Acorn Group plc
Company Background

I. Converging Technologies Herald the Information Age

Poised at the brink of the 21St Century, technology developments that change the way we work and live are accelerating at an unprecedented rate. In the past two decades, there has been significant technology growth in individual market areas such as computing, interactive multimedia and telecommunications, and, more recently, the Internet and World Wide Web. Today, convergence is the focus. Integrating these technologies in new ways and exploring the possibilities for new products and services will shape the future.

Today's leading-edge technology products cater to individual needs and provide breakthrough levels of accessibility, flexibility and useability both for business and the home. The technology infrastructure already exists to provide new services such as entertainment-on-demand, on-screen links to URLs, personalised news reports, interactive voting, links from movie previews and on-line ticket purchases, all on the family TV. Worldwide trials of this technology, such as the Cambridge Interactive TV trial in the UK and Reno TV trial in the US, and installations in Hong Kong, France and Hawaii have proved very successful.

The market for digital TV today is supplier-driven, and the technology infrastructure is well under construction. Government regulation has mandated the shift to the digital TV format, the broadcasting industry wants to provide more channels, new services and better picture/sound quality, and the consumer electronics industry wants to breathe new life into the commodity TV market. In light of these market forces, many predict 1998 is the year digital TV will become a reality. In addition, multi-vendor, world-wide deals for set-top boxes are being announced at a rapid pace, and the continued explosion of the Internet and Web set the stage for a strong market for interactive TV. Consumers will be able to access a wealth of information at their fingertips on their familiar living room TV set.

By the year 2000, Jupiter Communications estimates that 16 percent of Internet access will come from sources other than a PC, and that the TV will be the leading non-PC access device. The firm predicts that the market for hardware that brings the Internet to TV will move from the 1 million units in 1998 to 7.7 million in 2002.

Fourth Wave Computing

In addition, a major shift is taking place as we embark upon the fourth wave of computing. The first wave was the mainframe, the second, the minicomputer, the third, the PC, and now, with a new class of appliance, the Network Computer, the fourth wave is launched. This does not imply that the PC is dead. Rather, it has reached a critical stage of maturity.

The Network Computer, licensed by Oracle, belongs to an emerging class of new products known as Information Appliances (IA). These products include low-cost, dedicated terminals, smartphones and low-cost Internet devices designed to provide easy network and Internet access

Acorn Computers Limited
Acorn House 645 Newmarket Road
Cambridge CB5 8PB United Kingdom

Telephone +44(0) 1223 725000 W W W
http://www.acorn.com/

with limited storage and processing capability. The market for Information Appliances is being driven by the increased bandwidth that can now be delivered to the consumer's home, made possible by DSL technology, and the opportunity to use client end solutions such as the Citrix ICA that offer consumers low-cost Internet and networking products.

To cut costs and streamline system maintenance, corporate IT departments are seriously considering the Network Computer (NC) model. The NC is a network-based, multimedia appliance that supports Web browsing, email, PC applications, and graphics. Its lack of local mass storage, minimal RAM requirements and easy design from low-cost components, make it very cost effective. The NC will supplement, rather than replace, the PC, providing a cost-effective appliance primarily for information consumption, while the PC can be used for information creation.

II. Technology Solution Providers — Business Model for the Information Age

Because of rapid shifts in technology, convergence and increased market pressures, today's system suppliers are increasingly looking at leading-edge design consultancies and technology licensers to help them develop products that are competitive and quick to market: Vendors appreciate having the flexibility to license part of a solution, an entire solution, or perhaps bring in an expert for design consultation to accelerate product development.

The design consultancy/ technology licensing business model is cooperative rather than competitive. The consultancy does not compete directly with the supplier in the marketplace. High-technology suppliers are engaged in competition on many fronts including pricing, innovation and product development. Today's market pressures drive the industry to deliver ever-lower-cost products with higher functionality in shorter timeframes. These increased pressures represent a major opportunity for a high- technology design consultancy, such as Acorn, to accelerate and add significant value to a client's product development.

The design consultancy firm wins, too. It can channel resources to focus on the intricacies of specific technologies, market its expertise globally, and design the most innovative solutions. The firm can also play a major role in developing technology roadmaps that give customers a glimpse of the future and foreshadow the evolution and maturation of new and existing technologies.

For instance, Acorn has core competencies in digital TV and has developed software solutions that provide increased levels of flexibility and functionality: This technology is well-suited to fast-moving sectors where development flexibility is of prime importance.

