

EXECUTIVE SUMMARY

0.1 INTRODUCTION

An analysis of the historical developments of video recording from 1932 to its present status, indicates that the technologies of the mid-seventies, relating to the development of the Home Video recorder and Players with VHS (JVC) and the Betamax (Sony) formats offered limited functions of recording and replay of video and audio signals. Subsequent developments by global industry leaders spectacularly improved almost all major specifications and added many user friendly and attractive features through contemporary technologies to offer the slick, portable, light weight, compact and reliable VCRs/VCPs with excellent picture and sound quality at affordable prices as compared to the bulky models offered by the industry only a decade ago. Accordingly, the global markets for VCRs/VCPs reported at levels of about 3.5 Mn sets p.a. by 1980 registered annual growth rates of 25% to 30% p.a. year by year to 24 Mn sets p.a. by 1985 and to 56 Mn sets p.a. by 1991.

0.2 TECHNOLOGY STATUS

The sound recording techniques of early thirties on magnetic tapes were suitably modified to suit video recording as Longitudinal Video Recording (LVR), Transverse Video Recording (TVR), Quadruplex Video Recording (QVR) and the currently used technology of Helical Scan Systems (HSS). The corresponding tape transport mechanisms for each technique, developed between the early fifties upto 1975, were also duly modified for relevant tape movements and ease of operation. Subsequent modifications in 1977 eliminated the need for video guard bands through the azimuth orientation of the video recording/replay heads.

The present day VCRs are offered in three major formats namely :

- (a) Video Home Systems (VHS)
- (b) Betamax
- (c) Video 2000

The VHS format introduced by JVC was accepted by many Japanese and European manufacturers and soon emerged as a popular format for the global markets. The usage of Betamax format is confined to Japan and the USA. The V 2000 format incorporating the latest IC technologies of eighties is finding increasing acceptability in Europe.

but is still less popular than the VHS format, as most European homes are already having VHS VCRs and VHS recorded cassettes.

The continuing improvements in VCR and VCP technologies since 1980 have presented many operational features such as front loading of the cassette, full loading mechanism v/s half loading of the cassette, use of a third video head for replay of 'still' or 'slow motion' viewing, auto head cleaner, special coatings on video head and drums, automatic recording as per pre-programmed instructions, 'Hi-Fi' sound, child proof lock, intelligent turbo mechanism, Karaoke VCR etc. These user friendly features incorporated in latest technology VCRs have been discussed in detail in Chapter-1.

0.3 MAJOR APPLICATION SECTORS

The entertainment sector quantitywise demand, representing about 90% of the total global market, stands out as the dominant application area for the VCR/VCP market demand. The education and industry sectors account for about 7% of the global market demand and the world-wide requirements of the information sector including news gathering, advertising agencies, social welfare agencies and political users, quantitatively contribute about 2% to the global markets. Special applications in the police, defence and security sectors for surveillance and intelligence are estimated at about 1% of global demand.

0.4 MANUFACTURING PROCESS

The manufacturing activities of the product range involve sophisticated assembly and testing operations with well co-ordinated incoming inspection, sequential taping and automatic insertion of axial/radial components for PCB assembly, fixing up and aligning of the VTDM assembly, manual mounting of large radial components, transformers, front panel components, tuner switches and other subassemblies, functional PCB testing, in-circuit modular testing and final reliability testing of the production as per well laid-out schedules. Earlier models upto 1986 used thru-hole component technologies but the recent models use more of SMDs for miniaturisation, portability, better performance and higher reliability. A typical VCR unit requiring about 1600 electronic components and about 300 precision metal and plastic parts, involves about 15 functional circuits which are suitably clubbed in 4 to 10 PCBs by different manufacturers as per their designs. The production units thus need well equipped materials management with inventory planning, effective vendor development groups and incoming inspection disciplines to ensure timely availability of each part and component with assured quality as per specification. For a typical production level of about 400 to 500 VCRs/VCPs per shift

(120,000 to 150,000 units p.a. in single shift operation), the valuewise requirements of the capital goods with automatic assembly machines/semiautomatic test equipment have been estimated at about US \$ 4.5 Mn (landed cost at Rs. 20.0 crores) and the total fixed investments at about Rs. 25.0 crores.

