, yet only c 50% of ARM's licensees are paying royalties today because of lengthy development cycles. This means that even if ARM were to stop signing new licences, it would still see growth in royalty revenues for years to come.

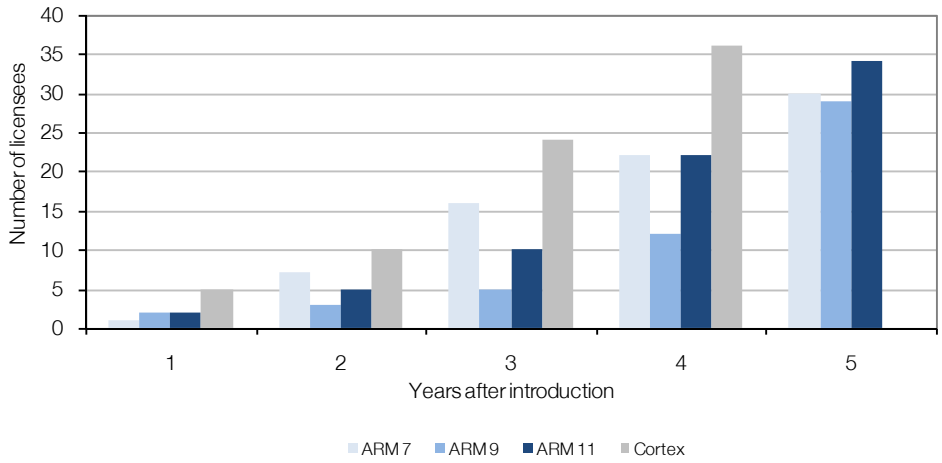
Multiple end-markets

The continual increase in sophistication of digital products, coupled to the pace of technological development, particularly in mobile handsets, determines demand for ARM's products. ARM's technology is used in all of the world's mobile handsets (ARM has 100% share of base-band modem processors), and chipmakers are showing heightened interest in ARM's latest-generation Cortex processors for use in notebook and netbook PCs as well as smartphones. In addition, the use of ARM technology is continually growing in non-mobile markets, many of which are both large and well established. These include:

- Hard disk-drives
- Printers
- Automobiles – ARM cores are used to control air bags and braking
- Digital TVs and set-top boxes
- Embedded systems for various applications such as monitors and sensors.

ARM's dominance of the market for handset-optimised processors has barely changed in the past 10 years. There are several reasons for this. First of all, ARM's customers typically take several years to go from signing a licence to manufacturing the ARM-based chip, and this long development cycle, which involves the pooling of engineering resources around ARM's technology, gives rise to long-term strategic commitments to ARM and therefore a high level of customer retention. Secondly, customer satisfaction is very high, thanks to the flexibility and quality of ARM's designs, and the relatively low cost of ARM's royalty fees. Thirdly, many handset operating systems – such as Symbian, for example, which is used by Nokia – are optimised to run on ARM processors. Finally, ARM's processors are renowned for their ultra-low power consumption – a key requirement for mobile handsets. As Exhibit 1 shows, ARM's partners have consistently demonstrated their willingness to upgrade to the latest ARM technology and we believe this favourable trend will continue.

Exhibit 1: Multiple processor families of which Cortex is the fastest growing



Source: Edison Investment Research, ARM Holdings

High barriers to entry

As chip complexity grows, so do the barriers for entry for competition. ARM's competitors include MIPS, Tensilica and ARC. All look hamstrung, lacking sufficient design wins to pose a significant threat. ARC has even stopped investing in its legacy microprocessor business, due to chronic lack of profitability. Put simply, ARM's success over the years has led to more success. We believe ARM's PD division can strengthen its franchise in mobile handsets and further penetrate non-mobile markets over the next decade.

Closer to hand, ARM looks strongly poised to benefit from structural shifts in the handset market with regard to smartphones. These sophisticated handsets incorporate several times more ARM-based processors compared with earlier generation handsets. Even though the smartphone upgrade cycle is in its infancy, the number of ARM cores per handset has grown from 1.2 in 2004 to 1.9 in 2008. Accordingly, the ARM dollar-content per handset has increased by c 40%. This is one reason why ARM saw a PD royalty CAGR of 21% between 2004 and 2008 compared with global semiconductor industry revenue CAGR of 4%. We believe ARM can continue to reap the benefits of these favourable trends in 2009 and beyond.

Physical IP (PIPD): Structural changes yielding strategic deals

ARM's physical IP division works with foundries and chipmakers to provide so-called 'libraries' that convert circuit designs to actual chips. Here ARM's library covers designs for capacitances, resistances and transistors that map logical structures in the circuit design onto a physical structure that works in silicon. These libraries have to be updated for every new process node, ie every 18-24 months, in accordance with Moore's Law. Thus the licensing cycle is shorter than the PD division, however the number of licences in this business is much smaller. We believe physical IP is well placed for two reasons. First, ARM can leverage its extensive applications knowledge and its established relationships with chipmakers. Secondly, ARM's technology coupled to outsourced manufacturing can help chipmakers slash development costs.

Since 2004, when ARM brought Artisan Inc., physical IP's licensing base has grown from foundries alone to chipmakers. It has signed more than 400 licence agreements to date, mostly relating to mainstream 90nm and 65nm process technology. Despite this, physical IP's royalty revenue growth has lagged ARM's PD division, something that has invited criticism. While it has taken longer than expected for ARM to realign the business and get physical IP onto the proper growth track, we believe the elements are now falling into place, and that physical IP can capitalise on its R&D investments. That said, the market for physical IP is still relatively immature. Many large chipmakers are still only using foundries for overflow capacity. Until there is more widespread outsourcing of manufacturing by the large chipmakers, physical IP will struggle to move along the same growth path as PD.

Design win momentum

Our checks indicate ARM should build on initial sub-65nm design-win momentum in 2009, particularly with regard to 32/28nm nodes, spanning logic, memory and general-purpose applications. Physical IP is currently seeing leading-edge design wins with Tier 1 foundries and chipmakers, including STMicro. Importantly, 32nm is the node where many chipmakers are cutting or ceasing in-house investment, which should give physical IP an added impetus.

ARM signed 12 physical IP licences in Q109 for technologies at process nodes from 90nm to 32nm, and ARM signed an agreement to develop a new platform at 130nm and update an existing platform at 90nm. These new licence deals bode well for ARM. All in all, we believe physical IP should emerge from the downturn with an enlarged customer base and the opportunity for healthy royalty growth. In the near term, physical IP royalties fall so long as chip-manufacturing remains depressed. We expect a 15-20% decline in physical IP royalties in H109 compared with H108 levels. However, royalty growth will accelerate once the end-markets and foundry utilisation levels show evidence of sustained recovery.

Operating leverage: Like few others

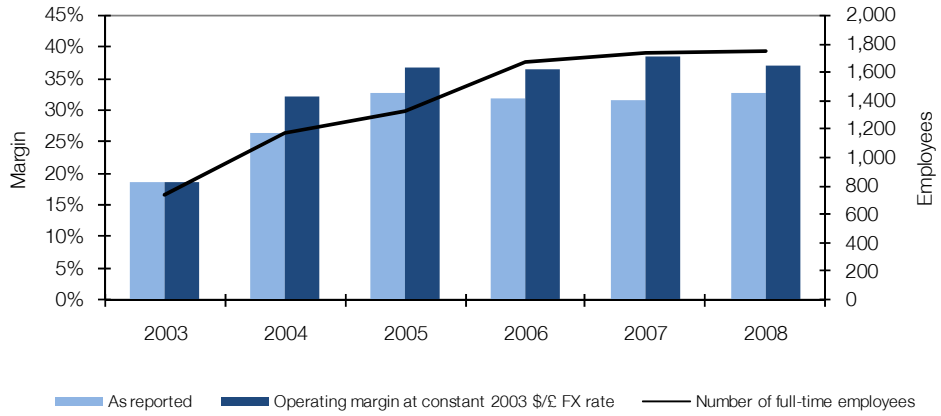
Combining PD and physical IP, ARM's business model is highly profitable and so long as royalties keep growing, operating leverage is a fundamental characteristic of the business. We feel ARM deserves credit for raising its margins since 2003 while more than doubling headcount in order to capitalise on growth opportunities (see Exhibit 2). Over this period, ARM also acquired US-based Artisan Inc. in August 2004, which had lower operating margins than ARM at the time of the

acquisition. All this demonstrates the robustness of ARM's business model. Currencies provide a helping hand in 2009 and mean ARM should see a low-30s percent operating margin (flat year-on-year) even if dollar denominated revenues decline by 11%, as we expect.

Looking further out, we see ample room for margin expansion driven by continued growth in royalty revenues, which incur negligible costs. For 2009, ARM is targeting flat SG&A expenses, although it says it could cut headcount if the operating environment were to take a turn for the worse. ARM says operating expenses should grow at no more than half the rate of sales growth going forward. We see ARM's normalised operating margin reaching c 35% by H210 and 40% by 2012 (vs 32.6% in 2008).

Exhibit 2: Normalised operating margins*

Note: * Excludes amortisation of acquisition-related intangibles, share-based compensation, restructuring charges and profit on disposal of and impairment of available for-sale assets.

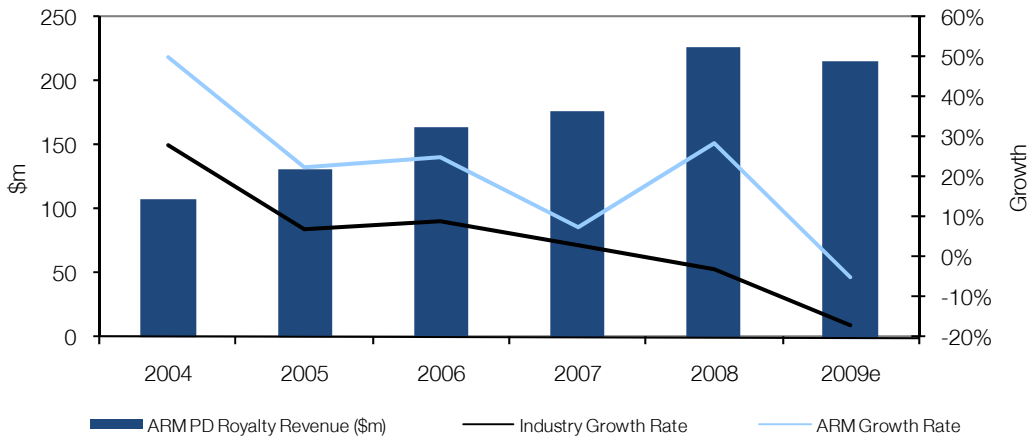


Source: Edison Investment Research, ARM Holdings

Business model yields long-term results

As Exhibit 3 shows, ARM's revenue growth has outpaced that of the wider semiconductor industry. This is mainly due to the combination of a growing number of ARM-based chips per handset and ARM's growth in non-mobile markets.

Exhibit 3: ARM PD royalty revenues



Source: Edison Investment Research, ARM Holdings

In terms of revenues, both PD and physical IP generate licensing and royalty contributions. Royalties are recognised on every ARM-based chip or wafer that an ARM licensee ships. They are a function of cumulative licensing, and they account for c 50% of ARM's revenues. Licensing revenues are less cyclical than royalties but also 'lumpier' since they depend on the various development cycles of ARM's numerous partners, whereas royalty revenues depend on the volume of chips that are shipped by ARM's licensees and their average selling price. ARM recognises royalty revenues from its licensees (both PD and physical IP) one quarter after shipments, ie one quarter in arrears. Overall, we believe ARM can continue to outperform the semiconductor industry in the medium term.

PD Licensing: Opportunity remains intact

Historically, chipmakers have rarely deferred investments in ARM's leading-edge technology Nevertheless, to the extent that small, cash strapped chipmakers and start-ups may have no choice but to defer licensing deals in the current environment, we believe the level of licensing activity is likely to be affected by the downturn. However, we do not believe that well-capitalised chipmakers, which represent c 80% of ARM's licensing revenues in any given quarter, will delay their investments in ARM's latest-generation processors, ie ARM11 and Cortex, which are essential in enabling them to address high-growth markets, such as smartphones, mobile computing and a raft of digital consumer devices and networking infrastructure. ARM says that it has not seen any significant or across-the-board change in customer behaviour recently in terms of licensing activity and the Q109 results speak volumes. ARM signed a total of 17 licences in Q109 (after 21 in Q408), spanning the entire portfolio (ARM7, ARM9, ARM11, Cortex and Mali), despite the downturn. Four companies licensed Cortex-M, demonstrating growing demand for ARM in microcontrollers. Approximately 70% of licences signed in Q109 are to be used initially in applications such as digital TVs, microcontrollers, networking and storage.

It should be noted that both Cortex and ARM11 licensing are at an early stage: by the end of Q109, ARM had signed a cumulative total of 61 Cortex licences and 69 for ARM11 compared with 249 for ARM9 and 171 for ARM7. With many chipmakers eyeing growth opportunities in both

mobile and non-mobile devices, we see ample medium-term upside for Cortex and ARM11. While ARM's licensing revenues are notoriously difficult to predict quarter-by-quarter, we take the view that licensing revenues are not likely decline more than 20% in 2009 based on our expectation that most of the top 20 chipmakers will press ahead with leading-edge investments.

Investors should also keep an eye on ARM's Mali graphics technology. After the success of the iPhone (which uses Imagination's MBX graphics processor), the quality of the graphics and the user interface can make or break smartphone sales and this is driving demand for dedicated graphics processing technology. Here ARM can leverage its ecosystem and take share from Imagination Technology. While Imagination is currently the *de facto* leader in advanced graphics for mobile handsets, ARM is rising through the ranks. Twenty-one companies have licensed Mali, and even though the Mali licensing cycle is in its infancy, there are already tens of millions of Mali enabled handsets in the marketplace. We would not bet against Mali taking share from Imagination in the handset market over the next two-to-three years.