III. Acorn's History of Technology Innovation

Acorn Group, plc, based in Cambridge, UK, was founded in 1978 and has been at the forefront of IT developments for nearly 20 years. Acorn emerged as part of the "Cambridge phenomenon," a group of highly successful technology start-ups with roots in the University's historically renowned and newly entrepreneurial scientific community: Acorn, started by physicist Hermann Hauser, almost single-handedly jump-started development of the UK's "Silicon Fen," which has attracted the interest and investment capital of Hewlett-Packard, Microsoft and other leading US technology companies: Acorn has three divisions: Advanced RISC Machines (ARM), Acorn Computers Ltd:, and Xemplar.

Acorn started a wave of technology innovation beginning with its BBC microcomputer, which became the UK standard for educational computing, and sold well over a million units in one decade. Its ARM 32-bit RISC microprocessor broke new ground in processor performance and lower system costs: And, most recently, the company was tapped by Oracle to supply reference designs for the Network Computer.

Acorn's Technology Milestones

1981 Designed and manufactured BBC computer

1987 Unveiled the first 32-bit RISC desktop microprocessor

1990 Formed ARM division to focus on RISC processor development

1992 Launched the first software-only full motion video codec

1994 Launched the first fully-digital ATM interactive TV trial in Cambridge:

1995 Announces set-top box

1996 Delivers SmartTV to Curtis Mathes

1996 First prototype Network Computer delivered to Oracle

1997 First to support the Java^{m} platform on TVs

1997 Formed partnership with Digital, Ericsson and Oracle for video-enabled Web services

IV. Acorn's Re-Birth as a Technology Powerhouse

In 1996, Acorn transformed its core business from educational PC supplier to convergence technology developer and licensor. The company recognised its limitations as a vertically-integrated PC vendor and made a decision to use its significant R&D resources. Because of its expertise with the RISC ARM processor architecture and the company's work in handling multimedia content on a TV, Acorn was ideally positioned to cultivate and drive leading-edge convergence solutions.

Acorn provides end products, technology licensing, and/or design services for system hardware design and system integration, including application-specific integrated circuits (ASICs), operating systems and software components. Acorn provides a very flexible range of options to meet customer design requirements — the design can be a complete, production-ready reference design, specific technologies used in the reference design, or it can be as high-level as a schematic drawing that illustrates the findings of a feasibility study:

Acorn is considered a key player in the emerging Internet industry and its technologies feature prominently in the interactive TV and intelligent network appliance markets. Acorn boasts a blue-chip list of global industry partnerships and technology customers such as Intel, Digital, Cirrus Logic, Sprint, Oracle, NetChannel, Raytheon, Samsung, Olivetti, RCA, Silicon Graphics, Casio and Zenith.

V. The Acorn Architecture – Tomorrow's technology in today's products

Acorn, in conjunction with its partners, has developed one of the most comprehensive families of information appliance technologies available today. These technologies will shape the direction of new consumer and office-based interactive devices. Acorn's technology serves as the new brains powering new and existing systems such as Internet appliances, televisions, VCRs, games systems, photocopiers, fax systems, set-top boxes and Network Computers.

Acorn offers a complete silicon and hardware design, operating system and application solution. This includes a broad selection of proven reference designs, customised operating systems and applications, as well as access to licensed and integrated technologies such as Java, Shockwave™ and RealAudio™.

Acorn provides off-the-shelf or customised hardware designs and can assist customers in every stage of product development from concept to production.

Acorn acTiVe Range — Broadband Digital Video Receiving Devices

Acorn has been in the interactive TV field since 1994, and has built relationships with key suppliers in the market such as Alcatel, nCUBE, Sun Microsystems, Digital and Ericsson: The company's broadband video technologies address the power consumption, integration and display demands of the future, and the company has developed hardware and software that

provide the highest functionality at the lowest cost. Acorn's core expertise lies in delivering high-definition, anti-aliased fonts and graphics on low-quality monitors and TVs. The technology is very well-suited for today's consumer interactive multimedia devices.

The set-top box (STB) is widely perceived as a dumb RF-tuner, but today's digital TV solutions require more than dumb STBs. Acorn's STB22 is dynamic, intelligent and digital. This is the company's third-generation digital STB and it is designed to meet and exceed the demands of interactive television. Its uniquely powerful combination of features makes it a preferred choice for large-scale trials and volume commercial deployments:

The Acorn STB22 gives the ordinary TV immediate access to a wide range of broadband services: It is designed to support and encourage user participation in services such as selecting video on demand, home shopping or playing networked games. And, Acorn has developed a solid roadmap of products that will meet consumers' needs to access the world of information that will be available on the domestic TV:

Video-Enhanced Web Services Solution

The Video-Enhanced Web Services solution jointly created by Acorn, Digital Equipment Corp., Ericsson, and Oracle enables telecommunications enterprises to provide customers with access to full-streaming, high-quality video from an Internet environment. The solution integrates new and leading products from each company: a set-top box from Acorn, the new ATM-based multi-service access network from Ericsson, video server application software from Oracle, and the high-performance, Alpha-based video server platform provided by Digital.

