เอกสารอ้างอิง

Benjamin W. Nibel and Alan B. Draper, Product Design and Process Engineering. 1st ed. Tokyo : Mcgraw-Hill Kogakusha, Ltd., 1974.

Peter W. Becker and Finn Jensen, Design of System and Circuits. 1st ed. New York : Mcgraw-Hill, Inc., 1977.

Clyde N. Herrick, Television Theory and Servicing. 2nd ed. Verginia : Reston Publishing Company, Inc., 1976.

Wm. A. Stover, Circuit Design for Audio, AM/FM, and TV. 1st ed. New York : Mcgraw-Hill Book Company., 1967.

Joseph A. walston and John R. Jiller, Transistor Circuit Design. 1st ed. New York : Mcgraw-Hill Book, Inc., 1963.

L.W. Turner, Electronic Engineer's Reference Book. 4th ed. London : Butterworth & Co Ltd., 1976.

Clyde F. Coombs, Jr, Printed Circuits Handbook. 1st ed. New York : Mcgraw-Hill Book, Inc., 1967.

Ralph M. Barnes, Motion and Time Study : Design and Measurement of Work. 6th ed. New York : John Willy & Son, Inc., 1968.

Frank W. Wilson, Manufacturing Planning and Estimating Handbook. 1st ed. New York : Mcgraw-Hill Book Company., 1963.

E. Paul De Garmo and John R. Canada, Engineering Economy. 5th ed. New York : Macmillan Publishing Co., Inc., 1973.

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แสดงข้อมูลสำหรับการออกแบบต้นแบบ

MPS-H32 (SILICON)

NPN SILICON ANNULAR TRANSISTOR

. . . designed for first and second video IF stages in TV receivers.

- Low Collector-Base Capacitance – C_{cb} = 0.22 pF (Max)
- Maximum Unilateralized Power Gain – G_{um} = 44 dB (Typ)
- Low Noise Figure – NF = 3.3 dB (Typ) @ f = 45 MHz
- Forward AGC Characteristics
- Complete y-Parameter Curves at 45 MHz
- Guaranteed Power Gain – G_{pe} = 22.5 dB (Min) (Unneutralized) @ f = 45 MHz

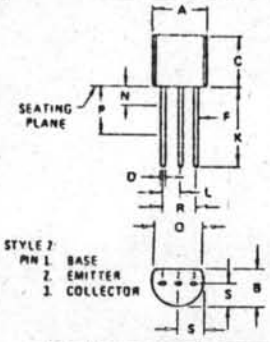
NPN SILICON VHF TRANSISTOR

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	30	Vdc
Collector-Base Voltage	V_{CB}	40	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	310 2.81	mW mW/°C
Operating and Storage Junction Temperature Range	T_J T_{stg}	-55 to +135	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	0.137	°C/mW
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	0.357	°C/mW



DIM	MILLIMETERS MIN	MAX	INCHES MIN	MAX
A	4.450	5.200	0.175	0.205
B	3.180	4.190	0.125	0.165
C	4.320	5.330	0.170	0.210
D	0.407	0.533	0.016	0.021
F	0.407	0.482	0.016	0.019
K	12.700	-	0.500	-
L	1.150	1.390	0.045	0.055
N	-	1.270	-	0.050
P	6.350	-	0.250	-
Q	3.430	-	0.135	-
R	2.410	2.670	0.095	0.105
S	2.030	2.670	0.080	0.105

CASE 29-02
TO-92

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)	BV_{CEO}	30	–	–	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	BV_{CBO}	40	–	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	BV_{EBO}	4.0	–	–	Vdc
Collector Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)	I_{CBO}	–	–	50	nAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 4.0 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	27	35	200	–
Collector-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 5.0 mAdc)	$V_{CE(sat)}$	–	1.5	3.0	Vdc
Base-Emitter Saturation Voltage (I_C = 10 mAdc, I_B = 5.0 mAdc)	$V_{BE(sat)}$	–	0.9	1.2	Vdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain–Bandwidth Product (I_C = 4.0 mAdc, V_{CE} = 10 Vdc, f = 100 MHz)	f_T	300	440	–	MHz
Collector-Base Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz) (Emitter Guarded)	C_{cb}	–	0.2	0.22	pF
Noise Figure (Figure 10) ($I_E \approx$ 4.0 mAdc, $V_{CE} \approx$ 9.3 Vdc, V_{AGC} = 2.75 Vdc, R_S = 50 Ohms, f = 45 MHz)	NF	–	3.3	–	dB
FUNCTIONAL TEST					
Common-Emitter Amplifier Power Gain (Figure 10) ($I_E \approx$ 4.0 mAdc, $V_{CE} \approx$ 9.3 Vdc, V_{AGC} = 2.75 Vdc, R_S = 50 Ohms, f = 45 MHz)	G_{pe}	22.5	25	–	dB
Forward AGC Voltage (Figure 10) (Gain Reduction = 30 dB, R_S = 50 Ohms, f = 45 MHz)	V_{AGC}	–	5.5	–	Vdc

SUMMARY-COMMON EMITTER PARAMETERS (V_{CE} = 10 Vdc, I_C = 4.0 mAdc, f = 45 MHz)

Input Conductance	g_{ie}	–	6.0	–	mmhos
Input Capacitance	C_{ie}	–	33	–	pF
Forward Transfer Admittance Magnitude	$\lvert Y_{fe} \rvert$	–	110	–	mmhos
Forward Transfer Admittance Phase Angle	$\angle Y_{fe}$	–	-22	–	Degrees
Feedback Capacitance	C_{re}	–	0.2	–	pF
Output Conductance	g_{oe}	–	20	–	μmhos
Output Capacitance	C_{oe}	–	1.4	–	pF
Maximum Unilateralized Power Gain $G_{um} = \frac{\lvert Y_{fe} \rvert^2}{4\, g_{ie}\, g_{oe}}$	G_{um}	–	44	–	dB

AGC CHARACTERISTICS

V_{CC} = 12 Vdc, R_S = 50 Ohms, f = 45 MHz, See Figure 10

FIGURE 1 – POWER GAIN

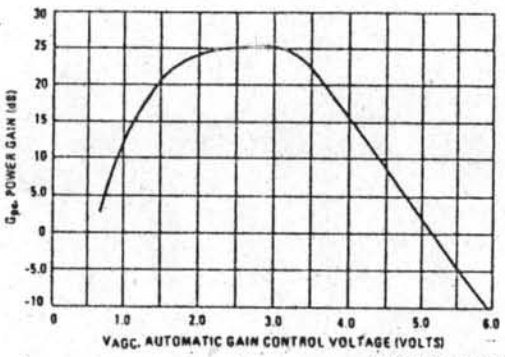
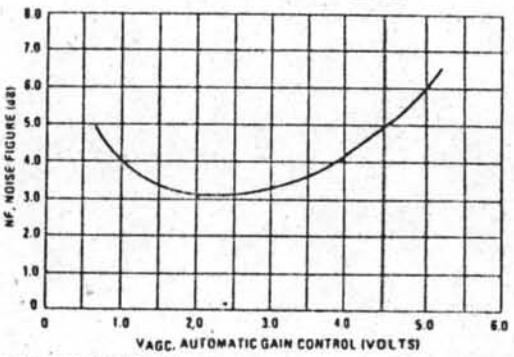


FIGURE 2 – NOISE FIGURE



COMMON-EMITTER y PARAMETERS

V_{CE} = 10 Vdc, f = 45 MHz, T_A = 25°C

FIGURE 3 – INPUT ADMITTANCE

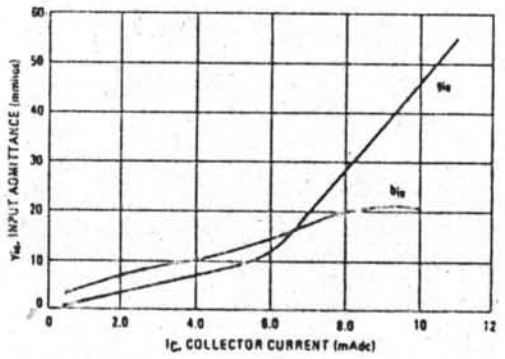


FIGURE 4 – REVERSE TRANSFER ADMITTANCE

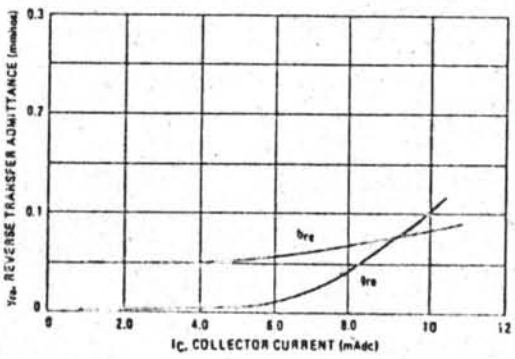


FIGURE 5 – FORWARD TRANSFER ADMITTANCE

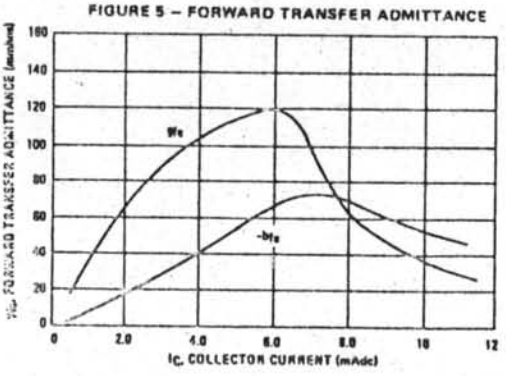


FIGURE 6 – OUTPUT ADMITTANCE

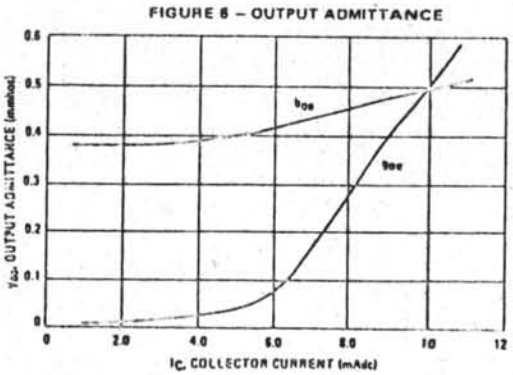


FIGURE 7 – DC CURRENT GAIN

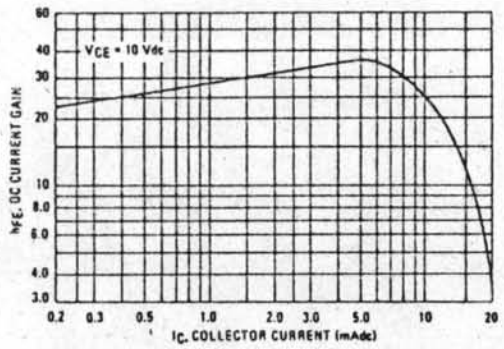


FIGURE 8 – COLLECTOR-BASE CAPACITANCE

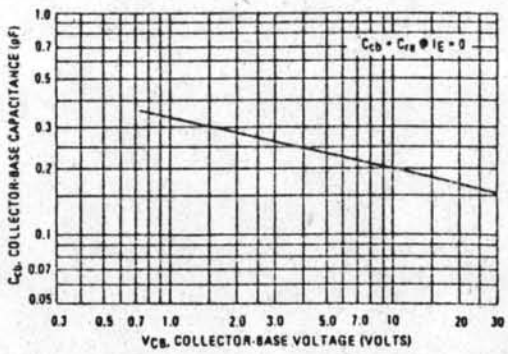


FIGURE 9 – CURRENT-GAIN–BANDWIDTH PRODUCT

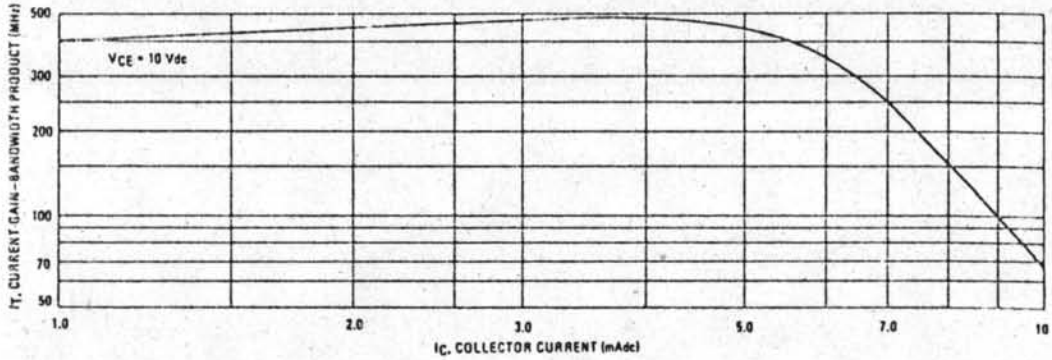
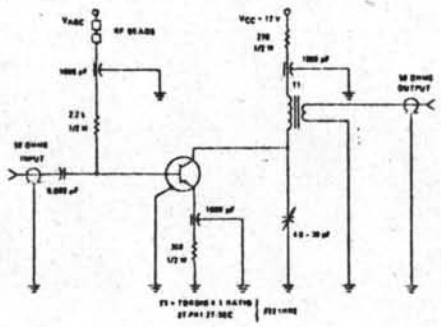


FIGURE 10 – 45 MHz FUNCTIONAL TEST CIRCUIT (UNNEUTRALIZED)



AN-545
Application Note

TELEVISION VIDEO IF AMPLIFIER USING INTEGRATED CIRCUITS

Prepared by
Terry Kiteley
Applications Engineering

This applications note considers the requirements of the video IF amplifier section of a television receiver, and gives working circuit schematics using integrated circuits which have been specifically designed for consumer oriented products. The integrated circuits used are the MC1350, MC1352, MC1353 and the MC1330.

MOTOROLA Semiconductor Products Inc.

TELEVISION VIDEO IF AMPLIFIER USING INTEGRATED CIRCUITS

INTRODUCTION

The very stringent requirements of the television video IF amplifier can now be met using integrated circuits while giving a substantial increase in performance and cost saving over conventional discrete components. Circuit techniques that would not have been technically or economically possible with discrete components, can now be utilized with integrated circuits.

Figure 1 indicates the signal levels and degree of automatic gain control (AGC) required if a television receiver is to function correctly throughout the range of input signal conditions commonly encountered. In some locations, all TV channels may provide high level signals, or conversely, all channels appear as low level signals. However, in most practical situations, each channel has its own amplitude. Some signals are nearly lost in noise, while others approach overload strength. This range of field intensity at the antenna requires AGC compensation in the television receiver over a dynamic range greater than 90 dB. Some of this control can be accomplished in the tuner, since a good solid-state TV tuner has an AGC reduction capability usually greater than 36 dB. The difference of at least 60 dB must be provided by the video IF amplifier.

The detected video output level will depend on the video amplifier and picture tube drive requirements. In the extreme case of a single stage, tube video amplifier, as used in inexpensive monochrome receivers, the level could be as high as 6 V. But in most hybrid and all solid-state receivers a one to two volt composite video and sync signal is sufficient. Figure 2 shows a block diagram using two integrated circuits, which gives the required IF gain, more than adequate AGC gain reduction, and a detected composite video output signal level of up to six volts, if required.

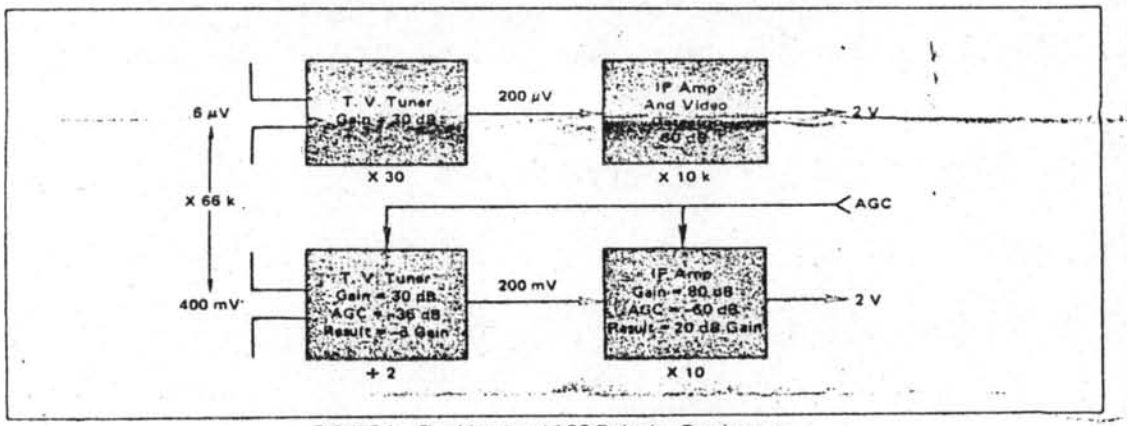


FIGURE 1 – Signal Levels and AGC Reduction Requirements for a Typical Television Receiver

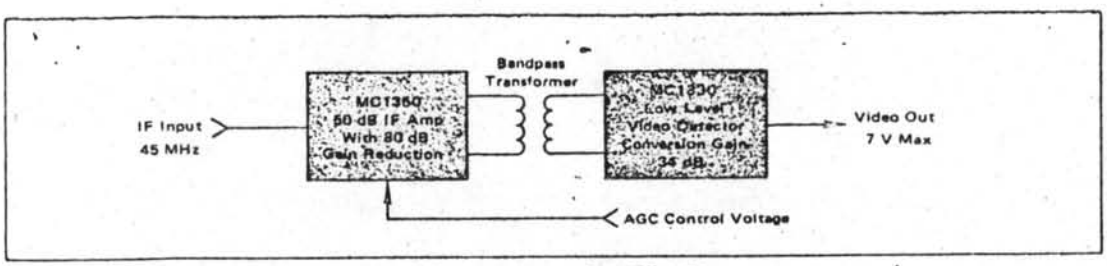


FIGURE 2 – Block Diagram of an IC Television Video IF Amplifier

Circuit diagrams external to Motorola products are included as a means of illustrating typical semiconductor applications; consequently, complete information sufficient for construction purposes is not necessarily given. The information in this Application Note has been carefully checked and is believed to be entirely reliable. However, no responsibility is assumed for inaccuracies. Furthermore, such information does not convey to the purchaser of the semiconductor devices described any license under the patent rights of Motorola Inc. or others.

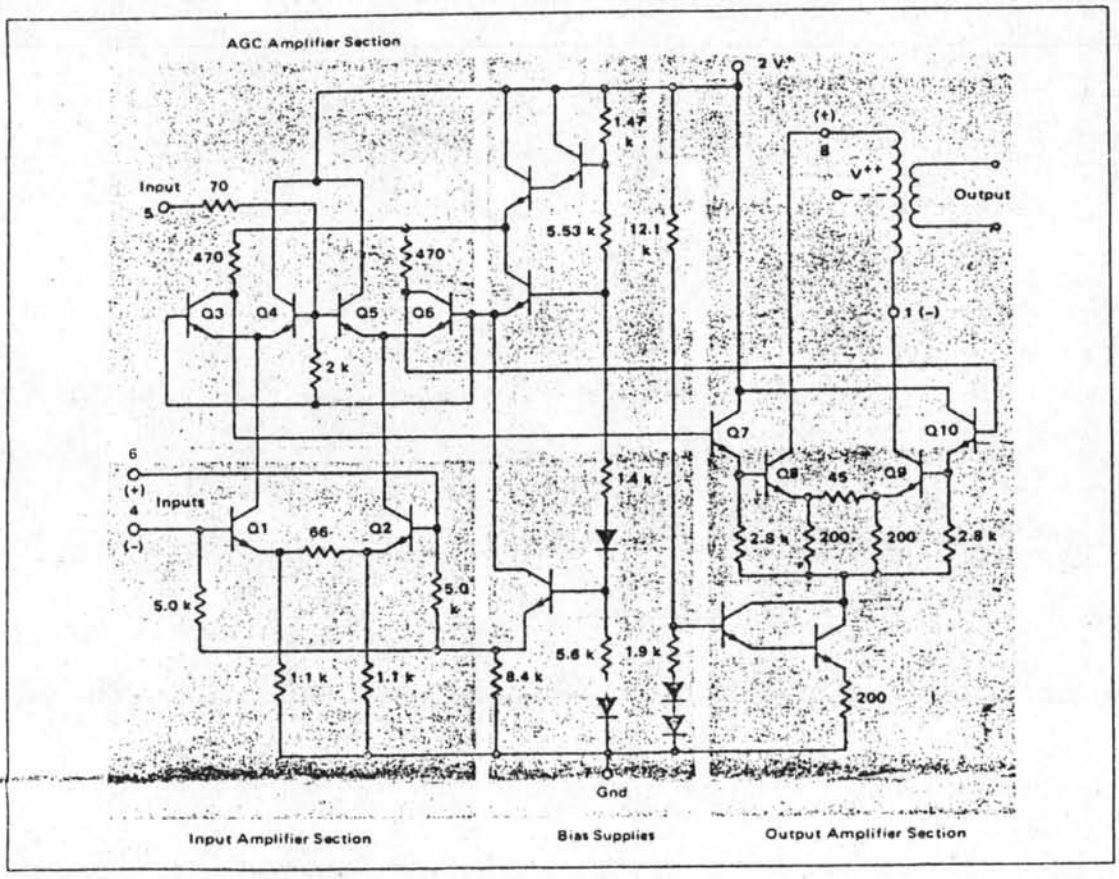


FIGURE 3 – Circuit Schematic

CIRCUIT DESCRIPTION – MC1350

Figure 3 is a schematic diagram of the MC1350, video IF amplifier. Q1, Q2, Q3, and Q6 form a differential cascade amplifier. When Q4 and Q5 are not conducting, the amplifier is at maximum gain. With a positive AGC bias voltage applied to the bases of Q4 and Q5, they will conduct and shunt away the signal current of Q3 and Q6. This will attenuate the gain of the amplifier, although the collector currents of Q1 and Q2 will remain constant preventing a large input impedance change. The output amplifiers, Q7, Q8, Q9, and Q10, are supplied from an active current source that maintains a constant quiescent bias keeping the output admittance nearly constant over the AGC range. The differential output is taken from the collectors of Q8 and Q9, however single-ended output may be taken from either collector, provided the unused collector is connected to the positive supply (V^+). Operation in this latter mode reduces the circuit gain. Either differential or single-ended inputs may be applied to Q1 and Q2. For single-ended input, there will be no loss in gain provided the unused input is grounded through a capacitor.

Figure 4 is a graph of the AGC gain reduction characteristics versus the voltage applied to Pin 5, through a 5 kΩ resistor.

In later paragraphs a more complex, keyed or gated AGC system will be discussed.

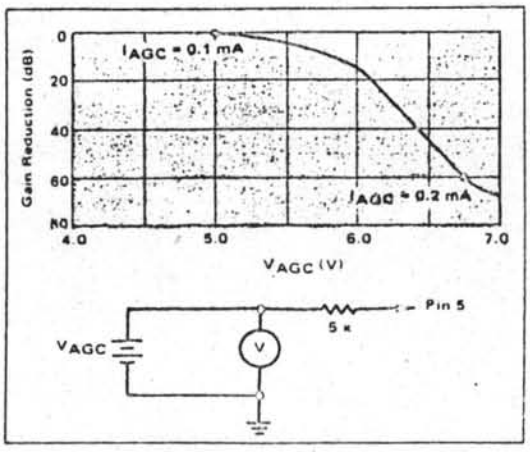


FIGURE 4 – Typical Gain Reduction

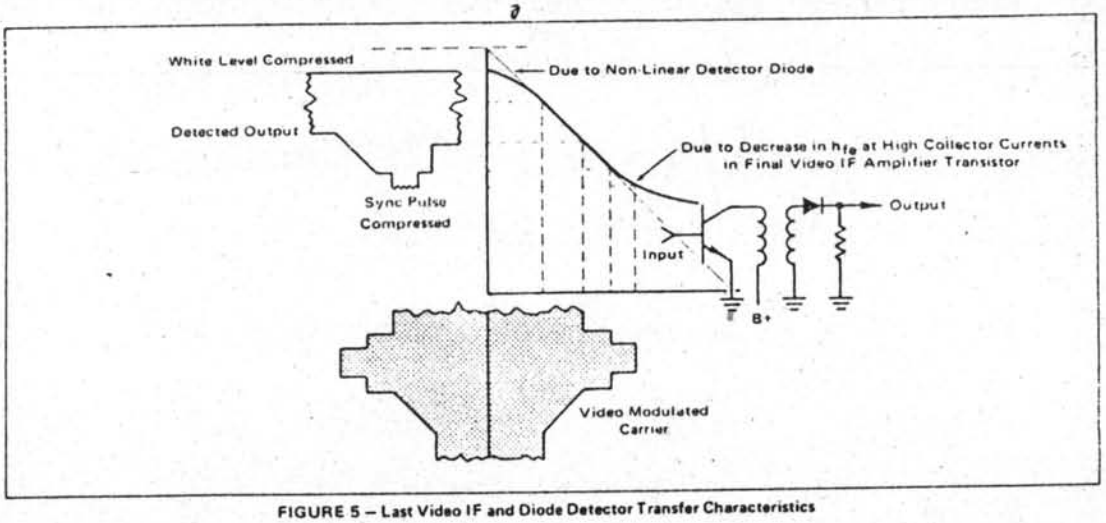


FIGURE 5 – Last Video IF and Diode Detector Transfer Characteristics

THE FINAL VIDEO IF AMPLIFIER AND DETECTOR

The final video IF amplifier and video detector must be linear, if the video waveforms are to be undistorted. If the detector or final video IF amplifier limits the video carrier, either the sync pulses or the white region of the video may be clipped.

In present day TV receivers, a germanium diode is often used for the video detector. While the germanium diode functions exceedingly well, it is inherently non-linear. The non-linearity is the result of the forward impedance characteristics of germanium. When the collector current of the final video IF transistor reaches a certain level, h_{FE} may begin to decrease resulting in non-linear amplification. Both of these effects are illustrated in Figure 5. These non-linearities generate unwanted sum and difference frequencies ("tweets"). The high frequency tweets may radiate into either the receiver antenna input, or into the low level stages of the IF amplifier, causing instability. The low frequency products may mix with the video signal and produce unwanted patterns on the picture tube. Television manufacturers incorporate filters and shields to eliminate these effects, however, a low level detection system not utilizing a germanium diode would eliminate these problems.

The MC1330, low level detector (LLD), is a doubly balanced, full wave, synchronous detector featuring very linear detection and excellent frequency response. The linearity is displayed in Figure 6. Carrier rejection for this type of detector is typically 60 dB. The synchronous detector functions by multiplying the signal to be detected by the same signal which has been amplified and limited. (See Figure 7.) Further information on low level detectors may be obtained in Motorola Application Notes AN-489 and AN-490.