PD royalties: Royalty harvest in early stages

ARM's dominance of the mobile handset processor market means that its royalties and thus its share price are correlated to mobile handset shipment cycles and inventories. At this point in the cycle, the smartphone segment is a key variable in linking ARM's royalty revenues to the handset industry. On its 16 April conference call, Nokia said it expects 2009 industry handset volumes to decline by 10% from 2008 levels, with the decline to be greater in H109 than H209. Within this, the smartphone segment will likely grow 15%. Given the positive mix effect of rising smartphone volumes, ARM's handset royalty revenues should decline by less than 10% in 2009 (taking Nokia's forecast as the baseline). Our forecast 5% decline could show upside if the handset markets recover strongly in H209 or if smartphone volumes positively surprise.

Looking further out, we see ample room for ARM's royalty revenue growth to accelerate once the recovery gets underway: smartphones represent only c 20% of global mobile handset volumes today, but should grow as user expectations continually rise. ARM should also capitalise on multiple technology trends in non-handset markets and increase its penetration of these markets, such as digital TVs, autos and embedded low-cost microcontrollers.

Watch this space

We highlight the mobile PC segment (which includes notebooks and netbooks), where we see increased significance for ARM's Cortex processors. Here ARM's licensees compete with Intel and AMD. Currently, Cortex can only run on Linux-based operating systems since Microsoft does not yet allow Windows to run on Cortex. However, several of ARM's partners, including Qualcomm, Freescale and Texas Instruments, are betting on ARM's technology. One reason is that Cortex offers very significant cost savings compared with Intel's Atom processor. Qualcomm's Snapdragon, for example, is an ARM-based platform that can be optimised for netbooks. The list of companies developing Snapdragon-based products includes Taiwan-based OEMs and ODMs such as Acer, Asus, Compal, Quanta Computer and Foxconn. Given this broad-based support, we believe that some degree of success is inevitable for ARM, and that once ARM gains critical mass in this market, Microsoft will no longer be able to ignore it. At the risk of stating the obvious, any

deal with Microsoft allowing Windows to run on ARM-based processors would further improve ARM's fortunes in the notebook/netbook PC markets.

Sensitivities

- The economic downturn could reduce chip volumes and licensing activity over and above our estimates.
- ARM's revenue recognition in respect of licensing is such that a) the extent of any decline in licensing revenues is hard to predict, and b) any such decline could be delayed.
- Almost all of ARM's revenues and c 40% of its costs are denominated in dollars. The fall in the value of sterling in 2009 provides a helping hand in terms of profitability. Conversely, any strengthening of sterling has a negative impact.

Financials and valuation

For the reasons outlined above, we believe ARM can continue to outperform the broader semiconductor industry. Specifically, we forecast a 12% CAGR for ARM's PD royalty revenues between 2009-2019 versus a 4% CAGR for the semiconductor industry (broadly in-line with global GDP growth). We believe ARM's total revenues will grow at a slightly lower 10% CAGR over the same period, reflecting lower growth rates in PD licensing and PIPD. This drives a near threefold increase in ARM's revenues over the next 10 years. Our five-year CAGRs for PD royalties and ARM's total revenues are 16% and 13%, respectively. See Exhibit 4 for details.

Exhibit 4: Revenue forecasts ($m)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
PD royalties	215	254	290	340	394	455	518	565	599	632	661
PD licensing	123	134	147	160	174	190	207	225	246	263	276
PIPD royalties	26	33	41	47	52	55	59	63	68	71	75
PIPD licensing	40	44	49	53	59	65	71	76	81	85	90
Devel. systems	53	60	68	78	89	101	113	123	132	140	146
Services	31	34	38	42	47	53	58	62	66	69	72
Total revenues	**488**	**560**	**632**	**721**	**815**	**918**	**1,026**	**1,115**	**1,191**	**1,261**	**1,320**

Source: Edison Investment Research, ARM Holdings

Our estimates could show upside if ARM's Cortex processor becomes the *de facto* standard for netbook PCs or if the smartphone market grows faster than we expect. We currently forecast that 60% of handset volumes will be smartphones in 2019 compared with 20% in 2009 (see Exhibit 5).

Exhibit 5: Forecasts for ARM's addressable markets (units millions)

Mobile	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Smartphone	230	281	342	418	510	611	734	844	970	1,116	1,261
Feature phone	595	577	537	499	464	427	393	361	333	306	281
Low end voice phone	240	288	331	364	400	424	449	476	505	535	567
Portable media players	175	179	182	186	189	193	200	200	200	200	200
Non-Mobile											
DSC	90	92	94	96	97	94	90	86	83	79	76
STB and DTV	300	321	343	367	390	417	447	478	511	547	585
Networking	527	606	667	700	749	786	818	851	885	920	957
Printers	105	121	133	146	150	152	153	155	156	158	159
Storage (HDD + Flash)	1,040	1,248	1,398	1,538	1,700	1,802	1,910	2,025	2,146	2,275	2,411
Automotive	1,120	1,232	1,417	1,587	1,650	1,716	1,785	1,856	1,931	2,008	2,088
Smart card	3,330	3,830	4,289	4,675	5,000	5,300	5,618	5,955	6,312	6,691	7,093
MCU	2,340	2,668	3,148	3,620	4,054	4,419	4,817	5,250	5,723	6,238	6,800
Others	880	1,012	1,103	1,147	1,200	1,248	1,298	1,350	1,404	1,460	1,518
Total	**10,972**	**12,453**	**13,983**	**15,342**	**16,554**	**17,590**	**18,711**	**19,887**	**21,159**	**22,533**	**23,998**

Source: Edison Investment Research, ARM Holdings

Exhibit 6: Summary financials

Year end Dec	£'000s	2007	2008	2009e	2010e
Profit & Loss					
Turnover		259,160	298,934	305,128	349,748
(% change)		(2%)	15%	2%	15%
EBITDA		**87,100**	**104,356**	**102,838**	**128,645**
(% margin)		34%	35%	34%	37%
(% change)		15%	20%	(1%)	25%
EBIT pre GW and except's.		79,393	97,315	95,638	121,245
(% margin)		31%	33%	31%	35%
Net financial items		5,402	3,246	2,510	3,320
Other		0	0	0	0
Pre-tax profit (norm'd)		84,795	100,561	98,148	124,565
Tax		(9,846)	(19,597)	(19,244)	(27,170)
Net Income		**61,874**	**72,485**	**70,404**	**89,396**
EPS (norm'd and fd)		**4.5**	**5.6**	**5.5**	**6.9**
Balance Sheet					
Fixed Assets		501,400	654,787	633,255	613,855
Current Assets		141,494	193,098	243,965	330,051
Current Liabilities		(62,136)	(106,909)	(98,035)	(59,073)
Long term Liabilities		(164)	(1,223)	(1,100)	(1,100)
Shareholders Equity		**580,594**	**739,753**	**778,085**	**883,733**
Cash Flow					
Cash flow from operations		59,827	100,534	101,348	117,908
Capex		(4,660)	(7,236)	(7,000)	(7,000)
Net debt(cash)		**(49,509)**	**(76,502)**	**(136,444)**	**(210,755)**

Source: Company accounts/Edison Investment Research

ARM trades on 15x 2010e P/E and 9x EV/EBITDA. We see 20%+ EPS growth in 2010/11 and medium-term growth of c 15%, partly driven by ARM's operating leverage. Notably, the shares have performed well during the downturn, and are up 25% year-to-date. Further upside may await a positive surprise on handset volumes, ARM's prospects in the netbook PC market, or progress with regard to Mali graphics IP (where ARM can take share from Imagination). Any of these could trigger a rally during H209. Our DCF yields a 140p price target, equivalent to 20x 2010 P/E.

Management

Exhibit 7: Management

Chairman: Doug Dunn	Doug joined the board in 1998 and became non-executive chairman in 2006. He was previously president and CEO of ASML N.V. until his retirement in 2004. Before joining ASML, he was CEO of the Consumer Electronics division of Philips Electronics.
CEO: Warren East	Warren joined ARM in 1994 and held various senior positions within the company before becoming CEO in 2001. Before joining ARM he was with Texas Instruments. He is a chartered engineer and a non-executive director of Reciva Limited.
CFO: Tim Score	Tim joined ARM as CFO in 2002. Before joining ARM, he was finance director of Rebus Group. He was previously finance director of William Baird plc, and financial controller at BTR plc. He is a non-executive director of National Express Group plc.

CSR

Year End	Revenue ($m)	PBT* ($m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/07	848.6	177.5	94.0	0.0	5.2	N/A
12/08	694.9	67.2	43.0	0.0	11.4	N/A
12/09e	494.0	(36.4)	(31.0)	0.0	N/A	N/A
12/10e	761.2	74.2	25.0	0.0	21.5	N/A

Note: *PBT and EPS are normalised, excluding goodwill amortisation and exceptional items.

Investment summary: Singing the blues in 2009

2009 is a pivotal year for CSR to regain share at Nokia via its BC7000 (BlueCore 7000) chip. Our checks suggest BC7000 is highly competitive on cost and performance, and we believe the CSR/Nokia relationship is back on track. CSR's soon-to-be-closed acquisition of SiRF diversifies its revenues by technology and customer, and will see CSR continue to move beyond discrete Bluetooth. We feel there is upside potential on a 12-month view if the market is to recognise CSR's combo chip ambitions, and its strong presence in non-cellular markets.

Wireless connectivity

Wireless connectivity depends on Bluetooth, Wi-Fi and GPS, all of which contribute to CSR's revenues. Bluetooth represents the largest market; here CSR has a c 30% share. Bluetooth is a short-range radio communications technology that enables devices to exchange data, and can be found in mobile handsets.

CSR/SiRF: Strong combined GPS portfolio

While CSR's acquisition track record has been poor (eg CPS, UbiNetics), we feel CSR's purchase of SiRF makes strategic sense, immediately increasing CSR's scale in the high-growth GPS market, and addressing OEM demand for integrated Bluetooth/GPS functionality.

Cost savings add to the investment case

CSR will move fast to cut overheads after the SiRF acquisition, so that SiRF is accretive in H209 and 2010. An additional US$25m in cost savings will also come through in 2009 from the restructuring of its core business. Despite these actions, CSR will make an operating loss in 2009; however, we see a return to profit in 2010.

Valuation: Further upside potential despite recent rally

On our FY10 estimates, CSR trades on a 0.6x EV/sales and 7x EV/EBITDA even though the shares are up 100% year-to-date. These multiples reflect growing confidence around pending share gains at Nokia, yet undervalue CSR's combo chip ambitions, and its strong presence in non-cellular markets.

Price*	339p
Market Cap	£452m

*Priced as at 26 May 2009

Share price graph

Share details

Code	CSR
Listing	FULL
Sector	IT Hardware
Shares in issue	133.5m

Price

52 week	High	Low
	360.3p	150.3p

Balance Sheet as at 31 March 2009

Debt/Equity (%)	N/A
NAV per share (c)	238
Net cash ($m)	91

Business

CSR boasts the leading Bluetooth technology and market share, having shipped over one billion Bluetooth chips to date.

Valuation

	2008	2009e	2010e
P/E relative	117%	N/A	209%
P/CF	12.0	13.9	10.6
EV/Sales	0.7	0.6	0.5
ROE	8%	N/A	6%

Revenues by geography

UK	Europe	US	Other
0.2%	9.0%	5.0%	85.8%

Analyst

Martin O'Sullivan 020 3077 5700
mosullivan@edisoninvestmentresearch.co.uk

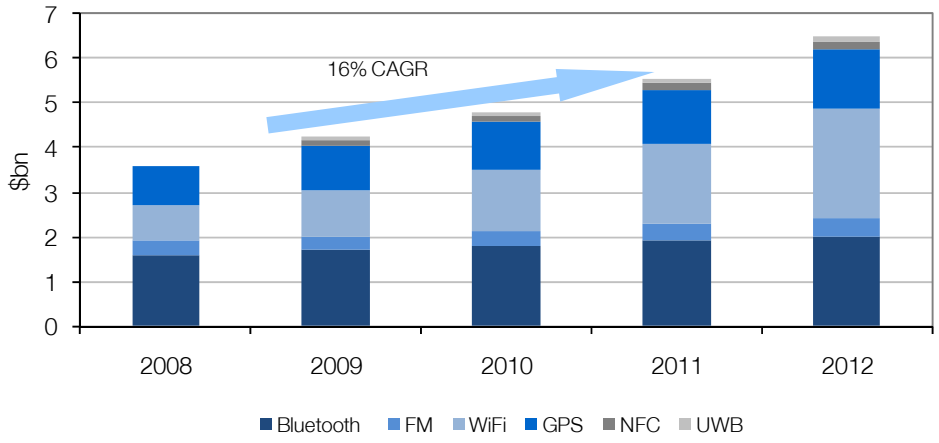
Company description: Bluetooth leader

CSR boasts the leading Bluetooth technology and market share, having shipped over one billion Bluetooth chips to date. Bluetooth is a short-range radio communications technology that enables devices to exchange data. The largest market for Bluetooth today is the mobile handset market. There is also a sizable market for Bluetooth in consumer electronics and automotives. CSR is fabless (it outsources manufacturing to TSMC) and has headquarters in Cambridge UK. Its customers include many of the world's leading handset makers, including Nokia, Samsung, LG and Research in Motion. In February 2009, CSR announced its intention to merge with US-based SiRF, a leader in GPS technology. The acquisition is expected to close in June 2009, and CSR expects SiRF to be earnings accretive in H209 and 2010.

Wireless connectivity

We estimate that 54% of the 1.2 billion mobile handsets shipped in 2008 incorporated Bluetooth technology. We see this rising to c 80% by 2012, driven by the growth of smartphones (where attach rates are already 100%) and higher attach rates in mid-range handsets. Bluetooth and other wireless technologies such as Wi-Fi and GPS are being increasingly adopted other high-volume end-markets including automotives, digital TVs, gaming consoles and notebook and netbook PCs. This underpins a double-digit CAGR over the next several years (see Exhibit 1). While Bluetooth is CSR's largest segment by revenues today, it addresses all of the key technologies (including Wi-Fi and GPS).