0.5 VCR/VCP MARKETS AS A PART OF CONSUMER ELECTRONICS INDUSTRY

The valuewise production of the consumer electronics industry in India registered fast growth rates (30% p.a. to 75% p.a.) between 1981 to 1988 (partly because of SKD/CKD assembly activity reported as production). Such growth rates in demand slowed down since 1989 because of increase in taxation at various levels. The current valuewise production of consumer electronics sector account for 30% to 35% to the total electronics industry production with colour TV sets, B&W TV sets and audio tape recorders as major contributors (25%, 18% and 13% respectively for value of production for consumer sector). The value of VCR/VCP production contributes less than 5% to the consumer electronics segment production and about 1.5% only of the total electronics industry production. The indigenous production of VCR/VCP which peaked at 160,000 pcs in 1991 however met only about 50% of the domestic 1991 market requirements. About 50% of the demand in 1991, 1992 and 1993 were met through imports.

0.6 PRESENT STATUS OF VCR/VCP INDUSTRY

The market demand of home VCRs for the entertainment sector is an adjunct and associated with the growth of colour TV demand. According to global market experts, the overall population as well as annual demand of VCRs/VCPs is generally reckoned at about 25% to 30% of similar parameters for colour TV sets in corresponding market areas. Thus the demand of VCRs/VCPs in India grew to significant levels with the introduction of the colour TV on the eve of the Asiad Games in 1982. Though mini-licences for assembly of 500 sets p.a. for VCRs/VCPs were issued to about 60 odd manufacturers in 1980 and 1981, no significant indigenous production had been established till end 1982. Government thus permitted liberal imports of VCRs and colour TV sets in 1982. Production quantities of 500 sets p.a. were too small for any level of vertical integration or indigenisation, and hence most of these mini-license holders assembled VCRs and VCPs mainly from SKD/CKD kits. Enhanced production capacities for assembly operations were subsequently permitted in 1986, as a re-endorsement scheme under the liberalised import policy.

To establish organised sector production units with firm commitments for indigenisation, the Department of Electronics (DoE) issued letters of intent at production levels of about 300,000 sets p.a. each to three major units with equity participation and formal technical collaborations with world-class manufacturers of VCRs/VCPs (BPL with SANYO, VIDEOCON with TOSHIBA and KALYANI with SHARP). The collaboration arrangements, selection of the specific models/technologies, prices of capital goods, levels of investments etc. were finalised in 1986 with the respective foreign collaborators. These units could commence production only by 1989/1990. Due to enthusiastic project implementation and reciprocal co-operation from their collaborators, all the three units attained appreciable levels of indigenisation by 1991 and together they accounted for 68% of the indigenous production (112,000 sets in 1991 out of estimated production of 165,000 sets).

The rest of the production came from leading TV manufacturers like ONIDA, BUSH, CROWN, KRISONS, UPTRON and others who operated as multiunit companies with re-endorsement schemes. Not bound by any obligations for formal technology transfer, these manufacturers assembled VCRs/VCPs with imported CKD kits and could quickly attain significant production levels (between 15,000 sets to 40,000 sets p.a.) by 1988, with manual assembly operations and marginal investments in production machines and test equipment. After significant changes in excise duties and in the revaluation of rupee since 1991, their profit margins were eroded and hence they desired to trim down their production. As the overall domestic demand dropped in 1992, these manufacturers almost closed down their activities by mid 1992 / early 1993.