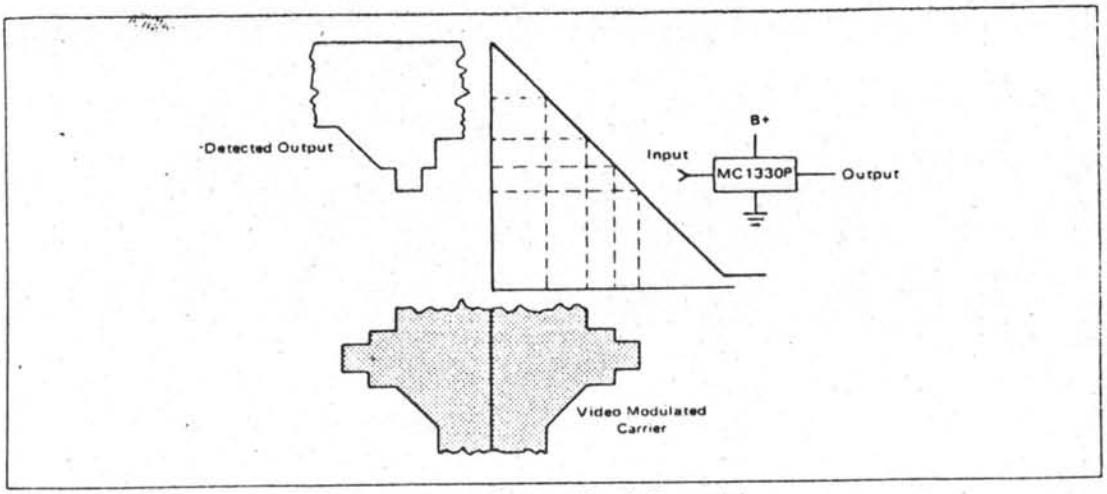


FIGURE 6 – MC1330P Linear Transfer Characteristics

CIRCUIT DESCRIPTION – MC1330

Figure 8 is a simplified circuit diagram of the MC1330. Q7 is a constant current source, Q1 and Q2 form a differential amplifier, while Q3, Q4, Q5, and Q6 are carrier operated switches. When positive half cycles of the amplitude modulated carrier appear at the base of Q1, it begins to conduct. The in-phase, clipped carrier signal will turn on Q3 causing current flow through R1 to increase. No current will flow through Q4, because it is switched off:

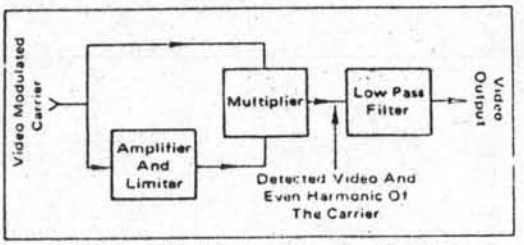


FIGURE 7 – Block Diagram of Low Level Detector

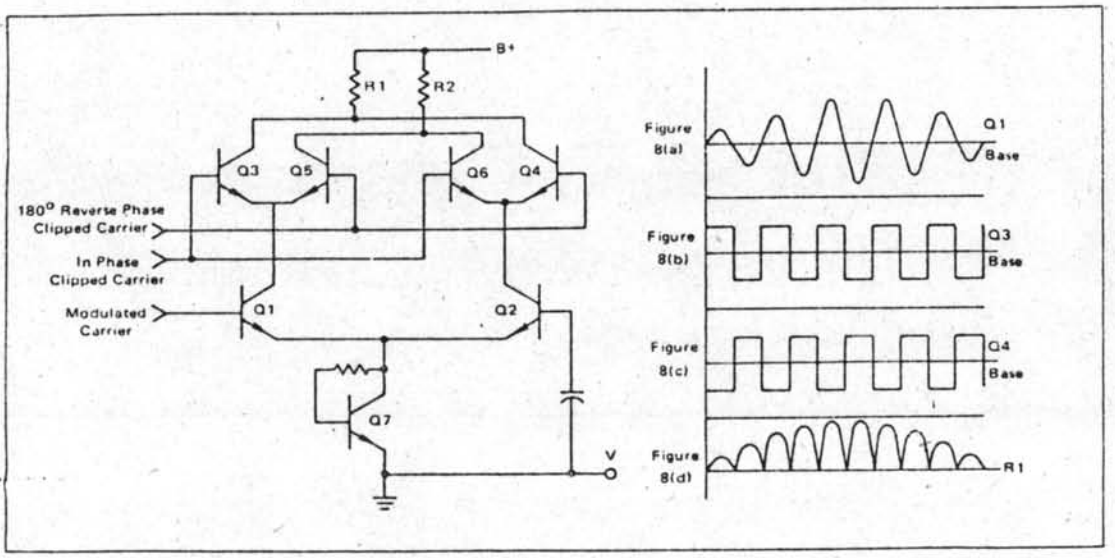


FIGURE 8 – Simplified Schematic of MC1330 and Waveforms

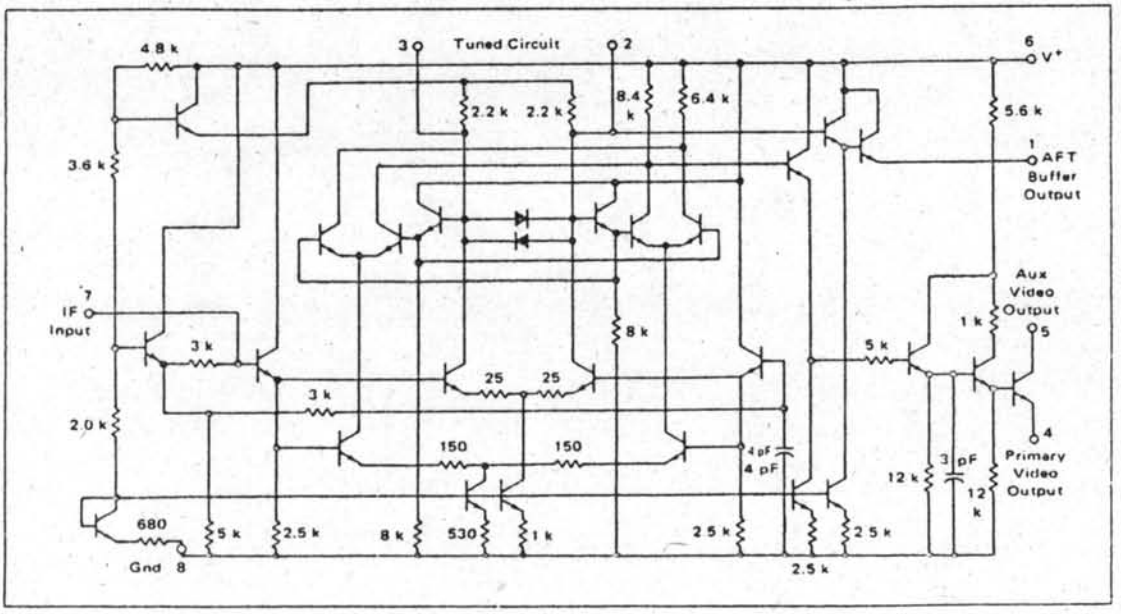


FIGURE 9 – Circuit Schematic

When negative half cycles appear at the base of Q1, Q2 will conduct through differential action. The reverse phase carrier pulse will turn on Q4, causing the current through R1 to increase. No current will flow through Q3, since the in-phase carrier pulse is negative at this time. The current flow through R1 increases for either positive or negative half cycles of the carrier producing a negative voltage change at the collectors of Q3 and Q4.

The reverse action takes place in R2 due to Q5 and Q6. Figure 8(a) is the amplitude modulated carrier appearing at the base of Q1. Q2 would see the same waveform inverted. The two clipped carrier waveforms required as switching pulses are shown in Figures 8(b) and 8(c). The detector is switched at twice carrier frequency, with Q3 conducting on the positive half cycles and Q4 conducting on the negative half cycles. Figure 8(d) is the voltage waveform across R1. Notice that the original carrier no longer exists and that the detected modulation is constructed of pulses of double the carrier frequency.

The stages which follow the basic detector in Figure 9 have limited frequency response, amplifying only lower frequency components, i.e. the modulation, and making the detector self filtering for the high frequency products. Therefore, shielding the detector to prevent spurious radiation of the IF and harmonics of the IF is not necessary.

It is essential that the switching waveform contains only the carrier and not sideband information. To prevent spurious switching, an external tuned circuit is connected between the bases of the switching transistors. This is composed of L3 and C10 in Figure 10.

The Q of this tuned circuit directly affects two characteristics of the detector. First, the higher the Q, the more critical and difficult tuning becomes. Secondly, the magnitude of the sum and difference products of two modulating frequencies decreases as Q is increased. This is indicated in the data in Figure 11 along with the test circuit used to obtain the data. It is obvious that some compromise must be achieved. The inter-modulation product between the chroma subcarrier (3.58 MHz) and the sound subcarrier (4.5 MHz) must be kept to a minimum, to avoid the 920 kHz beat pattern, without making the tuning excessively critical. The compromise value of Q is usually between 15 and 25. Within these values of Q, tuning is not critical, in fact, mistuning by 1 MHz gives acceptable pictures, while the 920 kHz beat is 14 dB below the level of the sound subcarrier. If the sound subcarrier trap (41.25 MHz) cuts the subcarrier by 40 dB, the beat frequency will be 54 dB below the video signal level, or 200 mV, when the video drive is 100 V. At the same time, there will be 2 mV of 4.5 MHz information at the detector producing one volt of detected video output which is adequate to drive most sound IF integrated circuits. The conversion gain of the MC1330 is typically 34 dB.

The circuit requires about 33 mA from the 18 V supply. Some regulation of the supply is desirable as gain and the output dc reference level change with the supply voltage. The required regulation depends on the changes in these parameters which can be tolerated.

A PRACTICAL TELEVISION IF AMPLIFIER AND DETECTOR

Figure 10 shows a complete practical circuit for an integrated circuit, video IF amplifier. This circuit employs the two integrated circuits previously discussed. This circuit has a typical voltage gain of 84 dB and a typical AGC range of 80 dB. It gives very small changes in bandpass shape, usually less than 1 dB tilt for 60 dB compression. There are no shielded sections. The detector uses a single tuned circuit (L3 and C10).

Coupling between the two integrated circuits is achieved by a double tuned transformer (L1 and L2). No block filters or traps have been designed for the front end of this amplifier, as different television manufacturers may have their own preferences and rejection requirements. The sound intercarrier information may be taken from the detected video output.

ALIGNMENT PROCEDURE

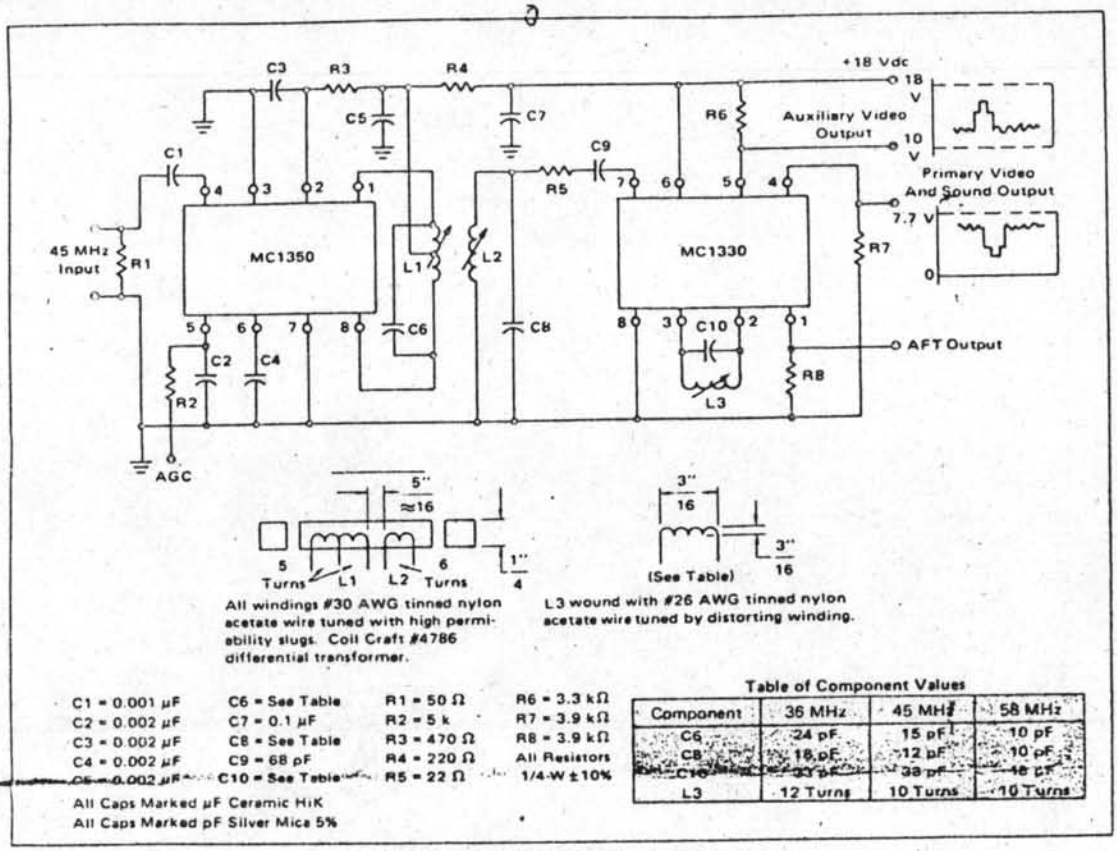
The following equipment is required for alignment:

1. Signal generator—tuned to video carrier frequency
2. Sweep generator that will sweep IF band and supply markers
3. VHF attenuator
4. 5 MHz bandwidth, dual trace oscilloscope
5. Power supply to deliver 100 mA at 18 V
6. Power supply adjustable 0-12 V (AGC)
7. Resistive mixing pad

If the amplifier is swept in the conventional manner, the resultant display will be misleading due to the absence of a fixed frequency carrier. The detector tuned circuit will follow the sweep generator and indicate a high amplitude response at the resonant frequency of C10 and L3 as shown in Figure 12. A block diagram of the alignment operation is given in Figure 15. The signal generator tuned to the video carrier frequency of 45.75 MHz (no modulation) is connected to the input. The scope probe is attached to the output, Pin 4 of the MC1330, and L3 is tuned to give a maximum dc output. The only method of tuning the open core inductor L3 is stretching or compressing the windings. After L3 has been correctly tuned by distorting the windings, it should not be retuned in later stages of alignment.

TUNING L1 AND L2

In order to tune L1 and L2 connect the scope probe to Pin 4 of MC1330 and sweep generator to Pin 7 through an attenuator and a mixing pad. Apply 10 to 20 dB of AGC compression by adjusting the AGC power supply. Withdraw tuning cores of L1 and L2 as far as possible before beginning adjustment. Adjust L1 and L2 roughly to obtain response trace similar to Figure 12. Adjust the signal generator output level to give approximately 3 dB greater output than the sweep generator level and apply signal generator output to the mixing pad. This will give the detector the fixed carrier frequency it requires to operate. The AGC



All windings #30 AWG tinned nylon acetate wire tuned with high permiability slugs. Coil Craft #4786 differential transformer.

L3 wound with #26 AWG tinned nylon acetate wire tuned by distorting winding.

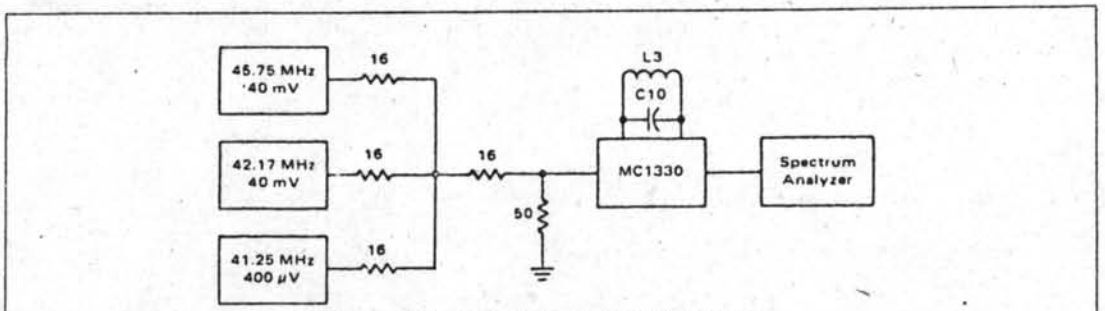
C1 = 0.001 µF
C2 = 0.002 µF
C3 = 0.002 µF
C4 = 0.002 µF
C5 = 0.002 µF
C6 = See Table
C7 = 0.1 µF
C8 = See Table
C9 = 68 pF
C10 = See Table
R1 = 50 Ω
R2 = 5 k
R3 = 470 Ω
R4 = 220 Ω
R5 = 22 Ω
R6 = 3.3 kΩ
R7 = 3.9 kΩ
R8 = 3.9 kΩ
All Resistors 1/4-W ±10%

All Caps Marked µF Ceramic HiK
All Caps Marked pF Silver Mica 5%

Table of Component Values

Component	36 MHz	45 MHz	58 MHz
C6	24 pF	15 pF	10 pF
C8	18 pF	12 pF	10 pF
C10	47 pF	33 pF	18 pF
L3	12 Turns	10 Turns	10 Turns

FIGURE 10 – Typical MC1350 Video IF Amplifier and MC1330 Low-Level Video Detector Circuit



Intermodulation Products as Measured in Above Circuit

Loaded Q	920 kHz	2.68 MHz	3.58 MHz	4.5 MHz	6.3 MHz	7.16 MHz	84 MHz	45.75 MHz	91.5 MHz
3	-45 dB	-60 dB	0 dB	-41 dB	-65 dB	-14 dB	-50 dB	-59 dB	-52 dB
15	-64 dB	-60 dB	0 dB	-41 dB	-65 dB	-15 dB	-50 dB	-59 dB	-52 dB
20	-56 dB	-62 dB	0 dB	-41 dB	-65 dB	-17 dB	-51 dB	-59 dB	-52 dB
50	-60 dB	-68 dB	0 dB	-41 dB	—	-21 dB	-55 dB	-59 dB	-52 dB

FIGURE 11 – Test Circuit for Intermodulation Products

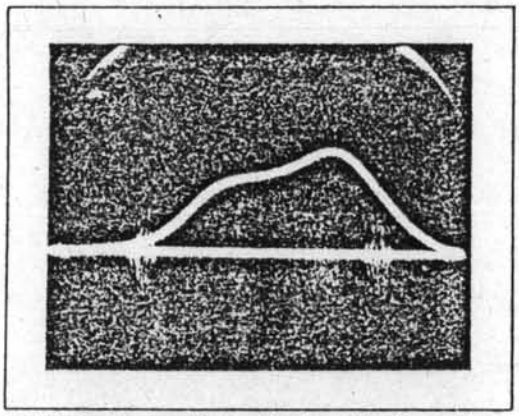


FIGURE 12 – Bandpass Displayed by Conventional Sweep System Indicating Narrow Bandwidth and Uneven Peaks

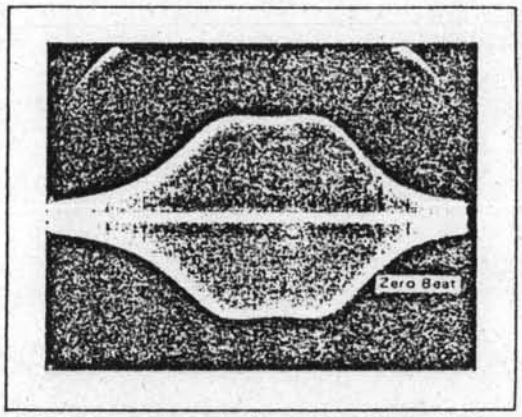


FIGURE 13 – Bandpass as in Figure 12, But With the Addition of Carrier Injection. Zero Beat is Evident on Right Side of Picture.

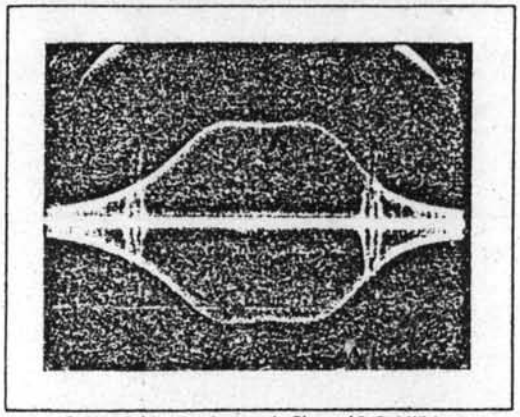


FIGURE 14 – Bandpass as in Figure 12, But With the Addition of Marker Frequencies

may also be adjusted, if required. The display on the scope should now be similar to Figure 13, with the zero beat between the sweep generator and the signal generator appearing within the modulation envelope. Adjust the second trace of the scope to display the marker frequencies, and adjust L1 and L2 to give bandpass shape as required. (See Figure 14.) L1 and L2 should be tuned to the first peak as the cores are turned into the windings to avoid over coupling.

A full-sized (1:1) printed circuit board layout is given in Figure 16. The components are identified as in the schematic diagram.

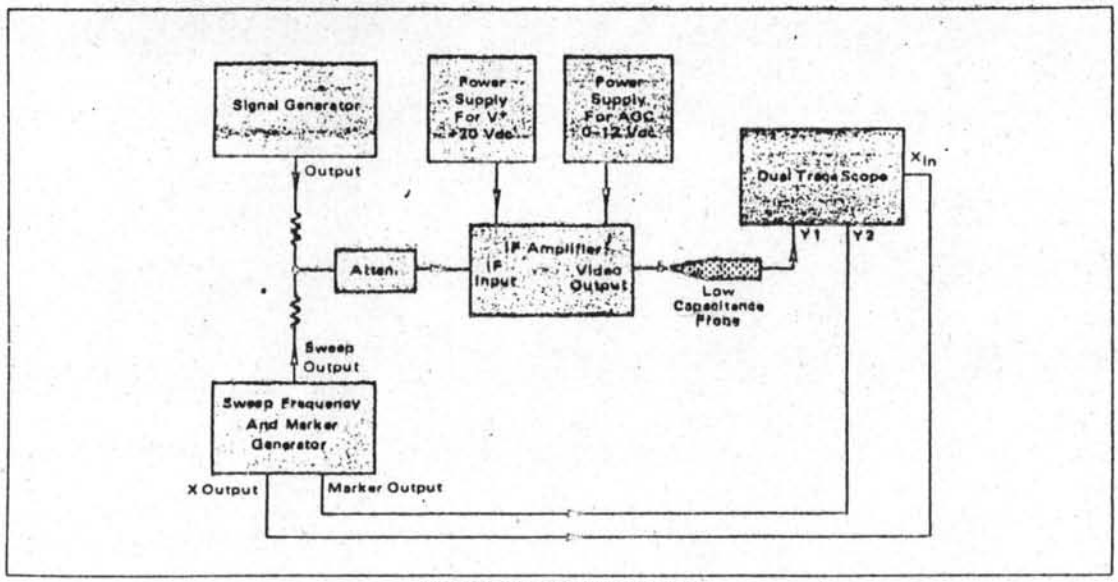


FIGURE 15 – Alignment Schematic

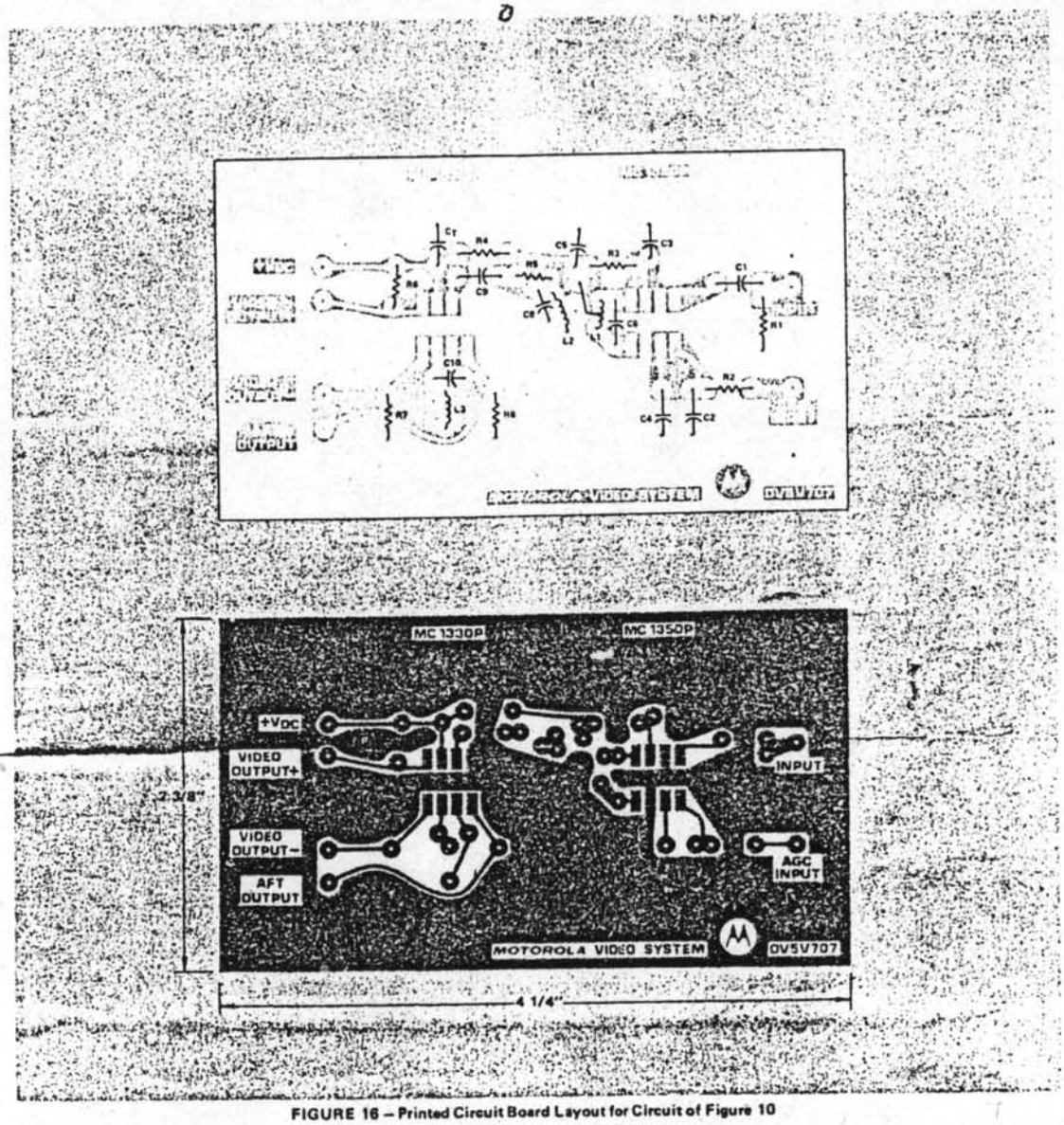


FIGURE 16 – Printed Circuit Board Layout for Circuit of Figure 10

AUTOMATIC GAIN CONTROL – MC1352 AND MC1353

The IF amplifier previously described will require AGC from an external source. The AGC voltage source can be either a discrete system or a portion of the MC1345 video processor integrated circuit, which is not covered by this note. However, there are other integrated circuits for IF amplifier applications which replace the MC1350 and have built-in keyed AGC systems. The first type is the MC1352, which has a positive going AGC output, and the second type is the MC1353, which has a negative going AGC output. The schematics of the devices are given in Figure 17. A gating pulse, a reference level, and the composite video signal to be controlled are required for correct operation of this AGC system. If positive-going video (with negative sync) is available, apply it to Pin 6 and apply the reference voltage to Pin 10. However, if negative going video (with positive sync) is used, apply it to Pin 10 and the reference voltage to Pin 6. The magnitude of the reference voltage determines the AGC threshold.

CIRCUIT DESCRIPTION – MC1352 AND MC1353

A negative keying pulse of eight volts amplitude and timed to each sync pulse is taken from the horizontal time base. This pulse is applied to Pin 5. Q2, normally in

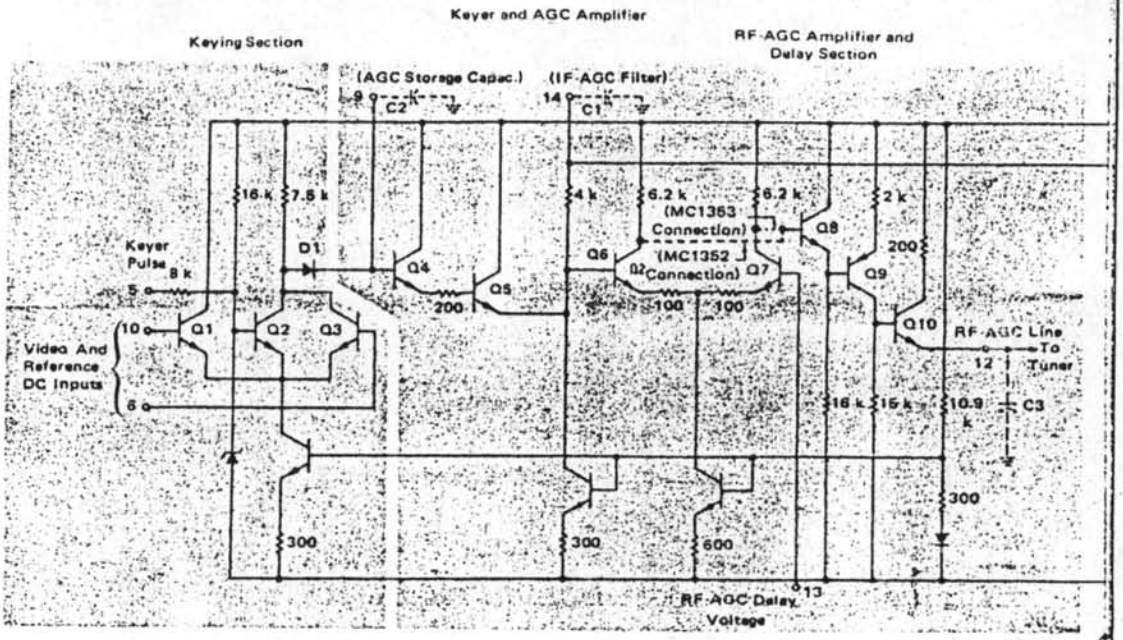


FIGURE 17 – Circuit Diagram of MC1352-MC1353

saturation, is turned off by this pulse, permitting the anode of diode D1 to rise toward the positive supply voltage. The level to which this point rises is determined by the difference between the reference and video input voltages applied to Pins 6 and 10. An external capacitor C2 is charged through D1. When Q2 returns to saturation, D1 will be back-biased preventing current flow from C2. The voltage on C2 is amplified by Q4 and Q5 and filtered by R1 and C1. The filtered voltage is supplied to the bases of Q12 and Q14 controlling the IF gain as described in the previous section on the MC1350. Q6 and Q7 form a differential amplifier. The amplified voltage from the capacitor is also applied to the base of Q6, while a delay voltage is applied to the base of Q7 through Pin 13. The delay voltage is used to determine the AGC threshold of the tuner. The output of the differential amplifier is taken from the collector of Q6 on the MC1352 or from the collector of Q7 on the MC1353 giving either positive or negative going AGC action. Q8, Q9, and Q10 amplify the difference voltage (delayed AGC voltage) permitting gain control in the tuner. The full RF

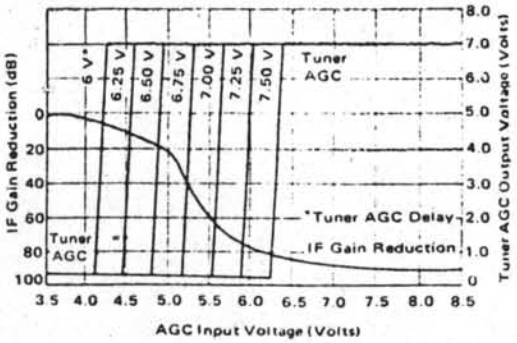
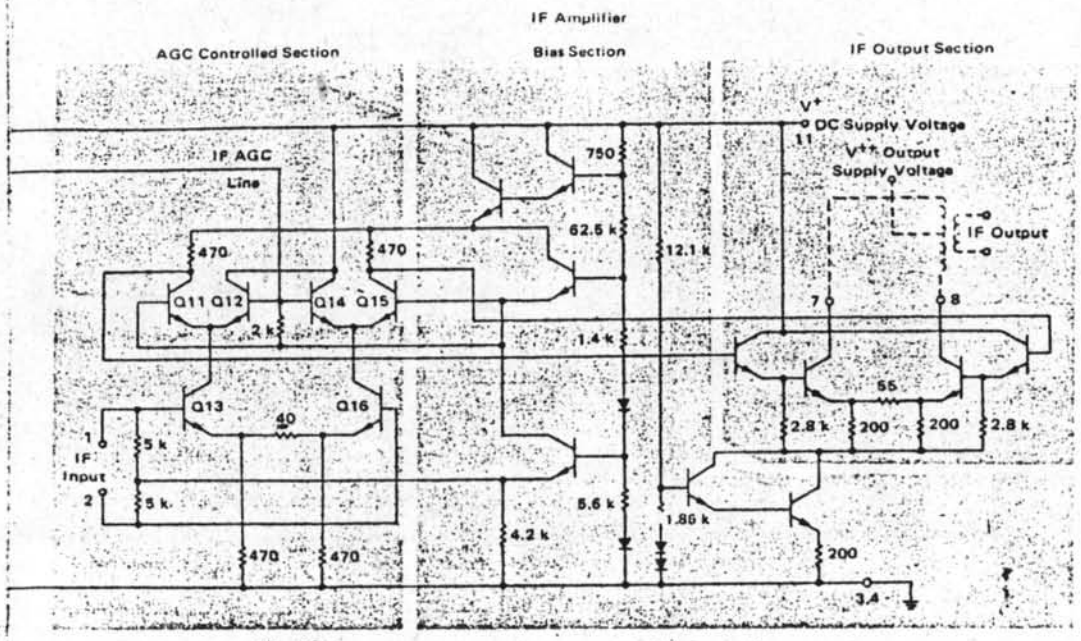


FIGURE 18 – MC1352 AGC Characteristics

amplifier AGC compression is obtained with a much smaller change in video input voltage than required for full AGC compression in the IF amplifier. Figure 18 displays the AGC characteristics of the MC1352, while Figure 19 displays the MC1353.