Exhibit 1: Wireless connectivity market value



Source: Edison Investment Research, CSR

Singing the blues in 2009

CSR made hay while sun shone in 2006 and 2007, but suffered an 18% revenue decline in 2008 after product delays that saw competitors gain share, principally Broadcom. This share loss will have further negative implications in 2009. Add to this a c 12% decline in overall handset volumes, and CSR's revenues are likely to fall 29% compared with 2008 levels (this includes SiRF, which will be consolidated in CSR's financials from H209). CSR is singing the blues in 2009; the question is, can it stage a comeback in 2010?

Comeback depends on BC7000 (BlueCore 7000)

If CSR is to stage a comeback, it must prove it can execute on its strategy of providing the technology of choice for wireless connectivity, and reverse recent share loss. Key to this is its BC7000 (BlueCore 7000) chip, which features the world's first ultra-low cost Bluetooth chip with integrated GPS and FM functionality. Our checks indicate that BC7000 is the smallest Bluetooth chip in the industry today: we understand that the chip from CSR's nearest competitor, Broadcom, is c 50% bigger and more costly. Importantly, BC7000 gives handset makers the ability to add not just Bluetooth but also GPS to a handset at low incremental cost, thereby facilitating GPS-enabled mass-market feature phones running a wide variety of location-based services, something that appeals to handset makers and operators alike.

Nokia is a key account where CSR's share has fallen from c 80% in 2007 to c 20% in Q109. While BC5 missed Nokia's timing objectives by a few months (forcing Nokia to give sockets to Broadcom), BC7000 is highly competitive on cost and performance, and we believe the CSR/Nokia relationship is back on track. Our checks indicate that BC7000 will be incorporated in new Nokia handsets from H209 and into 2010. On this basis, we see CSR regaining share at Nokia via BC7000, starting Q309 and rising to c 50% of Nokia's units in 2010. We also believe CSR can gain share at Samsung and LG, where it is currently in 20-30% of units. Key to this is CSR's soon-to-be-completed acquisition of US-based SiRF – which diversifies CSR's revenue base by customer.

In making strategic decisions, handset makers choose suppliers whose technology roadmaps meet their requirements, as those requirements move beyond discrete Bluetooth. Here we believe CSR ticks many boxes. CSR is the only company that can offer the full range of wireless connectivity technologies (Bluetooth, GPS, WiFi, FM, UWB and NFC). The CSR9000 chip provides combined BT + FM + WiFi and initial volume shipments are expected during H209. CSR also offers Wi-Fi connectivity via its UniFi technology. Here its latest generation UF6000 product – which should be available for shipping during H209 – is a small form-factor, ultra-low cost chip that dramatically lowers the cost of Wi-Fi adoption for handset makers. All this makes CSR a one-stop-shop for wireless connectivity technology. CSR also offers stereo audio CODECs on a single chip – thanks to MusiCore – which is on track to generate initial revenues from Tier 1 handset makers in 2009. Here CSR can take share from Wolfson. However, MusiCore will likely be a slow burn. Finally, CSR is also developing a low-cost Bluetooth + Wi-Fi + GPS + FM module (code named UF8068) – the first such highly integrated chip of its type, although initial revenues are unlikely before 2011. Overall, we feel that CSR's competitive positioning coupled to its embedded relationships with many top tier handset makers means it can stage a comeback in 2010 (see Exhibit 2).

Exhibit 2: Handset forecasts

	Handset vols (m)		BT handsets (m)		ASP ($)		Market revs. ($m)		CSR share		CSR sales ($m)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Nokia	415	457	266	343	1.32	1.16	351	397	20%	50%	70	199
Motorola	149	155	95	116	1.32	1.16	126	135	10%	15%	13	20
SEMC	85	92	55	69	1.32	1.16	72	80	0%	0%	0	0
Samsung	149	165	95	124	1.32	1.16	126	144	30%	40%	38	58
LG	75	80	48	60	1.32	1.16	63	69	20%	30%	13	21
Other	192	197	123	148	1.32	1.16	162	172	50%	50%	81	86
	1,065	**1,146**	**681**	**860**	**1.32**	**1.16**	**900**	**997**	**24%**	**38%**	**214**	**385**

Source: Edison Investment Research, CSR

Aside from share gains, CSR is well placed to benefit as smartphones continue to grow as a proportion of overall handset sales, given that Bluetooth attach rates are typically 100% on these high-end phones compared with 40% or less for mid- and low-end handsets. As previously discussed in this report, we believe the smartphone volumes will grow c 15% in 2009 compared with 2008 levels. Exhibit 3 shows our stand-alone estimates for CSR (ie excluding SiRF).

Exhibit 3: Stand-alone CSR estimates

1) Handsets	2008	2009	2010
Overall Handset Units (m)	1,212	1,065	1,146
Attach Rate	54%	64%	75%
B/T Units (m)	654	681	860
% with FM	35%	75%	80%
% with Wi-Fi	0%	5%	15%
% with GPS	0%	12%	20%
Blended ASP ($)	1.537	1.32	1.16
Market Revenues ($m)	1,006	901	1,000
CSR Share	40%	24%	38%
CSR Sales ($m)	399	214	384
2) Headsets			
Handset Attach Rate	10%	7%	7%
Units (m)	65	48	60
ASP	2.93	2.58	2.19
Market Revenues ($m)	192	123	132
CSR Share	80%	80%	70%
CSR Sales	153	98	92
3) Consumer/PC/Autos			
Total B/T Units	98	80	96
Blended ASP ($)	2.90	2.47	2.10
Total Sales ($m)	284	198	202
CSR Share	50%	50%	40%
CSR Sales	142.1	99.0	80.8
Total Market			
Total B/T Units (m)	818	810	1,016
Blended ASP ($)	1.81	1.51	1.31
Total Sales ($m)	1,482	1,222	1,334
CSR Share	47%	34%	42%
CSR Sales ($m)	**695**	**412**	**557**

Source: Edison Investment Research

CSR and SiRF: Strong combined GPS portfolio

While CSR's acquisition track record has been patchy (eg UbiNetics), we feel SiRF makes strategic sense. SiRF is a leader in semiconductor-based GPS location technology. It generated revenues of $232m in FY08 (compared with CSR's $695m), and the combined CSR/SiRF entity had a net cash of $378m at year-end 2008. The combined entity will be the single largest pure-play provider of integrated connectivity and location-based platforms, and one of the top 10 fabless semiconductor companies in the world.

GPS attach rates in the mobile handset market are expected to rise from c 20% today to 50% by 2011. The SiRF acquisition will not only boost CSR's presence in the GPS market but also allow CSR to address increasing customer demand for integrated Bluetooth and GPS functionality. It should also accelerate CSR's combo chip ambitions (combined Bluetooth/GPS/WiFi/FM), and thereby de-risk its strategic plans. Our checks indicate that only two of CSR's Bluetooth competitors are currently offering integrated Bluetooth/GPS technology – Texas Instruments and Broadcom. While these are major companies, we believe CSR/SiRF can meet OEM demand for both connectivity and location-based services in a broad range of products. CSR's Tier 1

customers are said to be supportive of the merger, which implies the possibility of fewer sockets for Texas Instruments and Broadcom going forward and a larger opportunity for CSR.

SiRF also diversifies CSR's revenues by customer and technology. Importantly, SiRF has a significant GPS and A-GPS patent portfolio, whereas CSR has an extensive patent portfolio relating to E-GPS. The combined CSR/SiRF patent portfolio will therefore cover the complete range of GPS technologies. CSR can leverage this combined technology portfolio to drive the innovation of new GPS chips.

Non-handset markets: Ample room for growth

We feel the market may be neglecting CSR's growth potential in non-handset markets, such as desktop PCs, notebooks, digital TVs and autos. Here Bluetooth attach rates are low (10-20%) but could grow strongly. Many consumer electronics majors are backing the 'connected home' concept whereby TVs can talk to PCs, which in turn can talk to mobile handsets, etc. This should spur Bluetooth attach rates. In addition, multiple MP3 players from Sony, Samsung and other now feature Bluetooth – although there is ample room for growth (if iPods follow suit) – and carmakers are increasingly adding Bluetooth as standard (eg all new Fords in the US now feature Bluetooth). While it is difficult to predict with accuracy the growth rates in CSR's non-cellular markets, the big picture is that we believe there are enough catalysts for healthy double-digit growth rates over the next several years.

Cost savings support the investment case

In addition to BC7000 design wins and the integration of SiRF, cost savings are a focus of attention for CSR in 2009. CSR will move fast to restructure the business post the SiRF acquisition, ensuring that SiRF is accretive in H209 and 2010. Cost synergies of at least $35m per annum should be implemented within 60 days of completion. CSR has already reduced underlying operating costs by $25m in 2009 from restructuring and streamlining its core business, ie headcount reductions and cutting travel expenses and consultants. CSR says it does not plan to cut key development projects, which we welcome; however, the cost cutting actions that CSR has so far committed to implement will not prevent an operating loss in FY09.

Sensitivities

- CSR has a number of execution risks in its integration of California-based SiRF.
- Competitors including Broadcom and Texas Instruments may put pressure on pricing.
- Share gains at Nokia in 2009/10 could prove more or less than we expect.

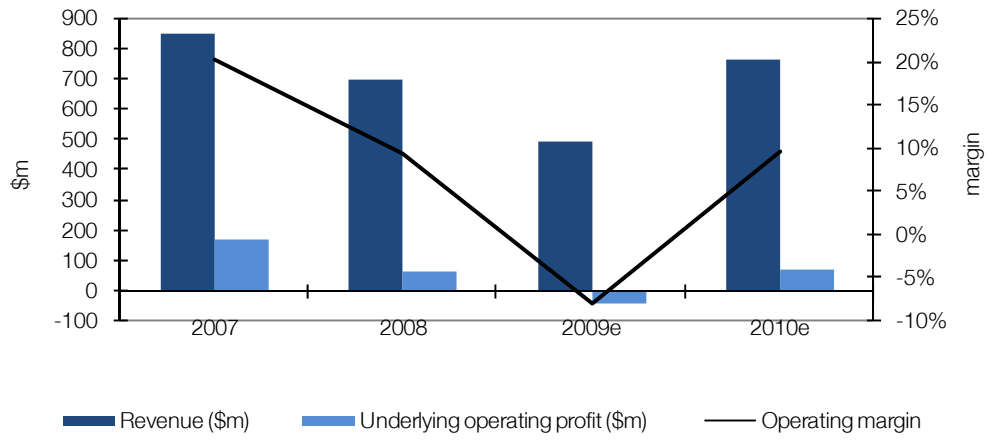
Financials and valuation

We estimate 2009 revenues of $494m (down 29%), which includes the consolidation of SiRF's results in H209, and an underlying operating loss of $39m (underlying loss per share of 31 cents). We believe the market recognises that 2009 will be a difficult and loss making year for CSR.

We see CSR returning to profit in FY10 (see Exhibit 4) – we forecast organic revenue growth of 35% (driven by share gains at Nokia coupled with a 8% growth in overall handset volumes) and underlying EPS of 25 cents. This could show upside if CSR is able to find additional cost savings, or CSR's integrated combo chips have more favourable than expected implications for average selling prices. 2010 will mark the first full-year of operating results for the combined CSR/SiRF entity.

The shares are up a whopping 100% year-to-date, and on our estimates they trade on 22x FY10 P/E and 7x EV/EBITDA. An EV/sales multiple of 0.6x FY10 means the shares are no longer in the bargain basement, but equally they are still valued well below Broadcom (2.0x) and Atheros (1.8x) and several other fabless peers. The share price rally in the past six months reflects growing confidence around pending share gains at Nokia, yet we feel there is more upside potential on a 12-month view if the market is to recognise CSR's combo chip ambitions, and its strong presence in non-cellular markets. Key to further upside near-term is the strength of handset demand in H209. While CSR may be singing the blues in 2009, it should not be long before the music changes.

Exhibit 4: Revenue and underlying operating profit



Source: Edison Investment Research, CSR

Exhibit 5: Summary financials

Year end Dec	$'000s	2007	2008	2009e	2010e
Profit & Loss					
Turnover		849	695	494	761
(% change)		20%	(18%)	(29%)	54%
EBITDA		**189**	**85**	**(9)**	**104**
(% margin)		22%	12%	(2%)	14%
(% change)		12%	(55%)	(110%)	(1,265%)
EBIT pre GW and except's.		172	65	(39)	74
(% margin)		20%	9%	(8%)	10%
Net financial items		6	2	3	2
Other		0	0	0	0
Pre-tax profit (norm'd)		177	67	(36)	76
Tax		(49)	(11)	(10)	(31)
Net Income		**128**	**57**	**(46)**	**46**
EPS (norm'd and fd)		**0.94**	**0.43**	**(0.31)**	**0.25**
Balance Sheet					
Fixed Assets		249	182	230	189
Current Assets		420	410	379	446
Current Liabilities		153	101	53	57
Long term Liabilities		8	24	5	5
Shareholders Equity		**508**	**467**	**667**	**697**
Cash Flow					
Cash flow from operations		222	66	52	83
Capex		(29)	(23)	(25)	(25)
Net debt(cash)		**(191)**	**(176)**	**(196)**	**(246)**

Source: Company accounts/Edison Investment Research

Management

Exhibit 6: Management

Chairman: Ron Mackintosh	Ron has served as a non-executive director of CSR since May 2004 and was appointed chairman in May 2007. He is a non-executive director of Fidessa plc. Between 1992 and 2000 he was CEO of Computer Sciences Corporation's (CSC) European business.
CEO: Joep van Beurden	Joep was appointed CEO in 2007. He has over 10 years of experience in managing tech companies in the US and Europe. For the three years prior to joining CSR, he as CEO of NexWave Inc. He has also held senior positions at Philips Electronic and McKinsey.
CFO: Will Gardiner	Will joined CSR in 2008. Previously he was a director at BSkyB plc. Will was also CFO of Easynet Group plc, before its acquisition by BSkyB in 2006, prior to which he spent 10 years in investment banking with JP Morgan.