The solution, which represents the first true convergence of interactive TV and the Web, will enable subscribers to interactively search, select and view a range of "infotainment" services including news, films, information and educational programs using Internet technology. For the first time, services will include full-motion MPEG-2 video delivered over ATM. A unique aspect of this solution is the ability to deliver a variety of services into the home in a cost-effective manner using a single interface adapter, thereby eliminating the need for multiple access boxes for each service.

Acorn Core Technologies

Acorn has a range of licensable technologies that provide time-to-market, feature and cost advantages to manufacturers, integrators and solution providers: These technologies are designed for business, home and mobile applications and require little or no maintenance.

Hardware Designs

Acorn licenses a wide range of off-the-shelf solutions such as the Acorn Network Computer (NC), Acorn Fast NC, Acorn Corporate NC, Acorn Home NC, Acorn NCLite and Acorn NewsPAD, all designed for easy, cost-effective network access in the office, home or on the road. Acorn can customise these designs as required, or the company can develop tailor made solutions from its core technologies.

Reference Designs

Acorn has developed several licensable system designs that address a variety of emerging markets. These reference designs are based on requirements for networked interactive multimedia, Internet access and existing application support within the consumer device and office/corporate environments.

Current Acorn reference designs include:

- Internet consoles
- Network Computers
- Set-top boxes
- Fax devices
- Portable multimedia systems

Operating Systems

Acorn's RISC operating system is a stable, scaleable, multitasking operating system designed to be run from ROM. As such, it is ideal for embedded applications and can be enhanced as required with a choice of system-wide extensions, network stacks and specific applications.

Acorn Applications

Acorn has an extensive range of ROM-based applications that include HTML 3.2-compliant Web browsers with Java, Shockwave and a range of other plug-ins, MIME-compliant email clients, newsreaders, word processors and audio/video codecs.

Acorn TVCentric™ Technology

Acorn has developed key technologies that allow high-quality text, images and video to be viewed on television-based interlaced displays. The displays can be connected to a variety of Acorn hardware and software designs, providing access to intranet and Internet resources using high or low bandwidth network connections. TVCentric technology is available as a component or as part of a complete solution:

Acorn was the first to bring Java to the TV. The company's TVCentric technologies support Sun Microsystems' Java platform which allows Internet-enabled TVs using Acorn's TVCentric technology to run Java applications. Acorn expects TV-centric Java will become the de facto standard for the convergence of TV and Java technologies, and the company is taking the lead and providing innovative solutions in this initiative.

Acorn's TVCentric technologies are developed using cost-effective and highly flexible software and hardware solutions. Using this technology, OEMs and solution providers can offer systems with high-quality TV-based displays at very competitive price points.

Suitable for use with both NTSC and PAL configured television sets, Acorn's TVCentric display technology offers a unique hardware and software solution that includes:

- Anti-aliased, scaleable fonts for high-defmition text
- Anti-twitter software for stable text, images and video on interlaced displays
- Software-programmable video resolution, colour depth and scan rates

- Graphics overlay support, including semitransparencies
- Acorn's flashdisplay technology that allows periodic downloading of regularly accessed information to Flash ROM
- A range of applications optimised for use on TVs, including Web browser, email client and newsreader

These technologies can be interchanged or combined to provide some of the highest quality and most cost-effective TV-based display solutions available today.

Acorn Offers Customers the Highest Level of Flexibility

Because Acorn has expertise in every part of the product development process, the company can offer complete solutions, cost reduction exercises and technology roadmaps. Development solutions, including ARM-based development systems, C, C++ and ARM assembler-based development tools and technical training packages can all be supplied to customers who wish to develop or port their own applications or other components.

VI. Management

David Lee	Chief Executive Officer
Dr. Graham Dodgson	Executive Vice President, Sales and Marketing
Andy Mee	Vice President, Business Development
Peter Shkurko	Vice President Sales, EMEA and the Americas
Stan Boland	Chief Finance Officer
Chris Cox	Executive Vice President, Workstations
Peter Bondar	Executive Vice President, Software

All press enquiries:

Lindsay Edmunds/Amanda Horlington
MIDNIGHT COMMUNICATIONS
Phone: 01273 709977
Fax: 01273 709966
lindsay/amanda@midnight.co.uk

Chris Cox
ACORN WORKSTATIONS DIVISION
Phone: 01223 725231
Fax: 01223 725331
ccox@acorn.com