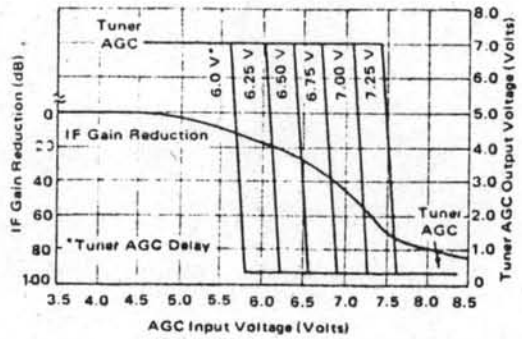


FIGURE 19 – MC1353 AGC Characteristics

ADJUSTMENT OF RF AMPLIFIER BIAS

Figure 20 is a schematic diagram of a video IF amplifier for use at 45 MHz using a MC1330, low level detector and either a MC1352 or MC1353. If the RF amplifier transistor in the tuner is an NPN device, a MC1352 is used. To set the maximum gain pre-bias on a forward AGC NPN transistor, a fixed resistor R_{pb} must be selected. This forms a voltage divider with the 6.8 kΩ resistor (R3). In the maximum gain condition, the voltage on Pin 12 would be zero volts without the voltage divider. To pre-bias a forward AGC PNP transistor, R_{pb} is set at 6.8 kΩ and R3 is selected for proper pre-bias. To obtain maximum gain without AGC control, for alignment purposes connect a 22 kΩ resistor between Pins 9 and 11 of the MC1352 or MC1353. Connecting a 200 kΩ variable resistor between Pin 14 and ground and also the 22 kΩ resistor between Pins 9 and 11 provides a method of obtaining any particular gain desired. The alignment procedure for Figure 20 is the same as described earlier for the MC1350. Additional information on the MC1352 and MC1353 can be obtained from the data sheets.

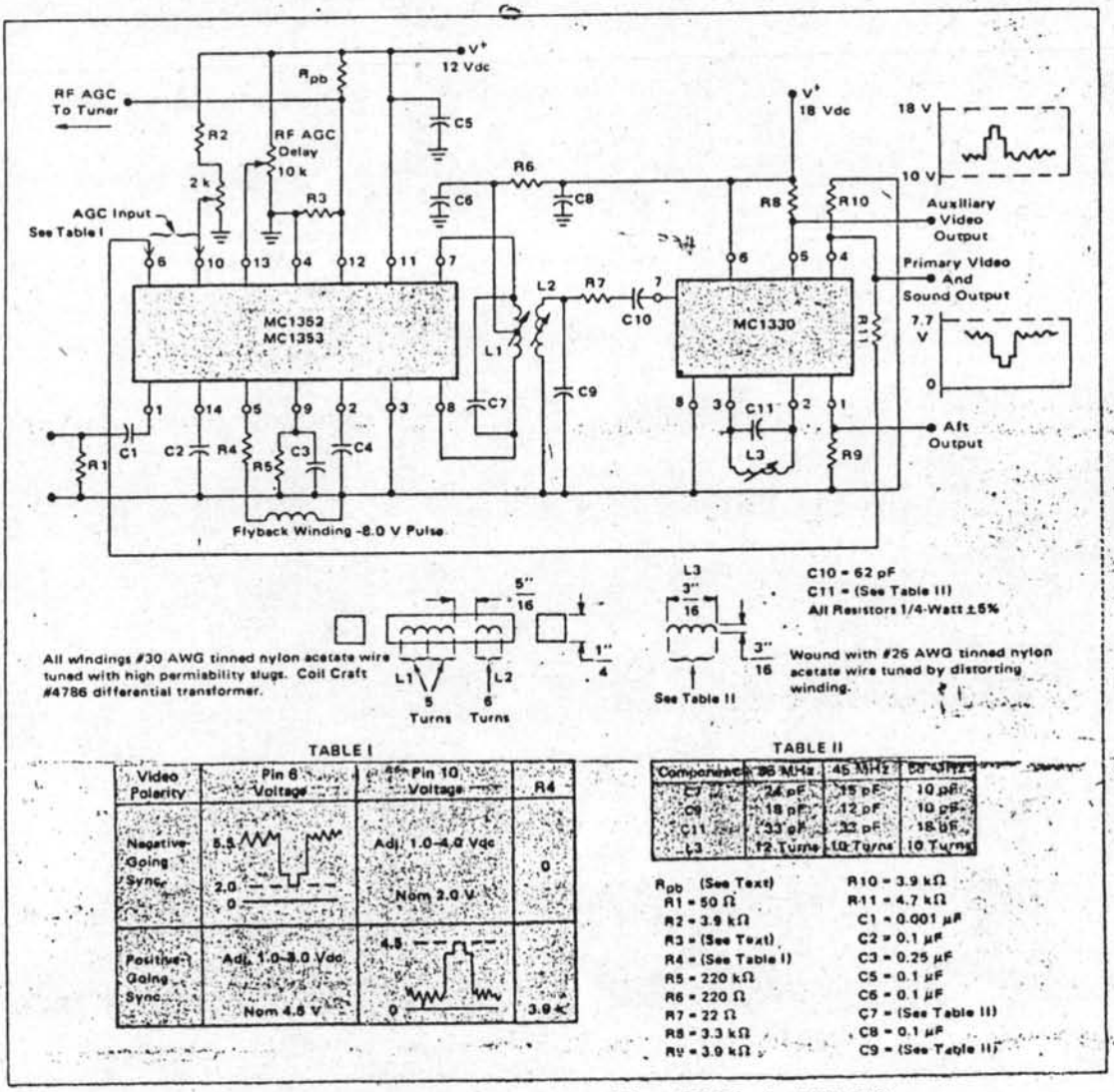


TABLE I

Video Polarity	Pin 6 Voltage	Pin 10 Voltage	R4
Negative-Going Sync	5.5 / 2.0 / 0	Adj. 1.0-4.0 Vdc, Nom 2.0 V	0
Positive-Going Sync	Adj. 1.0-3.0 Vdc, Nom 4.6 V	4.5 / 0	3.9 k

TABLE II

Component	36 MHz	45 MHz	58 MHz
C7	24 pF	15 pF	10 pF
C9	18 pF	12 pF	10 pF
C11	33 pF	22 pF	18 pF
L3	12 Turns	10 Turns	10 Turns

Rpb (See Text)
R1 = 50 Ω
R2 = 3.9 kΩ
R3 = (See Text)
R4 = (See Table I)
R5 = 220 kΩ
R6 = 220 Ω
R7 = 22 Ω
R8 = 3.3 kΩ
R9 = 3.9 kΩ
R10 = 3.9 kΩ
R11 = 4.7 kΩ
C1 = 0.001 µF
C2 = 0.1 µF
C3 = 0.25 µF
C5 = 0.1 µF
C6 = 0.1 µF
C7 = (See Table II)
C8 = 0.1 µF
C9 = (See Table II)

FIGURE 20 – Television IF Amplifier and Detector Using an MC1330 and an MC1352/53

MOTOROLA Semiconductor Products Inc.
BOX 20912 • PHOENIX, ARIZONA 85036 • A SUBSIDIARY OF MOTOROLA INC.

National Semiconductor

TDA440 Video IF Amplifier

General Description

The integrated circuit has the following functions incorporated: 3 symmetrical IF (broad band) amplifier with first and second regulated stages, controlled color carrier demodulator; video post-amplifier with low pass response and output independent of supply fluctuations; gated AGC section for the IF amplifier; delayed regulated output voltage for the tuner pre-stage.

Features

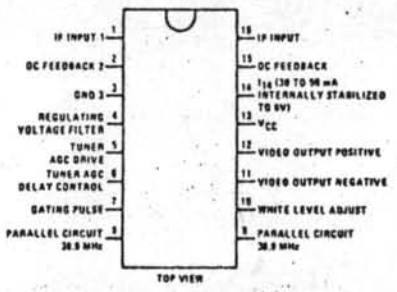
- High gain – high stability
- Constant input impedance indepedent of AGC
- Poor noise increase due to AGC action
- Negative video signal hardly affected by supply voltage variations
- Minimum RF breakthrough to video outputs
- Fast AGC action – gating largely independent of pulse shape and amplitude
- Very low intermodulation products
- Minimum differential error
- Positive as well as negative video signal available from low impedance outputs
- Integrated temperature compensating circuit
- DC output component adjustable (peak white)

Applications

- Video IF amplifier for color and monochrome television receivers

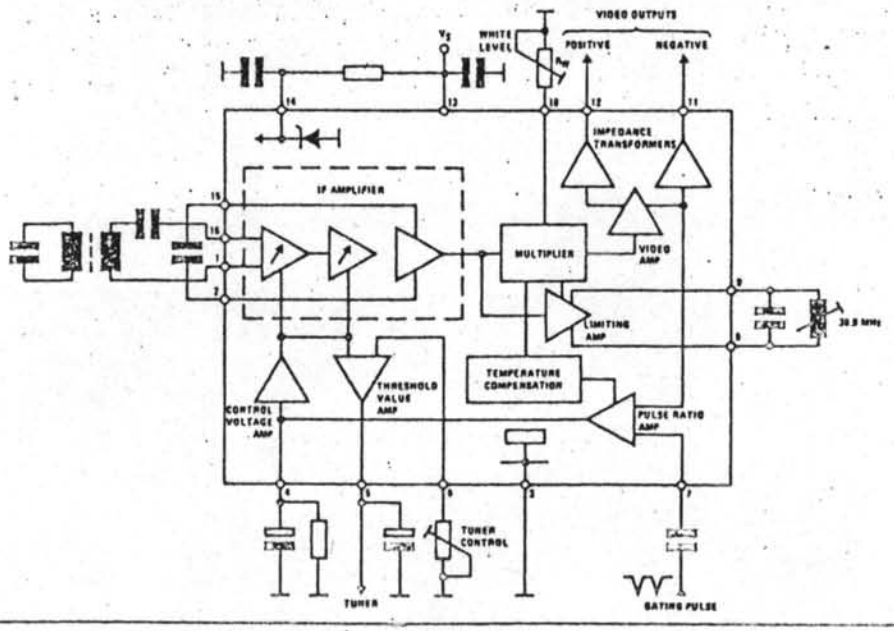
Connection and Block Diagrams

Dual-In-Line Package



Dual-In-Line Package, Order Number TDA440
See NS Package N16A

Quad-In-Line Package, Order Number TDA440Q
See NS Package N16C



Absolute Maximum Ratings

V_S, Supply Voltage Range (Pin 13)	10 to 15V
I_S, Supply Current of Low Voltage Stabilizer (Pin 14)	50 mA
V_Q, Open Loop Voltage (Pin 5)	15V
Video DC Output Current	
I_Q, Positive (Pin 12)	5 mA
I_Q, Positive (Pin 12)	30 mA
I_Q, Negative (Pin 11)	5 mA
I_Q, Negative (Pin 11)	30 mA
V_W, White Level Control (R_W) (Pin 10)	−1 to +3V
V_{EXT}, External Voltage (Pin 4)	3.2V
Power Dissipation	
P_{TOT}, $T_A \leq 55°C$	700 mW
T_J, Junction Temperature	125°C
T_A, Ambient Temperature Range	−25°C to +70°C
T_{STG}, Storage Temperature Range	−25°C to +125°C
Thermal Resistance	
R_{thJA}, Junction Ambient	100°C/W Max

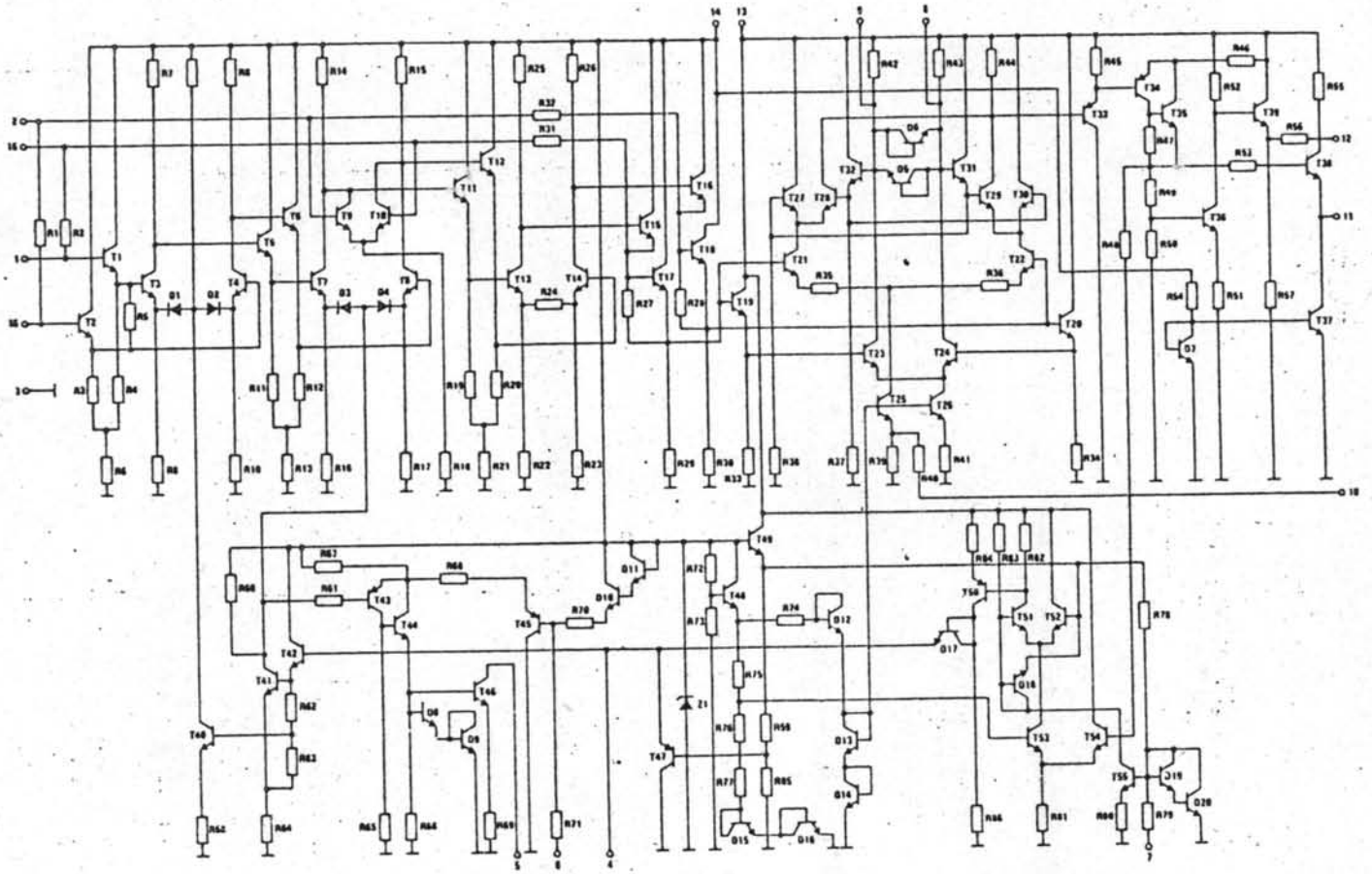
Electrical Characteristics V_S = 12V, T_A = 25°C, Reference point pin 3 unless otherwise specified

	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_S	Supply Voltage	Pin 13	10	12	15	V
I_S	Supply Current	Pin 13	15	19	25	mA
V_S	Supply Voltage	Pin 14, I_S = 40 mA	5.5	5.8	6.4	V
V_Q	Negative Video DC Output Voltage	Pin 11		5.5		V
V_Q	With White Level Adjustable	Pins 10 and 11, R_W = ∞			4.8	V
		R_W = 0	6.5			V
V_Q	Peak Black Clamping Level for Negative Video DC Output Voltage	Pin 11	1.75	1.9	2.15	V
I_Q	Output DC Current Reference Point	Pins 11 and 13		3.2		mA
V_Q	Positive Video DC Output Voltage	Pin 12		5.6		V
I_Q	Available Tuner Control Current 10 dB after Onset of Tuner Control Action (Note 1)	Pin 5	3	4.5		mA
V_I	Negative Gating Pulse	Pin 7	1.5	3	5	V_{SS}
$-v_q$	Composite Video Output Level	Pin 11				
		V_Q = 5.5V		3.3		V_{SS}
		V_Q = 6.4V		4.2		V_{SS}
$\Delta A_{(IF)}$	AGC Range		50	56		dB
B_{VIDEO}	Video Bandwidth	Δv_{VIDEO} = −3 dB	8	10		MHz
Δv_{VIDEO}	Video Frequency Response Change	$\Delta A_{(IF)}$ = 50 dB, B_{VIDEO} = 0–5 MHz		1.0	2.0	dB
v_i	Symmetrical Input Voltage	Pins 1–16, $-v_q$ = 3.3 V_{SS} (Pin 11)	100	150	220	µV
	Maximum IF Voltage Level Present at Video Outputs Over the Full AGC Range	Pins 11 and 12				
		f = 38.9 MHz			30	mV
		f = 77.8 MHz (2. Harm)			50	mV
	Sound IF Voltage Level Present at Video Outputs with Selective Circuit	Pin 12, f = 5.5 MHz, B_T/T_T = 30 dB	30			mV
d	Differential Gain of Negative Comp. Video Output Signal, for Full Black to White Swing				15	%
a_{IM}	Suppression of Sound Carrier/ Color Subcarrier IP (1.07 MHz) with Respect to Color Subcarrier Level		40			dB
	Picture Carrier			0		dB
	IF Color Subcarrier Level			−6		dB
	IF Sound Carrier Level			−24		dB
	Input Impedance Reference Point	Pin 16				
R_I	$A_{(IF)}$ Max	Pin 1		1.4		kΩ
C_I				2		pF
R_I	$A_{(IF)}$ Min	Pin 1		1.4		kΩ
C_I				1.9		pF

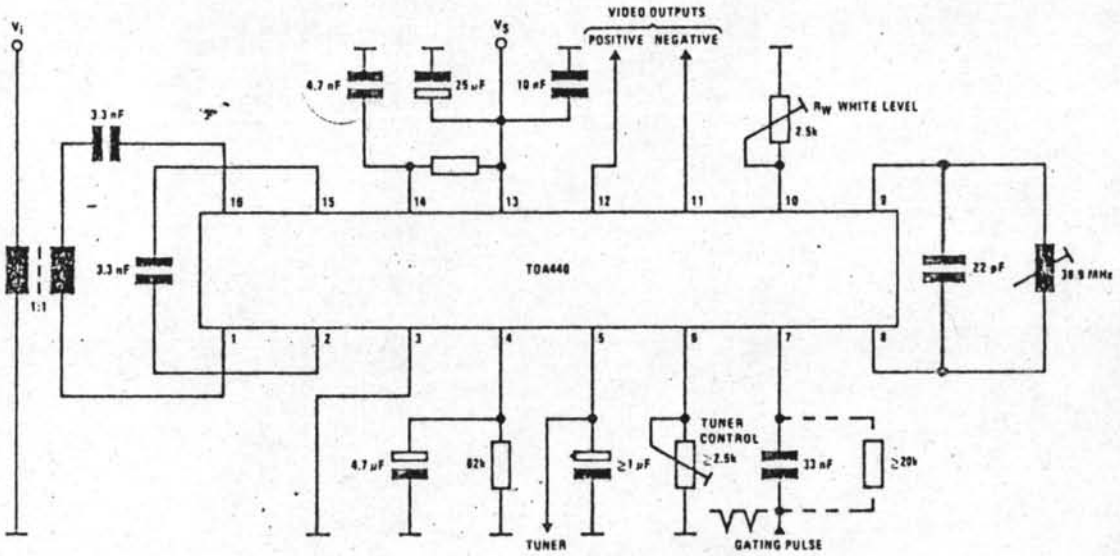
Note 1: On request ≥ 7 mA

Schematic Diagram

Application Note for Reference Circuit to Improve
Audio Interference and Cross Color Characteristics



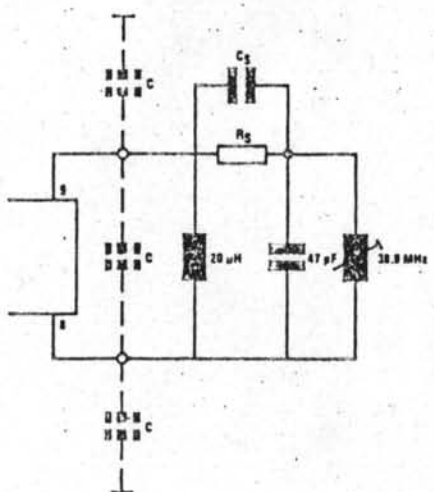
Test Circuit



Note. Supply voltage *must be disconnected* before inserting the integrated circuit in the socket.

Typical Applications

Improved Tank Circuit to Reduce Audio Interference and Chroma Beat



C = Parasitic capacitance at pins 8 and 9 should be kept minimum

C_S = 6–10 pF – series capacitance

f_o = 38.9–(1.8–2.75) MHz–series resonance frequency

R_S = 1.8–3.3 kΩ – series resonance damping determine the tuning characteristics

i.e., R_S = 2.4 kΩ tuning range, f = 3 MHz

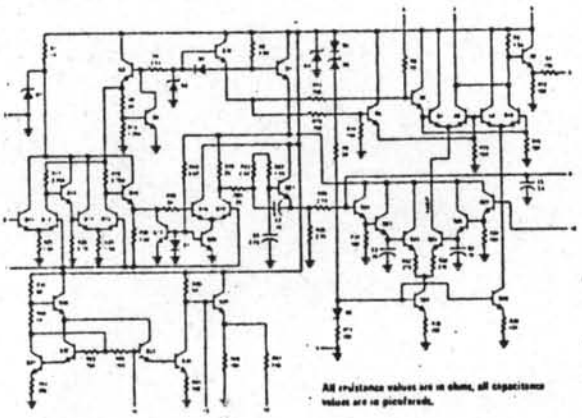
National Semiconductor

LM3065 television sound system general description

The LM3065 is a monolithic integrated circuit television sound system that requires a minimum of external components for operation. It includes three stages of IF limiting, an FM detector, an electronic attenuator or volume control, an audio amplifier-driver, and a temperature stable regulated power supply. Volume control is accomplished by varying bias levels of the electronic attenuator with a potentiometer between pin 6 and ground. Because no audio signal is present in this control, hum and noise pickup are easily filtered. Unshielded wire may be used for volume control. Features include:

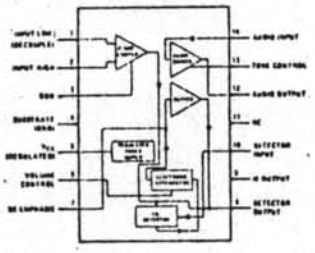
- Electronic attenuator: replaces conventional ac volume control
- Volume reduction range: >60 dB
- Sensitivity: 3 dB limiting voltage—200 μV typically
- High stability
- Low harmonic distortion
- Audio drive capability: 6 mA p-p
- Undistorted audio output voltage: 7V p-p
- Differential peak detector
- Simple detector alignment: one coil
- Internal zener diode regulator
- Excellent AM rejection—50 dB typ. @ 4.5 MHz

schematic and connection diagrams



All resistance values are in ohms, all capacitance values are in picofarads.

Dual-In-Line Package

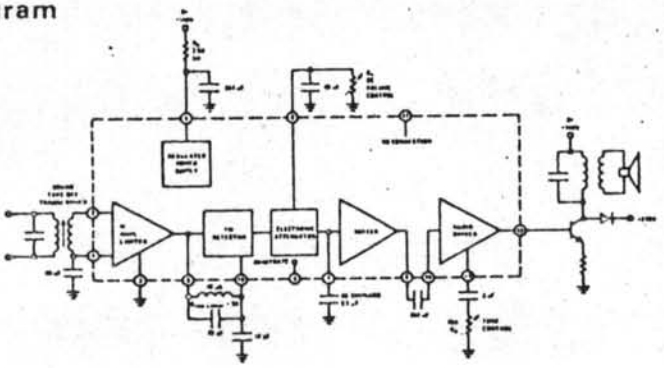


TOP VIEW

Order Number LM3065N
See NS Package N14A

Order Number LM3065N-01
See NS Package N14C

block diagram



absolute maximum ratings

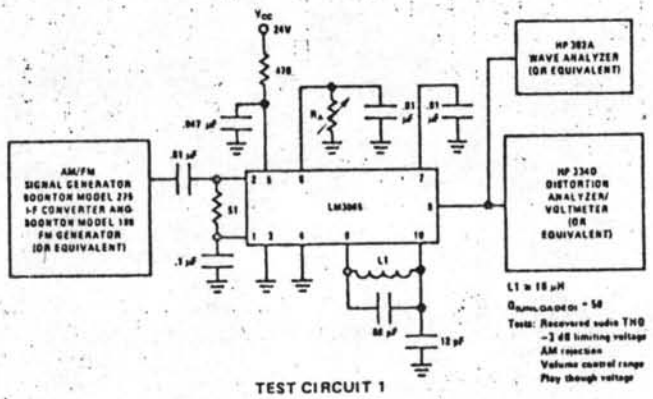
Input Signal Voltage (Between Pin 1 and 2)	±3V	Operating Temperature Range	−40°C to +85°C
Power Supply Current (Pin 5)	75 mA	Storage Temperature Range	−65°C to +150°C
Power Dissipation (Note 1)	715 mW	Lead Temperature (Soldering, 10 seconds)	300°C

electrical characteristics

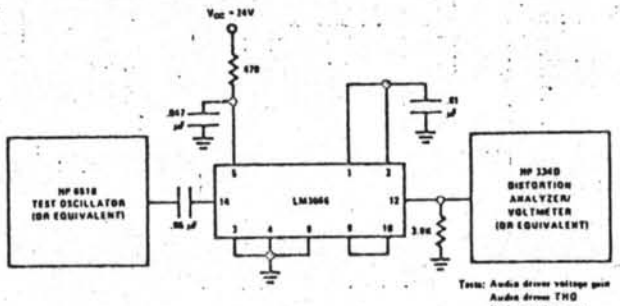
PARAMETER	SYMBOL	TEST CIRCUIT	CONDITIONS	LIMITS MIN.	LIMITS TYP	LIMITS MAX	UNITS
Static Characteristics							
Zener Regulating Voltage	V_5			10.3	11.5	12.2	V
Quiescent Supply Current	I_5				28		mA
Voltage @ Pin 12	V_{12}			4.0	5.2	5.8	V
Current into Terminal 5	I_5		V_5 = 9V	10.0	12.3	24	mA
Dynamic Characteristics							
IF Amplifier/Detector							
Input Limiting Voltage (−3 dB point)	V_{IN} (lim)	1	fo = 4.5 MHz fm: 400 Hz @ ±25 kHz		200	400	µV
Recovered Audio	V_O (af)	1	fo = 4.5 MHz, V_{IN} = 100 mV fm: 400 Hz @ ±25 kHz	500	750		mV rms
AM Rejection	AMR	1	fo = 4.5 MHz, fm: 400 Hz @ ±25 kHz AM: 1 kHz @ 30%	40	50		dB
Total Harmonic Distortion	THD	1	fo = 4.5 MHz, V_{IN} = 100 mV fm: 400 Hz @ ±25 kHz		.9	2	%
Attenuator							
Volume Reduction Range			fo = 4.5 MHz fm: 400 Hz @ ±25 kHz R_A = 0 for max volume, R_A = ∞ for minimum volume	60			dB
Audio Driver							
Voltage Gain	Av(af)	2	V_{IN} = 100 mV @ 400 cps	17.5	20		dB
Total Harmonic Distortion	THD	2	V_O = 2V rms @ 400 cps		1.5		%
Undistorted Output Voltage		2	THD = 5% @ 400 cps	2	2.5		V rms

Note 1: For operation in ambient temperatures above 25°C, the device must be derated based on a 150°C maximum junction temperature and a thermal resistance of 175°C/W junction to ambient.

test circuits



TEST CIRCUIT 1



TEST CIRCUIT 2

National Semiconductor

TBA120S IF amplifier and detector

general description

The TBA120S is a monolithic integrated circuit specifically designed for audio detection in TV and FM radio receivers. It incorporates an 8-stage limiting IF amplifier and balanced detector plus a dc operated volume control.

features

- Electronic attenuator: replaces conventional ac volume control
- Volume reduction range 85 dB typ
- Sensitivity: 3 dB limiting voltage 30μV typ
- Excellent AM rejection 68 dB typ at 10 mV
- Audio output voltage 1V typ
- Wide supply voltage range (6-18V)
- Internal zener diode regulator
- Very low external component requirement
- Simple detector alignment: one coil

The TBA120S is supplied in four groups depending on the resistance required between pin 5 and ground to attenuate the audio output by 30 dB. The group number as defined below is marked on the package.