Source: Edison Investment Research, CSR

Cyan Holdings

Year End	Revenue (£m)	PBT* (£m)	EPS* (p)	DPS (p)	P/E (x)	Yield (%)
12/06	0.3	(3.0)	(3.0)	0.0	N/A	N/A
12/07	0.0	(3.6)	(3.0)	0.0	N/A	N/A
12/08	0.1	(4.5)	(1.7)	0.0	N/A	N/A
12/09e	3.8	(1.0)	(0.1)	0.0	N/A	N/A

Note: * PBT and EPS are normalised, excluding amortisation and exceptional items.

Investment summary: Growing confidence

Cyan's FY08 results highlighted significant financial and strategic progress. While Cyan is not out of the woods, it has cut costs and added new functionality to its chips. The latter has led to heightened customer engagement in the past six months, initial orders from several new customers and the opportunity for major volume orders. In addition, Cyan has won the backing of Micrel, a major player in the wireless markets. If, as we expect, Cyan can build on increasing customer acceptance of its technology, the potential valuation is substantially higher than its current EV of c £6m.

Substantial progress underway

The product refresh that Cyan completed during 2008 has had two effects. First, Cyan now offers multiple low-cost and low-power consumption products that provide wireless, web-based and modular functionality. This has led to recent orders for delivery in 2009 with a value in excess of $1m. Secondly, capital expenditure on new product development was completed last year while operating costs were cut by 40% in Q109, greatly reducing the revenues required for cash flow break-even and profitability in 2009/10.

2009 focus: Automatic meter reading

Cyan's automatic meter reading (AMR) technology allows utility meters to be read and controlled from a central location. Even in the current economic climate, AMR is receiving investment from central governments as it contributes to reducing energy consumption. The very low bill of materials of Cyan's chipset, the recently added interfaces and the option to deliver a fast-to-market module, leave Cyan strongly positioned in this large and growing market.

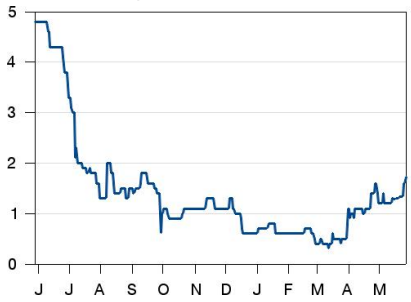
Forecasts and valuation: Contracts support break-even

While the quality and scale of customer discussions has increased substantially over the last 12 months, forecasting the timing of sales is still guesswork. However, recent contracts highlight the positioning of the group's technology and if other major deals can be closed, then Cyan's equity story looks increasingly viable.

Price*	1.6p
Market Cap	£8m

*Priced at 26 May 2009

Share price graph



Share details

Code	CYAN
Listing	AIM
Sector	Technology Hardware
Shares in issue	477m

Price

52 week	High	Low
	3.88p	0.35p

Balance sheet as at 31 December 2008

Debt/Equity (%)	N/A
NAV per share (p)	0.6
Net cash (£m)	1.4

Business

Cyan is a fabless semiconductor company that designs and markets microcontrollers.

Valuation

	2007	2008	2009e
P/E relative	N/A	N/A	N/A
P/CF	N/A	N/A	N/A
EV/Sales	N/A	17.0	1.6
ROE	N/A	N/A	N/A

Revenues by geography

UK	Europe	US	Asia
0%	0%	0%	100%

Analysts

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Cyan Holdings is a research client of Edison Investment Research Limited

Company description: Leader in microcontroller design

Cyan is a fabless semiconductor company (it outsources manufacturing) specialising in low-power, configurable 16-bit microcontrollers (MCUs). These can simply plug into an application, or be customised using Cyan's software tools. After the completion of a recent phase of product development – which added RF and web-based functionality – Cyan looks poised to benefit from major structural trends. Its key markets in 2009 are automated meter reading and street lamp controllers. Here the volume opportunity is substantial and growing around the globe thanks to central government subsidies aimed at reducing energy consumption. Cyan's competitors include several large chipmakers with the ability, if needed, to be price-aggressive. The group has a growing sales channel in China, is building out major partnerships in Europe and the US, and we expect major initial success in the automated metering markets.

Major cost and technology progress in the last 12 months

A key challenge for Cyan since IPO has been to compete with major semiconductor manufacturers such as Texas Instruments, STM, Freescale and Renesas. This means being able to produce products that are not only technically excellent and easily configurable, but are also able to be manufactured at a cost that customers are willing to pay. Under CEO Kenn Lamb, Cyan has made major cost and technology progress in the last 12 months, particularly with regard to its Cy-Solved, RF-Solved and CyanIDE brands. In the round, these allow Cyan to offer low-cost pre-packaged modules that address various end-market requirements and can simply plug into customers' systems (significantly reducing design costs and time to market). We highlight the following:

- RF functionality. Cyan introduced the RF-Solved product that added full radio frequency functionality to its eCOG microcontrollers. Applications include intelligent remote sensors, automated, smart and intelligent utility meter reading.
- Gateways. In addition to network and RF capability, Cyan also offers a gateway solution that links the RF network to a monitoring and control centre via the internet. This should accelerate Cyan's penetration into new markets.
- Cost out. Kenn Lamb has built an operations team that has halved the manufacturing cost of the products through smarter design and better procurement (significantly lowering the bill of materials). This has opened up major opportunities in China.

The significant progress that Cyan has made in these areas is driving a new level of customer engagement, particularly in the area of automatic meter reading.

2009 focus: Automatic meter reading

Automatic meter reading (AMR) is capturing the imaginations of central governments and utility providers around the globe. Utility providers are being increasingly subsidised by governments to set up secure, easy-to-use wireless networks for managing and billing energy usage. A utility meter with AMR can read billing information, perform meter diagnostics and automatically communicate that information wirelessly back to the utility provider. Studies have shown that metered customers use on average between 10-15% less than their un-metered counterparts.

It is envisaged that utility companies would use AMR to read meters and vary tariffs according to the time of day to reflect generation efficiency. The primary benefits for utility companies deploying AMR services are lower operating costs in customer management and network maintenance.

Some countries are considering the deployment of demand control AMR systems that give them the ability to remotely switch off customers if demand gets too high to prevent blackouts. South Africa's state-owned electricity supplier, Eskom, is looking to implement AMR for this purpose. South Africa has faced shortages of electrical power because of a lack of investment in new power plants.

Estimating the pace of rollout of AMR in multiple regions is very difficult, however the big picture is that there are approximately 1.4bn electricity meters in the world, and that the replacement market for AMR units is already substantial (c 10 million units per annum) and growing. Deployment of AMR technology (in a number of guises and from a number of Cyan's competitors) is progressing in the US; Italy has led the way in Europe, while Scandinavia is now setting the pace for Northern Europe. Leading Chinese utility companies have announced their interest in AMR, and we believe China will become a major market in the next few years.

Product refresh: Off-the-shelf modular solutions

Over the past six months, Cyan's AMR products received a significant refresh thanks to RF-Solved (Cyan's low-power, radio frequency networking technology) and Cy-Net3, its mesh-networking technology. Mesh networking is a way of routing data between nodes. (A node is an active electronic device that is connected to the network.) It allows for continuous connections by 'hopping' from node-to-node until the hub is reached, and can save the infrastructure of many data collection points.

Cy-Net3 is a radio frequency (RF)-based AMR solution which, when implemented using Cyan's Gateway technology, allows utility meters to be read and controlled from a central location. Importantly, Cy-Net3 is frequency-band agnostic, which means that system designers can customise it to the RF protocol of their choice, such as ZigBee, Z-Wave, Wavenis, or IEEE 802.15.4 (a standard that specifies the parameters for low-rate wireless personal area networks). This represents tremendous design flexibility, allowing system designers to escape the constraints and limitations of standards-based alternatives. This in turn allows AMR systems to be optimised for frequency bands, data rate, output power, channel bandwidth, etc.

Long battery life and therefore low power consumption is a key requirement of AMR solutions, in order to eliminate costly ongoing meter service calls for battery replacement. Here Cyan's AMR solutions are highly competitive thanks to its proprietary low-power eCOG microcontrollers (which have an in situ battery life of up to 12 years). On the cost side, Cyan recently completed the development of a sub-$2 microcontroller that achieves performance and low power consumption that few competitors can match. This lowers the bill of materials of AMR solutions that use Cyan's technology, which has been crucial in allowing Cyan to win orders from China-based customers. Finally, Cyan's Gateway technology means that its AMR solutions can be implemented with embedded web server functionality, so they can process and send relevant data over the web, thereby rounding out a low-cost off-the-shelf solution that end-customers are looking for. Crucially, Cyan can package all of this functionality – together with a microcontroller – via a modular design, ie pre-packaged ICs on a plug-and-play printed circuit board (PCB).

Order wins: $1m+ deals

Cyan's product refresh has led to heightened customer interest in the past six months. The group has secured working relationships with established suppliers of AMRs and is actively engaged in multiple field trials and the joint development of customised products. We highlight the following orders for delivery in 2009:

- 50,000 AMR modules scheduled for delivery in batches between July and December. This is for an established Chinese meter manufacturer with an existing installed base of such meters. Significantly, this customer is bidding on projects that could involve further orders of up to another 130,000 units during 2009.
- 5,000 microcontrollers and a Letter-of-Intent for a further 20,000 to be incorporated within a jointly designed gateway for AMR networks.

Cyan's own or jointly designed gateway products are being evaluated in several European countries, as well as in North America. We believe the market for such modules for any individual European or US company could run into the hundreds of thousands per annum. In addition, 15 separate utility companies in China and India are currently evaluating Cyan's AMR modules. Not to be overlooked is Cyan's recently announced technology partnership with Micrel Inc. (c $400m market cap, $250m sales and $80m cash), which not only bodes well from a strategic perspective, but also boosts Cyan's 'mind share' in the AMR industry.

Cyan has also been building indirect channels to market with the likes of Ember (leader in Zigbee chips) and Radiocrafts (leading supplier of Wireless M-Bus RF modules, the dominant European metering standard). Radiocrafts has demonstrated the first complete Wireless M-Bus AMR solution available in Europe, which incorporates Cyan's Gateway technology, and both companies are engaged with several potential customers.

Cyan recently announced a distribution deal with Future Electronics (unlisted), which operates in 169 locations in 41 countries. This offers Cyan, for the first time, access to worldwide markets through a global network of sales and support. While many of these opportunities are currently at an early stage, and some are more tangible than others, we believe they offer the prospect of very substantial markets for Cyan in 2009/10.

In addition to AMR, Cyan's Cy-Net3 and Gateway products enable it to target a substantial range of major market opportunities. One of these concerns the remote dimming or on-off switching of individual lamps. Here Cyan has already received an order for 10,000 street lamp controller modules. While this initial order is subject to final field-testing, the Cyan units have passed similar field tests and the Chinese company concerned is bidding on contracts for more than one million units to be delivered during 2009/10. Another well-established Chinese street lamp supplier is expected to schedule field trials, which, if successful, could see Cyan win a c 500,000 unit order in 2009 for delivery in 2010.

Cyan has also received an initial order for 20,000 MCUs with 10,000 units paid for in advance for use in a printer application. Subject to the success of the product, it could lead to additional order of 80,000 units in 2009.

Sensitivities

- The microcontroller market is dominated by very large chip manufacturers, with established customer relationships and strong balance sheets.
- Management has limited visibility of assessing the timing and volume of the ramp in shipments.
- Cyan's revenues are almost entirely dollar denominated, whereas costs are split 75:25 between sterling and dollars. Any strengthening of sterling against the dollar has an incrementally negative impact on earnings.

Financials and valuation

Following the placing of up to 80m new shares, which will raise a gross £1.2m (at 1.5p), Cyan will have c £2m of cash at the end of June. Given the contracted revenue and low monthly overheads (c £200k), this should provide Cyan with sufficient resources to manage the business well into next year and provide time to monitise the major opportunities highlighted above.

Trying to estimate the revenue outlook for the business in FY09 remains problematic given the balance between the timing of design wins and shipments, and the obvious 'swing item' impact of high volume market opportunities. However, we have made assumptions about the number of larger customers (we assume 12), their average demand over the year, as well as forecasts of average selling price and margins to form a base case. On this basis, we forecast revenues of £3.8m and an EBITDA loss of £1.0m. We would expect revenues in the current year to be very back-end weighted, ie these forecasts broadly reflect management's target of reaching monthly profitability by the end of FY09.

Exhibit 1: Financials

Year end Dec £'000s	2007	2008	2009e
Profit & Loss			
Turnover	33	146	3,840
(% change)	(88%)	347%	2,537%
EBITDA	**(3,662)**	**(4,491)**	**(964)**
(% margin)	N/A	N/A	(25%)
(% change)	(17%)	(23%)	79%
EBIT pre GW and except's.	(3,716)	(4,558)	(1,044)
(% margin)	N/A	N/A	(27%)
Net financial items	145	93	52
Other	0	0	0
Pre-tax profit (norm'd)	(3,572)	(4,465)	(992)
Tax	360	466	300
Net Income	**(3,212)**	**(3,999)**	**(692)**
EPS (norm'd and fd)	**(3.0)**	**(1.7)**	**(0.1)**
Balance Sheet			
Fixed Assets	125	100	145
Current Assets	4,763	2,821	3,734
Current Liabilities	(704)	(275)	(900)
Long term Liabilities	0	0	0
Shareholders Equity	**4,184**	**2,646**	**2,979**
Cash Flow			
Cash flow from operations	(4,311)	(5,609)	(475)
Capex	(73)	(30)	(100)
Net debt(cash)	**(4,080)**	**(1,357)**	**(2,134)**

Source: Company accounts/Edison Investment Research

The trebling of the share price off recent lows reflects growing confidence that Cyan can survive. Key to this has been the announced orders for delivery in 2009, and the reduced operating costs. However, there is still little in the current capitalisation to reflect the investment in the intellectual property or the massive target markets. Cyan is clearly gaining design traction with major OEMs, and its distribution deal with Future Electronics brings, for the first time, access to worldwide markets through a global network of sales and support. If, as we expect, management can show evidence of additional global orders and build on growing confidence that the business can see profitability, then the potential valuation is substantially higher.

