

Transistor Radio Receivers (AM/FM)

PRODUCT CODE (ASICC)	: 78261
QUALITY AND STANDARDS	: Domestic Radio Receiver IS 615:1966 Community Radio Receiver IS 3397:1981. Utilising transistors, dry battery operated
PRODUCTION CAPACITY	: Qty. : 10,000 Nos. (per annum) Value : Rs. 25,00,000
YEAR OF PREPARATION	: 2002–2003
PREPARED AND UPDATED BY	: Small Industries Service Institute 22 Godown, Industrial Estate, Jaipur – 302 006 (Rajasthan), And Office of the Development Commissioner (Small Scale Industries), Electronics and Electrical Division, 7th Floor, Nirman Bhavan, New Delhi – 110 011.

INTRODUCTION

Radio is one of the effective media used to entertain and educate the masses about different aspects of life, culture and languages in a developing country like ours where literacy level is very low. Considering the importance of this media, the Govt. have established a number of broadcasting stations throughout the country and introduced different programmes. The Govt. has also taken steps to reduce the cost of radio and abolished the radio licence to help the ordinary household possess a radio.

The production of radio receiver is an assembly based industry and the technology involved is simple. The

industry is highly labour intensive. The investment in Plant and Machinery and space requirement both are low. The assembly of radio receiver is economical in small scale sector due to low overhead expenditure compared to the organized sector. Radios/Car Radios (Low Cost up to Rs. 250) are reserved for manufacture in the small scale sector.

MARKET POTENTIAL

Transistor Radio receivers are very common in India. These radios are generally being used by lower income group people masses being one of the strongest means of entertainment for them. In the present state of economy in our country, a large section of the

population especially in the rural areas can easily afford to buy a cheap radio set for their entertainment. The Government has already started the broadcasting FM channels in the country which will also boost the popularity of radio. Besides private FM broadcasting stations are channels to be established in near future further giving Philip to the market of Radio/Car Radios.

BASIS AND PRESUMPTIONS

- i) The basis for calculation of production capacity has been taken on single shift basis on 75% efficiency.
- ii) The maximum capacity utilization on single shift basis for 300 days a year. During first year and second year of operations the capacity utilization is 60% and 80% respectively. The unit is expected to achieve full capacity utilization from the third year onwards.
- iii) The salaries and wages, cost of raw materials, utilities, rents, etc. are based on the prevailing rates in and around Jaipur. These cost factors are likely to vary with time and location.
- iv) Interest on term loan and working capital loan has been taken at the rate of 16% on an average. This rate may vary depending upon the policy of the financial institutions/agencies from time to time.
- v) The cost of machinery and equipments refer to a particular make/model and prices are approximate.
- vi) The break-even point percentage

indicated is of full capacity utilization.

- vii) The project preparation cost etc. whenever required could be considered under pre-operative expenses.
- viii) The essential production machinery and test equipment required for the project have been indicated. The unit may also utilize common test facilities available at Electronics Test and Development Centres (ETDCs) and Electronic Regional Test Laboratories (ERTLs) set up by the State Governments and STQC Directorate of the Department of Information Technology, Ministry of Communication and Information Technology, to manufacture products conforming to Bureau of Indian Standards.

IMPLEMENTATION SCHEDULE

The major activities in the implementation of the project has been listed and the average time for implementation of the project is estimated at 12 months:

Sl. No.	Name of Activity	Period in Months (Estimated)
1.	Preparation of project report	1
2.	Registration and other formalities	1
3.	Sanction of loan by financial institutions	3
4.	Plant and Machinery:	
	a) Placement of orders	1
	b) Procurement	2
	c) Power connection/ Electrification	2
	d) Installation/Erection of machinery/Test Equipment	2

Sl. No.	Name of Activity	Period in Months (Estimated)
5.	Procurement of raw materials	2
6.	Recruitment of Technical Personnel etc.	2
7.	Trial production	11
8.	Commercial production	12

Notes

1. Many of the above activities shall be initiated concurrently.
2. Procurement of raw materials commences from the 8th month onwards.
3. When imported plant and machinery are required, the implementation period of project may vary from 12 months to 15 months.