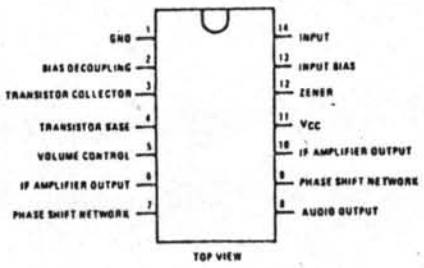
GROUP	II	III	IV	V	
R5-Gnd	1.9-2.2	2.1-2.5	2.4-2.9	2.8-3.3	kΩ

Pins 3 and 4 are connected to the collector and base of a transistor which may be used as an AF-preamplifier or as a switch.

At pin 12 a zener-diode is accessible which can be used to stabilize the supply voltage of this integrated circuit or the voltage of other circuit elements in the set.

connection diagram

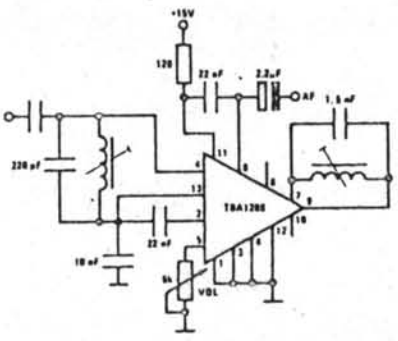
Dual-In-Line Package



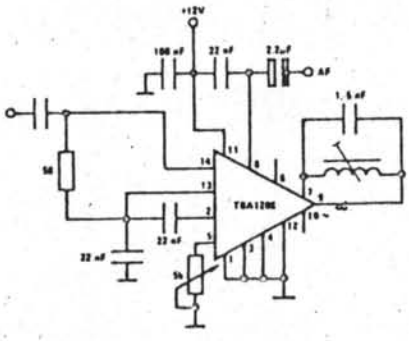
Order Number TBA120S II, TBA120S III, TBA120S IV or TBA120S V
See NS Package N14A

Order Number TBA120SQ II, TBA120SQ III, TBA120SQ IV, TBA120SQ V
See NS Package N14C

typical application (5.5 MHz)



test circuit (5.5 MHz)



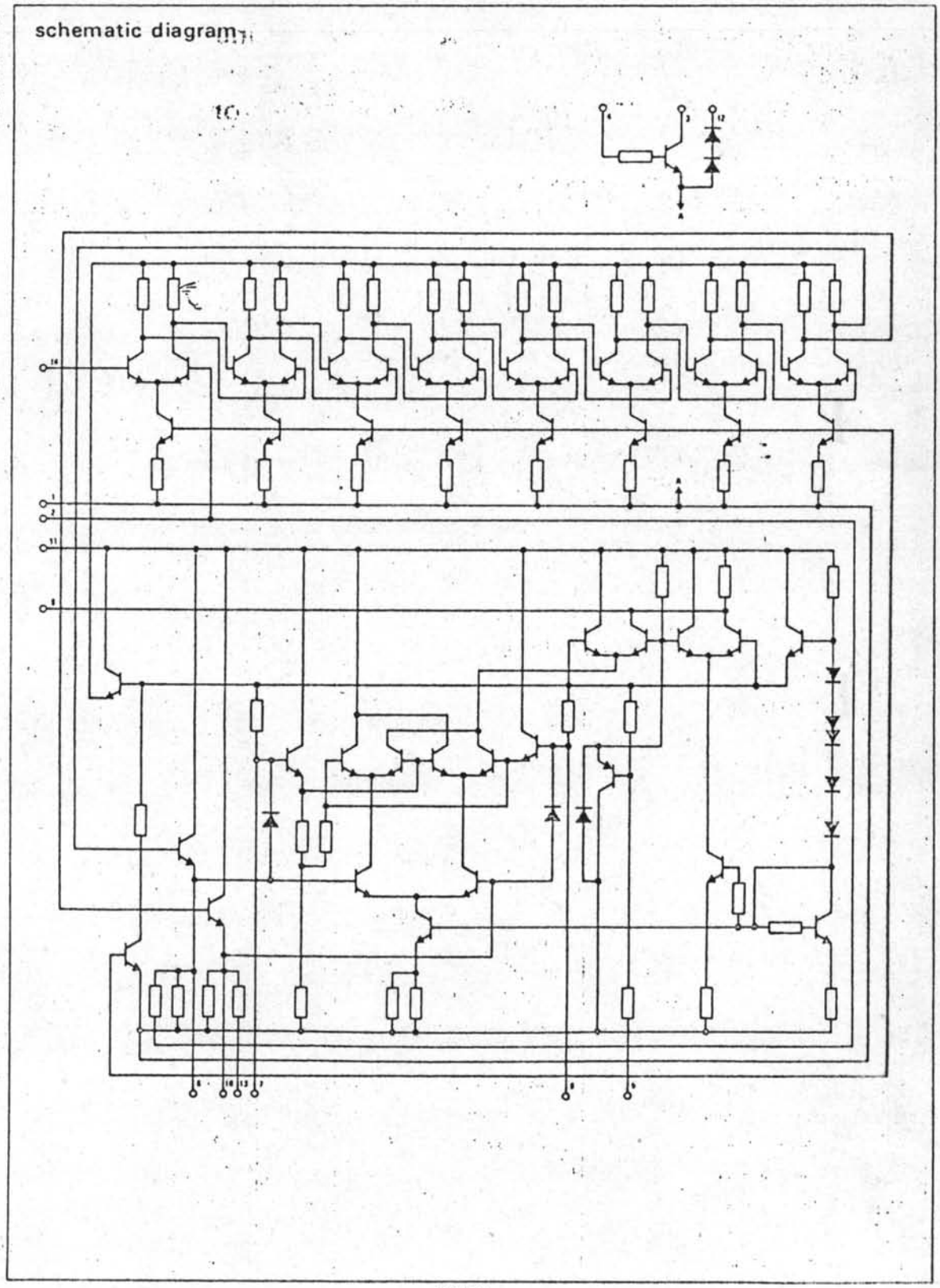
absolute maximum ratings

Supply Voltage, V11	18V	Transistor Base Current, I_4	2 mA
Volume Control Voltage, V5	4V	Bias Resistance (Max), R13-14	1 kΩ
Zener Current, I_{12}	20 mA	Operating Temperature Range	−15°C to +70°C
Transistor Collector Current, I_3	5 mA	Storage Temperature Range	−65°C to +150°C

electrical characteristics (V_{CC} = 12V, T_A = 25°C)

	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
I_{CC}	Supply Current	R5 = ∞	10	14	18	mA
		R5 = 0	11		20	mA
G_V	IF Voltage Gain	f = 5.5 MHz		68		dB
V_O	IF Output Voltage, Each Output, at Limiting		170	250		mVp-p
Vaf	AF Output Voltage	f = 5.5 MHz, Δf = ±50 kHz, f_{MOD} = 1 kHz, V_I = 10 mV, Q = 45	0.7	1.0		V
	Distortion (5.5 MHz)	f = 5.5 MHz, Δf = 25 kHz, f_{MOD} = 1 kHz, V_I = 10 mV, Q = 45		1.5		%
	Distortion (10.7 MHz)	f = 10.7 MHz, Δf = ±50 kHz, f_{MOD} = 1 kHz, V_I = 10 mV, Q = 20		0.2		%
V_{LIM}	Input Voltage Before Limiting	f = 5.5 MHz, Δf = ±50 kHz, f_{MOD} = 1 kHz, Q = 45		30	60	μV
Z_I	Input Impedance	f = 5.5 MHz	15/6	40/4.5		kΩ/pF
R_O	Output Resistance		1.9	2.6	3.3	kΩ
$\frac{Vaf\ max}{Vaf\ min}$	Volume Control Range		70	85		dB
V8	DC Component of the Output Signal	V_I = 0	6.2	7.3	8.4	V
a_{AM}	AM Rejection	f = 5.5 MHz, Δf = ±50 kHz, f_{MOD} = 1 kHz, V_I = 500μV, m = 30%	50	60		dB
a_{AM}	AM Rejection	f = 5.5 MHz, Δf = ±50 kHz, f_{MOD} = 1 kHz, V_I = 10 mV, m = 30%		68		dB
R5	Potentiometer Resistance	1 dB Attenuation		3.7	4.7	kΩ
V5	Voltage	1 dB Attenuation		2.2	2.5	V
R5	Potentiometer Resistance	70 dB Attenuation	1.0	1.4		kΩ
V5	Voltage	70 dB Attenuation		1.2		V
	Noise Voltage at Output	V_I = 10 mV		30		μV
V12	Zener Voltage	I_{12} = 5 mA	11.2	12	13.4	V
R_Z	Zener Slope Resistance			30	50	Ω
V_{cbo}	Breakdown Voltage		45	65		V
V_{ceo}	Breakdown Voltage	I_3 = 500μA	18	24		V
h_{fe}	Current Gain	I_3 = 1 mA	50	100	500	

schematic diagram



National Semiconductor

Audio, Radio and TV Circuits

TBA950-2 Television Signal Processing Circuit

General Description

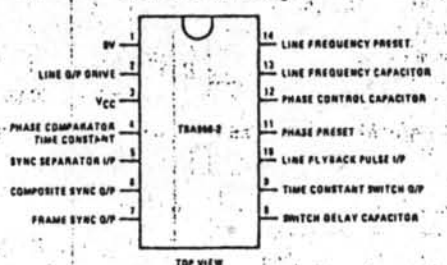
The TBA950-2 is a monolithic integrated circuit for pulse separation and line synchronization in TV receivers with transistor output stages.

The TBA950 comprises the sync separator with noise suppression, the frame pulse integrator, the phase comparator, a switching stage for automatic changeover of noise immunity, the line oscillator with frequency range limiter, a phase control circuit and the output stage.

It delivers prepared frame sync pulses for triggering the frame oscillator. The phase comparator may be switched for video recording operation. Due to the large scale of integration, few external components are needed.

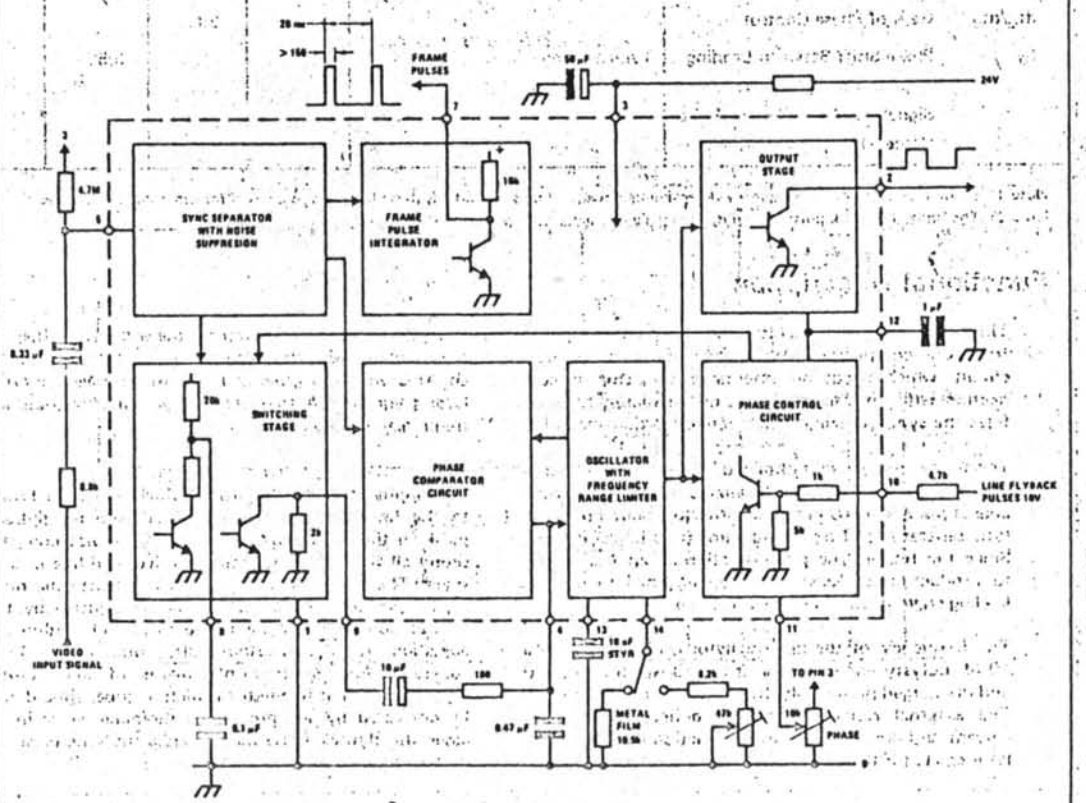
Connection and Block Diagrams

Dual-In-Line Package



Dual-In-Line Package, Order Number TBA950-2
See NS Package N14A

Quad-In-Line Package, Order Number TBA950-2Q
See NS Package N14C



Absolute Maximum Ratings

All voltages are referred to pin 1

I_3, Supply Current *(Figure 6)*	45 mA
I_5, Input Current	2 mA
V5, Input Voltage	−6V
I_2, Output Current	22 mA
V2, Output Voltage	12V
I_8, Switch-Over Current for Video Recording	5 mA
I_{10}, Flyback Peak Pulse Current	5 mA
V11, Phase Correction Voltage	0 to V3
T_A, Ambient Temperature	60°C

Recommended Operating Conditions

(For operating circuits *Figures 4 and 5*)

I_5, Input Current During Sync Pulse	>5 µA
V_{IN} p-p, Composite Video Input Signal	3 (1 to 6)V
I_{10}, Input Current During Line Flyback Pulse	0.2 to 2 mA
I_8, Switch-Over Current	>2 mA
t_d, Time Difference Between the Output Pulse at Pin 2 and the Line Flyback Pulse at 10	<20 µs
I_3, Current Consumption *(Figure 6)*	≤45 mA
T_A, Ambient Operating Temperature Range	0°C to +60°C

Electrical Characteristics

T_A = 25°C, f_o = 15,625 Hz in the test circuit *Figure 2* (Note 1)

SYMBOL	CHARACTERISTIC	CONDITIONS	MIN	TYP	MAX	UNITS
V7	Amplitude of the Frame Pulse			>8		V
t7	Frame Pulse Durations			>150		µs
$R_{OUT\ 7}$	Output Resistance at Pin 7 (High State)		7.5	10	13	kΩ
t2	Output Pulse Duration	Typical Ranges	25		28	µs
V2 Res.	Residual Output Voltage	I_2 = 20 mA		<0.55		V
f_o	Oscillator Frequency	C13/1 = 10 nF, R14/1 = 10.5 kΩ	14063	15625	17187	Hz
$\pm\Delta f_F$	Frequency Pull-In Range		400		1000	Hz
$\pm\Delta f_H$	Frequency Holding Range	Typical Ranges	400		1000	Hz
df_o/dt_d	Slope of Phase Comparator Control Loop			2		kHz/µs
dt_d/dt_p	Gain of Phase Control			20		
t_p	Phase Shift Between Leading Edge of Composite Video Signal and Line Flyback Pulse (Note 2) Adjustable by V11	Typical Range	0		3.5	µs

Note 1: By modification of the frequency-determining network at pins 13 and 14, these ICs can also be used for other line frequencies.
Note 2: The limited flyback pulse should overlap the video signal sync pulse on both edges.

Functional Description

The sync separator separates the synchronizing pulses from the composite video signal. The noise inverter circuit, which needs no external components, in connection with an integrating and differentiating network frees the synchronizing signal from distortion and noise.

The frame sync pulse is obtained by multiple integration and limitation of the synchronizing signal, and is available at pin 7. The *RC* network, hitherto required between sync separator and frame oscillator is no longer needed. Since the frame sync pulse duration at pin 7 is subject to production spreads, it is recommended to use the leading edge of this pulse for triggering.

The frequency of the line oscillator is determined by a 10 nF polystyrene capacitor at pin 13 which is charged and discharged periodically by 2 internal current sources. The external resistor at pin 14 defines the charging current and consequently in conjunction with the oscillator capacitor the line frequency.

The phase comparator compares the sawtooth voltage of the oscillator with the line sync pulses. Simultaneously, an AFC voltage is generated which influences the oscillator frequency. A frequency range limiter restricts the frequency holding range.

The oscillator sawtooth voltage, which is in a fixed ratio to the line sync pulses, is compared with the flyback pulse in the phase control circuit, in this way compensating all drift of delay times in driver and line output stage. The correct phase position and hence the horizontal position of the picture can be adjusted by the 10 kΩ potentiometer connected to pin 11. Within the adjustable range the output pulse duration (pin 2) is constant. Any larger displacements of the picture, e.g., due to non-symmetrical picture tube, should not be corrected by the phase potentiometer, since in all cases the flyback pulse must overlap the sync pulse on both edges *(Figure 3)*.

Functional Description (Continued)

The switching stage has an auxiliary function. When the 2 signals supplied by the sync separator and the phase control circuit, respectively, are in synchronism, a saturated transistor is in parallel with the integrated 2 kΩ resistor at pin 9. Thus the time constant of the filter network at pin 4 increases and consequently reduces the pull-in range of the phase comparator circuit for the synchronized state to approximately 50 Hz. This arrangement ensures disturbance-free operation.

For video recording operation, this automatic switchover can be blocked by a positive current fed into pin 8, e.g., via a resistor connected to pin 3. It may also be useful to connect a resistor of about 680 Ω or 1 kΩ between pin 9 and earth. The capacitor at pin 4 may be lowered, e.g., to 0.1 μF. These alterations do not significantly influence the normal operation of the IC and thus do not need to be switched.

The output stage delivers at pin 2 output pulses of duration and polarity suitable for driving the line driver stage. If the supply voltage goes down (e.g., by switching off the mains) a built-in protection circuit ensures defined line frequency pulses down to V3 = 4V and shuts off when V3 falls below 4V, thus preventing pulses of undefined duration and frequency. Conversely, if the supply voltage rises, pulses defined in duration and frequency will appear at the output pin as soon as V3 reaches 4.5V. In the range between V3 = 4.5V and full supply the shape and frequency of the output pulses are practically constant.

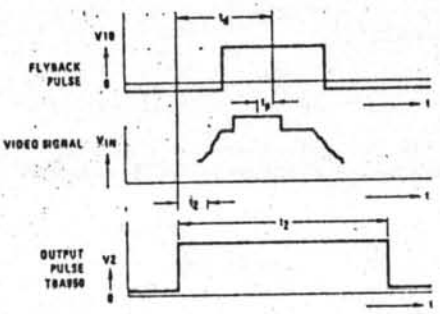
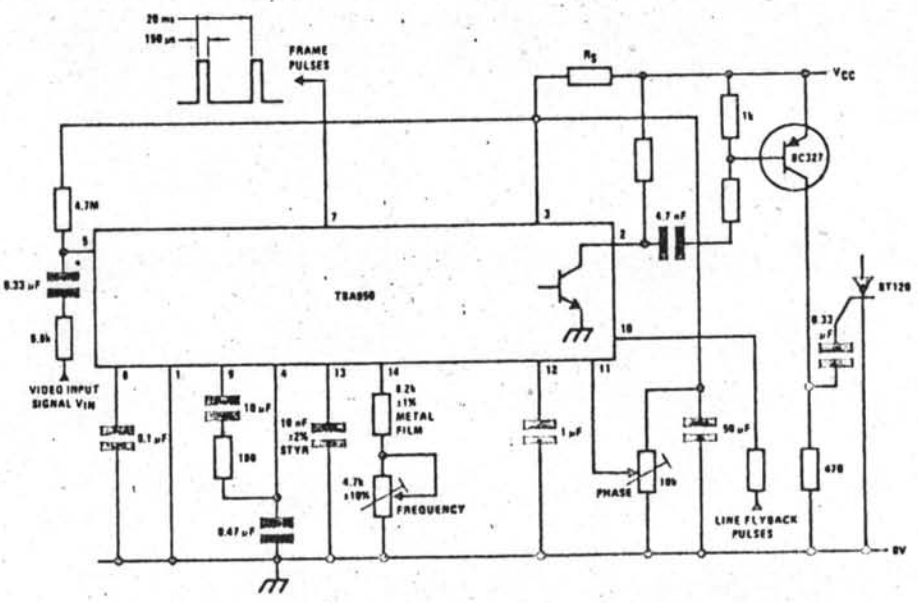


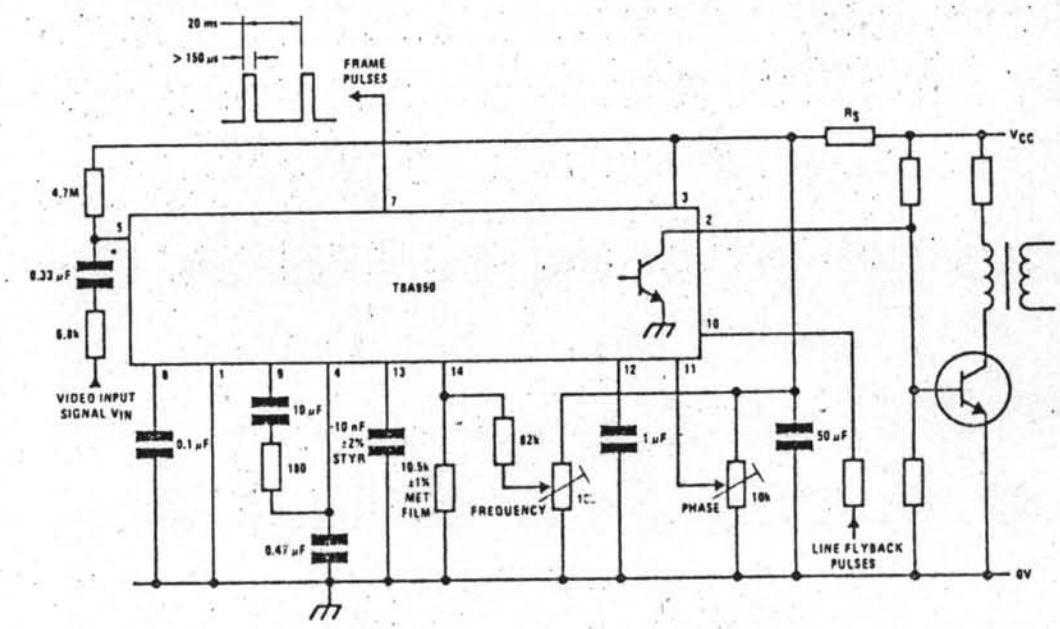
FIGURE 3. Phase Relationships



*Input circuitry must be optimized

FIGURE 4. Operating Circuit (Thyristor Output Stage)

Functional Description (Continued)



*Input circuitry must be optimized

FIGURE 5. Another Possibility for Line Frequency Adjustment (Transistor Output Stage)

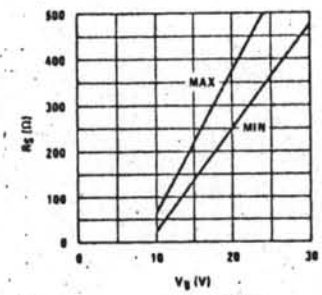


FIGURE 6. Graph for Determining the Supply Series Resistor, R_S

National Semiconductor

Voltage Regulators

LM723/LM723C voltage regulator

general description

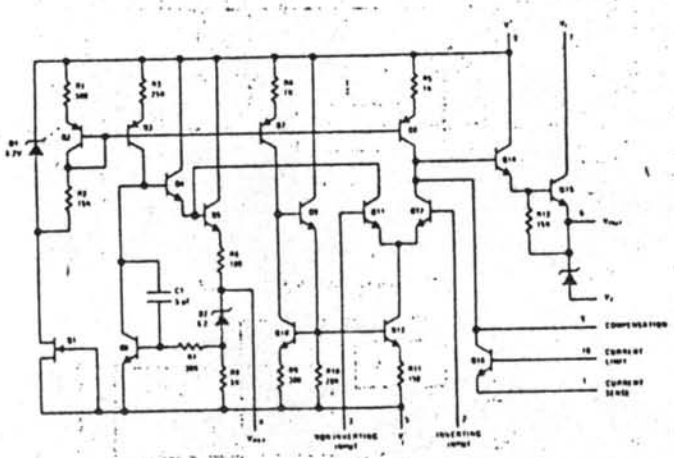
The LM723/LM723C is a voltage regulator designed primarily for series regulator applications. By itself, it will supply output currents up to 150 mA; but external transistors can be added to provide any desired load current. The circuit features extremely low standby current drain, and provision is made for either linear or foldback current limiting. Important characteristics are:

- 150 mA output current without external pass transistor
- Output currents in excess of 10A possible by adding external transistors
- Input voltage 40V max
- Output voltage adjustable from 2V to 37V
- Can be used as either a linear or a switching regulator.

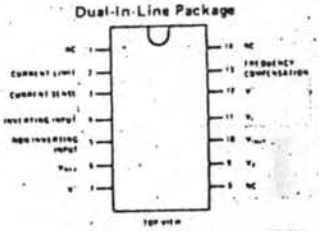
The LM723/LM723C is also useful in a wide range of other applications such as a shunt regulator, a current regulator or a temperature controller.