Management

Exhibit 2: Management

Chairman: Dr John Reid	John has been a director of Cyan since 2005 and was appointed chairman in October 2007. He is an experienced manager with a record of developing profitable semiconductor businesses. In the 1990s he was a director of GEC Plessey Semiconductors.
CEO: Kenn Lamb	Kenn was appointed CEO in April 2007. From 2001 to 2006, Kenn was CEO of Elixent where he completed a successful sale of the business to Matsushita of Japan. Prior to Elixent he was senior VP of sales at ARC International where he managed the restructuring of its international sales team.
Financial Controller: Heather Peacock	After the resignation of Andrew Lee in February 2009, due to ill-health, the position of finance director was terminated and Cyan hired Heather Peacock as full-time financial controller.

Source: Edison Investment Research, CSR

Imagination Technologies

Year End	Revenue (£m)	PBT* (£m)	EPS* (p)	DPS (p)	P/E (x)	Yield (%)
03/07	48.1	(2.3)	(1.2)	0.0	N/A	N/A
04/08	60.0	1.9	1.0	0.0	100.0	N/A
04/09e	62.5	2.8	1.2	0.0	83.4	N/A
04/10e	74.2	5.9	2.5	0.0	39.3	N/A

Note: * PBT and EPS are normalised, excluding goodwill amortisation and exceptional items.

Investment summary: Priced for perfection

Imagination has long been seen (rightly or not) as an also-ran in the world of semiconductor IP, never reaching the scale or profitability of an ARM. However, the company is evolving and looks poised to deliver sustained profitability and growth. Key to this is the company's 3D graphics technology, which is being designed into mobile handsets and other consumer applications. While Apple and Intel are backing the long-term story, and the group should see strong growth in FY10, ultimately we see ARM spoiling the party. In addition, PURE revenues and profits could disappoint near-term. Despite this, the stock is priced for perfection at current levels.

The iPhone effect

The success of Apple's iPhone – which incorporates Imagination's graphics processor technology – has increased the level of customer engagement that Imagination is seeing, particularly in respect of its PowerVR SGX technology. In addition, Imagination recently announced a number of licensing deals with major OEMs and chipmakers that should see its technology deployed in multiple end-markets.

Ambitious growth forecasts

Imagination sees partner chip unit shipments doubling in FY09 and doubling again in FY10. The principal driver for this is increased adoption of 3D graphics capability in mobile handsets on the back of the iPhone effect. If Imagination comes close to achieving these bullish forecasts, coupled to a royalty rate of 16p per unit, then royalties could reach £30.6m in FY11 compared with £10.9m in FY08.

Valuation: Downside risks not priced in

Imagination trades on punchy multiples: 39x FY10 P/E and EV/EBITDA of 34x. The fact that Apple and Intel are shareholders may create warm and fuzzy feelings, but we see serious risks to the group's competitive positioning in the form of ARM's Mail graphics technology. Meanwhile, PURE radio sales could disappoint if the housing market and consumer spending remain depressed.

Price*	100p
Market Cap	£228m

* Priced at 26 May 2009

Share price graph

Share details

Code	IMG
Listing	FULL
Sector	IT Hardware
Shares in issue	228.4m

Price

52 week	High	Low
	117.5p	32.0p

Balance Sheet as at 31 October 2008

Debt/Equity (%)	N/A
NAV per share (p)	15
Net cash (£m)	9.1

Business

Imagination supplies semiconductor system-on-chip (SoC) intellectual property (IP) to chipmakers and OEMs. Its primary markets are mobile handsets, consumer electronics and automotives.

Valuation

	2008	2009e	2010e
P/E relative	941%	724%	397%
P/CF	N/A	65.6	45.6
EV/Sales	3.7	3.6	3.1
ROE	7%	7%	14%

Revenues by geography

Europe	Asia	US	RoW
53%	23%	24%	0%

Analyst

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Company description: 3D graphics and digital radio

Imagination supplies semiconductor system-on-chip (SoC) intellectual property (IP) to chipmakers and OEMs. Its primary markets are mobile handsets, consumer electronics and automotives. The group has two divisions: Technology and PURE. The Technology division creates and licenses embedded graphics, video, multi-standard receiver and other semiconductor SoC technologies, and is currently the market leader in embedded 3D graphics for mobile handsets. PURE is Imagination's brand-name digital radio business, which also licenses digital-radio technology to third-party manufacturers such as Grundig and Roberts. PURE has c 30% market share and Imagination's digital radio technology is designed into c 70% of digital radios. Imagination has passed through many phases over the years and at times has struggled to create a sustainable business. However, the Technology division is now making significant financial and strategic progress, resulting in a pre-tax profit of £1.9m in FY08 and the market expects strong earnings growth in FY09/10.

Mobile handsets: 3D graphics adoption cycle

The move to 3D graphics in mobile handsets is a key catalyst for Imagination's financials. Here the growth rates are potentially very high (in a range of 50-150% per year), and since the driver for this is a rapid technology adoption cycle, particularly in respect of smartphones, the expected c 12% decline in handset volumes in 2009 is likely to have a relatively marginal impact. Chipmakers such as Intel, Samsung and Texas Instruments have licensed Imagination's MBX and PowerVR SGX technology and include it on their SoC designs, which pack multiple processing cores, memory and interface components into a single, tightly integrated package. Our checks indicate Imagination's Power MBX chip is used in the Apple iPhone, the Nokia N95 and several other high-end handsets that support the OpenGL ES standard, ie the leading 3D rendering application programming interface (API) for mobile and embedded devices. The result is a rich, 3D user interface (see Exhibit 1). This is important because – following the success of the iPhone – the quality of the graphics and the user interface can make or break smartphone sales.

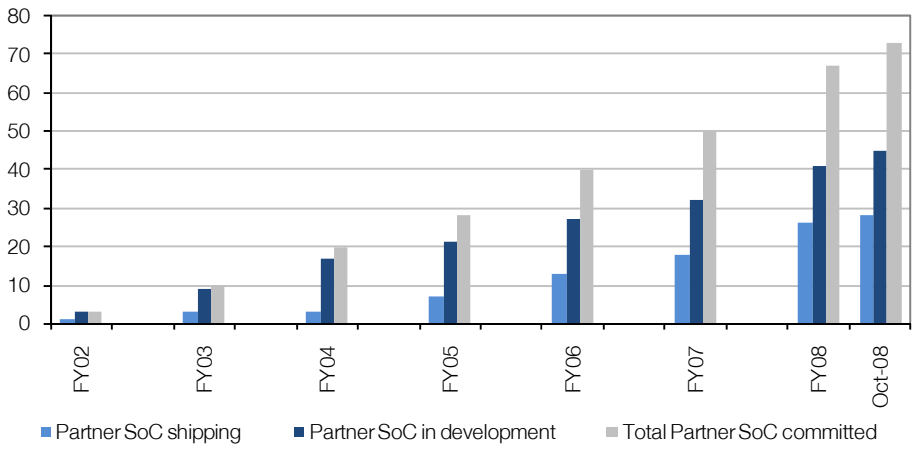
Exhibit 1: Apple iPhone and N95 user interfaces

Source: Apple, Nokia

The mobile handset segment is Imagination's largest in volume terms. Imagination is unique in having such a long history in the area of graphics IP for mobile handsets. It can rightfully claim a position of expertise in this market, and it has seen significant growth in design wins and partner chip unit shipments (see Exhibit 2). We estimate that Imagination has invested c £150m in R&D since 1999 to get where it is today. Competitors in this segment are few in number but include some big-hitters in the form of Nvidia, ARM and Vivante. Of these, Nvidia and Vivante look hamstrung, lacking meaningful design wins and chipmaker partnerships. ARM, however, looks to be going places with its graphics IP (dubbed Mali), which we see as a realistic competitive threat.

Just like Imagination's PowerVR technology, ARM's Mali technology offers console-quality mobile gaming, stunning user interfaces, advanced navigation and web browsing. Notably, ARM and Imagination worked together on graphics IP in the past, though they no longer do so. ARM gained insights and technical know-how which it has put to work. While Imagination is currently the *de facto* leader in advanced graphics IP for mobile handsets, ARM is rising through the ranks thanks to the competitive strength of Mali and the breadth of the ARM partner ecosystem. More than 20 chipmakers have licensed Mali, including Samsung, LG, Motorola, Broadcom and STMicro, and even though the Mali licensing cycle is in its infancy, there are already tens of millions of Mali enabled handsets in the marketplace (many of which are based on an earlier-generation software approach to 3D graphics). With ongoing product investment and partner collaboration, ARM could topple Imagination for dominance of advanced 3D graphics technology.

Exhibit 2: Status of Imagination's licensees



Source: Edison Investment Research, Imagination Technologies

Imagination is not down for the count, not yet at least. It claims its latest-generation PowerVR SGX system-on-chip IP takes handset graphics to new levels of performance and efficiency, a critical factor for handsets, and, importantly, is backwards compatible with code developed for MBX. The acid test is design wins and here Imagination counts Apple as a licensee. From Apple's perspective, Imagination's technology has been key in helping it differentiate its iPhone from other smartphones, and we believe Imagination's technology will be integrated into future SoC designs from PR Semi, a chip-design house that Apple acquired in 2008 to provide in-house expertise.

Strategically, Apple wants to keep itself flexible to adopt any mobile processor architecture (eg Intel's x-86 or ARM-based) while retaining a competitive edge in graphics performance and battery life, thereby leveraging the processor-agnostic design of its OS X operating system. Apple can achieve this by licensing Imagination's technology directly, as we believe it has, and by developing microprocessor technology in-house. We therefore believe Imagination is strategically important to Apple. Notably, Apple has a 3.6% stake in Imagination, which it acquired in a private placing in December 2008.

Intel is also of strategic significance. It is not only a licensee but also holds a 3.0% stake, which it acquired via a placing in September 2006 and a market purchase in December 2008. Intel plans to incorporate Imagination's technology into its Atom processor for netbooks and mobile internet devices (MIDs) – segments where it competes with ARM. Intel has been rumoured as a potential buyer of Imagination. However – leaving aside the issue of valuation – we can see little strategic advantage in Intel buying Imagination not least because it is already a licensee. In addition, we feel that Imagination's licensees would not greet an Intel acquisition with enthusiasm – which could harm Imagination's licensing opportunity and thereby invalidate any acquisition – since several of them compete with Intel in respect of ARM-based central processor units (CPUs) for mobile devices. This could in turn accelerate the adoption of ARM's Mali technology.

The huge success of the iPhone means there is now a major drive by Nokia, Samsung and other handset OEMs to migrate to technology that provides a rich user interface and internet browsing capabilities. We see a raft of 3D graphics-enabled handsets coming to market in H209, including the new iPhone (scheduled for June) and Samsung's Omnia HD. Imagination stands to benefit as many mobile handset chipmakers have a design licence to develop SoCs that include its graphics cores. Texas Instruments (TI) is a licensee, for example. This is important because many mobile handsets use its open multimedia application platform (OMAP) processors, including Nokia's N-series range, many other Nokia, Samsung and Sony Ericsson handsets. However, the longer-term outlook is rather more uncertain as TI's OMAP processors are ARM-based and TI could readily adopt ARM's Mali technology, thereby supplanting Imagination.

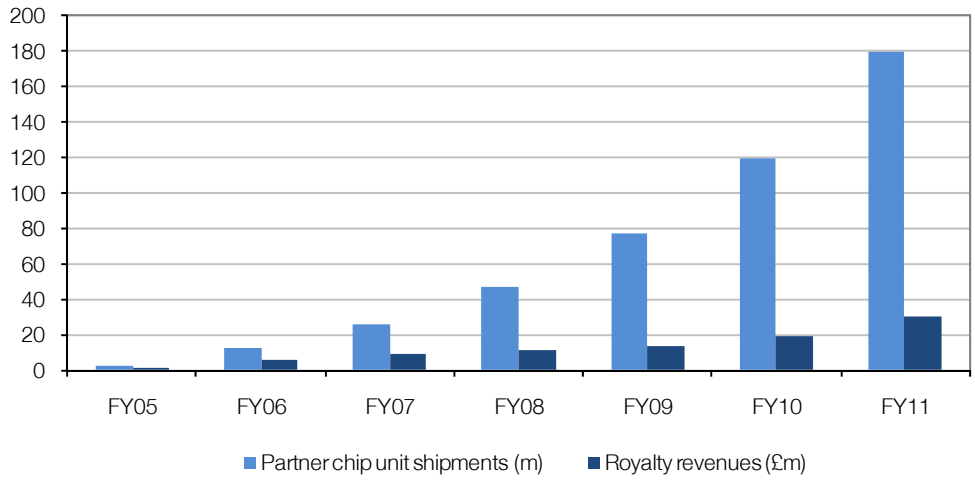
Imagination's addressable market is growing strongly, but…

The migration to 3D graphics in high-end handsets underpins Imagination's expectation of c 64% growth in unit shipment in FY09 (to c 77m units), and Imagination expects c 200m units to be shipped in FY11. It should be noted that Imagination's technology is also to be found in several other high-volume markets, such as home digital TVs, set-top boxes, mobile computing (notebook and netbook PCs) and in-car electronics (Navigation, PND). Here growth rates will accelerate once macroeconomic conditions improve, and thus contribute to the growth of Imagination's serviceable market.

While Imagination's ambitious growth expectations may be achieved or even exceeded in terms of unit shipments, we believe that royalty revenues may continue to be lacklustre compared with partner chip unit growth (see Exhibit 3). In FY08, for example, partner chip unit shipment surged 83% year-on-year, yet royalty revenues (billed in dollars and reported in sterling) increased by just 33% (on a dollar basis).

There are two reasons for this. Firstly, royalty revenues depend on the average selling prices (which more or less continually decline) and the volume of chips shipped, such that the royalty per unit declines as certain volume thresholds are reached. Secondly, Imagination has legacy royalty sharing agreements in place with ARM relating to MBX graphics IP, which appear to favour ARM almost as much as Imagination. Combined, these factors put a dampener on royalty growth. Imagination says the latter should be removed once the PowerVR SGX chip ramps up in meaningful volume; however, there is little visibility on when this inflection point will be reached, since it depends on the various development cycles of Imagination's licensees. We give Imagination the benefit of the doubt and forecast 47% royalty revenue growth in FY10 and 59% in FY11 (to £19.2m and £30.6m, respectively). However, we are mindful that this may prove too optimistic and that there is a risk that Imagination's PowerVR SGX technology may not be established quickly enough to nullify the pending competitive threat from ARM.