TECHNICAL ASPECTS

Process of Manufacture

A radio receiver consists of a RF section with mixer and oscillator, IF section with one or two amplifiers, a detector section and AF section with push-pull amplifier stages and loud speakers. As per the circuit design these stages are assembled on a printed circuit board using appropriate components and aligned. It is essential to test the bought-out components prior to assembly for avoiding any defective component going into the assembly. The ferrite antenna, speaker and other controls like volume control, tone control, tuning dial system, battery terminals/connectors etc., are mounted on the radio cabinet prior to mounting of assembled PCB in it. After mounting of above items, the PCB in the cabinet and necessary wiring has been made for

interconnections. A plastic cabinet with an appealing front panel is widely used for housing the receiver. The assembled receiver is tested for performance before packing. The radio is packed in a cardboard box in such way that it should withstand shock and vibration during transportation.

Quality Control and Standards

The radio receiver should conform to the following specification :

(a) Domestic radio receivers	IS 615:1966
(b) Community radio receivers utilizing transistors, dry battery operated	IS 3397:1981

Production Capacity (per annum)

Quantity	Value (Rs.)
10,000 Nos.	2.5 lakhs

Motive Power 5 KVA.

Pollution Control

The Govt. accords utmost importance to control environmental pollution. The small-scale entrepreneurs should have an environmental friendly attitude and adopt pollution control measures by process modification and technology substitution.

India having acceded to the Montreal Protocol in Sept. 1992, the production and use of Ozone Depleting Substances (ODS) like Chlorofluoro Carbon (CFC), Carbon Tetrachloride, Halons and Methyl Chloroform etc. need to be phased out immediately with alternative chemicals/solvents. A notification for detailed Rules to regulate ODS phase out under the Environment Protection Act, 1986 have been put in place with effect from 19th July 2000.

The following steps are suggested which may help to control pollution in electronics industry, wherever applicable:

- i) In electronic industry fumes and gases are released during hand soldering/wave soldering/Dip soldering, which are harmful to people as well as environment and the end products. Alternate technologies may be used to phase out the existing polluting technologies. Numerous new fluxes have been developed containing 2-10% solids as opposed to the traditional 15-35% solids.
- ii) Electronic industry uses CFC, Carbon Tetrachloride and Methyl Chloroform for cleaning of printed circuit boards after assembly to remove flux residues left after soldering, and various kinds of foams for packaging.

Many alternative solvents could replace CFC-113 and Methyl Chloroform in electronics cleaning. Other Chlorinated solvents such as Trichloroethylene, Perchloroethylene and Methylene Chloride have been used as effective cleaners in electronics industry for many years. Other organic solvents such as Ketones and Alcohols are effective in removing both solder fluxes and many polar contaminants.

Energy Conservation

With the growing energy needs and shortage coupled with rising energy cost, a greater thrust in energy efficiency in industrial sector has been given by the Govt. of India since 1980s. The Energy Conservation Act, 2001 has been enacted on 18th August'2001,

which provides for efficient use of energy, its conservation and capacity building of Bureau of Energy Efficiency created under the Act.

The following steps may help for conservation of electrical energy:

- i) Adoption of energy conserving technologies, production aids and testing facilities.
- ii) Efficient management of process/manufacturing machineries and systems, QC and testing equipments for yielding maximum Energy Conservation.
- iii) Optimum use of electrical energy for heating during soldering process can be obtained by using efficient temperature controlled soldering and desoldering stations.
- iv) Periodical maintenance of motors, compressors etc.
- v) Use of power factor correction capacitors. Proper selection and layout of lighting system; timely switching on-off of the lights; use of compact fluorescent lamps wherever possible etc.