The production technology of VCRs and VCPs in India (VHS format) is based on the training and documentation received through technology transfer as per formal collaboration agreements by the three joint-venture manufacturers and training received through technology tie-up for assembly and testing of specific models as taken by ONIDA, CROWN, BUSH, UPTRON, KRISONS and others. The common features between the various models offered by leading manufacturers as well as comparative aspects of specifications, special features and prices etc., have been compiled in detail and presented in Chapter-2. The unitwise details on current activities of major manufacturers giving company background, production capacities, yearwise production, exports, company strengths etc., as part of technology status survey (available through responses to the detailed questionnaire and extensive personal visits by the consultant are also given in Chapter-2. The present level of indigenisation achieved by the three joint-ventures units is around 42% to 45% of the value of BOM, whereas the smaller level production units had managed to indigenise the valuewise BOM to the extent of 22% to 35%, mainly to achieve the cost reduction for BOM.

The installed production capacities of the three joint-venture manufacturers with formal industrial licences, technical collaboration and equity participation total upto about 450,000 sets p.a. in single shift basis. An additional production capacity of about 150,000 sets is installed with ONIDA, CROWN, KRISONS, BUSH and others. These installed capacities of 0.6 Mn VCRs/VCPs with single shift operation were thus expected to meet the projected domestic demands of about 1.0 Mn sets by 1993 and 1.4 Mn sets by 1995 with double extended shift of operation. The annual domestic market demand however saturated around 350,000 sets since 1989 and showed declining trends to 210,000 VCRs/VCPs in 1992 and 195,000 sets in 1993. As more than 50% of the domestic demand is still being met through imports, the indigenous production peaked to a level of about 160,000 VCRs/VCPs only in 1991 and the single shift capacity utilisation has been reported at 26.7% in 1991, 17.5% in 1992 and 16% in 1993.

Whereas most TV lobby manufacturers have cut down their VCR/VCP production or even closed down the activity, the three major manufacturers with high investments and significant commitments continue operations at lower levels through suitable support of export orders from their collaborators. They also expect to step-up their higher level export-oriented activity to participate in the global markets. Their infrastructure and production capacities at 400 to 500 VCRs/VCPs per shift are however much lower than the typical production capacities of about 4000 to 10,000 sets per shift considered to give the desired levels of economies of scale to compete in the world markets. Since the existing expertise and resources for design and development available with each of these units (on single unit basis) are insufficient to face the global level competition, it is suggested they form a consortium to pool their design and development resources for specific models for the global markets. Even a meagre share of less than 3% of such markets for all three manufacturers, would give them viable levels of capacity utilisation.

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PRODUCTION AT INTERNATIONAL LEVELS

The initial bulk level production of home VCRs started in Japan by MATSUSHITA, JVC, SONY, SHARP etc. between 1978 to 1980 with annual production levels at about 0.5 Mn pcs to 1.0 Mn pcs p.a. Initially about 85% of the production was exported to USA and Europe and the balance was marketed in Japan, Gulf countries etc. The global market for VCRs/VCPs had since grown fast at 30% to 70% p.a. till 1989. The 1991 global markets were reported at about 56 Mn pcs worth US \$ 9.25 Bn with Japanese companies contributing about 72% of the quantitywise production, Korea 15% and the balance 13% shared by the manufacturers in Europe, Taiwan, Hong Kong, Australia, South America and others. The major

markets of VCR/VCPs are reported in USA and Europe (about 63% in 1991) whereas Asian countries including Japan, Korea and the Gulf countries account only for about 30% of the global markets. Australia and Africa make up the balance 5% to 7% of the markets.

These are around 25 world-class manufacturers with production capacities of more than 1.0 Mn VCR/VCPs p.a. This includes 10 to 12 leading manufacturers in Japan and Korea, who claim about 85% of the global market share with MATSUSHITA-JVC combine as the technology leaders (27%), SONY (11.5%), SHARP (10%), SANYO (8%), and the three Korean companies (Goldstar, Samsung and Daewoo - 15%). The balance 12% to 15% of the market is claimed by PHILIPS, THOMOS alongwith about 30 medium and small manufacturers in Europe, South America, Hong Kong, Australia, Singapore and India.