Exhibit 3: Lacklustre royalty revenues compared with partner chip unit shipments



Source: Edison Investment Research, Imagination Technologies

Sensitivities

- Imagination's financials depend on the timing of the ramp up of PowerVR SGX technology by licensees, which is difficult to predict with accuracy.
- ARM could quickly erode Imagination's competitive positioning, which could severely impact Imagination's expected growth rates.
- Although there are long-term growth opportunities for PURE radio in pan-European markets, PURE radio is dependent on UK retail at the moment.
- We do not think Intel or Apple will buy Imagination. However, it is possible that acquisition rumours could resurface, which could see the shares trade at a premium to current levels.
- Significant $/£ exchange rate movements have minimal impact on the group's overall profitability, with the dollars generated by the Technology business being used to procure product for the PURE Digital business.

Financials and valuation

We forecast revenues of £62.5m in FY09 and £74.1m in FY10, corresponding to 4% and 19% year-on-year growth respectively. Within this we estimate PURE revenues of £27.4m in FY09 (down 9% year-on-year) and Technology revenues of £35.1m (up 17%, with royalties up 20%). Our royalty revenue estimate is based on 77m partner chips at an average royalty rate of 17p in FY09 versus 23p in FY08.

For FY10, we forecast 22% growth in Technology revenues, driven by 47% growth in royalty revenues (based on 120m partner unit chip shipments), which assumes a healthy ramp up of PowerVR SGX technology. For PURE, we forecast 14% revenue growth in FY10, which assumes a degree of overseas expansion, particularly in Germany and France. We model 5% growth in operating expenses in FY09 and 14% growth in FY10, in line with management guidance and driven by rising R&D spending. Finally, we forecast earnings per share of 1.2p in FY09, 2.5p in FY10 and 2.7p in FY11.

Exhibit 4: Summary financials

Year end Apr	£'000s	2007	2008	2009e	2010e
Profit & Loss					
Turnover		48,062	60,022	62,535	74,187
(% change)		36%	25%	4%	19%
EBITDA		**(1,447)**	**2,679**	**3,760**	**6,884**
(% margin)		(3%)	4%	6%	9%
(% change)		73%	285%	40%	83%
EBIT pre GW and except's.		(3,069)	928	2,060	5,184
(% margin)		-6%	2%	3%	7%
Net financial items		219	379	150	124
Other		0	0	0	0
Pre-tax profit (norm'd)		(2,301)	1,881	2,760	5,858
Tax		(244)	383	0	0
Net Income		**(2,545)**	**2,264**	**2,760**	**5,858**
EPS (norm'd and fd)		**(1.2)**	**1.0**	**1.2**	**2.5**
Balance Sheet					
Fixed Assets		15,690	14,732	14,237	15,237
Current Assets		24,455	25,358	30,396	35,733
Current Liabilities		(8,783)	(7,104)	(7,645)	(8,843)
Long term Liabilities		(529)	(743)	0	0
Shareholders Equity		**30,833**	**32,243**	**36,988**	**42,126**
Cash Flow					
Cash flow from operations		(2,018)	(1,027)	3,297	4,741
Capex		(683)	(2,099)	(2,000)	(2,700)
Net debt(cash)		**(8,271)**	**(6,711)**	**(11,245)**	**(13,240)**

Source: Company accounts/Edison Investment Research

On our below-consensus estimates, which give Imagination the benefit of the doubt in terms of royalty revenue ramp in FY10/11, the stock is trading on 39x FY10 P/E (and 37x calendar year 2010), making it far and away the most expensive stock in this report on forward-year earnings. Looking at consensus estimates, the stock trades on 33x FY10 and 24x calendar year 2010 P/Es.

Looking at EV/EBITDA, Imagination trades on an equally punchy (and hard to justify) multiple of 34x FY10. We differ from calendar year 2010 consensus in forecasting a decline in Technology licensing revenues in FY11 due to competitive pressure from ARM.

To some extent, Imagination's earnings outlook justifies a premium rating, if it can deliver strong royalty revenue growth on the back of a doubling of partner chip unit shipments between FY09 and FY10, ie if it can deliver on its promises. However, we feel Imagination will have to pull a rabbit from a hat to justify an even greater premium than the one it already has. While the group should deliver profitability and growth in FY09 and FY10, we find it hard to get excited about the valuation, especially given the risk of share loss to ARM over the next two years, which could see Imagination's licensing and royalties collapse. If ARM can leverage the competitive strength of its Mali graphics technology and the breadth of the ARM partner ecosystem, then Imagination's days as a growth stock are numbered.

Management

Exhibit 5: Management

Chairman: Geoff Shingles	Geoff joined the Imagination board in 1994 and became chairman in 1996. He is a non-executive chairman of Sarantel Group plc and is also a non-executive director of a number of private companies.
CEO: Hossein Yassaie	Prior to joining Imagination in 1992, Hossein was with STMicro and Inmos for eight years, where he set up and managed the DSP and digital video developments. He was technical director at Imagination before becoming CEO in June 1998.
CFO: Trevor Selby	Trevor worked for the Dowty Group until 1992 holding senior finance positions in several of the group's IT companies. He joined Imagination and the board in 1996 as group finance director.

Source: Edison Investment Research, Imagination Technologies

IQE

Year End	Revenue (£m)	PBT* (£m)	EPS* (p)	DPS (p)	P/E (x)	Yield (%)
12/07	50.1	(0.1)	0.0	0.0	N/A	N/A
12/08	60.5	3.0	0.7	0.0	12.9	N/A
12/09e	54.5	2.9	0.7	0.0	12.9	N/A
12/10e	62.2	4.7	1.0	0.0	9.0	N/A

Note: * PBT and EPS are normalised, excluding goodwill amortisation and exceptional items.

Investment summary: Q.E.D.

Despite more than doubling off recent lows, IQE shares remain undervalued in our view. Strong cash generation means the group is in good shape to weather the downturn. IQE is also leveraged to growth in smartphones and well placed to profit from long-term opportunities in solar cells and solid-state lighting. Despite its c £18m of net debt, we believe IQE will continue to trade well within its debt covenants. On 9x 2010 P/E and 5x EV/EBITDA, risk/reward looks attractive given that double-digit revenue and earnings growth should return in 2010.

A one-stop shop for compound semiconductor wafers

IQE's strategy of focusing on high-growth markets has resulted in significant financial progress in recent years. The 2008 results showed EDITDA more than doubled to £8.4m compared with 2007 levels, while revenues of £60.5m were up 21%. While IQE will undoubtedly be impacted by end-market weakness in 2009, and the market has concerns about the group's £18m of net debt, IQE has reduced operating costs by c 17% and slashed capital expenditure. In addition, currencies are providing a helping hand and one of IQE's key end-markets – smartphones – should show double-digit growth in 2009, offsetting declines in the broader handset market.

New markets overlooked: Solar cells, solid-state lighting

Although the mobile handset market will remain the key revenue driver in 2009, IQE has developed new products for the solar cell and solid-state lighting markets. If IQE can participate in these markets to the extent we expect, it should create new revenue streams totalling £50-70m by 2014 in addition to revenues from the wireless communications markets. This potential is absent from today's share price.

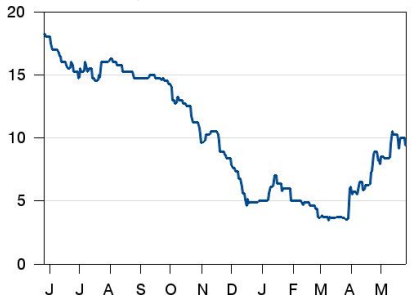
Valuation: Misconception creates opportunity

The valuation looks undemanding and represents a misappraisal of the group's competitive positioning, its operational leverage to the smartphone market, and its long-term potential in solar cells and solid-state lighting. The stock could rally strongly if handset volumes positively surprise in H209.

Price*	9p
Market Cap	£39m

*Priced as at 26 May 2009

Share price graph



Share details

Code	IQE
Listing	AIM
Sector	IT Hardware
Shares in issue	434m

Price

	High	Low
52 week	17.0p	3.4p

Balance Sheet as at 31 December 2008

Debt/Equity (%)	60
NAV per share (p)	7.0
Net borrowings (£m)	18.1

Business

IQE has positioned itself as a one-stop shop for the compound semiconductor wafer needs of the world's leading semiconductor manufacturers.

Valuation

	2008	2009e	2010e
P/E relative	121%	136%	76%
P/CF	5.2	4.3	4.4
EV/Sales	0.9	1.0	0.8
ROE	10%	8%	12%

Geography based on revenues

Europe	North America	Asia
24%	56%	20%

Analyst

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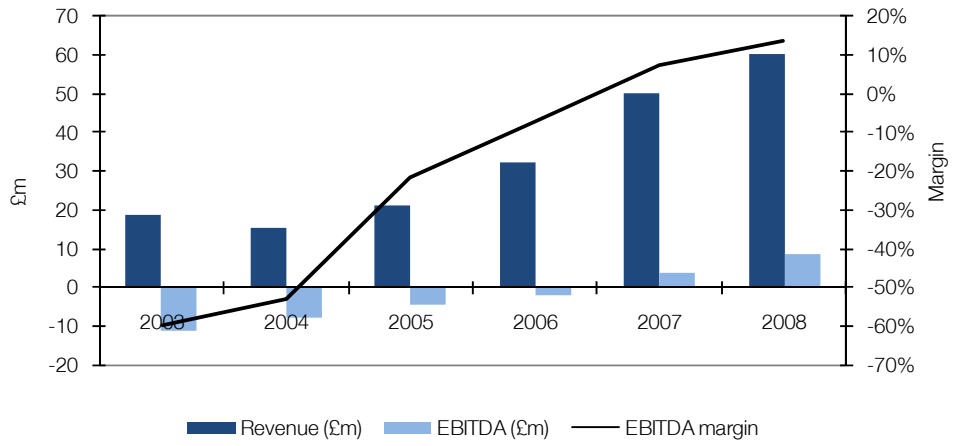
Company description: Leading wafer supplier

IQE has positioned itself as a one-stop shop for the compound semiconductor wafer needs of the world's leading semiconductor manufacturers. The group uses advanced crystal growth technology (epitaxy) to manufacture and supply bespoke semiconductor wafers (epi-wafers) to the major chipmakers, which then use these wafers to make the chips that form the key components of various electronic devices. IQE's wafers are used in a diverse range of leading consumer, computing, communication and industrial applications. IQE also provides R&D services to deliver customised materials for specific applications. The group operates six manufacturing facilities located in Cardiff (two) and Milton Keynes in the UK; in Bethlehem, Pennsylvania and Somerset, New Jersey in the US; and Singapore. IQE also has 11 sales offices located in major economic centres worldwide.

Strategy remains valid and intact

IQE's strategy of focusing on high-volume, high-growth markets has been executed successfully in recent years as evidenced by the group's financial progress (see Exhibit 1). Despite testing market conditions towards the end of last year, 2008 marked IQE's fourth consecutive year of strong growth, resulting in record revenues, profitability and cash flow.

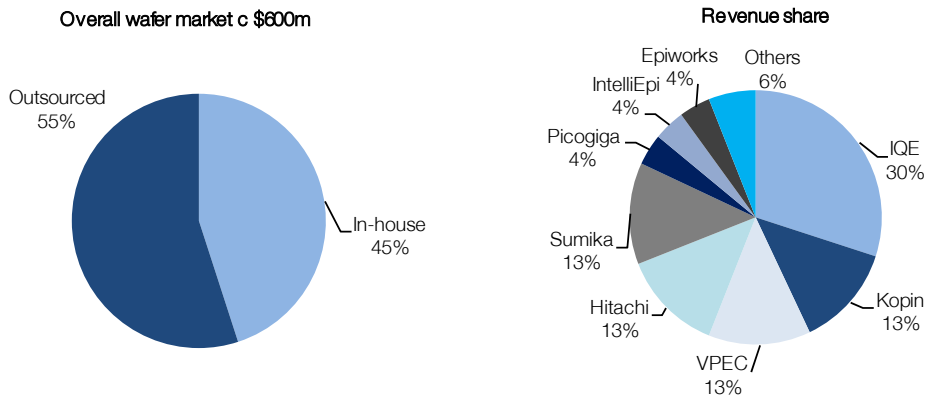
Exhibit 1: IQE's six-year revenue and EBITDA



Source: Edison Investment Research, IQE

As Exhibit 2 shows, IQE is the clear market leader in compound wafers for the wireless communications industry (principally mobile handsets). IQE supplies all of the major gallium arsenide (GaAs) module manufacturers and is therefore almost agnostic to share shifts among its customer base, or even share shifts among end-market handset suppliers (such as Nokia, Samsung, Sony Ericsson and others). IQE's customers include RFMD, Skyworks, Anadigics, TriQuint Semiconductor, Freescale and NEC. Another attraction is that compound semiconductor wafer outsourcing is set to grow in future years. Notably, Skyworks recently credited its ongoing profitability to its arrangements with its outsourcing manufacturing partners. Our checks suggest many of IQE's other customers are increasingly seeking to outsource wafer production to specialist foundries such as IQE in order to reduce overall wafer costs and accelerate time-to-market.

Exhibit 2: Market leader in compound semiconductors for the wireless market



Source: Edison Investment Research, IQE

IQE's end-markets include optical and wireless communications, consumer, computing, auto and industrial markets. Mobile handsets are the key market today, accounting for c 75% of group revenues. Here IQE benefits from the trend towards smartphones. This functionality requires high-speed radio-frequency communication technologies enabled by IQE's GaAs-based wafers. More advanced handsets mean increasing reliance on GaAs, ie more GaAs-based chips per handset. This ensures growing demand for IQE's wafers. For example, smartphone handsets contain several times more GaAs chips than previous generations. This creates a powerful demand driver for IQE's wafers. To the extent that smartphone shipments are expected to grow in 2009, IQE should benefit, although a shrinking low- and mid-range handset market will counteract this to some extent. Overall, we like IQE's leverage to greater sophistication per device.