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building	
Built up area	125 sq. mtrs.
Office, Store etc.	25 sq. mtrs.
Factory	100 sq. mtrs.
Rent	Rs. 3000 per month

(ii) Machinery and Testing Equipments

Sl. No.	Description	Qty.	Total (Rs.)
1.	Coil Winding Machine	2	7,000
2.	Bench Grinder	1	7,000
3.	Portable Drill Machine (1/2")	1	5,000

Sl. No.	Description	Qty.	Total (Rs.)
4.	R.F. Signal Generator	1	7,000
5.	A.F. Oscillator	2	5,000
6.	Oscilloscope (20 MHz)	1	20,000
7.	A.F. Power Meter	1	5,000
8.	D.C. Power Supply (30 V, 2A)	3	13,500
9.	Digital Multi-meter (3 ½ digit)	1	3,500
10.	Analog multi-meter	2	1,500
11.	Transistor tester	1	15,000
	Total		89,500
	<i>Electrification and Installation charges @ 10% of the cost of machine and equipment</i>		8,950
	<i>Hand Tools, Soldering, Irons and Jigs</i>	L.S	20,000
	<i>Work benches, stools and office equipments</i>	L.S.	50,000
	(iii) Pre-operative Expenses		10,000
	Total Fixed Capital		1,78,450
	or Say		1,79,000

B. Working Capital (per month)

(i) Staff and Labour

Sl. No.	Designation	No.	Salary (Rs.)	Total (Rs.)
1.	Manager	1	5,000	5,000
2.	Supervisor	1	3,000	3,000
3.	Marketing Assistant	1	2,500	2,500
4.	Clerk-cum-Accountant	1	2,000	2,000
5.	Typist/Steno	1	2,000	2,000
6.	Peon/ Chowkidar	1	1,600	1,600
7.	Skilled Workers	3	2,500	7,500
8.	Un-skilled Workers	2	2,000	4,000
	Total			27,600
	<i>Perquisites @ 15% of the salary</i>			4,140
	Total			31,740
	or Say			32000

(ii) Raw Material Requirement (per month)

Sl. No.	Description	Price per Unit	Total (Rs.)
1.	Transistors and Diodes	20	16,800
2.	Resistors	10	8,400

Sl. No.	Description	Price per Unit	Total (Rs.)
3.	Capacitors	15	12,600
4.	IFT and RF Coils	5	5,880
5.	P C B	15	12,600
6.	Band Switch	3	2,520
7.	Variable gang condenser	5	5,880
8.	Volume Control	4	3,360
9.	Speaker	8	6,720
10.	Ferrite rods	3	2,520
11.	Tuning system	5	4,200
12.	Plastic Cabinet	20	16,800
13.	Knobs	3	2,520
14.	Misc. Items (Solder wire, mech. Hardware etc.) L.S.	7	5,880
15.	Battery Holder	3	2,520
16.	Transformer	10	8,400
	Total		1,17,600

(iii) Utilities (per month)	(Rs.)
Power	3,500
Water	500
Total	4,000

(iv) Other Contingent Expenses (per month) (Rs.)	(Rs.)
Rent	3,000
Postage Stationery	1,000
Repair and Maintenance	500
Transport and Packaging	8,000
Conveyance expenses	3,000
Advertisement	7,000
Misc. expenses	1,500
Total	24,000

(v) Total Recurring Expenditure (i+ii+iii+iv) Rs. 1,77,600

(vi) Total Working Capital (3 Months Basis) Rs. 5,32,800

C. Total Capital Investment

(i) Fixed Capital	Rs. 1,79,000
(ii) Working Capital (3 months basis)	Rs. 5,32,800
Total	Rs. 7,11,800

FINANCIAL ANALYSIS

(1) Cost of Production (per annum) (Rs.)	
Recurring expenditure	21,31,200
Depreciation on Machinery and Testing equipment @ 10%	8,950
Depreciation on furniture and office equipment @20%	10,000
Depreciation on jig, fixture and tools etc @ 25%	5,000
Interest on total investment @ 16%	1,13,888
Total	22,69,038
or Say	22,69,000

(2) Turnover (per annum) (Rs.)	
By sale of 10,000 nos. Transistor Radio Receivers (AM/FM), @ Rs. 250	25,00,000