The LM723C is identical to the LM723 except that the LM723C has its performance guaranteed over a 0°C to 70°C temperature range, instead of −55°C to +125°C.

schematic and connection diagrams *

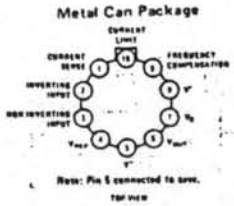


Dual-In-Line Package



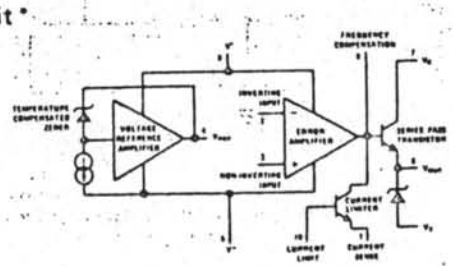
Order Number LM723N or LM723CN
See NS Package N14A
Order Number LM723J or LM723CJ
See NS Package J14A

Metal Can Package



Order Number LM723H or LM723CH
See NS Package H10C

equivalent circuit *



*Pin numbers refer to metal can package.

absolute maximum ratings

Pulse Voltage from V^+ to V^- (50 ms)	50V
Continuous Voltage from V^+ to V^-	40V
Input-Output Voltage Differential	40V
Maximum Amplifier Input Voltage (Either Input)	7.5V
Maximum Amplifier Input Voltage (Differential)	5V
Current from V_Z	25 mA
Current from V_{REF}	15 mA
Internal Power Dissipation Metal Can (Note 1)	800 mW
Cavity DIP (Note 1)	900 mW
Molded DIP (Note 1)	660 mW
Operating Temperature Range LM723	-55°C to +125°C
LM723C	0°C to +70°C
Storage Temperature Range Metal Can	-65°C to +150°C
DIP	-55°C to +125°C
Lead Temperature (Soldering, 10 sec)	300°C

electrical characteristics (Note 2)

PARAMETER	CONDITIONS	LM723			LM723C			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Line Regulation	V_{IN} = 12V to V_{IN} = 15V		.01	0.1		.01	0.1	% V_{OUT}
	$-55°C \leq T_A \leq +125°C$			0.3				% V_{OUT}
	$0°C \leq T_A \leq +70°C$						0.3	% V_{OUT}
	V_{IN} = 12V to V_{IN} = 40V		.02	0.2		0.1	0.5	% V_{OUT}
Load Regulation	I_L = 1 mA to I_L = 50 mA		.03	0.15		.03	0.2	% V_{OUT}
	$-55°C \leq T_A \leq +125°C$			0.6				%V_{OUT}
	$0°C \leq T_A \leq +70°C$						0.6	%V_{OUT}
Ripple Rejection	f = 50 Hz to 10 kHz, C_{REF} = 0		74			74		dB
	f = 50 Hz to 10 kHz, C_{REF} = 5 μF		86			86		dB
Average Temperature Coefficient of Output Voltage	$-55°C \leq T_A \leq +125°C$		.002	.015				%/°C
	$0°C \leq T_A \leq +70°C$					.003	.015	%/°C
Short Circuit Current Limit	R_{SC} = 10Ω, V_{OUT} = 0		65			65		mA
Reference Voltage		6.95	7.15	7.35	6.80	7.15	7.50	V
Output Noise Voltage	BW = 100 Hz to 10 kHz, C_{REF} = 0		20			20		μVrms
	BW = 100 Hz to 10 kHz, C_{REF} = 5 μF		2.5			2.5		μVrms
Long Term Stability			0.1			0.1		%/1000 hrs
Standby Current Drain	I_L = 0, V_{IN} = 30V		1.3	3.5		1.3	4.0	mA
Input Voltage Range		9.5		40	9.5		40	V
Output Voltage Range		2.0		37	2.0		37	V
Input-Output Voltage Differential		3.0		38	3.0		38	V

Note 1: See derating curves for maximum power rating above 25°C.

Note 2: Unless otherwise specified, T_A = 25°C, V_{IN} = V^+ = V_C = 12V, V^- = 0, V_{OUT} = 5V, I_L = 1 mA, R_{SC} = 0, C_1 = 100 pF, C_{REF} = 0 and divider impedence as seen by error amplifier $\leq$ 10 kΩ connected as shown in Figure 1. Line and load regulation specifications are given for the condition of constant chip temperature. Temperature drifts must be taken into account separately for high dissipation conditions.

Note 3: L_1 is 40 turns of No. 20 enameled copper wire wound on Ferroxcube P36/22-3B7 pot core or equivalent with 0.009 in. air gap.

Note 4: Figures in parentheses may be used if R1/R2 divider is placed on opposite input of error amp.

Note 5: Replace R1/R2 in figures with divider shown in Figure 13.

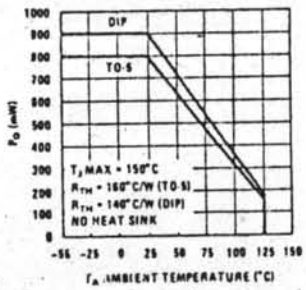
Note 6: V^+ must be connected to a +3V or greater supply.

Note 7: For metal can applications where V_Z is required, an external 6.2 volt zener diode should be connected in series with V_{OUT}.

maximum power ratings

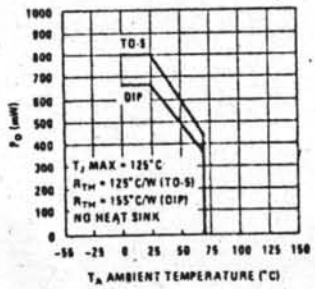
LM723

Power Dissipation vs Ambient Temperature



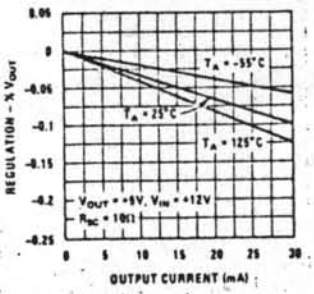
LM723C

Power Dissipation vs Ambient Temperature

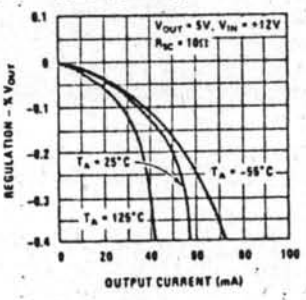


typical performance characteristics

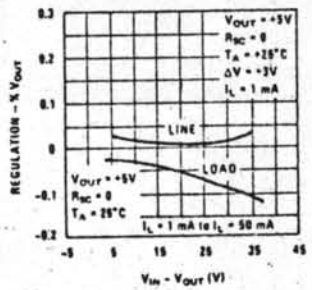
Load Regulation Characteristics with Current Limiting



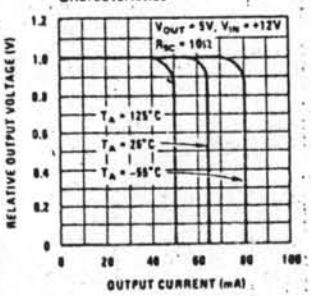
Load Regulation Characteristics with Current Limiting



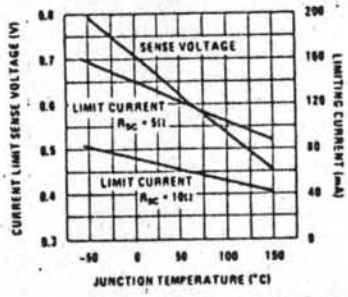
Load & Line Regulation vs Input-Output Voltage Differential



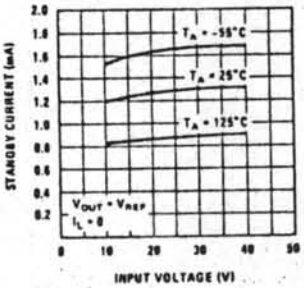
Current Limiting Characteristics



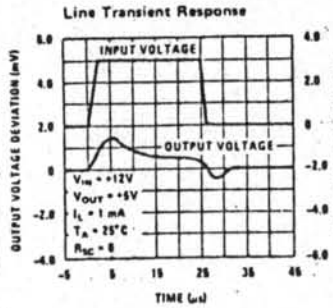
Current Limiting Characteristics vs Junction Temperature



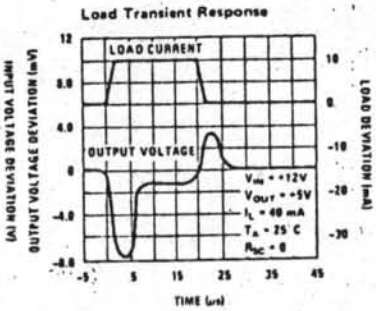
Standby Current Drain vs Input Voltage



Line Transient Response



Load Transient Response



Output Impedance vs Frequency

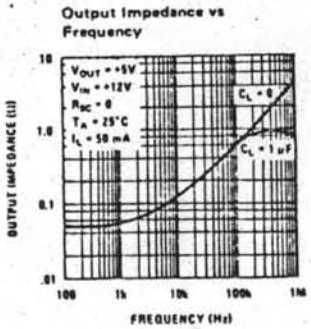


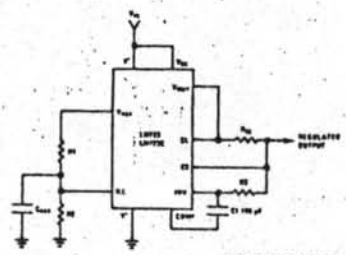
TABLE I RESISTOR VALUES (kΩ) FOR STANDARD OUTPUT VOLTAGE

POSITIVE OUTPUT VOLTAGE	APPLICABLE FIGURES	FIXED OUTPUT ±5%		OUTPUT ADJUSTABLE ±10% (Note 5)			NEGATIVE OUTPUT VOLTAGE	APPLICABLE FIGURES	FIXED OUTPUT ±5%		5% OUTPUT ADJUSTABLE ±10%		
	(Note 4)	R1	R2	R1	P1	R2			R1	R2	R1	P1	R2
+3.0	1, 5, 6, 9, 12 (4)	4.12	3.01	1.8	0.5	1.2	+100	7	3.57	102	2.2	10	91
+3.6	1, 5, 6, 9, 12 (4)	3.57	3.65	1.5	0.5	1.5	+250	7	3.57	255	2.2	10	240
+5.0	1, 5, 6, 9, 12 (4)	2.15	4.99	.75	0.5	2.2	-6 (Note 6)	3, (10)	3.57	2.43	1.2	0.5	.75
+6.0	1, 5, 6, 9, 12 (4)	1.15	6.04	0.5	0.5	2.7	-9	3, 10	3.48	5.36	1.2	0.5	2.0
+9.0	2, 4, (5, 6, 12, 9)	1.87	7.15	.75	1.0	2.7	-12	3, 10	3.57	8.45	1.2	0.5	3.3
+12	2, 4, (5, 6, 9, 12)	4.87	7.15	2.0	1.0	3.0	-15	3, 10	3.65	11.5	1.2	0.5	4.3
+15	2, 4, (5, 6, 9, 12)	7.87	7.15	3.3	1.0	3.0	-28	3, 10	3.57	24.3	1.2	0.5	10
+28	2, 4, (5, 6, 9, 12)	21.0	7.15	5.6	1.0	2.0	-45	8	3.57	41.2	2.2	10	33
+45	7	3.57	48.7	2.2	10	39	-100	8	3.57	97.6	2.2	10	91
+75	7	3.57	78.7	2.2	10	68	-250	8	3.57	249	2.2	10	240

TABLE II FORMULAE FOR INTERMEDIATE OUTPUT VOLTAGES

Outputs from +2 to +7 volts (Figures 1, 5, 6, 9, 12, (4)) $V_{OUT} = [V_{REF} \times \frac{R2}{R1 + R2}]$	Outputs from +6 to +250 volts (Figure 7) $V_{OUT} = [\frac{V_{REF}}{2} \times \frac{R2 - R1}{R1}] \cdot R3 = R4$	Current Limiting $I_{LIMIT} = \frac{V_{SENSE}}{R_{SC}}$
Outputs from +7 to +37 volts (Figures 2, 4, (5, 6, 9, 12)) $V_{OUT} = [V_{REF} \times \frac{R1 + R2}{R2}]$	Outputs from −6 to −250 volts (Figures 3, 8, 10) $V_{OUT} = [\frac{V_{REF}}{2} \times \frac{R1 + R2}{R1}]; R3 = R4$	Foldback Current Limiting $I_{KNEE} = [\frac{V_{OUT}}{R_{SC}} \frac{R3}{R4} + \frac{V_{SENSE}}{R_{SC}} \frac{(R3 + R4)}{R4}]$ $I_{SHORT\,CKT} = [\frac{V_{SENSE}}{R_{SC}} \times \frac{R3 + R4}{R4}]$

typical applications

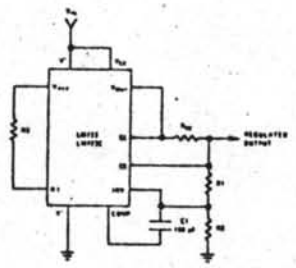


Note: $R3 = \frac{R1 \cdot R2}{R1 + R2}$ for minimum temperature drift.

TYPICAL PERFORMANCE

Regulated Output Voltage	5V
Line Regulation (ΔV_{IN} = 3V)	0.8 mV
Load Regulation (ΔI_L = 50 mA)	1.5 mV

FIGURE 1. Basic Low Voltage Regulator (V_{OUT} = 2 to 7 Volts)



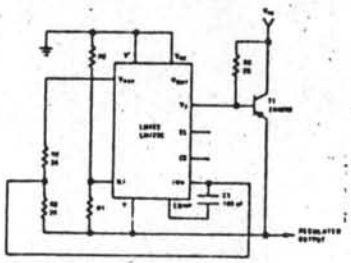
Note: $R3 = \frac{R1 \cdot R2}{R1 + R2}$ for minimum temperature drift.

R3 may be eliminated for minimum component count.

TYPICAL PERFORMANCE

Regulated Output Voltage	15V
Line Regulation (ΔV_{IN} = 3V)	1.5 mV
Load Regulation (ΔI_L = 50 mA)	4.5 mV

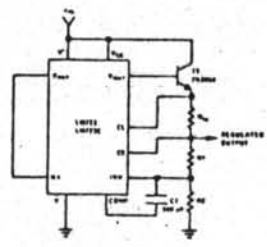
FIGURE 2. Basic High Voltage Regulator (V_{OUT} = 7 to 37 Volts)



TYPICAL PERFORMANCE

Regulated Output Voltage	-15V
Line Regulation (ΔV_{IN} = 3V)	1 mV
Load Regulation (ΔI_L = 100 mA)	2 mV

FIGURE 3. Negative Voltage Regulator

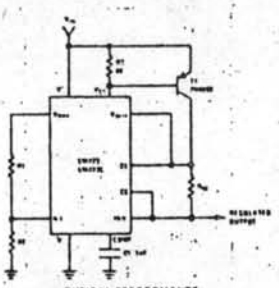


TYPICAL PERFORMANCE

Regulated Output Voltage	+15V
Line Regulation (ΔV_{IN} = 3V)	1.5 mV
Load Regulation (ΔI_L = 1A)	15 mV

FIGURE 4. Positive Voltage Regulator (External NPN Pass Transistor)

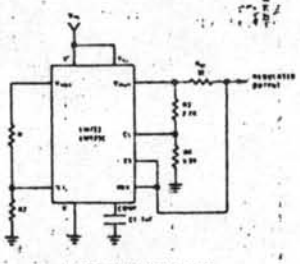
typical applications(con't.)



TYPICAL PERFORMANCE

Regulated Output Voltage	+5V
Line Regulation (ΔV_{in} = 3V)	0.5 mV
Load Regulation (ΔI_L = 1A)	5 mV

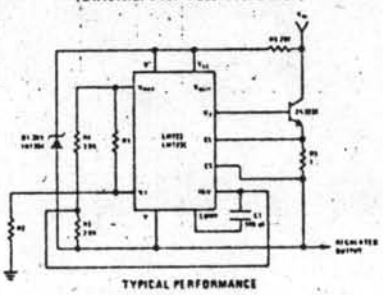
FIGURE 5. Positive Voltage Regulator (External PNP Pass Transistor)



TYPICAL PERFORMANCE

Regulated Output Voltage	+5V
Line Regulation (ΔV_{in} = 3V)	0.5 mV
Load Regulation (ΔI_L = 10 mA)	1 mV
Short Circuit Current	20 mA

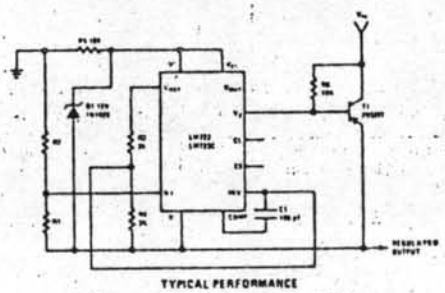
FIGURE 6. Foldback Current Limiting



TYPICAL PERFORMANCE

Regulated Output Voltage	+50V
Line Regulation (ΔV_{in} = 20V)	15 mV
Load Regulation (ΔI_L = 50 mA)	20 mV

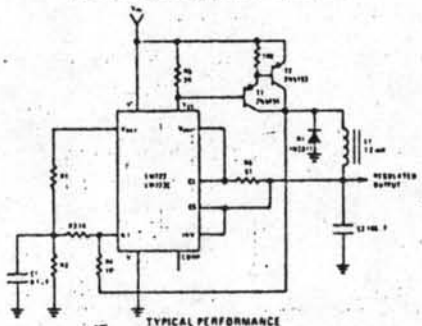
FIGURE 7. Positive Floating Regulator



TYPICAL PERFORMANCE

Regulated Output Voltage	-100V
Line Regulation (ΔV_{in} = 20V)	30 mV
Load Regulation (ΔI_L = 100 mA)	20 mV

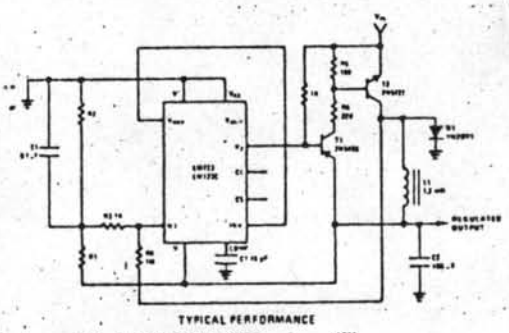
FIGURE 8. Negative Floating Regulator



TYPICAL PERFORMANCE

Regulated Output Voltage	+5V
Line Regulation (ΔV_{in} = 30V)	10 mV
Load Regulation (ΔI_L = 2A)	50 mV

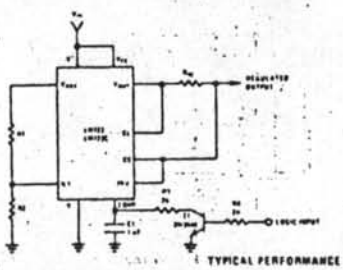
FIGURE 9. Positive Switching Regulator



TYPICAL PERFORMANCE

Regulated Output Voltage	-15V
Line Regulation (ΔV_{in} = 20V)	8 mV
Load Regulation (ΔI_L = 2A)	8 mV

FIGURE 10. Negative Switching Regulator

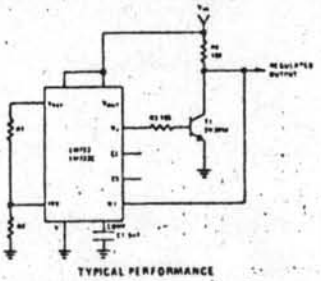


TYPICAL PERFORMANCE

Note: Current limit transistor may be used for shutdown if current limiting is not required.

Regulated Output Voltage	+5V
Line Regulation (ΔV_{in} = 3V)	0.5 mV
Load Regulation (ΔI_L = 50 mA)	1.5 mV

FIGURE 11. Remote Shutdown Regulator with Current Limiting



TYPICAL PERFORMANCE

Regulated Output Voltage	+5V
Line Regulation (ΔV_{in} = 10V)	0.5 mV
Load Regulation (ΔI_L = 100 mA)	1.5 mV

FIGURE 12. Shunt Regulator

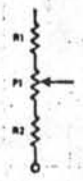
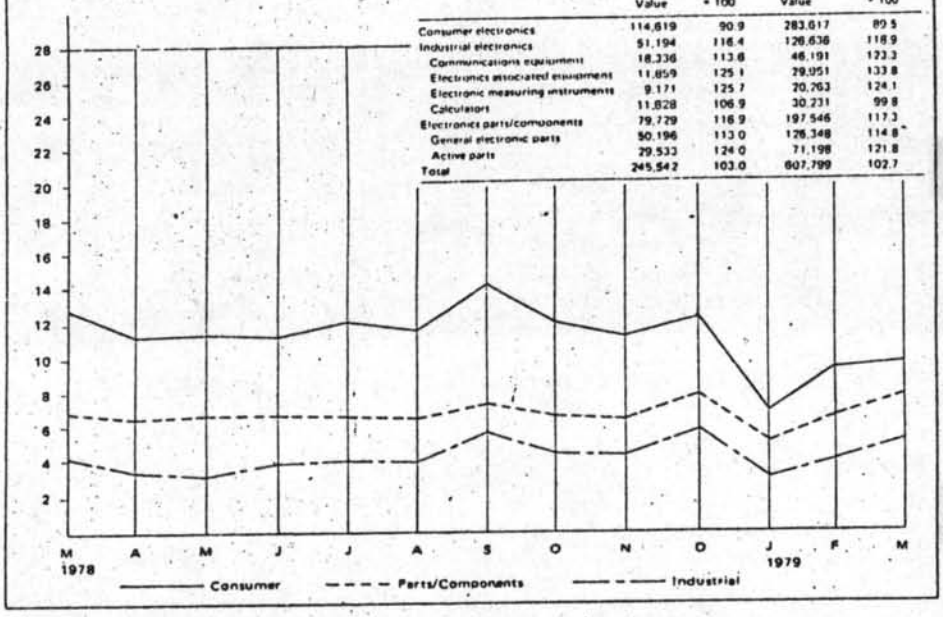


FIGURE 13. Output Voltage Adjust (See Note 5)

Vital Export Statistics

March '79

1. Monthly trends
Value: ¥10 billion



2. March breakdown
Value: ¥1 million

	Value	Mar. '78 = 100	Jan ~ Mar. Value	Jan ~ Mar. '78 = 100
Consumer electronics	114,619	90.9	283,617	89.5
Industrial electronics	51,194	116.4	126,636	118.9
Communications equipment	18,336	113.6	46,191	123.3
Electronics associated equipment	11,859	125.1	29,051	133.8
Electronic measuring instruments	9,171	125.7	20,763	124.1
Calculators	11,828	106.9	30,231	99.8
Electronics parts/components	79,729	116.9	197,546	117.3
General electronic parts	50,196	113.0	126,348	114.8
Active parts	29,533	124.0	71,198	121.8
Total	245,542	103.0	607,799	102.7

● Finished products

Volume: units or kg Value: ¥1 million Source: EIAJ

Items	Mar. '79 Volume	Mar. '79 Value	Comparison with Mar. '78 (%) Volume	Comparison with Mar. '78 (%) Value	Total of Jan ~ Mar. Volume	Total of Jan ~ Mar. Value	Comparison with total of Jan ~ Mar. '78 (%) Volume	Comparison with total of Jan ~ Mar. '78 (%) Value
Color TVs	250,178	14,240	82.6	83.2	669,493	36,209	84.8	81.6
B/W TVs	290,254	5,998	68.8	72.9	707,890	14,326	66.4	71.2
Car radios	217,651	1,405	84.5	77.5	506,797	3,241	72.3	67.6
Portable radios*	267,800	1,844	62.3	78.7	725,740	4,622	71.9	85.6
Clock radios	102,505	455	55.6	49.2	172,294	882	41.4	41.9
Radio chassis & kits*	58,581	684	51.4	80.6	214,956	1,936	62.3	72.1
Car cassette stereos w/radio(s)*	801,019	10,578	125.1	132.3	1,955,847	25,469	120.4	126.4
Radio-cassette combinations	975,760	15,073	78.4	82.0	2,206,707	34,470	75.3	77.7
Hi-Fi tuners*	128,730	2,212	141.4	136.2	344,264	5,733	167.9	151.0
Hi-Fi receivers*	161,681	4,912	68.4	62.6	451,007	13,191	75.9	65.9
Hi-Fi amplifiers	343,360	6,059	149.8	127.1	838,477	15,089	156.1	126.8
Record players	380,192	5,542	99.2	93.0	973,833	14,047	98.4	92.2
Hi-Fi speaker systems	382,833	2,486	101.1	71.5	1,028,165	6,683	117.2	77.2
VTRs	114,637	14,913	193.8	168.9	287,084	37,573	185.9	172.5
CBs (over 100 mW output)*	90,029	1,055	23.9	22.1	232,737	2,617	22.9	19.4
Intercoms	82,800	247	103.3	90.8	190,156	635	77.6	81.8
Calculators	2,748,756	11,828	109.2	106.9	7,051,300	30,231	103.2	99.8

The statistics on these pages are announced by the Electronic Industries Association of Japan (EIAJ). The exports figures are drawn up by the Ministry of Finance, while production figures (page 62) are compiled by the Ministry of International Trade and Industry. This accounts for the fact that the classifications of the statistics differ, and that the product items in the production and the export columns do not tally. This is particularly the case with items marked with an asterisk.

The Ministry of Finance bases its exports figures on customs clearance statistics. This contrasts with the production figures that are based on declarations submitted by all enterprises employing 50 people or more. They do not, therefore, represent the total output. Production and exports cannot be meaningfully correlated from the statistics on these pages.

The Editor

• Electronics parts/components

Volume: units or kg — Value: ¥1 million

Items	Mar. '79 Volume	Mar. '79 Value	Comparison with Mar. '78 (%) Volume	Comparison with Mar. '78 (%) Value	Total of Jan. ~ Mar. '79 Volume	Total of Jan. ~ Mar. '79 Value	Comparison with total of Jan. ~ Mar. '78 (%) Volume	Comparison with total of Jan. ~ Mar. '78 (%) Value
Phonomotors	33,826	35	34.0	68.7	49,568	40	33.6	68.5
Transformers	4,126,495	759	94.1	82.3	10,626,815	1,969	92.1	81.5
IF & HF transformers	1,891,080	103	105.1	175.3	5,119,851	229	106.7	131.7
Less than 0.5 kVA in capacity	2,233,370	634	86.6	76.5	5,490,967	1,685	81.6	77.5
0.5 – 1 kVA in capacity	2,045	22	58.6	63.9	15,997	55	171.2	81.0
Microswitches	1,877,208	103	97.6	102.3	4,763,513	456	94.9	109.8
Other switches	26,304,306	2,152	111.9	107.8	69,526,381	5,338	127.2	117.7
Parts & components for connecting electric circuits (kg)	664,633	2,414	79.1	107.2	1,786,577	6,179	90.0	111.8
Resistors	–	3,507	–	130.7	–	8,547	–	128.5
Variable resistors	26,140,884	1,542	107.0	157.9	62,081,097	3,629	119.3	150.7
Fixed resistors (1,000 units)	1,168,535	1,481	127.3	110.0	3,151,372	3,741	138.7	109.8
Microphones and mic stands (kg)	150,742	1,010	81.1	98.0	387,460	2,619	86.8	99.0
Earphones	389,930	47	201.5	140.4	726,288	95	133.6	110.2
Loudspeakers (excluding earphones)	5,025,644	3,748	81.8	93.6	13,040,459	9,451	93.1	99.8
Parts for microphones & loudspeakers (kg)	620,157	574	83.7	120.3	1,821,016	1,636	90.4	127.3
Parts for medical electronics equipment (kg)	7,048	96	65.3	159.5	18,691	257	90.2	156.2
Capacitors	–	5,559	–	119.5	–	13,895	–	119.3
Variable capacitors (1,000 units)	17,427	549	179.5	110.8	37,535	1,360	154.7	109.6
Paper capacitors (1,000 units)	672	169	118.7	201.3	1,280	295	78.9	139.4
Electrolytic capacitors (1,000 units)	148,928	2,423	123.5	116.7	390,037	6,143	130.1	120.2
Ceramic capacitors (1,000 units)	329,277	1,171	115.5	120.7	862,584	2,967	125.4	123.9
Other capacitors (1,000 units)	56,801	545	119.0	102.9	131,449	1,361	111.2	100.9
Parts for capacitors (kg)	132,585	702	129.9	141.5	326,511	1,769	118.6	131.6
TV antennas	161,467	140	93.1	74.9	457,535	325	87.8	86.5
Rod antenna	2,834,281	940	107.6	99.4	7,169,430	2,449	103.5	106.9
Other antennas	452,014	663	124.2	430.1	875,054	1,056	137.2	96.3
TV tuners	401,636	902	71.2	99.7	1,070,285	2,166	62.8	85.1
FM radio tuners	386,182	368	267.0	222.6	980,367	985	260.5	221.2
Parts for phonographs & record players (kg)	114,491	851	81.4	86.5	282,670	2,211	109.0	100.1
Parts for sound/video tape recorders & players (kg)	1,547,668	4,685	142.0	141.3	3,764,015	11,334	133.2	128.8
Pre-recorded tapes (kg)	4,402	78	118.2	142.5	10,939	179	71.5	124.0
Blank tapes for recording (kg)	1,501,437	3,501	123.3	115.9	3,845,712	7,983	107.9	101.9
Other recording tapes, sheets, etc. (kg)	526,599	3,381	145.5	163.6	1,435,533	11,864	160.7	176.9
Parts for electron microscopes and diffraction instruments (kg)	7,572	115	222.1	112.7	13,369	253	165.0	113.0
Wooden cabinets for TVs and radios	40,491	66	94.4	29.6	88,758	149	76.0	29.6
Parts for wireless equipment, TVs, radios, etc.(kg)	4,029,282	11,634	115.4	114.3	9,892,575	21,947	111.7	125.7
Parts for wired-communications equipment (kg)	394,182	2,140	81.0	75.3	1,171,988	6,421	90.5	80.3
Parts for both wired & wireless communications equip (kg)	6,235	26	89.1	36.0	20,695	90	138.4	81.0

• Electron tubes, semiconductors

Cathode-ray tubes	773,119	8,708	–	–	1,648,365	20,656	–	–
For color TVs	577,614	8,267	115.9	101.1	1,372,416	19,839	109.1	97.6
For B/W TVs	155,505	441	167.3	141.2	275,949	817	103.5	98.8
Thermionic tubes	1,801,894	1,825	–	–	4,730,232	4,480	–	–
For communications, transmitting equipment	32,092	410	52.1	142.9	73,812	1,096	67.4	153.7
For reception	543,247	119	23.3	25.0	1,512,700	310	32.3	31.7
For others	1,226,555	1,296	131.6	123.9	3,143,720	3,074	133.9	108.8
Semiconductor devices	–	4,976	–	114.3	–	12,590	–	109.2
Semiconductor devices (excl. pcb mounted units) (kg)	434	683	283.7	147.3	819	1,721	206.8	140.9
Germanium diodes	34,189,395	135	119.3	102.3	92,351,936	388	150.0	125.0
Silicon diodes	74,148,113	798	134.2	137.7	175,308,408	1,826	120.5	118.7
Silicon rectifiers	23,510,733	488	87.2	100.8	59,498,067	1,272	99.4	102.8
Germanium transistors	7,309,185	183	65.0	74.0	17,278,843	509	57.9	88.9
Silicon transistors	75,509,407	1,843	93.9	99.8	201,797,513	4,828	105.2	93.9
Other semiconductors devices	10,911,133	845	127.8	140.8	27,199,928	2,046	128.8	135.5
Piezo-electric crystal elements	21,154,711	1,254	155.2	123.0	54,445,563	3,319	163.5	129.6

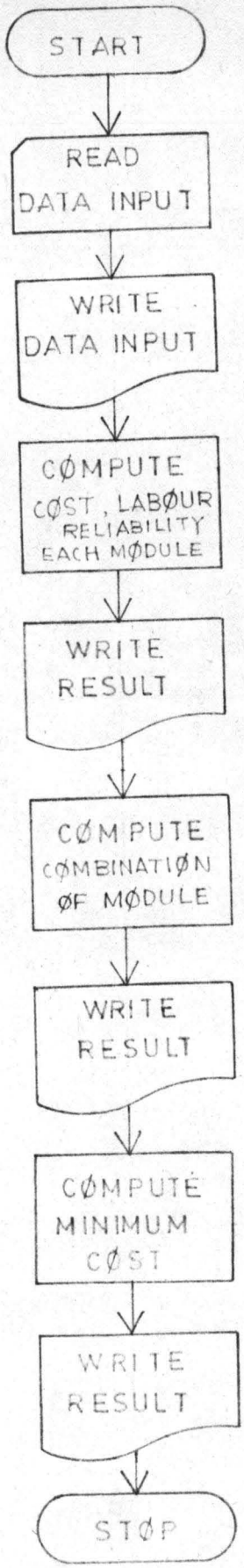
Table 2-4. Basic assessed failure rates in % per 1000 h. (*Reprinted from "Microelectronics and Reliability" with the kind permission of Pergamon Press*). Before applying the figures the reader should check the most recent literature and MIL-STD's to see if changes have been reported; e.g., some MIL data from 1974 are listed in Appendix IV.