0.8 LATEST VCR MODELS WITH CONTEMPORARY TECHNOLOGIES

The contemporary technologies for the production of VCRs and VCPs by major manufacturers are offered in their latest models in 1992 and 1993 which incorporate a number of features such as Super VHS, Hi-Fi Stereo Sound, built-in worldwide TV tuner with upto 85 channels, time base correction, digital VCR, digital tracking, Karaoke functions and many other innovative features such as TVCR (combination of TV+VCR) and Caption VCR. A few special features such as Voice Actuated VCR, Digital VCR and Advanced Digital VCR working with High Definition TV have been announced for their futuristic models scheduled for 1995.

Technology development trends for VCR/VCPs are related to the advancements in TV broadcast technology (for improvements in sound and picture quality) such as Digital TV, High Definition TV and Multimedia. The latest technology Digital VCRs can handle High Definition TV signals with sharper recordings and the recorded software in NTSC or SECAM can be played on PAL receiver and vice versa. The recorded data can also be viewed on a personal computer. The images received from a TV source can be stored in the computer file, retrieved and passed on to another viewer over the telephone lines. Similar advancements have been reported for Digital HDTV VCRs. The Multimedia technologies involving optical storage, signal processing and ISDN transmission allow interfacing the viewer with Digital Video Interaction (DVI) Systems. The stored video signals, in the digital form, with DVI, can be manipulated through the compression of video data for a variety of applications, including 'Surrogate Travel' and 'Synthetic video' EIA Japan estimates that global markets for these high priced digital VCRs would grow to a level of 30 Mn sets p.a. by the year 2000. Leading manufacturers in Japan and Europe

have thus joined hands for development work for these new designs and adopted new drive concepts with efficient data reduction methods.

0.9 RELEVANCE OF CONTEMPORARY TECHNOLOGY TO INDIAN VCR/VCP INDUSTRY

The VCR/VCP models in the present domestic production corresponds broadly to the low priced medium level technology types introduced by leading world class manufacturers (respective technology doners) in international markets by 1988 and 1989 (5 to 6 years technology gap). High priced models as range extension with specific additive variations are offered with marginal new technology features such as auto head cleaners, special silicon coated ferrite heads, titanium oxide coated head drums, use of slim brushless motors in VTDMs, circuit to view NTSC pre-recorded cassettes on PAL receivers and such other features basically in the same cabinet as their standard models. Though some of the features of advanced technology as discussed above may be of interest to some segments of Indian industry, the saturation of the domestic markets since 1990 and subsequent shrinking of the demand in 1992 and 1993 have discouraged the existing manufacturers to invest further in introduction of new models requiring additional technology feedback, dies, moulds, jigs, fixtures etc. Advanced features such as S-VHS format, extended play/long play capabilities, Hi-Fi audio systems, Teletexting, compact VHS cassettes, variable replay speed VCRs, Time-base correction Digital VCRs and such other technologies are not being planned in the forthcoming VCR/VCP range in India.

0.10 R&D EFFORTS

The consumer electronic equipment industry and the national laboratories had not initiated efforts for the development of technologies related to VCRs, VCPs, Colour TV receivers during the early 1980s. As a result, colour TV sets and VCRs had to be imported in a large way.

As against the global norms of R&D spending at a level of about 5% to 7% of their turnovers by the world-class manufacturers in Japan and Korea, the R&D spending by the consumer electronics industry in India (Philips, Nelco, Keltron etc.) stood only at 0.5% to 0.8% of their annual sales turnover till 1978. Following large imports of SKD/CKD kits this decreased to less than 0.5% of the turn over in 1979 and to less than 0.3% of the turnover since 1982. The national laboratories and academic institutions also did not take up design and development work in consumer electronic equipment and no significant inputs have been reported since 1972.

0.11 TECHNOLOGY ABSORPTION

The consumer industry in India had almost negligible exposure to the sophisticated technologies for design, development, production and testing of VCR/VCPs, till technical teams from leading manufacturers were deputed for training from Japanese and Korean collaborators in 1989 and 1990 as a part of technology transfer. These teams concentrated more on project implementation and commissioning of the facilities for assemble and testing, rather than the design know-why. The important element of technology absorption was thus missed and the industry has so far not gained the expertise for the development of new features or extension of the product range for newer models. Accordingly, the Indian VCR/VCP industry has to depend perpetually on their collaborators and any introduction of new models would involve further payments as technology transfer fees as well as additional cost of assembly jigs and test fixtures.