(3) Profit (per annum) (Before Taxes) Rs. 2,31,000

$$\begin{aligned} \text{(4) Net Profit Ratio} &= \frac{\text{Profit (per annum)} \times 100}{\text{Sales (per annum)}} \\ &= \frac{2,31,000 \times 100}{25,00,000} \\ &= 9.24\% \end{aligned}$$

$$\begin{aligned} \text{(5) Rate of Return} &= \frac{\text{Profit (per annum)} \times 100}{\text{Total capital investment}} \\ &= \frac{2,31,000 \times 100}{7,11,800} \\ &= 32.45\% \end{aligned}$$

(6) Break-even Point

Fixed Cost (per annum) (Rs.)	
1. Depreciation on M/c., equipment, furniture tools, etc.	23,950
2. Rent	36,000
3. Interest on Capital Investment	1,13,888
4. 40% of salaries and wages	1,53,600
5. 40% of other contingent expenses (excluding rent)	88,800
Total	447438
or Say	447000

$$\begin{aligned} \text{B. E. P.} &= \frac{\text{Fixed Cost} \times 100}{\text{Fixed Cost} + \text{Net Profit}} \\ &= \frac{447000 \times 100}{447000 + 231000} \\ &= 65.93\% \end{aligned}$$

Additional Information

- The Project Profile may be modified/tailored to suit the individual entrepreneurship qualities/capacity, production programme and also to suit the locational characteristics, wherever applicable.
- The Electronics Technology is undergoing rapid strides of change and there is need for regular monitoring of the national and international technology scenario. The unit may, therefore, keep abreast with the new technologies in order to keep them in pace with the developments for global competition.
- Quality today is not only confined to the product or service alone. It also extends to the process and environment in which they are generated. The ISO 9000 defines standards for Quality Management Systems and ISO 14001 defines standards for Environmental Management System for acceptability at international level. The unit may therefore adopt these standards for global competition.
- The margin money recommended is 25% of the working capital requirement at an average. However, the percentage of margin money may vary as per bank's discretion.

Addresses of Machinery and Testing Equipment Suppliers

- M/s. Quality Machine Tools
34, JC Road,
VISL Building,
Bangalore – 560 002.

2. M/s. Swastik Machine Tools
4, Lata Chambers,
Nashik - 422 002.
 3. M/s. Applied Electronics Ltd.
A-5, Wagle Industrial Estate,
Thane - 400 604.
 4. M/s. BPL (India) Ltd.,
84, MG Road,
Bangalore - 560 001.
 5. M/s. Peico Electronics and
Electrical Ltd.
Shivasagar Estate, Block 'A'
Dr. Annie Besant Road,
Mumbai - 18.
 6. M/s. Agronic Instruments (P) Ltd.
201, Shiv-Shakti Industrial Estate,
Mumbai - 86.
 7. M/s. Syntronics
89-92, Industrial Area,
Naroda - 382 330.
 8. M/s. Electronics Trade and
Technology Dev. Corporation Ltd.
15/48, Malcha Marg,
New Delhi - 110 021.
- Addresses of Raw Material
Components
1. M/s. Electronics Trade and
Technology Dev. Corpn. Ltd.
15/48, Malcha Marg,
New Delhi - 110 021.
 2. M/s. Peico Electronics and
Electricals Limited
Shivsagar Estate,
Block-A,
Dr. Annie Besant Road,
Mumbai - 12.
 3. M/s. OEN Connectors Ltd.
Vytila,
Post Box No. 2,
Cochin - 19.
 4. M/s. Micropack Ltd.
Plot 16, Jigami Industrial Area,
Anekal Taluk,
Bangalore Distt. - 562 106
(For PCB)
 5. M/s. Amar Radio Corporation
11/1, Thiglar Periyanna Lane,
SJP Road,
Bangalore - 560 002.
 6. M/s. Globe Industries
69, Saddar Patrappa Road,
Behind SJP Road,
Bangalore - 2.
 7. M/s. Champion Electronics (P) Ltd.
A-17, MIDC, Bhosari,
Pune - 411 026.