Component	Failure rate	Component	Failure rate
Capacitors, fixed, paper	0.1	Lamps, filament	0.1
Capacitors, fixed, metallized paper	0.05	Meters, indicating instruments	0.01
Capacitors, fixed, plastic film	0.01	Motors, small, general	0.5
Capacitors, fixed, glass and mica	0.03	Motors, stepper	0.3
Capacitors, fixed, ceramic	0.01	Plugs and sockets (*see Connectors*)	—
Capacitors, fixed, electrolytic, aluminum foil	0.2	Rectifiers, metal	0.2
Capacitors, fixed, electrolytic, tantalum foil	0.1	Relays, general, unsealed (each contact pair)	0.03
Capacitors, fixed, electrolytic, tantalum, wet	0.02	Relays, general, sealed (each contact pair)	0.003
Capacitors, fixed, electrolytic, tantalum, solid	0.04	Relays, general, unsealed (each coil)	0.1
Capacitors, variable, air	0.005	Relays, general, sealed (each coil)	0.01
Capacitors, variable, ceramic	0.04	Relays, reed (each coil)	0.1
Capacitors, variable, piston	0.01	Relays, reed (each contact)	0.001
Connections, soldered	0.001	Resistors, fixed, composition	0.005
Connections, crimped	0.002	Resistors, fixed, carbon film (heat stable)	0.05
Connections, welded	0.004	Resistors, fixed, metal film (heat stable)	0.005
Connections, wrapped	0.0001	Resistors, fixed, oxide film (heat stable)	0.002
Connectors, multipin (per used pin)	0.005	Resistors, fixed, film, power	0.01
Connectors, coaxial	0.2	Resistors, fixed, wirewound, general purpose	0.01
Connectors, edge (per used pin)	0.01	Resistors, fixed, wirewound, precision	0.1
Coils (*see Inductors*)	—	Resistors, fixed, wirewound, power	0.01
Crystals	0.05	Resistors, variable, composition	0.2
Diodes, silicon < 1 W	0.005	Resistors, variable, wirewound, general purpose	0.3
Diodes, silicon > 1 W	0.05	Resistors, variable, wirewound, precision	0.6
Diodes, germanium	0.08	Resistors, variable, lead screw	0.5
Diodes, zener	0.01	Switches, rotary (each contact)	0.01
Fuses	0.02	Switches, push button (each contact pair)	0.02
Inductors, af	0.05	Switches, toggle (each contact pair)	0.02
Inductors, if	0.05	Switches, micro (each contact pair)	0.01
Inductors, rf	0.08	Synchros	0.5
Lamps, neon	0.02	Thermistors	0.06

Component	Failure rate	Component	Failure rate per circuit (approx 40 components)
Transformers, power, oil-filled (each winding)	0.01	*MICROELECTRONICS*	
Transformers, power, potted (each winding)	0.02	*Note:* The following figures are for early guidance only and will vary with manufacturer.	
Transformers, power, impregnated (each winding)	0.04		
Transformers, pulse, oil-filled (each winding)	0.01		
Transformers, pulse, potted (each winding)	0.02		
Transformers, af (each winding)	0.01		
Transformers, if (each winding)	0.01		
Transformers, rf (each winding)	0.03		
Transformers, variable (each winding)	0.05		
Transistors, germanium < 1 W	0.01		
Transistors, germanium > 1 W	0.05		
Transistors, silicon < 1 W	0.008		
Transistors, silicon > 1 W	0.08		
Valves, diodes	1.0		
Valves, double diodes	1.5		
Valves, triodes	1.8		
Valves, double triodes	2.4		
Valves, tetrodes	2.0		
Valves, pentodes	2.2		
Valves, heptodes	2.5		
Valves, stabilizers	1.3		
Valves, rectifiers	2.0		
Valves, thyratrons (small)	3.0		
Valves, magnetrons	5.0		
Valve holders (per pin)	0.01		
Wiring (*see Connections*)	—		
		Thin-film circuits: nickel–chromium resistors, silicon dioxide capacitors, gold wiring on glass or ceramic substrates with flip-chip transistors	0.8
		Thin-film circuits: all tantalum, with flip-chip or beam-lead transistors	0.05
		Thick-film circuits: (all types) with flip-chip or beam-lead transistors	0.1
		Silicon integrated circuits:	
		digital, in TO5, etc., containers	0.01
		digital, in flat-pack containers	0.01
		digital, in beam-lead containers	0.01
		digital, in plastic containers	0.02
		digital, in flip-chips	0.05
		Silicon integrated circuits:	
		linear, in TO5, etc., containers	0.03
		linear, in flat-pack containers	0.03
		linear, in beam-lead containers	0.03
		linear, in plastic containers	0.04
		linear, in flip-chips	0.06
		LSI (large-scale integrated circuits): special case—apply to manufacturer	—

ภาคผนวก ข.

แสดงโปรแกรมการเลือกการออกแบบ


START
READ DATA INPUT
WRITE DATA INPUT
CØMPUTE CØST, LABØUR RELIABILITY EACH MØDULE
WRITE RESULT
CØMPUTE CØMBINATIØN ØF MØDULE
WRITE RESULT
CØMPUTE MINIMUM CØST
WRITE RESULT
STØP

```
********************  START   ABDBKMTY   00200   LAST
********************  START   ABDBKMTY   00200   LAST
```

```
21 OCT 80    13.28.42    ********************
21 OCT 80    13.28.42    ********************
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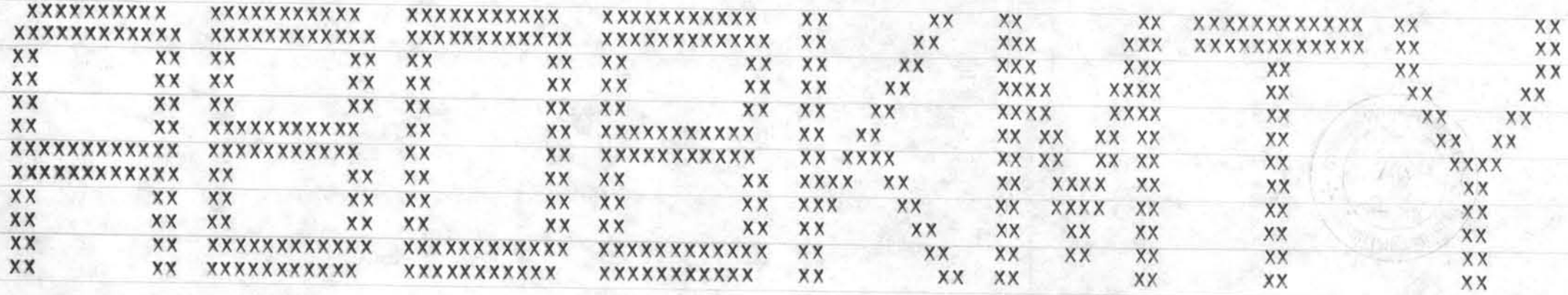

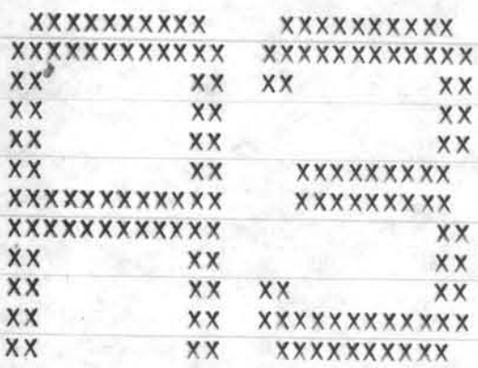

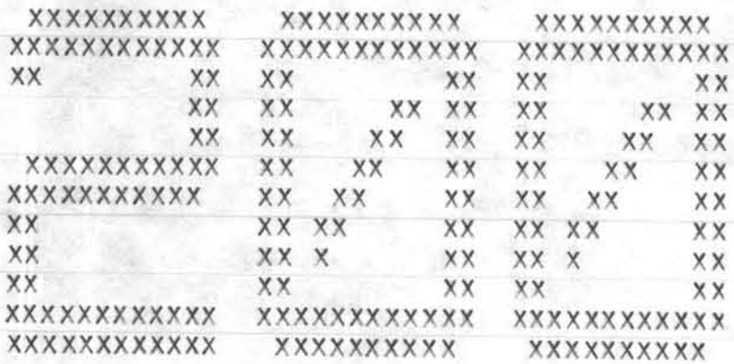

OPTIONS IN EFFECT

LOAD =4

DECK NO

LIST YES

LISTX NO

EBCDIC

```
C
C     NOTE1.
C     VAIABLE INFORMATION
C
C1    MEANM  THE NAME OF MODULE.
C1    ISYM   THE SYMBOL OF MODULE.
C1    TNC    THE TECHNICALPERFORMANCE OF THE MODULE IN CITY USE.
C1    TNV    THE TECHNICAL PERFORMANCE OF THE MODULE IN COUNTRY-SIDE USE.
C1    AMNC   THE IMPORTANCE OF THE MODULE IN CITY USE.
C1    AMNV   THE IMPORTANCE OF THE MODULE IN COUNTRY-SIDE USE.
C1    KO     THE NUMBER OF DATA CARD SET1.
C2    MCOM   THE NAME OF THE COMPONENT.
C2    ISCOM  THE SYMBOL OF THE COMPONENT.
C2    COST   THE UNIT COST OF THE COMPONENT IN JAPANESE YEN.
C2    WORK   THE LABOUR IN MINIUTE NEED TO FABICATE EACH COMPONENT.
C2    RELI   THE FAILURE RATE OF EACH OF THE COMPONENT IN PERCENT FOR 1000 HOURS
C2    NSK    THE NUMBER OF DATA CARD SET2.
C3    MODULE THE SUB CHASSIS OF THE SYSTEM CAN BE HANDLE UP TO 8 MODULE.
C3    ICOM   THE NUMBER OF EACH COMPONENT WHICH ARE NEED FOR EACH MODULE.
C3    NO     THE NUMBER OF THE KIND OF COMPONENT NEED TO MAKE A SYSTEM.
C3    MO     THE NUMBER OF DATA CARD SET3.
C     MAXA-H IS THE MAXIMUM VALUE OF EACH MODULE.
C     FACTOR   = THE NUMBER TO CHANGE C.I.F. YEN TO MATERIAL COST BATH.
C     RATE     = LABOUR COST IN BATH PER ONE MINUTE.
C
C     NOTE2.
C     DATA CARD PUNCH INFORMATION.
C
C     DATA CARD SET1.
C  10 FORMAT(1X,A3,1X,11A4,5X,F2.0,2X,F2.0,3X,F3.0,2X,F3.0)
C   **EXAMPLE**
C        1         2         3         4         5         6         7
C234567890123456789012345678901234567890123456789012345678901234567890123456789012
CAAA AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA      WW  WW    WW   WW
CA 1 RECIEVER MODULE (9TR,MOTOLOLA)                    9   8    20   25
C
C     DATA CARD SET2.
C  20 FORMAT(1X,9A4,A3,F8.2,2X,F5.2,2X,F8.4)
C   **EXAMPLE**
C        1         2         3         4         5         6         7
C234567890123456789012345678901234567890123456789012345678901234567890123456789012
CAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA   AAAWWWWWWDD  WWWDD  WWWWDDDD
CVARIABLE RESISTOR                  VR.   50.2    0.50    0.2
C
C     DATA CARD SET3.
C  30 FORMAT (1X,A3,1X,20F3.0)
C   **EXAMPLE**
C        1         2         3         4         5         6         7
C234567890123456789012345678901234567890123456789012345678901234567890123456789012
CAAA WWW   WWW   WWW   WWW   WWW   WWW   WWW   WWW   WWW   WWW
C       WWW   WWW   WWW   WWW   WWW   WWW   WWW   WWW   WWW   WWW
CA 1   1 16 27        5    27  2  5  1        5        9     1  3
0001        REAL   ICOM
0002        DIMENSION MCOM(100,9),ISCOM(100),COST(100),WORK(100),RELI(100)
```

```
0003              DIMENSION ISYM(30),MEANM(30,11),TNC(30),TNV(30),AMNC(30),AMNV(30)
0004              DIMENSION TOTC(30),TOTW(30),TOTR(30),SCRA(30),SCRB(30)
0005              DIMENSION MODULE(30),ICOM(30,100)
0006              DIMENSION PMCOST(10),PMRELI(10),PMSCA(10),PMSCB(10),
                 *PMTOTW(10)
0007              DIMENSION PXCOST(10,10),PXRELI(10,10),PXSCA(10,10),PXSCB(10,10),
                 *PXTOTW(10,10)
0008              DIMENSION KAP(10),KBP(10),KCP(10),KDP(10),KEP(10),KFP(10),KGP(10)
0009              DIMENSION MXA(10,10),MXB(10,10),MXC(10,10),MXD(10,10),MXE(10,10),
                 *MXF(10,10),MXG(10,10)
0010              DIMENSION MI(10) ,NAM(10),NOM(10,10)
0011              DATA MAXA,MAXB,MAXC,MAXD,MAXE,MAXF,MAXG,MAXH/ 4,2,2,4,2,4,2,0/
0012              DATA PMCOST/470.,472.,474.,476.,478.,480.,482.,484.,486.,488./,
                 *MI/10*0/
0013              DATA  TOTC,TOTW,TOTR/90*0./,SCRA,SCRB/60*0./
0014              DATA  KA,KB,KC,KD,KE,KF,KG,KH/8*0/
0015              SMD = 7.
0016              MO = 20
0017              NO = 20
0018              KO = 20
0019              NSK = 20
0020              TNAM = 100.
0021              FACTOR = 0.098
0022              RATE = 0.167
0023              MAXP=10
                  C
                  C1    READ SYMBOL OF MODULE,NAME,TNC,TNV,AMNC,AMNV FROM DATA CARD SET1.
                  C
0024                    DO 5 J = 1,KO
0025                    READ (1,10)  ISYM(J),(MEANM(J,I),I = 1,11),TNC(J),TNV(J),AMNC(J),
                       *AMNV(J)
0026                  5 CONTINUE
                  C
                  C2    READ NAME OF COMPONENTS,SYMBOL,COST,LABOUR,RELIABILITY FROM DATA CARD SET2
                  C
0027                    DO 15 J = 1,NSK
0028                    READ (1,20)  (MCOM(J,I),I = 1,9),ISCOM(J),COST(J),WORK(J),RELI(J)
0029                 15 CONTINUE
                  C
                  C3    READ SYMBOL OF MODULE,NUMBER OF COMPONENTS FROM DATA CARD SET3.
                  C
0030                    DO 25 J = 1,MO
0031                    READ (1,30)  MODULE(J),(ICOM(J,I),I = 1,NO)
0032                 25 CONTINUE
                  C
                  C4/1  PRINT OUT DATA SET1.
                  C
0033                    WRITE (3,40)
0034                    DO 45 J = 1,KO
0035                    WRITE(3,50) J,ISYM(J),(MEANM(J,I),I = 1,11),TNC(J),TNV(J),
                       *AMNC(J),AMNV(J)
0036                 45 CONTINUE
                  C
                  C4/2  PRINT OUT DATA SET2.
```

```
      C
0037        WRITE (3,60)
0038        DO 65 J = 1,NSK
0039        WRITE(3,70) J,ISCOM(J),(MCOM(J,I),I = 1,9),COST(J),WORK(J),RELI(J)
0040     65 CONTINUE
      C
      C4/3  PRINT OUT DATA SET3.
      C
0041        WRITE (3,80) (MODULE(J),J = 1,MO)
0042        DO 85 J = 1,NO
0043        WRITE(3,90) J,ISCOM(J),(ICOM(I,J),I = 1,MC)
0044     85 CONTINUE
      C
      C5    COMPUTE THE TOTAL-COST,TOTAL-LABOUR,TOTAL-RELIABILITY OF EACH MODULE.
      C
0045        DO 100 J = 1,MO
0046        DO 99 I = 1,NO
0047        CTA = COST(I)*ICOM(J,I)
0048        WOA = WORK(I)*ICOM(J,I)
0049        REA = RELI(I)*ICOM(J,I)
0050        TOTR(J) = TOTR(J)+REA
0051        TOTC(J) = TOTC(J)+CTA
0052        TOTW(J) = TOTW(J)+WOA
0053        SCRA(J) = TNC(J)*AMNC(J)/TNAM
0054        SCRB(J) = TNV(J)*AMNV(J)/TNAM
0055     99 CONTINUE
0056    100 CONTINUE
      C
      C6    PRINT THE RESULT WHICH COMPUTED IN C5
      C
0057        WRITE (3,95)
0058        WRITE (3,104)
0059        WRITE (3,110) (J,MODULE(J),TOTC(J),TOTW(J),TOTR(J),J = 1,MO)
0060        WRITE (3,106)
0061        WRITE (3,107)
0062        WRITE (3,104)
      C
      C7    COMPUTE THE SCORE A,B,TOTAL COST,LABOUR,RELIABILITY OF ALL MODULE (A-H)
      C
0063        NUM = 0
0064        NEXT = 0
0065        DO 120 KA = 1,MAXA
0066        DO 120 KB = 1,MAXB
0067        DO 120 KC = 1,MAXC
0068        DO 120 KD = 1,MAXD
0069        DO 120 KE = 1,MAXE                                    DATA=A-E
0070        DO 120 KF = 1,MAXF                                    DATA=A-F
0071        DO 120 KG = 1,MAXG                                    DATA=A-G
0072        NUM =NUM+1
0073        LB = MAXA+KB
0074        LC = MAXA+MAXB+KC
0075        LD = MAXA+MAXB+MAXC+KD
0076        LE = MAXA+MAXB+MAXC+MAXD+KE
0077        LF = MAXA+MAXB+MAXC+MAXD+MAXE+KF
```

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0078              LG = MAXA+MAXB+MAXC+MAXD+MAXE+MAXF+KG
0079              LH = MAXA+MAXB+MAXC+MAXD+MAXE+MAXF+MAXG+KH
                  C
                  C8    SELECTED THE FORMULA WHICH USED TO COMPUTED BY VALUE OF SMD. (1-8)  (A-H)
                  C
0080              IF (SMD .EQ. 5.) GO TO 130
0081              IF (SMD .EQ. 6.) GO TO 140
0082              IF (SMD .EQ. 7.) GO TO 150
0083              IF (SMD .EQ. 8.) GO TO 160
0084              SCOREA = SCRA(KA)+SCRA(LB)+SCRA(LC)+SCRA(LD)
0085              SCOREB = SCRB(KA)+SCRB(LB)+SCRB(LC)+SCRB(LD)
0086              TOTALC = TOTC(KA)+TOTC(LB)+TOTC(LC)+TOTC(LD)
0087              TOTALW = TOTW(KA)+TOTW(LB)+TOTW(LC)+TOTW(LD)
0088              TOTALR = TOTR(KA)+TOTR(LB)+TOTR(LC)+TOTR(LD)
0089              PRCOST = TOTALC*FACTOR + TOTALW*RATE
0090              GO TO 180
0091            130 SCOREA = SCRA(KA)+SCRA(LB)+SCRA(LC)+SCRA(LD)+SCRA(LE)
0092              SCOREB = SCRB(KA)+SCRB(LB)+SCRB(LC)+SCRB(LD)+SCRB(LE)
0093              TOTALC = TOTC(KA)+TOTC(LB)+TOTC(LC)+TOTC(LD)+TOTC(LE)
0094              TOTALW = TOTW(KA)+TOTW(LB)+TOTW(LC)+TOTW(LD)+TOTW(LE)
0095              TOTALR = TOTR(KA)+TOTR(LB)+TOTR(LC)+TOTR(LD)+TOTR(LE)
0096              PRCOST = TOTALC*FACTOR + TOTALW*RATE
0097              GO TO 180
0098            140 SCOREA = SCRA(KA)+SCRA(LB)+SCRA(LC)+SCRA(LD)+SCRA(LE)+SCRA(LF)
0099              SCOREB = SCRB(KA)+SCRB(LB)+SCRB(LC)+SCRB(LD)+SCRB(LE)+SCRB(LF)
0100              TOTALC = TOTC(KA)+TOTC(LB)+TOTC(LC)+TOTC(LD)+TOTC(LE)+TOTC(LF)
0101              TOTALW = TOTW(KA)+TOTW(LB)+TOTW(LC)+TOTW(LD)+TOTW(LE)+TOTW(LF)
0102              TOTALR = TOTR(KA)+TOTR(LB)+TOTR(LC)+TOTR(LD)+TOTR(LE)+TOTR(LF)
0103              PRCOST = TOTALC*FACTOR + TOTALW*RATE
0104              GO TO 180
0105            150 SCOREA = SCRA(KA)+SCRA(LB)+SCRA(LC)+SCRA(LD)+SCRA(LE)+SCRA(LF)
                   *+SCRA(LG)
0106               SCOREB = SCRB(KA)+SCRB(LB)+SCRB(LC)+SCRB(LD)+SCRB(LE)+SCRB(LF)
                   *+SCRB(LG)
0107               TOTALC = TOTC(KA)+TOTC(LB)+TOTC(LC)+TOTC(LD)+TOTC(LE)+TOTC(LF)
                   *+TOTC(LG)
0108               TOTALW = TOTW(KA)+TOTW(LB)+TOTW(LC)+TOTW(LD)+TOTW(LE)+TOTW(LF)
                   *+TOTW(LG)
0109               TOTALR = TOTR(KA)+TOTR(LB)+TOTR(LC)+TOTR(LD)+TOTR(LE)+TOTR(LF)
                   *+TOTR(LG)
0110               PRCOST = TOTALC*FACTOR + TOTALW*RATE
0111               GO TO 180
0112            160 SCOREA = SCRA(KA)+SCRA(LB)+SCRA(LC)+SCRA(LD)+SCRA(LE)+SCRA(LF)
                   *+SCRA(LG)+SCRA(LH)
0113               SCOREB = SCRB(KA)+SCRB(LB)+SCRB(LC)+SCRB(LD)+SCRB(LE)+SCRB(LF)
                   *+SCRB(LG)+SCRB(LH)
0114               TOTALC = TOTC(KA)+TOTC(LB)+TOTC(LC)+TOTC(LD)+TOTC(LE)+TOTC(LF)
                   *+TOTC(LG)+TOTC(LH)
0115               TOTALW = TOTW(KA)+TOTW(LB)+TOTW(LC)+TOTW(LD)+TOTW(LE)+TOTW(LF)
                   *+TOTW(LG)+TOTW(LH)
0116               TOTALR = TOTR(KA)+TOTR(LB)+TOTR(LC)+TOTR(LD)+TOTR(LE)+TOTR(LF)
                   *+TOTR(LG)+TOTR(LH)
0117               PRCOST = TOTALC*FACTOR + TOTALW*RATE
                  C
```

```
            C9    PRINT THE RESALTS.
            C
0118          180 WRITE(3,190) NUM,KA,KB,KC,KD,KE,KF,KG,KH,PRCOST,TOTALW,TOTALR,
                 *SCOREA,SCOREB
0119              NEXT = NEXT + 1
0120              IF (NUM.EQ.14) GO TO 1180
0121              IF (NEXT.LE.20) GO TO 1181
0122         1180 WRITE (3,106)
0123              WRITE (3,105)
0124              NEXT = 1
0125         1181 DO 185 JJ=1,10
0126              IF(PRCOST-PMCOST(JJ)) 182,184,185
0127          182 NK=10-JJ
0128              DO 170 J=1,NK
0129              JA=11-J
0130              JB=10-J
0131              NAM(JA)=NAM(JB)
0132              PMCOST(JA) = PMCOST(JB)
0133              PMTOTW(JA) = PMTOTW(JB)
0134              PMRELI(JA) = PMRELI(JB)
0135              PMSCA(JA)  = PMSCA(JB)
0136              PMSCB(JA)  = PMSCB(JB)
0137              KAP(JA)    = KAP(JB)
0138              KBP(JA)    = KBP(JB)
0139              KCP(JA)    = KCP(JB)
0140              KDP(JA)    = KDP(JB)
0141              KEP(JA)    = KEP(JB)
0142              KFP(JA)    = KFP(JB)
0143              KGP(JA)    = KGP(JB)
0144              JM = MI(JB)
0145              DO 170 II=1,JM
0146              NOM(JA,II)=NOM(JB,II)
0147              PXCOST(JA,II)=PXCOST(JB,II)
0148              PXTOTW(JA,II) = PXTOTW(JB,II)
0149              PXRELI(JA,II)=PXRELI(JB,II)
0150              PXSCA(JA,II)=PXSCA(JB,II)
0151              PXSCB(JA,II)=PXSCB(JB,II)
0152              MXA(JA,II)=MXA(JB,II)
0153              MXB(JA,II)=MXB(JB,II)
0154              MXC(JA,II)=MXC(JB,II)
0155              MXD(JA,II)=MXD(JB,II)
0156              MXE(JA,II)=MXE(JB,II)
0157              MXF(JA,II)=MXF(JB,II)
0158              MXG(JA,II)=MXG(JB,II)
0159          170 CONTINUE
0160              NAM(JJ)=NUM
0161              PMCOST(JJ)  = PRCOST
0162              PMTOTW(JJ) = TOTALW
0163              PMRELI(JJ)  = TOTALR
0164              PMSCA(JJ)   = SCOREA
0165              PMSCB(JJ)   = SCOREB
0166              KAP(JJ)     = KA
0167              KBP(JJ)     = KB
0168              KCP(JJ)     = KC
```

```
0169              KDP(JJ)     = KD
0170              KEP(JJ)     = KE
0171              KFP(JJ)     = KF
0172              KGP(JJ)     = KG
0173              MI(JJ) = 0
0174              GO TO 120
0175          184 MI(JJ) =MI(JJ)+1
0176              IF(MI(JJ).GT.10) GO TO 120
0177              NOM(JJ,MI(JJ))=NUM
0178              PXCOST(JJ,MI(JJ))  = PRCOST
0179              PXTOTW(JJ,MI(JJ)) = TOTALW
0180              PXRELI(JJ,MI(JJ)) = TOTALR
0181              PXSCA(JJ,MI(JJ)) = SCOREA
0182              PXSCB(JJ,MI(JJ)) =SCOREB
0183              MXA(JJ,MI(JJ)) = KA
0184              MXB(JJ,MI(JJ)) = KB
0185              MXC(JJ,MI(JJ)) = KC
0186              MXD(JJ,MI(JJ)) =KD
0187              MXE(JJ,MI(JJ)) =KE
0188              MXF(JJ,MI(JJ)) = KF
0189              MXG(JJ,MI(JJ)) =KG
0190              GO TO 120
0191          185 CONTINUE
0192          120 CONTINUE
0193              WRITE (3,106)
0194              WRITE (3,210)
0195              WRITE (3,104)
0196              DO 175 J=1,10
0197              WRITE(3,190) NAM(J),KAP(J),KBP(J),KCP(J),KDP(J),KEP(J),KFP(J),
                 *KGP(J),KH,PMCOST(J),PMTOTW(J),PMRELI(J),PMSCA(J),PMSCB(J)
0198              IF(MI(J).EQ.0) GO TO 175
0199              JM=MI(J)
0200              WRITE(3,190)(NOM(J,K),MXA(J,K),MXB(J,K),MXC(J,K),MXD(J,K),MXE(J,K)
                 *,MXF(J,K),MXG(J,K),KH,PXCOST(J,K),PXTOTW(J,K),PXRELI(J,K),
                 *PXSCA(J,K),PXSCB(J,K),K = 1,JM)
0201          175 CONTINUE
0202              WRITE (3,106)
0203              WRITE (3,220)
0204           10 FORMAT(1X,A3,1X,11A4,5X,F2.0,2X,F2.0,3X,F3.0,2X,F3.0)
0205           20 FORMAT(1X,9A4,A3,F8.2,2X,F5.2,2X,F8.4)
0206           30 FORMAT (1X,A3,1X,20F3.0)
0207           40 FORMAT('1',T15,'DATA SET1.',///T16,'NO',3X,'SYMBOL',8X,'NAME',
                 *T87,'TNC',6X,'TNV',6X,'IMNC',6X,'IMNV')
0208           50 FORMAT(/T15,I3,T23,A3,6X,11A4,T87,F3.0,6X,F3.0,6X,F4.0,6X,F4.0)
0209           60 FORMAT ('1',T15,'DATA SET2.',///T16,'NO',3X,'SYMBOL',8X,'MEANING',
                 *T81,'COST',T94,'LABOUR',T106,'RELIABILITY')
0210           70 FORMAT(/T15,I3,T23,A3,6X,9A4,T79,F8.2,T95,F5.2,T108,F8.4)
0211           80 FORMAT ('1',T15,'DATA SET3.',///T2,132(1H-)/T6,'|',T12,'|',/T3,
                 *'NO',1X,'|SYMB.|',
                 *1X,20A4/T6,'|',T12,'|'/1X,132(1H-)/T6,'|',T12,'|')                    1-30A4
0212           90 FORMAT(T2,I3,1X,'|',1X,A3,1X,'|',20F4.0,/T6,'|',T12,'|')            1-30F4.0
0213           95 FORMAT('1',///T49,'THE TABLE SHOW THE COST OF MODULE.',
                 *//T20,'COST          = F.O.B. COST IN JAPANESE YEN.',
                 *//T20,'LABOUR        = NORMAL TIME IN MINUTE.',
```

```
                *//T20,'RELIABILITY  = FAILOUR RATE PERCENT IN 1000 HOURS.')
0214          104 FORMAT (//,
                *T20,93(1H-)/T20,'|',6X,'|',T37,'MODULE.',T53,
                *'|',T66,'|',T75,'|',T90,'|',T101,'|',T112,'|'/T20,'|',2X,'NO',
                *2X,'|',25(1H-),'|',4X,'COST',4X,'|',1X,'LABOUR',1X,'|',1X,
                *'RELIABILITY. ','|',' SCORE A. ','|',' SCORE B. ','|'/T20,'|',
                *6X,'|',2X,'A',2X,'B',2X,'C',2X,'D',2X,'E',2X,'F',2X,'G',2X,'H',
                *1X,'|',T66,'|',T75,'|',T90,'|',T101,'|',T112,'|',/T20,93(1H-),
                */T20,'|',6X,'|',T53,'|',T66,'|',T75,'|',T90,'|',T101,'|',T112,'|')
0215          105 FORMAT('1',//,
                *T20,93(1H-)/T20,'|',6X,'|',T37,'MODULE.',T53,
                *'|',T66,'|',T75,'|',T90,'|',T101,'|',T112,'|'/T20,'|',2X,'NO',
                *2X,'|',25(1H-),'|',4X,'COST',4X,'|',1X,'LABOUR',1X,'|',1X,
                *'RELIABILITY. ','|',' SCORE A. ','|',' SCORE B. ','|'/T20,'|',
                *6X,'|',2X,'A',2X,'B',2X,'C',2X,'D',2X,'E',2X,'F',2X,'G',2X,'H',
                *1X,'|',T66,'|',T75,'|',T90,'|',T101,'|',T112,'|',/T20,93(1H-),
                */T20,'|',6X,'|',T53,'|',T66,'|',T75,'|',T90,'|',T101,'|',T112,'|')
0216          106 FORMAT(T20,93(1H-))
0217          107 FORMAT('1',///T46,'THE TABLE SHOW THE COST OF COMBINATION.',
                *//T20,'COST         = FACTORY PRIME-COST IN BATH.',
                *//T20,'LABOUR       = NORMAL TIME IN MINUTE.',
                *//T20,'RELIABILITY  = FAILOUR RATE PERCENT IN 1000 HOURS.',
                *//T20,'SCORE A      = TECHNICAL PERFORMANCE FOR CITY.',
                *//T20,'SCORE B      = TECHNICAL PERFORMANCE FOR COUNTRY-SIDE.')
0218          110 FORMAT(T20,'|',I5,1X,'|',T39,A3,T53,'|',F11.2,1X,'|',F7.2,1X,
                *'|',F11.4,3X,'|',T101,'|',T112,'|'/T20,'|',6X,'|',T53,'|',
                *T66,'|',T75,'|',T90,'|',T101,'|',T112,'|')
0219          190 FORMAT(T20,'|',I5,1X,'|',8(1X,I2),1X,'|',F11.2,1X,'|',F7.2,1X,
                *'|',F11.4,3X,'|',F8.2,2X,'|',F8.2,2X,'|',/T20,'|',6X,'|',T53,'|',
                *T66,'|',T75,'|',T90,'|',T101,'|',T112,'|')
0220          210 FORMAT('1',///T43,'THE TABLE SHOW MINIMUM PRIME COST.',
                *//T20,'COST         = FACTORY PRIME-COST IN BATH.',
                *//T20,'LABOUR       = NORMAL TIME IN MINUTE.',
                *//T20,'RELIABILITY  = FAILOUR RATE PERCENT IN 1000 HOURS.',
                *//T20,'SCORE A      = TECHNICAL PERFORMANCE FOR CITY.',
                *//T20,'SCORE B      = TECHNICAL PERFORMANCE FOR COUNTRY-SIDE.')
0221          220 FORMAT (//T45,'***** E N D *****')
0222              STOP
0223              END
```

SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
MAXA	18C	MAXB	190	MAXC	194	MAXD	198	MAXE	19C
MAXF	1A0	MAXG	1A4	MAXH	1A8	KA	1AC	KB	1B0
KC	1B4	KD	1B8	KE	1BC	KF	1C0	KG	1C4
KH	1C8	SMD	1CC	MO	1D0	NO	1D4	KO	1D8
NSK	1DC	TNAM	1E0	FACTOR	1E4	RATE	1E8	MAXP	1EC
J	1F0	I	1F4	CTA	1F8	WOA	1FC	REA	200
NUM	204	NEXT	208	LB	20C	LC	210	LD	214
LE	218	LF	21C	LG	220	LH	224	SCOREA	228
SCOREB	22C	TOTALC	230	TOTALW	234	TOTALR	238	PRCOST	23C
JJ	240	NK	244	JA	248	JB	24C	JM	250
II	254	K	258						

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
MCOM	25C	ISCOM	106C	COST	11FC	WORK	138C	RELI	151C
ISYM	16AC	MEANM	1724	TNC	1C4C	TNV	1CC4	AMNC	1D3C
AMNV	1DB4	TOTC	1E2C	TOTW	1EA4	TOTR	1F1C	SCRA	1F94
SCRB	200C	MODULE	2084	ICOM	20FC	PMCOST	4FDC	PMRELI	5004
PMSCA	502C	PMSCB	5054	PMTOTW	507C	PXCOST	50A4	PXRELI	5234
PXSCA	53C4	PXSCB	5554	PXTOTW	56E4	KAP	5874	KBP	589C
KCP	58C4	KDP	58EC	KEP	5914	KFP	593C	KGP	5964
MXA	598C	MXB	581C	MXC	5CAC	MXD	5E3C	MXE	5FCC
MXF	615C	MXG	62EC	MI	647C	NAM	64A4	NDM	64CC

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IBCOM#	665C								

FORMAT STATEMENT MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
10	6660	20	6680	30	6697	40	66A4	50	66F0
60	6715	70	6767	80	6787	90	67E7	95	680B
104	68CD	105	69F8	106	6B26	107	6B30	110	6C66
190	6CC8	210	6D33	220	6E64				

STATEMENT LABEL MAP

LOCATION	STA NUM	LABEL	LOCATION	STA NUM	LABEL	LOCATION	STA NUM	LABEL
006F80	15		006F88	16		006F90	17	
006F98	18		006FA0	19		006FA8	20	
006FB0	21		006FB8	22		006FC0	23	
006FC8	24		006FD4	25		007050	26	5
00706C	27		007088	28		007100	29	15
007118	30		007128	31		007180	32	25
00719C	33		0071B4	34		0071C0	35	
007240	36	45	00725C	37		007274	38	
00728C	39		007308	40	65	007324	41	
007374	42		007388	43		0073DC	44	85
0073FC	45		007410	46		007422	47	
00742E	48		00743A	49		007446	50	
007452	51		00746A	52		007482	53	
0074A2	54		00748A	55	99	0074DA	56	100
0074F6	57		007510	58		007524	59	
007594	60		0075AC	61		0075C0	62	
0075D4	63		0075DC	64		0075E4	65	
0075F4	66		007600	67		00760C	68	
007618	69		007624	70		007630	71	
00763C	72		00764C	73		007658	74	
007668	75		00767C	76		007694	77	
00768O	78		0076DO	79		0076F4	80	
007702	81		007710	82		00771E	83	
00772C	84		007760	85		00779C	86	
0077CC	87		007804	88		007834	89	
00784A	90		007850	91	130	007894	92	
0078DC	93		007918	94		00795C	95	
007998	96		0079AE	97		0079B4	98	140
007A04	99		007A58	100		007AA0	101	
007AF0	102		007B38	103		007B4E	104	
007B54	105	150	007BB0	106		007C10	107	
007C64	108		007CC0	109		007D14	110	
007D2A	111		007D30	112	160	007D98	113	
007E04	114		007E64	115		007ECC	116	
007F2C	117		007F42	118	180	007FCC	119	
007FD8	120		007FE6	121		007FF4	122	1180
00800C	123		008020	124		008028	125	1181
00803C	126		00805A	127	182	00806A	128	
008072	129		008082	130		00808E	131	
0080A6	132		0080BA	133		0080C2	134	
0080CA	135		0080D2	136		0080DA	137	
0080E2	138		0080EA	139		0080F2	140	
0080FA	141		008102	142		00810A	143	
008112	144		00811A	145		00812A	146	
00814E	147		00816E	148		00818E	149	
0081AE	150		0081CE	151		0081EE	152	
00820E	153		00822E	154		00824E	155	
00826E	156		00828E	157		0082AE	158	
0082CE	159	170	0082FE	160		008306	161	
008316	162		00831E	163		008326	164	
00832E	165		008336	166		00833E	167	

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008346    168                 00834E    169                 008356    170
00835E    171                 008366    172                 00836E    173
008376    174                 00837C    175       184       00838C    176
00839A    177                 0083B0    178                 0083C6    179
0083DC    180                 0083F2    181                 008408    182
00841E    183                 008434    184                 00844A    185
008460    186                 008476    187                 00848C    188
0084A2    189                 0084B8    190                 0084BE    191       185
0084DE    192       120       00857A    193                 008594    194
0085A8    195                 0085BC    196                 0085D0    197
008658    198                 008666    199                 00866E    200
0087E4    201       175       008804    202                 00881C    203
008830    222
 TOTAL MEMORY REQUIREMENTS 00883E BYTES

 HIGHEST SEVERITY LEVEL OF ERRORS FOR THIS MODULE WAS 0
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13.08.51,TOTAL COMPILATION TIME,00.06.03
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DATA SET1.

NO	SYMBOL	NAME	TNC	TNV	IMNC	IMNV
1	A 1	RECIEVER MODULE (9TR,MOTOLOLA)	9.	8.	20.	25.
2	A 2	RECIEVER MODULE (9TR,SONY)	7.	9.	20.	25.
3	A 3	RECIEVER MODULE (9TR,HITACHI)	8.	7.	20.	25.
4	A 4	RECIEVER MODULE (TDA440+3TR)	10.	6.	20.	25.
5	B 1	SOUND MODULE (CA3065+4TR)	7.	8.	20.	15.
6	B 2	SOUND MODULE (TBA120+TBA800)	9.	9.	20.	15.
7	C 1	VEDEO MODULE (D.C. COUPLING)	9.	8.	10.	5.
8	C 2	VEDEO MODULE (A.C. COUPLING)	8.	9.	10.	5.
9	D 1	HORIZONTAL OSCILLATOR MODULE (TBA950)	10.	4.	10.	10.
10	D 2	HORIZONTAL OSCILLATOR MODULE (HITACHI)	9.	8.	10.	10.
11	D 3	HORIZONTAL OSCILLATOR MODULE (HITACHI+SONY)	9.	8.	10.	10.
12	D 4	HORIZONTAL OSCILLATOR MODULE (TANIN)	9.	9.	10.	10.
13	E 1	HORIZONTAL DEFLECTION MODULE (HITACHI)	8.	9.	10.	10.
14	E 2	HORIZONTAL DEFLECTION MODULE (TANIN)	8.	6.	10.	10.
15	F 1	VERTICAL DEFLECTION MODULE (CLASS-A,TANIN)	8.	6.	15.	15.
16	F 2	VERTICAL DEFLECTION MODULE (F.B.-OSC.)	8.	4.	15.	15.
17	F 3	VERTICAL DEFLECTION MODULE (2TR-OSC.)	7.	9.	15.	15.
18	F 4	VERTICAL DEFLECTION MODULE (BLOCKING-OSC.)	7.	9.	15.	15.
19	¬ 1	POWER SUPPLY MODULE (LM723+2TR)	7.	6.	15.	20.
20	¬ 2	POWER SUPPLY MODULE (LM723+3TR)	9.	10.	15.	20.

DATA SET2.

NO	SYMBOL	MEANING	COST	LABOUR	RELIABILITY
1	VR.	VARIABLE RESISTOR	50.20	0.50	0.2000
2	RF.	CARBON FILM RESISTOR	1.50	0.36	0.0500
3	RC.	COMPOSSITION RESISTOR	2.20	0.36	0.0050
4	RM.	METAL OXIDE RESISTOR	8.60	0.36	0.0050
5	RW.	WIRE WOUND RESISTOR	44.50	0.50	0.0100
6	CE.	ELECTROLYIC CAPACITOR	13.50	0.35	0.2000
7	CT.	TANTALUM CAPACITOR	22.50	0.30	0.0400
8	CC.	CERAMIC CAPACITOR	3.90	0.30	0.0100
9	CO.	ORGANIC CAPACITOR	9.70	0.30	0.0100
10	IF.	I.F. TRANSFORMER	31.80	0.95	0.0100
11	PC.	PEAKING COIL	15.20	0.35	0.0800
12	PW.	POWER AND OUTPUT TRANSFORMER	328.00	1.50	0.0400
13	TI.	INTERSTAGE TRANSFORMER	105.00	0.90	0.0200
14	GD.	GERMANIUM DIODE	5.60	0.35	0.0800
15	SD.	SILICON DIODE	8.80	0.35	0.0050
16	SR.	SILICON RECTIFIER	27.30	0.40	0.0500
17	ST.	SILICON TRANSISTOR	26.80	0.48	0.0080
18	IC.	INTEGRATED CIRCUITS	220.00	0.55	0.0400
19	TH.	THERMISTOR	35.30	1.80	0.0600
20	MS.	MISSCELLENEOUS	30.00	1.50	0.0

DATA SET3.

NO	SYMB.	A 1	A 2	A 3	A 4	B 1	B 2	C 1	C 2	D 1	D 2	D 3	D 4	E 1	E 2	F 1	F 2	F 3	F 4	G 1	G 2
1	VR.	1.	1.	1.	2.	1.	1.	2.	2.	2.	0.	1.	0.	0.	0.	3.	3.	3.	3.	0.	1.
2	RF.	16.	16.	16.	8.	10.	7.	5.	7.	6.	11.	16.	13.	0.	0.	12.	16.	17.	14.	2.	2.
3	RC.	27.	27.	27.	13.	3.	0.	10.	10.	1.	1.	1.	1.	7.	8.	4.	0.	0.	0.	0.	1.
4	RM.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	4.	4.	4.	0.	0.
5	RW.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.
6	CE.	5.	5.	5.	1.	7.	7.	3.	3.	3.	3.	3.	3.	3.	3.	9.	5.	4.	5.	2.	3.
7	CT.	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	3.	3.	3.	0.	0.
8	CC.	27.	26.	28.	16.	3.	5.	0.	0.	0.	1.	4.	1.	1.	1.	0.	1.	0.	0.	3.	3.
9	CO.	2.	2.	2.	2.	6.	6.	3.	3.	5.	6.	6.	6.	5.	13.	3.	3.	3.	3.	0.	0.
10	IF.	5.	5.	5.	6.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
11	PC.	1.	1.	1.	2.	0.	0.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
12	PW.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	1.
13	TI.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	1.	0.	0.	0.	0.	0.
14	GD.	5.	5.	5.	0.	0.	0.	2.	2.	0.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.
15	SD.	0.	0.	0.	0.	2.	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	2.	3.	3.	0.	1.
16	SR.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	5.	3.	1.	0.	0.	0.	2.	3.
17	ST.	9.	9.	9.	3.	4.	0.	1.	1.	0.	2.	4.	3.	2.	2.	3.	6.	7.	6.	2.	2.
18	IC.	0.	0.	0.	1.	1.	2.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
19	TH.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.
20	MS.	3.	3.	3.	3.	4.	3.	1.	1.	1.	4.	1.	4.	4.	4.	2.	3.	3.	3.	4.	4.

THE TABLE SHOW THE COST OF MODULE.

COST = F.O.B. COST IN JAPANESE YEN.

LABOUR = NORMAL TIME IN MINUTE.

RELIABILITY = FAILOUR RATE PERCENT IN 1000 HOURS.

NO	MODULE. A B C D E F G H	COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
1	A 1	894.50	43.90	3.0870		
2	A 2	890.60	43.60	3.0770		
3	A 3	898.40	44.20	3.0970		
4	A 4	915.40	28.10	1.6490		
5	B 1	732.80	20.45	2.2970		
6	B 2	794.70	15.32	2.1500		
7	C 1	325.20	12.13	1.7080		
8	C 2	328.20	12.85	1.8080		
9	D 1	468.00	8.83	1.4050		
10	D 2	306.10	15.13	1.4010		
11	D 3	347.90	15.14	1.9020		
12	D 4	324.70	15.63	1.3490		
13	E 1	590.40	16.03	1.0310		
14	E 2	615.60	17.99	1.0160		
15	F 1	964.00	20.35	3.2440		
16	F 2	645.40	20.63	2.6380		
17	F 3	665.10	21.17	2.4910		
18	F 4	647.30	19.96	2.5330		
19	G 1	817.90	12.13	0.7260		
20	G 2	919.90	14.09	1.1860		

THE TABLE SHOW THE COST OF COMBINATION.

COST = FACTORY PRIME-COST IN BATH.

LABOUR = NORMAL TIME IN MINUTE.

RELIABILITY = FAILOUR RATE PERCENT IN 1000 HOURS.

SCORE A = TECHNICAL PERFORMANCE FOR CITY.

SCORE B = TECHNICAL PERFORMANCE FOR COUNTRY-SIDE.

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
1	1	1	1	1	1	1	1	0	492.04	133.82	13.4980	8.15	7.00
2	1	1	1	1	1	1	2	0	502.36	135.78	13.9580	8.45	7.80
3	1	1	1	1	1	2	1	0	460.87	134.10	12.8920	8.15	6.70
4	1	1	1	1	1	2	2	0	471.19	136.06	13.3520	8.45	7.50
5	1	1	1	1	1	3	1	0	462.89	134.64	12.7450	8.00	7.45
6	1	1	1	1	1	3	2	0	473.21	136.60	13.2050	8.30	8.25
7	1	1	1	1	1	4	1	0	460.94	133.43	12.7870	8.00	7.45
8	1	1	1	1	1	4	2	0	471.26	135.39	13.2470	8.30	8.25
9	1	1	1	1	2	1	1	0	494.84	135.78	13.4830	8.15	6.70
10	1	1	1	1	2	1	2	0	505.16	137.74	13.9430	8.45	7.50
11	1	1	1	1	2	2	1	0	463.66	136.06	12.8770	8.15	6.40
12	1	1	1	1	2	2	2	0	473.99	138.02	13.3370	8.45	7.20
13	1	1	1	1	2	3	1	0	465.68	136.60	12.7300	8.00	7.15
14	1	1	1	1	2	3	2	0	476.01	138.56	13.1900	8.30	7.95

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
15	1	1	1	1	2	4	1	0	463.74	135.39	12.7720	8.00	7.15
16	1	1	1	1	2	4	2	0	474.06	137.35	13.2320	8.30	7.95
17	1	1	1	2	1	1	1	0	477.23	140.12	13.4940	8.05	7.40
18	1	1	1	2	1	1	2	0	487.55	142.08	13.9540	8.35	8.20
19	1	1	1	2	1	2	1	0	446.05	140.40	12.8880	8.05	7.10
20	1	1	1	2	1	2	2	0	456.37	142.36	13.3480	8.35	7.90
21	1	1	1	2	1	3	1	0	448.07	140.94	12.7410	7.90	7.85
22	1	1	1	2	1	3	2	0	458.40	142.90	13.2010	8.20	8.65
23	1	1	1	2	1	4	1	0	446.13	139.73	12.7830	7.90	7.85
24	1	1	1	2	1	4	2	0	456.45	141.69	13.2430	8.20	8.65
25	1	1	1	2	2	1	1	0	480.02	142.08	13.4790	8.05	7.10
26	1	1	1	2	2	1	2	0	490.35	144.04	13.9390	8.35	7.90
27	1	1	1	2	2	2	1	0	448.85	142.36	12.8730	8.05	6.80
28	1	1	1	2	2	2	2	0	459.17	144.32	13.3330	8.35	7.60
29	1	1	1	2	2	3	1	0	450.87	142.90	12.7260	7.90	7.55
30	1	1	1	2	2	3	2	0	461.19	144.86	13.1860	8.20	8.35
31	1	1	1	2	2	4	1	0	448.92	141.69	12.7680	7.90	7.55
32	1	1	1	2	2	4	2	0	459.25	143.65	13.2280	8.20	8.35
33	1	1	1	3	1	1	1	0	481.33	140.13	13.9950	8.05	7.40
34	1	1	1	3	1	1	2	0	491.65	142.09	14.4550	8.35	8.20

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
35	1	1	1	3	1	2	1	0	450.15	140.41	13.3890	8.05	7.10
36	1	1	1	3	1	2	2	0	460.47	142.37	13.8490	8.35	7.90
37	1	1	1	3	1	3	1	0	452.17	140.95	13.2420	7.90	7.85
38	1	1	1	3	1	3	2	0	462.49	142.91	13.7020	8.20	8.65
39	1	1	1	3	1	4	1	0	450.22	139.74	13.2840	7.90	7.85
40	1	1	1	3	1	4	2	0	460.55	141.70	13.7440	8.20	8.65
41	1	1	1	3	2	1	1	0	484.12	142.09	13.9800	8.05	7.10
42	1	1	1	3	2	1	2	0	494.45	144.05	14.4400	8.35	7.90
43	1	1	1	3	2	2	1	0	452.95	142.37	13.3740	8.05	6.80
44	1	1	1	3	2	2	2	0	463.27	144.33	13.8340	8.35	7.60
45	1	1	1	3	2	3	1	0	454.97	142.91	13.2270	7.90	7.55
46	1	1	1	3	2	3	2	0	465.29	144.87	13.6870	8.20	8.35
47	1	1	1	3	2	4	1	0	453.02	141.70	13.2690	7.90	7.55
48	1	1	1	3	2	4	2	0	463.34	143.66	13.7290	8.20	8.35
49	1	1	1	4	1	1	1	0	479.13	140.62	13.4420	8.05	7.50
50	1	1	1	4	1	1	2	0	489.46	142.58	13.9020	8.35	8.30
51	1	1	1	4	1	2	1	0	447.96	140.90	12.8360	8.05	7.20
52	1	1	1	4	1	2	2	0	458.28	142.86	13.2960	8.35	8.00
53	1	1	1	4	1	3	1	0	449.98	141.44	12.6890	7.90	7.95
54	1	1	1	4	1	3	2	0	460.30	143.40	13.1490	8.20	8.75

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
55	1	1	1	4	1	4	1	0	448.03	140.23	12.7310	7.90	7.95
56	1	1	1	4	1	4	2	0	458.36	142.19	13.1910	8.20	8.75
57	1	1	1	4	2	1	1	0	481.93	142.58	13.4270	8.05	7.20
58	1	1	1	4	2	1	2	0	492.25	144.54	13.8870	8.35	8.00
59	1	1	1	4	2	2	1	0	450.75	142.86	12.8210	8.05	6.90
60	1	1	1	4	2	2	2	0	461.08	144.82	13.2810	8.35	7.70
61	1	1	1	4	2	3	1	0	452.78	143.40	12.6740	7.90	7.65
62	1	1	1	4	2	3	2	0	463.10	145.36	13.1340	8.20	8.45
63	1	1	1	4	2	4	1	0	450.83	142.19	12.7160	7.90	7.65
64	1	1	1	4	2	4	2	0	461.15	144.15	13.1760	8.20	8.45
65	1	1	2	1	1	1	1	0	492.46	134.54	13.5980	8.05	7.05
66	1	1	2	1	1	1	2	0	502.78	136.50	14.0580	8.35	7.85
67	1	1	2	1	1	2	1	0	461.28	134.82	12.9920	8.05	6.75
68	1	1	2	1	1	2	2	0	471.60	136.78	13.4520	8.35	7.55
69	1	1	2	1	1	3	1	0	463.30	135.36	12.8450	7.90	7.50
70	1	1	2	1	1	3	2	0	473.62	137.32	13.3050	8.20	8.30
71	1	1	2	1	1	4	1	0	461.35	134.15	12.8870	7.90	7.50
72	1	1	2	1	1	4	2	0	471.68	136.11	13.3470	8.20	8.30
73	1	1	2	1	2	1	1	0	495.25	136.50	13.5830	8.05	6.75
74	1	1	2	1	2	1	2	0	505.58	138.46	14.0430	8.35	7.55

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
75	1	1	2	1	2	2	1	0	464.08	136.78	12.9770	8.05	6.45
76	1	1	2	1	2	2	2	0	474.40	138.74	13.4370	8.35	7.25
77	1	1	2	1	2	3	1	0	466.10	137.32	12.8300	7.90	7.20
78	1	1	2	1	2	3	2	0	476.42	139.28	13.2900	8.20	8.00
79	1	1	2	1	2	4	1	0	464.15	136.11	12.8720	7.90	7.20
80	1	1	2	1	2	4	2	0	474.47	138.07	13.3320	8.20	8.00
81	1	1	2	2	1	1	1	0	477.64	140.84	13.5940	7.95	7.45
82	1	1	2	2	1	1	2	0	487.96	142.80	14.0540	8.25	8.25
83	1	1	2	2	1	2	1	0	446.47	141.12	12.9880	7.95	7.15
84	1	1	2	2	1	2	2	0	456.79	143.08	13.4480	8.25	7.95
85	1	1	2	2	1	3	1	0	448.49	141.66	12.8410	7.80	7.90
86	1	1	2	2	1	3	2	0	458.81	143.62	13.3010	8.10	8.70
87	1	1	2	2	1	4	1	0	446.54	140.45	12.8830	7.80	7.90
88	1	1	2	2	1	4	2	0	456.86	142.41	13.3430	8.10	8.70
89	1	1	2	2	2	1	1	0	480.44	142.80	13.5790	7.95	7.15
90	1	1	2	2	2	1	2	0	490.76	144.76	14.0390	8.25	7.95
91	1	1	2	2	2	2	1	0	449.26	143.08	12.9730	7.95	6.85
92	1	1	2	2	2	2	2	0	459.59	145.04	13.4330	8.25	7.65
93	1	1	2	2	2	3	1	0	451.28	143.62	12.8260	7.80	7.60
94	1	1	2	2	2	3	2	0	461.61	145.58	13.2860	8.10	8.40