0.12 LEVEL OF INDIGENISATION

The joint ventures units have made appreciable progress in indigenisation of the Bill of Material (BOM) to attain possible vertical integration. Starting with an indigenisation level of 7% to 12% during 1987 and 1988, the industry has reported indigenisation levels of upto 45% in 1992. Almost all PCBs with passive and most active components, electromechanical parts, connectors, crystals, filters, transformers, tuner, RF convertor, modulator etc. have been indigenised.

0.13 UNDER-UTILISATION OF CAPACITIES - EXPORTS

The 1986 projections of exports indicated VCR/VCP demand to grow to 0.8 Mn pcs by 1992 and 1.0 Mn pcs by 1993. The domestic demand of VCR/VCPs, however, saturated at about 300,000 to 350,000 sets per annum since 1989 and suffered continued decline to 210,000 in 1992 and 195,000 sets in 1993. Based on optimistic projections in 1986 and 1987, the domestic VCR/VCP industry invested significantly (about Rs. 90.0 crores) in automated assembly lines, sophisticated production equipment and test equipment to instal annual production capacities at about 0.6 Mn VCR/VCP sets on single shift basis. As discussed above, the industry attained peak production of only 160,000 sets in 1991 and has reported a capacity utilisation of 26.7% in 1991, 17.5% in 1992 and 16.0% in 1993 resulting in high cost of production. The joint-venture manufacturing units have made efforts for initial entry in export markets with support of their respective collaborators and their current models *have received a finite though limited acceptability to an extent of*

about 20 to 25% of the global markets (say about 12 Mn to 14 Mn pcs as accessible markets). The Indian VCR/VCP Industry can attain viable levels of capacity utilisation if they can gear up their technology and market expertise for export to attain about 6% to 8% of this accessible segment of the global markets.

0.14 RECOMMENDATIONS

Recommendations related to this industry are summarised as under:

(a) Steps for Enhancement of Market Demand

- (i) The industry feels that a rationalised tax structure would result in significant reduction in the selling prices and hence revive the domestic market demand.
- (ii) Leading VCR manufacturers should sponsor preparation of well targeted entertainment software which should compete well with available multichannel entertainment on Satellite TV and Cable TV. Marketing of such pre-recorded cassettes through a broad base of video libraries by VCR manufacturers would promote the demand of VCRs/VCPs.
- (iii) Well planned market promotion campaigns through concept selling should be taken up, high lighting advantages like capabilities of leisure time viewing as well as recording of programme on alternate channel of interest, while viewing the other.
- (iv) Manufacturers may sponsor preparation of special school lessons by expert teachers for weak students at the school. This can be done through appropriate contacts with the school authorities. Parents can be encouraged to employ such video coaching through well circulated cassettes.
- (v) The utility of video recording in industry, technical education, security and crime detection should be highlighted through specific sales promotion campaigns.
- (vi) The three large units can supply VTDM/VCR/VCP kits to the assemblers in the country so that the indigenous utilisation of capacity goes up.

(b) Steps for Technology Development

- (vi) Industry should initiate result-oriented projects for R&D and technology development to incorporate specific

advanced technology features. Well formulated tasks could be given to the national laboratories, IITs etc., who have the requisite resources, infrastructure and expertise.

- (vii) Introduction of Surface Mount Devices Technology (SMT) for miniaturization with sleek and handy models in line with global technology status, should be taken up.
- (viii) ISO 9000 standards and relevant disciplines should be incorporated for high reliability production to ensure increased acceptability in the international markets.
- (ix) Development of innovative concepts like TVCR to offer TV cum VCR as a package at a lower price to the possible new customers of colour TV.
- (x) Efforts should be made to get reasonable market shares in the international markets through specially developed export oriented models with updated technologies. It is suggested a consortium of leading manufacturers may be formed to pool their existing expertise, infrastructure and other resources, leading to the development of export oriented models with international acceptability.