Notably, IQE sees higher demand in Q2 versus Q1, and further quarter-on-quarter growth in H209. Nokia recently indicated that the 'vast majority' of channel inventory de-stocking appears to be over and that demand in a number of regions is showing signs of stabilising. On its 23 April conference call, TriQuint Semiconductor – a significant customer of IQE – confirmed this and flagged an inflection point of increasing demand late in Q109, which should translate into stronger demand in Q209. These are positive data-points for IQE.

While IQE is heavily reliant on the handset market, we feel that investors should not overlook the group's other markets. For example, IQE has a complete portfolio of opto-electronic wafer products for laser-based applications that address multiple markets such as optical communications, optical storage and computing peripherals. In addition, IQE's wafers can be found in WiFi chipsets and set-top-box tuners. In these and other markets we believe IQE can maintain and strengthen its leadership. Significantly, the group boasts a range of customer-funded R&D activities, which not only underpin its position as the leading compound semiconductor wafer supplier, but also bode well for future progress. Here IQE is pioneering germanium on insulator (GoI) and strontium titanium oxide (STO) for ultra high speed, high capacity flash memory. Additionally, we believe IQE is being sponsored by Intel to develop high-volume production processes for III-V on silicon. The group is also developing a portfolio of advanced opto-electronic and electronic wafers designed to address a range of new end-markets including solar power.

New products for efficient power generation and usage

Photo-voltaics (solar cells) and solid-state lighting (light-emitting diodes) are two semiconductor markets that are developing from niche applications to become clean, efficient and sustainable sources of energy and light, respectively. If, as we expect, IQE can participate in these markets, it could create new revenue streams that could total £50-70m by 2014. Our checks indicate that in these nascent markets IQE is well ahead of its present-day competitors, eg Kopin, VPEC, Epiworks and others.

Solar cells

In nine out of 10 solar systems, the underlying technology is based on silicon, for example crystalline silicon or thin-film silicon. However, there is growing interest in GaAs-based technology because it is much more efficient at converting light into usable energy compared with silicon. GaAs also has the potential to reduce overall system costs by reducing material usage, and – uniquely – can be applied to all levels of usage from residential buildings to utility-scale installations.

We believe the market for GaAs-based solar cell technology could see 50% growth per annum, reaching c 1.5m 4-inch GaAs wafers, and could take c 20% share of the global solar cell market by 2014. On this basis, IQE's revenues from GaAs-based solar cells could be as large as its 2008 wireless revenues by 2014. IQE's development work on GaAs-based concentrator photovoltaic (CPV) technology has already resulted in the formation of strategic partnerships with key players, and product development plans are now well advanced.

We expect IQE to begin volume production of products for CPV solar cells during H209. While any estimate is subject to significant uncertainty given the market's infancy and the difficulty of predicting ramp up of IQE's output, we forecast CPV revenues of £1.0m in 2009 and £3.0m in 2010. The big picture is that from H209 IQE is establishing a new source of revenue in the form of CPV, which should see strong growth in the years ahead.

Solid-state lighting

There is also considerable potential for IQE in the high-brightness solid-state lighting markets, eg architectural, entertainment, retail display, automotive, all of which are based on compound semiconductors. Here the global focus on energy consumption is a key demand driver. For example, lighting accounts for c 20% of annual electricity usage in the US and Western Europe and results in substantial emissions of CO_2.

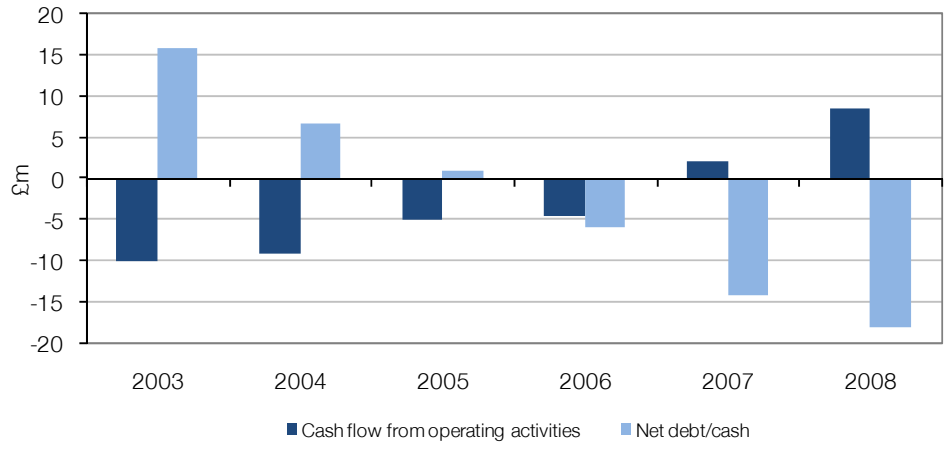
LED-based solid-state lighting is five times more efficient than mainstream incandescent lighting and is expected to be 10x more efficient by 2010. Legislation is already in place to ban incandescent light bulbs in the EU and US from 2012 and 2014, respectively. This will undoubtedly increase the market size for LED-based lighting technologies. As a result, IQE's revenues from this segment should increase in the years ahead, and the growth rate could be significant. On the negative side, the major players in this market have in-house wafer manufacturing capabilities, such as Lumileds and Orsam, which are business units of Philips Electronics and Siemens, respectively. However, there is also a considerable number of much smaller players based in the Far East, which, coupled to the highly fragmented nature of intellectual property and know-how, means that there is a clear growth opportunity for IQE in the solid-state lighting market.

Cash generation remains a focus of attention

IQE took swift action to restructure and streamline some of its operations in H208 in order to reduce costs and increase efficiencies. As a result, the group implemented short-time working arrangements and temporary pay reductions, which have reduced operating expenses by c 17% compared with 2008 levels. Currencies provide a helping hand in 2009, given that almost all of IQE's revenues are dollar-denominated, while 40% of its costs are in sterling. Using a $/£ exchange rate of 1.60 means that IQE would see flat revenues in 2009 even if dollar denominated revenues were to fall by 13% compared with 2008 levels. We estimate that dollar denominated revenues will fall by 18% in 2009.

The successful relocation of IQE's Singapore facility to a state-of-the-art clean room complex was completed in November 2008, marking the end of a major capital investment programme. As a result, we expect capital expenditure to fall from £6.4m in 2008 to £1.5m in 2009. This means IQE should continue to trade well within its debt covenants in 2009. While the group may not be able to avoid a cash outflow in H109 as a result of 40-50% lower revenues, we believe the business should swing into positive cash generation in H209, and net debt should be reduced to c £14m by year-end (from £18m at year-end 2008). All in all, the group's cash generation should hold up well in 2009 thanks to sharply lower capital expenditure and a reduced cost base. We therefore believe IQE is in good shape to weather the downturn. Moreover, the group's exposure to the handset market and in particular its leverage to smartphone volumes means it is highly geared to an end-market recovery.

Exhibit 3: IQE's operating cash flow and net debt/cash (£m)



Source: Edison Investment Research, IQE

Sensitivities

- IQE currently derives c 75% of revenues from GaAs wafers destined for the mobile handset market.
- Given that several of IQE's competitors are feeling the squeeze in 2009 and, in some cases, are non-core divisions of larger companies (eg PicoGiga), a degree of attrition among IQE's competitors could occur and IQE could benefit from this.

Financials and valuation

We forecast revenues of £54m in 2009 (down 10%) rising to £62m in 2010 (up 14%). For 2009 we estimate wireless revenues will decline 18% on a constant currency basis, and will be down 6% in sterling compared with 2008. Weak sterling provides a helping hand since almost all sales are dollar denominated. Debt is also primarily in sterling. We assume an average $/£ exchange rate for the year of 1.60.

While the group is likely to burn cash in H109 due to the inventory correction and the associated sales decline, we expect good cash generation for the year and, consequently, net debt to be reduced to c £14m. Capex requirements are very modest (we estimate £1.5m in 2009), and according to management, the group should continue to trade well within its debt covenants. Our normalised 2009 and 2010 EPS forecasts are 0.7p and 1.0p, respectively. These could see upside if the handset market recovers strongly in H209 and into 2010, or if government or enterprise spending on green technology projects, such as solar cells and solid-state lighting, comes in stronger than we anticipate.

The shares trade on 9x 2010 P/E and 5x EV/EBITDA. Clearly the valuation is undemanding, and in our view represents a misappraisal the group's competitive positioning, its operational leverage to the smartphone market, and the medium-term potential in solar cells and solid-state lighting. The shares could rally strongly if handset volumes positively surprise in H209.

Exhibit 4: Financials

Year end Dec	£'000s	2007	2008	2009e	2010e
Profit & Loss					
Turnover		50,065	60,485	54,487	62,198
(% change)		54%	21%	(10%)	14%
EBITDA		**3,320**	**8,407**	**8,282**	**9,949**
(% margin)		7%	14%	15%	16%
(% change)			153%	(1%)	20%
EBIT pre GW and except's.		920	4,447	4,182	5,749
(% margin)		2%	7%	8%	9%
Net financial items		(1,036)	(1,454)	(1,260)	(1,098)
Other		0	0	0	0
Pre-tax profit (norm'd)		(116)	2,993	2,922	4,651
Tax		0	0	0	0
Net Income		**(116)**	**2,993**	**2,922**	**4,651**
EPS (norm'd and fd)		**(0.0)**	**0.7**	**0.7**	**1.0**
Balance Sheet					
Fixed Assets		29,353	40,301	38,726	36,826
Current Assets		17,231	22,005	23,239	27,087
Current Liabilities		(15,243)	(21,951)	(20,330)	(22,217)
Long term Liabilities		(8,381)	(10,128)	(7,045)	(4,045)
Shareholders Equity		**22,960**	**30,227**	**34,590**	**37,651**
Cash Flow					
Cash flow from operations		1,828	7,461	9,089	8,912
Capex		(7,814)	(6,361)	(1,500)	(1,500)
Net debt(cash)		**14,159**	**18,126**	**13,184**	**8,572**

Source: IQE, Edison Investment Research

Management

Exhibit 5: Management

Chairman: Godfrey Ainsworth	Godfrey qualified as a chartered accountant and after a period in the accountancy profession he founded Gambit Corporate Finance in 1992, specialising in corporate finance services. He was appointed to the board in 1999 and appointed chairman in 2002.
CEO: Dr Andrew Nelson	Drew joined BT Research Laboratories in 1981, leading the group responsible for the development of MOCVD technology. Together with Mike Scott, he founded EPI in 1988, becoming CEO in 1996. Drew has been CEO of IQE since April 1999.
CFO: Phillip J Rasmussen	Phil qualified as a chartered accountant in the audit practice of Coopers & Lybrand. Before joining IQE, he was director of Transaction Services with PwC and worked with IQE on two major acquisitions. He was appointed CFO in March 2007.

Source: Edison Investment Research, IQE

Wolfson Microelectronics

Year End	Revenue ($m)	PBT* ($m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/07	231.1	43.1	26.2	0.0	6.2	N/A
12/08	198.2	22.0	13.5	0.0	12.1	N/A
12/09e	141.5	(2.8)	(2.4)	0.0	N/A	N/A
12/10e	161.3	3.4	2.9	0.0	56.9	N/A

Note: * PBT and EPS are normalised, excluding goodwill amortisation and exceptional items.

Investment summary: More bark than bite

While 2009 marks a challenging year for Wolfson, the company's AudioPlus strategy should spur a revival of fortunes in 2010/11. However, we believe the shares already discount recovery in FY10/11 on the back of design-win momentum for AudioPlus. With this in mind, and given the lacklustre near-term outlook for many of Wolfson's consumer electronics end-markets, we would stay on the sidelines until management can be more specific about AudioPlus design wins and the revenue implications for 2010.

Top-line turmoil in 2009

The Q109 results showed many of Wolfson's revenue segments declined by 60-70% compared with Q108 levels, with overall revenues down 46%; however, flat-panel TVs and handsets were bright spots as reflected in 56% and 25% growth. Overall, H109 revenues are likely to decline by c 40% year-on-year, with FY09 revenues down c 30% in the absence of a strong end-market rebound. This will lead to Wolfson's first financial year EBIT loss since its IPO. However, it should exit the year with net cash of c $100m.

AudioPlus: Meaningful revenues expected in 2010

AudioPlus spans a range of functionality (including power management and silicon microphones) aimed at marking out Wolfson as the supplier of choice for portable consumer devices. With AudioPlus, Wolfson believes it can triple its addressable market within three years by increasing its 'share of board', ie increasing the number of Wolfson chips per circuit board, driving a 20% CAGR from 2008-2012. This means it must win sockets in new markets, or where it is a small player today.

Valuation: High enough for now

The shares trade on 57x FY10 P/E and a much more reasonable 12x FY11. There is room for upside on an 18-24 month view, yet near-term the valuation looks full in the context of the group's recent top-line turmoil. Before turning more constructive, we would need to see specific news about AudioPlus design wins and the likely top-line implications for 2010.

Price*	113.8p
Market Cap	£131m

* Priced as at 26 May 2009

Share price graph

Share details

Code	WLF
Listing	FULL
Sector	IT Hardware
Shares in issue	115.1m

Price

52 week	High	Low
	130.5p	64.0p

Balance Sheet as at 31 March 2009

Debt/Equity (%)	N/A
NAV per share (c)	151
Net cash ($m)	97

Business

Wolfson is a fabless company specialising in the design of mixed-signal semiconductors for the consumer electronics market. It has a renowned audio brand.

Valuation

	2008	2009e	2010e
P/E relative	144%	N/A	609%
P/CF	5.2	7.7	17.8
EV/Sales	0.6	0.8	0.7
ROE	9%	N/A	2%

Geography based on revenues

Japan	Europe	US	RoW
16.4%	12.0%	4.0%	67.6%

Analyst

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Company description: Audio par excellence

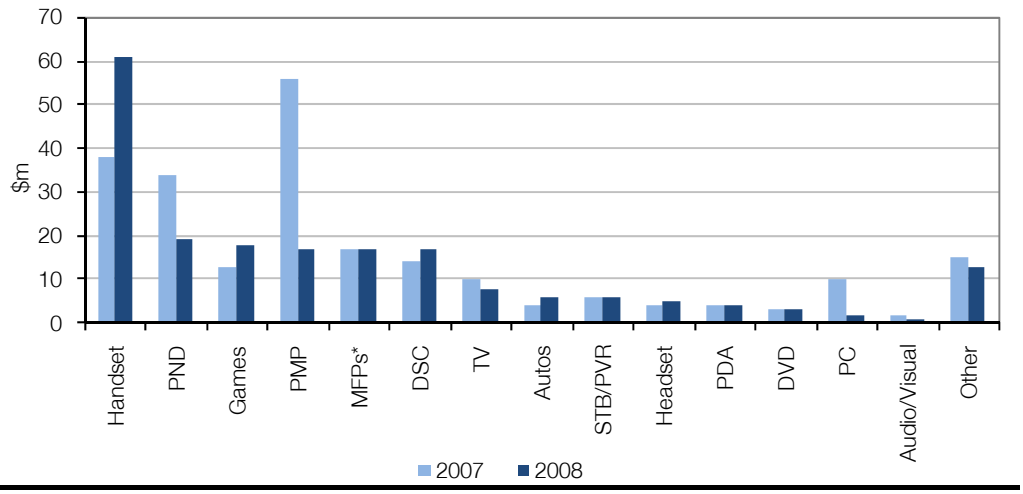
Wolfson is a fabless company specialising in the design of mixed-signal semiconductors for the consumer electronics market. Mixed-signal refers to the use of both analogue and digital circuits on a semiconductor chip. Wolfson has created more than 80 mixed-signal products for the consumer electronics markets. It has a renowned brand for audio technology, and its products can be found in mobile handsets, portable media players, digital cameras, flat-panel TVs and a raft of other devices. Its customers include Apple, Alpine, Canon, Garmin, Hewlett Packard, Samsung, Sony and Tom Tom. CEO Mike Hickey is a veteran of Motorola's European multimedia business; he also oversaw a major downsizing at Kymata before its £100m takeover by Alcatel in 2001. Finally, Wolfson employs c 370 people, its headquarters are in Edinburgh, and it has sales and engineering teams located in major economic centres worldwide.

Top-line turmoil, but some bright spots

As Exhibit 1 shows, Wolfson derives the bulk of its revenues from mobile handsets, personal navigation devices (PNDs), games consoles, portable media players (PMPs) and digital cameras (DSCs). It saw 60% growth in the mobile handset segment in 2008, thanks to audio design wins at Samsung and LG. The handset segment now accounts for c 30% of Wolfson's revenues; revenues from digital cameras, automotive, headset and gaming segments also increased in 2008. However, revenues from PMPs slumped 70%, mainly due to loss of share at Apple (relating to iPod not iPhone). We believe US-based Cirrus Logic was the main beneficiary here. Wolfson also suffered loss of market share in low-end PNDs in 2008, which, coupled with demand weakness and price erosion, resulted in a 44% decline in PND segment revenues in 2008. The Q109 results showed a continuation of poor sales in the PND, gaming, DSC and other segments, with overall revenues down 46% compared with Q108 levels. Within this, however, handset-related revenues increased 25% (accounting for 47% of total revenues) on the back of multimedia and smartphones. Revenues from the flat-panel TV segment jumped in Q109, up 56% year-on-year to $2.8m, thanks to design wins with a Tier 1 manufacturer.

Exhibit 1: Revenues by market segment ($m)

Note: * Multi function printers.



Source: Edison Investment Research, Wolfson

Strategy: Growing share of board

Wolfson must diversify its end-markets in order to offset recent share losses in PMPs and PNDs. While the company deserves credit for gaining traction in mobile handsets, Wolfson still has much to prove. Undoubtedly, its plans for future growth are ambitious: Wolfson believes it can treble its addressable market within three years, mainly by increasing its 'share of board', ie increasing the number of Wolfson chips per circuit board (see Exhibit 2), and by getting new products into the marketplace. This means it must win sockets in new markets, or win sockets where it is a small player today. Wolfson believes it can do this by offering products that are cheaper, smaller and better than those of its competitors.

Exhibit 2: Wolfson's view of its addressable markets in 2008 and 2011

2008	Handsets	Headphones	Flat-panel TV	Autos	PND	PMP	PC/Notebook	Gaming	DSC	Hi-Fi	Set-top box
High performance audio				✓			✓	✓✓✓		✓✓✓	✓✓✓
Audio hub	✓✓✓										
Low power audio	✓✓✓				✓✓✓	✓✓✓		✓✓✓	✓✓✓		
Amps											
Power management	✓					✓		✓			
Microphones	✓	✓		✓	✓	✓		✓	✓		✓
Ambient noise cancellation		✓									
2011e											
High performance audio			✓✓✓	✓✓✓			✓✓✓	✓✓✓		✓✓✓	✓✓✓
Audio hub	✓✓✓										
Low power audio	✓✓✓	✓			✓✓✓	✓✓✓		✓✓✓	✓✓✓		
Amps	✓✓✓		✓		✓✓✓	✓✓✓	✓✓✓		✓		
Power management	✓✓✓		✓	✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓	✓	✓✓✓
Microphones	✓✓✓	✓		✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓		✓✓✓
Ambient noise cancellation	✓✓✓	✓✓✓	✓	✓	✓	✓		✓	✓	✓	

✓ partially addressed
✓✓✓ addressed

Source: Edison Investment Research, Wolfson

As part of its growth strategy, Wolfson has set out a number of strategic objectives:

- Develop technologies to enable new user experiences and expand addressable markets.
- Focus on feature-differentiated consumer electronic applications that require high performance audio in compact, low power and low cost packages.
- Broaden the portfolio of audio technologies, customers and applications in order to broaden the revenue base.
- Build customer relationships through individualised product cycle support.
- Continue to invest in both technical and management skills development.

These are sensible objectives and in pursuing them the company is investing c 25% of revenues into R&D each year in order to stay competitive. Ultimately, Wolfson's growth strategy depends on its competitive positioning and the market's adoption of its AudioPlus technology.

Wolfson's AudioPlus strategy and roadmap were developed in-house and through Wolfson's acquisitions of Oligon and Sonaptic in 2007. The latter added acoustic technology to enable active noise cancellation and sound enhancement technologies, while the former was instrumental in allowing Wolfson to develop Micro-Electro-Mechanical systems (MEMS) based transducer technology for silicon microphone devices.

AudioPlus spans a range of functionality (including integrated power management and silicon microphones) aimed at marking out Wolfson as the supplier of choice for portable, consumer devices. For these reasons, AudioPlus potentially allows access to more end-markets, which underpins Wolfson's hoped-for trebling of its addressable markets. The family includes:

- Pure Sound – Solutions for natural sounding high-performance audio.
- Smart Power – Ultra-low power consumption and integrated power management.
- True Mics – High-performance silicon microphones.
- Enhanced Soundware – Advanced audio algorithms for an enhanced listening experience.

Pure Sound is targeted at end-markets where Wolfson is already well established, ie where high audio quality is a 'must have' – such as smartphones and portable music players. Here Wolfson can leverage its renowned audio brand.

Smart Power is aimed at multiple markets, mainly battery powered consumer devices such as PMPs and mobile gaming, where Wolfson hopes to grow share in large and mature markets.

In respect of True Mics and Enhanced Soundware, Wolfson hopes to enter and lead rapidly growing markets. Exhibit 3 summarises the key end-markets for AudioPlus (high-growth markets are highlighted in blue).

Exhibit 3: Growth outlook for Wolfson's key end-markets

Total addressable market ($m)	2008	2009	2010	2011	CAGR
High performance audio	318	308	299	291	-3%
Low power audio	347	348	348	349	0%
Audio Hub	141	164	191	222	16%
Audio Amps	330	332	333	335	1%
Power management	880	899	919	940	2%
Mics	240	318	422	560	33%
Enhanced software	100	168	281	470	68%

Source: Edison Investment Research, Wolfson

Meaningful revenues expected in 2010

Wolfson must start hitting targets, and show that all the investment into AudioPlus has been worthwhile. Management expects initial revenues from AudioPlus products in 2009, and a 'meaningful contribution' in 2010. Key to the growth outlook is the competitive landscape. Our checks confirm that no single competitor competes with Wolfson across all its product segments. However, there are suppliers of mixed-signal semiconductors that compete with Wolfson on a segment-by-segment basis. These include Texas Instruments, Broadcom, Infineon, Cirrus Logic, AKM, Maxim and Analog Devices. CSR should not to be overlooked, due to its existing customer relationships in the handset market; it hopes to get involved starting in 2009 with its MusiCore technology (Bluetooth + embedded audio), although we feel this is likely to be a slow burn.

Some of Wolfson's competitors claim superior cost-performance, yet none appears to offer the breadth of products or high-quality functionality that AudioPlus can deliver. This bodes well for Wolfson. While AudioPlus is cost competitive, we do not believe it is the lowest-cost technology of its type, thus if OEMs prioritise cost over audio performance, in the event of heavy price competition, Wolfson's ability to win sockets and grow revenues could be compromised. Overall, however, we believe AudioPlus can open up new markets, such as silicon microphones and ambient noise cancellation, and should see Wolfson maintain a strong presence in its established markets. Add in an end-market recovery, and Wolfson should see top-line growth in 2010 and 2011.

Sensitivities

- Wolfson's end-markets are consumer electronics related and many of them are declining in value and volume terms in 2009.
- Wolfson's hoped-for goal of expanding its addressable market could prove too optimistic if, for example, Wolfson's competitors up the ante in terms of audio quality.
- Wolfson reports in US dollars, almost all of its revenues are denominated in dollars and the majority of its operating costs are expensed in sterling. The fall in the value of sterling provides an exchange rate benefit in terms of Wolfson's operating margin. It is estimated that every one cent fall in the $/£ exchange rate has the effect of increasing the group's operating profit by c $275k on an annualised basis. Conversely, any strengthening of sterling has a negative impact.
- Wolfson has renowned engineering expertise, a best-in-class audio brand and c $100m in net cash. The group could therefore be subject to a takeover by a chipmaker such as, for example, Texas Instruments, Analog Devices or National Semiconductor.

Financials and valuation

Wolfson faces a c 40% decline in H109 revenues compared with H108, and an uncertain H209 outlook. However, we believe AudioPlus is competitive and can return the group to profitable trading and growth in the medium term. As a base case, we model a 29% revenue decline in FY09 to $142m and 14% growth in FY10. We believe 2011 should see increased traction for AudioPlus, driving 26% revenue growth (broadly restoring revenues to 2008 levels). Overall, our base-case assumes 16% revenue CAGR from 2008-2012, lower than management's targeted 20%. Given this outlook, we believe Wolfson will report an adjusted EBIT loss of c $5m in FY09, and earnings will remain depressed, ie below 2008 levels, until 2011.

The shares have rallied 37% year-to-date, and now trade on 57x FY10 P/E, and a more reasonable 12x FY11. The key to sustaining this valuation is evidence of end-market recovery and execution on AudioPlus. Clearly the market is looking past a challenging 2009, and discounting earnings growth in FY10/11 on the back of design-win momentum for AudioPlus. With this in mind, and given the lacklustre near-term outlook for many of Wolfson's end-markets, we would stay on the sidelines until management can be more specific about AudioPlus design wins and the revenue implications for 2010.

Exhibit 4: Financial summary

Year end Dec	$'000s	2007	2008	2009e	2010e
Profit & Loss					
Turnover		231,061	198,199	141,500	161,310
(% change)		13%	(14%)	(29%)	14%
EBITDA		**51,265**	**29,071**	**4,045**	**9,655**
(% margin)		22%	15%	3%	6%
(% change)		8%	(43%)	(86%)	139%
EBIT pre GW and exceptionals		39,208	19,712	(4,955)	655
(% margin)		17%	10%	(4%)	0%
Net financial items		3,935	2,288	2,127	2,742
Other		0	0	0	0
Pre-tax profit (norm'd)		43,143	22,000	(2,828)	3,397
Tax		(11,293)	(2,964)	0	0
Net Income		**31,208**	**15,941**	**(2,828)**	**3,397**
EPS (norm'd and fd)		**26.2**	**13.5**	**(2.4)**	**2.9**
Balance Sheet					
Fixed Assets		82,804	75,052	70,401	66,401
Current Assets		149,649	132,404	128,483	137,608
Current Liabilities		(43,674)	(18,190)	(13,247)	(14,975)
Long term Liabilities		(14,911)	(12,936)	(12,100)	(11,700)
Shareholders Equity		**173,868**	**176,330**	**173,537**	**177,334**
Cash Flow					
Cash flow from operations		52,524	16,009	10,601	7,364
Capex		(13,126)	(6,310)	(5,000)	(5,000)
Net debt(cash)		**(89,605)**	**(92,193)**	**(99,775)**	**(104,881)**

Source: Company accounts/Edison Investment Research

Management

Exhibit 5: Management

Chairman: Michael Ruettgers	Michael joined the board as chairman in January 2008. He is a senior advisor to the EMC Board and retired chairman of EMC. During his term as CEO of EMC he was named one of the "World's Top 25 Executives" by *BusinessWeek*.
CEO: Mike Hickey	Mike was appointed CEO on 1 January 2009. He joined Wolfson from Motorola Inc. where from March 2005 he held various senior positions in Motorola's mobile devices business. Previously, he held senior positions at Alcatel and Philips.
CFO: Mark Cubitt	Mark joined Wolfson as CFO in January 2007. Previously he was the finance director of Babtie Group from 2001 to the sale of the company to Jacobs in 2004. Before joining Babtie, Mark was the finance director of Dawson International plc.

Source: Edison Investment Research, Wolfson

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