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
95	1	1	2	2	2	4	1	0	449.34	142.41	12.8680	7.80	7.60
96	1	1	2	2	2	4	2	0	459.66	144.37	13.3280	8.10	8.40
97	1	1	2	3	1	1	1	0	481.74	140.85	14.0950	7.95	7.45
98	1	1	2	3	1	1	2	0	492.06	142.81	14.5550	8.25	8.25
99	1	1	2	3	1	2	1	0	450.56	141.13	13.4890	7.95	7.15
100	1	1	2	3	1	2	2	0	460.89	143.09	13.9490	8.25	7.95
101	1	1	2	3	1	3	1	0	452.58	141.67	13.3420	7.80	7.90
102	1	1	2	3	1	3	2	0	462.91	143.63	13.8020	8.10	8.70
103	1	1	2	3	1	4	1	0	450.64	140.46	13.3840	7.80	7.90
104	1	1	2	3	1	4	2	0	460.96	142.42	13.8440	8.10	8.70
105	1	1	2	3	2	1	1	0	484.54	142.81	14.0800	7.95	7.15
106	1	1	2	3	2	1	2	0	494.86	144.77	14.5400	8.25	7.95
107	1	1	2	3	2	2	1	0	453.36	143.09	13.4740	7.95	6.85
108	1	1	2	3	2	2	2	0	463.68	145.05	13.9340	8.25	7.65
109	1	1	2	3	2	3	1	0	455.38	143.63	13.3270	7.80	7.60
110	1	1	2	3	2	3	2	0	465.70	145.59	13.7870	8.10	8.40
111	1	1	2	3	2	4	1	0	453.43	142.42	13.3690	7.80	7.60
112	1	1	2	3	2	4	2	0	463.76	144.38	13.8290	8.10	8.40
113	1	1	2	4	1	1	1	0	479.55	141.34	13.5420	7.95	7.55
114	1	1	2	4	1	1	2	0	489.87	143.30	14.0020	8.25	8.35

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
115	1	1	2	4	1	2	1	0	448.37	141.62	12.9360	7.95	7.25
116	1	1	2	4	1	2	2	0	458.70	143.58	13.3960	8.25	8.05
117	1	1	2	4	1	3	1	0	450.39	142.16	12.7890	7.80	8.00
118	1	1	2	4	1	3	2	0	460.72	144.12	13.2490	8.10	8.80
119	1	1	2	4	1	4	1	0	448.45	140.95	12.8310	7.80	8.00
120	1	1	2	4	1	4	2	0	458.77	142.91	13.2910	8.10	8.80
121	1	1	2	4	2	1	1	0	482.34	143.30	13.5270	7.95	7.25
122	1	1	2	4	2	1	2	0	492.67	145.26	13.9870	8.25	8.05
123	1	1	2	4	2	2	1	0	451.17	143.58	12.9210	7.95	6.95
124	1	1	2	4	2	2	2	0	461.49	145.54	13.3810	8.25	7.75
125	1	1	2	4	2	3	1	0	453.19	144.12	12.7740	7.80	7.70
126	1	1	2	4	2	3	2	0	463.51	146.08	13.2340	8.10	8.50
127	1	1	2	4	2	4	1	0	451.24	142.91	12.8160	7.80	7.70
128	1	1	2	4	2	4	2	0	461.57	144.87	13.2760	8.10	8.50
129	1	2	1	1	1	1	1	0	497.25	128.69	13.3510	8.55	7.15
130	1	2	1	1	1	1	2	0	507.57	130.65	13.8110	8.85	7.95
131	1	2	1	1	1	2	1	0	466.07	128.97	12.7450	8.55	6.85
132	1	2	1	1	1	2	2	0	476.40	130.93	13.2050	8.85	7.65
133	1	2	1	1	1	3	1	0	468.10	129.51	12.5980	8.40	7.60
134	1	2	1	1	1	3	2	0	478.42	131.47	13.0580	8.70	8.40

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
135	1	2	1	1	1	4	1	0	466.15	128.30	12.6400	8.40	7.60
136	1	2	1	1	1	4	2	0	476.47	130.26	13.1000	8.70	8.40
137	1	2	1	1	2	1	1	0	500.05	130.65	13.3360	8.55	6.85
138	1	2	1	1	2	1	2	0	510.37	132.61	13.7960	8.85	7.65
139	1	2	1	1	2	2	1	0	468.87	130.93	12.7300	8.55	6.55
140	1	2	1	1	2	2	2	0	479.19	132.89	13.1900	8.85	7.35
141	1	2	1	1	2	3	1	0	470.89	131.47	12.5830	8.40	7.30
142	1	2	1	1	2	3	2	0	481.22	133.43	13.0430	8.70	8.10
143	1	2	1	1	2	4	1	0	468.95	130.26	12.6250	8.40	7.30
144	1	2	1	1	2	4	2	0	479.27	132.22	13.0850	8.70	8.10
145	1	2	1	2	1	1	1	0	482.44	134.99	13.3470	8.45	7.55
146	1	2	1	2	1	1	2	0	492.76	136.95	13.8070	8.75	8.35
147	1	2	1	2	1	2	1	0	451.26	135.27	12.7410	8.45	7.25
148	1	2	1	2	1	2	2	0	461.58	137.23	13.2010	8.75	8.05
149	1	2	1	2	1	3	1	0	453.28	135.81	12.5940	8.30	8.00
150	1	2	1	2	1	3	2	0	463.60	137.77	13.0540	8.60	8.80
151	1	2	1	2	1	4	1	0	451.33	134.60	12.6360	8.30	8.00
152	1	2	1	2	1	4	2	0	461.66	136.56	13.0960	8.60	8.80
153	1	2	1	2	2	1	1	0	485.23	136.95	13.3320	8.45	7.25
154	1	2	1	2	2	1	2	0	495.56	138.91	13.7920	8.75	8.05

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
155	1	2	1	2	2	2	1	0	454.06	137.23	12.7260	8.45	6.95
156	1	2	1	2	2	2	2	0	464.38	139.19	13.1860	8.75	7.75
157	1	2	1	2	2	3	1	0	456.08	137.77	12.5790	8.30	7.70
158	1	2	1	2	2	3	2	0	466.40	139.73	13.0390	8.60	8.50
159	1	2	1	2	2	4	1	0	454.13	136.56	12.6210	8.30	7.70
160	1	2	1	2	2	4	2	0	464.46	138.52	13.0810	8.60	8.50
161	1	2	1	3	1	1	1	0	486.53	135.00	13.8480	8.45	7.55
162	1	2	1	3	1	1	2	0	496.86	136.96	14.3080	8.75	8.35
163	1	2	1	3	1	2	1	0	455.36	135.28	13.2420	8.45	7.25
164	1	2	1	3	1	2	2	0	465.68	137.24	13.7020	8.75	8.05
165	1	2	1	3	1	3	1	0	457.38	135.82	13.0950	8.30	8.00
166	1	2	1	3	1	3	2	0	467.70	137.78	13.5550	8.60	8.80
167	1	2	1	3	1	4	1	0	455.43	134.61	13.1370	8.30	8.00
168	1	2	1	3	1	4	2	0	465.76	136.57	13.5970	8.60	8.80
169	1	2	1	3	2	1	1	0	489.33	136.96	13.8330	8.45	7.25
170	1	2	1	3	2	1	2	0	499.66	138.92	14.2930	8.75	8.05
171	1	2	1	3	2	2	1	0	458.16	137.24	13.2270	8.45	6.95
172	1	2	1	3	2	2	2	0	468.48	139.20	13.6870	8.75	7.75
173	1	2	1	3	2	3	1	0	460.18	137.78	13.0800	8.30	7.70
174	1	2	1	3	2	3	2	0	470.50	139.74	13.5400	8.60	8.50

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
175	1	2	1	3	2	4	1	0	458.23	136.57	13.1220	8.30	7.70
176	1	2	1	3	2	4	2	0	468.55	138.53	13.5820	8.60	8.50
177	1	2	1	4	1	1	1	0	484.34	135.49	13.2950	8.45	7.65
178	1	2	1	4	1	1	2	0	494.67	137.45	13.7550	8.75	8.45
179	1	2	1	4	1	2	1	0	453.17	135.77	12.6890	8.45	7.35
180	1	2	1	4	1	2	2	0	463.49	137.73	13.1490	8.75	8.15
181	1	2	1	4	1	3	1	0	455.19	136.31	12.5420	8.30	8.10
182	1	2	1	4	1	3	2	0	465.51	138.27	13.0020	8.60	8.90
183	1	2	1	4	1	4	1	0	453.24	135.10	12.5840	8.30	8.10
184	1	2	1	4	1	4	2	0	463.56	137.06	13.0440	8.60	8.90
185	1	2	1	4	2	1	1	0	487.14	137.45	13.2800	8.45	7.35
186	1	2	1	4	2	1	2	0	497.46	139.41	13.7400	8.75	8.15
187	1	2	1	4	2	2	1	0	455.96	137.73	12.6740	8.45	7.05
188	1	2	1	4	2	2	2	0	466.29	139.69	13.1340	8.75	7.85
189	1	2	1	4	2	3	1	0	457.99	138.27	12.5270	8.30	7.80
190	1	2	1	4	2	3	2	0	468.31	140.23	12.9870	8.60	8.60
191	1	2	1	4	2	4	1	0	456.04	137.06	12.5690	8.30	7.80
192	1	2	1	4	2	4	2	0	466.36	139.02	13.0290	8.60	8.60
193	1	2	2	1	1	1	1	0	497.67	129.41	13.4510	8.45	7.20
194	1	2	2	1	1	1	2	0	507.99	131.37	13.9110	8.75	8.00

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
195	1	2	2	1	1	2	1	0	466.49	129.69	12.8450	8.45	6.90
196	1	2	2	1	1	2	2	0	476.81	131.65	13.3050	8.75	7.70
197	1	2	2	1	1	3	1	0	468.51	130.23	12.6980	8.30	7.65
198	1	2	2	1	1	3	2	0	478.83	132.19	13.1580	8.60	8.45
199	1	2	2	1	1	4	1	0	466.56	129.02	12.7400	8.30	7.65
200	1	2	2	1	1	4	2	0	476.89	130.98	13.2000	8.60	8.45
201	1	2	2	1	2	1	1	0	500.46	131.37	13.4360	8.45	6.90
202	1	2	2	1	2	1	2	0	510.79	133.33	13.8960	8.75	7.70
203	1	2	2	1	2	2	1	0	469.29	131.65	12.8300	8.45	6.60
204	1	2	2	1	2	2	2	0	479.61	133.61	13.2900	8.75	7.40
205	1	2	2	1	2	3	1	0	471.31	132.19	12.6830	8.30	7.35
206	1	2	2	1	2	3	2	0	481.63	134.15	13.1430	8.60	8.15
207	1	2	2	1	2	4	1	0	469.36	130.98	12.7250	8.30	7.35
208	1	2	2	1	2	4	2	0	479.68	132.94	13.1850	8.60	8.15
209	1	2	2	2	1	1	1	0	482.85	135.71	13.4470	8.35	7.60
210	1	2	2	2	1	1	2	0	493.17	137.67	13.9070	8.65	8.40
211	1	2	2	2	1	2	1	0	451.68	135.99	12.8410	8.35	7.30
212	1	2	2	2	1	2	2	0	462.00	137.95	13.3010	8.65	8.10
213	1	2	2	2	1	3	1	0	453.70	136.53	12.6940	8.20	8.05
214	1	2	2	2	1	3	2	0	464.02	138.49	13.1540	8.50	8.85

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
215	1	2	2	2	1	4	1	0	451.75	135.32	12.7360	8.20	8.05
216	1	2	2	2	1	4	2	0	462.07	137.28	13.1960	8.50	8.85
217	1	2	2	2	2	1	1	0	485.65	137.67	13.4320	8.35	7.30
218	1	2	2	2	2	1	2	0	495.97	139.63	13.8920	8.65	8.10
219	1	2	2	2	2	2	1	0	454.47	137.95	12.8260	8.35	7.00
220	1	2	2	2	2	2	2	0	464.80	139.91	13.2860	8.65	7.80
221	1	2	2	2	2	3	1	0	456.49	138.49	12.6790	8.20	7.75
222	1	2	2	2	2	3	2	0	466.82	140.45	13.1390	8.50	8.55
223	1	2	2	2	2	4	1	0	454.55	137.28	12.7210	8.20	7.75
224	1	2	2	2	2	4	2	0	464.87	139.24	13.1810	8.50	8.55
225	1	2	2	3	1	1	1	0	486.95	135.72	13.9480	8.35	7.60
226	1	2	2	3	1	1	2	0	497.27	137.68	14.4080	8.65	8.40
227	1	2	2	3	1	2	1	0	455.77	136.00	13.3420	8.35	7.30
228	1	2	2	3	1	2	2	0	466.10	137.96	13.8020	8.65	8.10
229	1	2	2	3	1	3	1	0	457.79	136.54	13.1950	8.20	8.05
230	1	2	2	3	1	3	2	0	468.12	138.50	13.6550	8.50	8.85
231	1	2	2	3	1	4	1	0	455.85	135.33	13.2370	8.20	8.05
232	1	2	2	3	1	4	2	0	466.17	137.29	13.6970	8.50	8.85
233	1	2	2	3	2	1	1	0	489.75	137.68	13.9330	8.35	7.30
234	1	2	2	3	2	1	2	0	500.07	139.64	14.3930	8.65	8.10

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
235	1	2	2	3	2	2	1	0	458.57	137.96	13.3270	8.35	7.00
236	1	2	2	3	2	2	2	0	468.89	139.92	13.7870	8.65	7.80
237	1	2	2	3	2	3	1	0	460.59	138.50	13.1800	8.20	7.75
238	1	2	2	3	2	3	2	0	470.91	140.46	13.6400	8.50	8.55
239	1	2	2	3	2	4	1	0	458.64	137.29	13.2220	8.20	7.75
240	1	2	2	3	2	4	2	0	468.97	139.25	13.6820	8.50	8.55
241	1	2	2	4	1	1	1	0	484.76	136.21	13.3950	8.35	7.70
242	1	2	2	4	1	1	2	0	495.08	138.17	13.8550	8.65	8.50
243	1	2	2	4	1	2	1	0	453.58	136.49	12.7890	8.35	7.40
244	1	2	2	4	1	2	2	0	463.90	138.45	13.2490	8.65	8.20
245	1	2	2	4	1	3	1	0	455.60	137.03	12.6420	8.20	8.15
246	1	2	2	4	1	3	2	0	465.93	138.99	13.1020	8.50	8.95
247	1	2	2	4	1	4	1	0	453.66	135.82	12.6840	8.20	8.15
248	1	2	2	4	1	4	2	0	463.98	137.78	13.1440	8.50	8.95
249	1	2	2	4	2	1	1	0	487.55	138.17	13.3800	8.35	7.40
250	1	2	2	4	2	1	2	0	497.88	140.13	13.8400	8.65	8.20
251	1	2	2	4	2	2	1	0	456.38	138.45	12.7740	8.35	7.10
252	1	2	2	4	2	2	2	0	466.70	140.41	13.2340	8.65	7.90
253	1	2	2	4	2	3	1	0	458.40	138.99	12.6270	8.20	7.85
254	1	2	2	4	2	3	2	0	468.72	140.95	13.0870	8.50	8.65

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
255	1	2	2	4	2	4	1	0	456.45	137.78	12.6690	8.20	7.85
256	1	2	2	4	2	4	2	0	466.78	139.74	13.1290	8.50	8.65
257	2	1	1	1	1	1	1	0	491.61	133.52	13.4880	7.75	7.25
258	2	1	1	1	1	1	2	0	501.93	135.48	13.9480	8.05	8.05
259	2	1	1	1	1	2	1	0	460.43	133.80	12.8820	7.75	6.95
260	2	1	1	1	1	2	2	0	470.76	135.76	13.3420	8.05	7.75
261	2	1	1	1	1	3	1	0	462.45	134.34	12.7350	7.60	7.70
262	2	1	1	1	1	3	2	0	472.78	136.30	13.1950	7.90	8.50
263	2	1	1	1	1	4	1	0	460.51	133.13	12.7770	7.60	7.70
264	2	1	1	1	1	4	2	0	470.83	135.09	13.2370	7.90	8.50
265	2	1	1	1	2	1	1	0	494.41	135.48	13.4730	7.75	6.95
266	2	1	1	1	2	1	2	0	504.73	137.44	13.9330	8.05	7.75
267	2	1	1	1	2	2	1	0	463.23	135.76	12.8670	7.75	6.65
268	2	1	1	1	2	2	2	0	473.55	137.72	13.3270	8.05	7.45
269	2	1	1	1	2	3	1	0	465.25	136.30	12.7200	7.60	7.40
270	2	1	1	1	2	3	2	0	475.57	138.26	13.1800	7.90	8.20
271	2	1	1	1	2	4	1	0	463.30	135.09	12.7620	7.60	7.40
272	2	1	1	1	2	4	2	0	473.63	137.05	13.2220	7.90	8.20
273	2	1	1	2	1	1	1	0	476.80	139.82	13.4840	7.65	7.65
274	2	1	1	2	1	1	2	0	487.12	141.78	13.9440	7.95	8.45

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
275	2	1	1	2	1	2	1	0	445.62	140.10	12.8780	7.65	7.35
276	2	1	1	2	1	2	2	0	455.94	142.06	13.3380	7.95	8.15
277	2	1	1	2	1	3	1	0	447.64	140.64	12.7310	7.50	8.10
278	2	1	1	2	1	3	2	0	457.96	142.60	13.1910	7.80	8.90
279	2	1	1	2	1	4	1	0	445.69	139.43	12.7730	7.50	8.10
280	2	1	1	2	1	4	2	0	456.02	141.39	13.2330	7.80	8.90
281	2	1	1	2	2	1	1	0	479.59	141.78	13.4690	7.65	7.35
282	2	1	1	2	2	1	2	0	489.92	143.74	13.9290	7.95	8.15
283	2	1	1	2	2	2	1	0	448.42	142.06	12.8630	7.65	7.05
284	2	1	1	2	2	2	2	0	458.74	144.02	13.3230	7.95	7.85
285	2	1	1	2	2	3	1	0	450.44	142.60	12.7160	7.50	7.80
286	2	1	1	2	2	3	2	0	460.76	144.56	13.1760	7.80	8.60
287	2	1	1	2	2	4	1	0	448.49	141.39	12.7580	7.50	7.80
288	2	1	1	2	2	4	2	0	458.81	143.35	13.2180	7.80	8.60
289	2	1	1	3	1	1	1	0	480.89	139.83	13.9850	7.65	7.65
290	2	1	1	3	1	1	2	0	491.22	141.79	14.4450	7.95	8.45
291	2	1	1	3	1	2	1	0	449.72	140.11	13.3790	7.65	7.35
292	2	1	1	3	1	2	2	0	460.04	142.07	13.8390	7.95	8.15
293	2	1	1	3	1	3	1	0	451.74	140.65	13.2320	7.50	8.10
294	2	1	1	3	1	3	2	0	462.06	142.61	13.6920	7.80	8.90

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
295	2	1	1	3	1	4	1	0	449.79	139.44	13.2740	7.50	8.10
296	2	1	1	3	1	4	2	0	460.11	141.40	13.7340	7.80	8.90
297	2	1	1	3	2	1	1	0	483.69	141.79	13.9700	7.65	7.35
298	2	1	1	3	2	1	2	0	494.01	143.75	14.4300	7.95	8.15
299	2	1	1	3	2	2	1	0	452.51	142.07	13.3640	7.65	7.05
300	2	1	1	3	2	2	2	0	462.84	144.03	13.8240	7.95	7.85
301	2	1	1	3	2	3	1	0	454.53	142.61	13.2170	7.50	7.80
302	2	1	1	3	2	3	2	0	464.86	144.57	13.6770	7.80	8.60
303	2	1	1	3	2	4	1	0	452.59	141.40	13.2590	7.50	7.80
304	2	1	1	3	2	4	2	0	462.91	143.36	13.7190	7.80	8.60
305	2	1	1	4	1	1	1	0	478.70	140.32	13.4320	7.65	7.75
306	2	1	1	4	1	1	2	0	489.02	142.28	13.8920	7.95	8.55
307	2	1	1	4	1	2	1	0	447.53	140.60	12.8260	7.65	7.45
308	2	1	1	4	1	2	2	0	457.85	142.56	13.2860	7.95	8.25
309	2	1	1	4	1	3	1	0	449.55	141.14	12.6790	7.50	8.20
310	2	1	1	4	1	3	2	0	459.87	143.10	13.1390	7.80	9.00
311	2	1	1	4	1	4	1	0	447.60	139.93	12.7210	7.50	8.20
312	2	1	1	4	1	4	2	0	457.92	141.89	13.1810	7.80	9.00
313	2	1	1	4	2	1	1	0	481.50	142.28	13.4170	7.65	7.45
314	2	1	1	4	2	1	2	0	491.82	144.24	13.8770	7.95	8.25

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
315	2	1	1	4	2	2	1	0	450.32	142.56	12.8110	7.65	7.15
316	2	1	1	4	2	2	2	0	460.65	144.52	13.2710	7.95	7.95
317	2	1	1	4	2	3	1	0	452.34	143.10	12.6640	7.50	7.90
318	2	1	1	4	2	3	2	0	462.67	145.06	13.1240	7.80	8.70
319	2	1	1	4	2	4	1	0	450.40	141.89	12.7060	7.50	7.90
320	2	1	1	4	2	4	2	0	460.72	143.85	13.1660	7.80	8.70
321	2	1	2	1	1	1	1	0	492.02	134.24	13.5880	7.65	7.30
322	2	1	2	1	1	1	2	0	502.35	136.20	14.0480	7.95	8.10
323	2	1	2	1	1	2	1	0	460.85	134.52	12.9820	7.65	7.00
324	2	1	2	1	1	2	2	0	471.17	136.48	13.4420	7.95	7.80
325	2	1	2	1	1	3	1	0	462.87	135.06	12.8350	7.50	7.75
326	2	1	2	1	1	3	2	0	473.19	137.02	13.2950	7.80	8.55
327	2	1	2	1	1	4	1	0	460.92	133.85	12.8770	7.50	7.75
328	2	1	2	1	1	4	2	0	471.25	135.81	13.3370	7.80	8.55
329	2	1	2	1	2	1	1	0	494.82	136.20	13.5730	7.65	7.00
330	2	1	2	1	2	1	2	0	505.14	138.16	14.0330	7.95	7.80
331	2	1	2	1	2	2	1	0	463.64	136.48	12.9670	7.65	6.70
332	2	1	2	1	2	2	2	0	473.97	138.44	13.4270	7.95	7.50
333	2	1	2	1	2	3	1	0	465.67	137.02	12.8200	7.50	7.45
334	2	1	2	1	2	3	2	0	475.99	138.98	13.2800	7.80	8.25

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
335	2	1	2	1	2	4	1	0	463.72	135.81	12.8620	7.50	7.45
336	2	1	2	1	2	4	2	0	474.04	137.77	13.3220	7.80	8.25
337	2	1	2	2	1	1	1	0	477.21	140.54	13.5840	7.55	7.70
338	2	1	2	2	1	1	2	0	487.53	142.50	14.0440	7.85	8.50
339	2	1	2	2	1	2	1	0	446.03	140.82	12.9780	7.55	7.40
340	2	1	2	2	1	2	2	0	456.36	142.78	13.4380	7.85	8.20
341	2	1	2	2	1	3	1	0	448.05	141.36	12.8310	7.40	8.15
342	2	1	2	2	1	3	2	0	458.38	143.32	13.2910	7.70	8.95
343	2	1	2	2	1	4	1	0	446.11	140.15	12.8730	7.40	8.15
344	2	1	2	2	1	4	2	0	456.43	142.11	13.3330	7.70	8.95
345	2	1	2	2	2	1	1	0	480.01	142.50	13.5690	7.55	7.40
346	2	1	2	2	2	1	2	0	490.33	144.46	14.0290	7.85	8.20
347	2	1	2	2	2	2	1	0	448.83	142.78	12.9630	7.55	7.10
348	2	1	2	2	2	2	2	0	459.15	144.74	13.4230	7.85	7.90
349	2	1	2	2	2	3	1	0	450.85	143.32	12.8160	7.40	7.85
350	2	1	2	2	2	3	2	0	461.17	145.28	13.2760	7.70	8.65
351	2	1	2	2	2	4	1	0	448.90	142.11	12.8580	7.40	7.85
352	2	1	2	2	2	4	2	0	459.23	144.07	13.3180	7.70	8.65
353	2	1	2	3	1	1	1	0	481.31	140.55	14.0850	7.55	7.70
354	2	1	2	3	1	1	2	0	491.63	142.51	14.5450	7.85	8.50

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
355	2	1	2	3	1	2	1	0	450.13	140.83	13.4790	7.55	7.40
356	2	1	2	3	1	2	2	0	460.45	142.79	13.9390	7.85	8.20
357	2	1	2	3	1	3	1	0	452.15	141.37	13.3320	7.40	8.15
358	2	1	2	3	1	3	2	0	462.48	143.33	13.7920	7.70	8.95
359	2	1	2	3	1	4	1	0	450.21	140.16	13.3740	7.40	8.15
360	2	1	2	3	1	4	2	0	460.53	142.12	13.8340	7.70	8.95
361	2	1	2	3	2	1	1	0	484.10	142.51	14.0700	7.55	7.40
362	2	1	2	3	2	1	2	0	494.43	144.47	14.5300	7.85	8.20
363	2	1	2	3	2	2	1	0	452.93	142.79	13.4640	7.55	7.10
364	2	1	2	3	2	2	2	0	463.25	144.75	13.9240	7.85	7.90
365	2	1	2	3	2	3	1	0	454.95	143.33	13.3170	7.40	7.85
366	2	1	2	3	2	3	2	0	465.27	145.29	13.7770	7.70	8.65
367	2	1	2	3	2	4	1	0	453.00	142.12	13.3590	7.40	7.85
368	2	1	2	3	2	4	2	0	463.33	144.08	13.8190	7.70	8.65
369	2	1	2	4	1	1	1	0	479.12	141.04	13.5320	7.55	7.80
370	2	1	2	4	1	1	2	0	489.44	143.00	13.9920	7.85	8.60
371	2	1	2	4	1	2	1	0	447.94	141.32	12.9260	7.55	7.50
372	2	1	2	4	1	2	2	0	458.26	143.28	13.3860	7.85	8.30
373	2	1	2	4	1	3	1	0	449.96	141.86	12.7790	7.40	8.25
374	2	1	2	4	1	3	2	0	460.28	143.82	13.2390	7.70	9.05

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
375	2	1	2	4	1	4	1	0	448.01	140.65	12.8210	7.40	8.25
376	2	1	2	4	1	4	2	0	458.34	142.61	13.2810	7.70	9.05
377	2	1	2	4	2	1	1	0	481.91	143.00	13.5170	7.55	7.50
378	2	1	2	4	2	1	2	0	492.24	144.96	13.9770	7.85	8.30
379	2	1	2	4	2	2	1	0	450.74	143.28	12.9110	7.55	7.20
380	2	1	2	4	2	2	2	0	461.06	145.24	13.3710	7.85	8.00
381	2	1	2	4	2	3	1	0	452.76	143.82	12.7640	7.40	7.95
382	2	1	2	4	2	3	2	0	463.08	145.78	13.2240	7.70	8.75
383	2	1	2	4	2	4	1	0	450.81	142.61	12.8060	7.40	7.95
384	2	1	2	4	2	4	2	0	461.13	144.57	13.2660	7.70	8.75
385	2	2	1	1	1	1	1	0	496.82	128.39	13.3410	8.15	7.40
386	2	2	1	1	1	1	2	0	507.14	130.35	13.8010	8.45	8.20
387	2	2	1	1	1	2	1	0	465.64	128.67	12.7350	8.15	7.10
388	2	2	1	1	1	2	2	0	475.97	130.63	13.1950	8.45	7.90
389	2	2	1	1	1	3	1	0	467.66	129.21	12.5880	8.00	7.85
390	2	2	1	1	1	3	2	0	477.99	131.17	13.0480	8.30	8.65
391	2	2	1	1	1	4	1	0	465.72	128.00	12.6300	8.00	7.85
392	2	2	1	1	1	4	2	0	476.04	129.96	13.0900	8.30	8.65
393	2	2	1	1	2	1	1	0	499.62	130.35	13.3260	8.15	7.10
394	2	2	1	1	2	1	2	0	509.94	132.31	13.7860	8.45	7.90

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
395	2	2	1	1	2	2	1	0	468.44	130.63	12.7200	8.15	6.80
396	2	2	1	1	2	2	2	0	478.76	132.59	13.1800	8.45	7.60
397	2	2	1	1	2	3	1	0	470.46	131.17	12.5730	8.00	7.55
398	2	2	1	1	2	3	2	0	480.78	133.13	13.0330	8.30	8.35
399	2	2	1	1	2	4	1	0	468.51	129.96	12.6150	8.00	7.55
400	2	2	1	1	2	4	2	0	478.84	131.92	13.0750	8.30	8.35
401	2	2	1	2	1	1	1	0	482.00	134.69	13.3370	8.05	7.80
402	2	2	1	2	1	1	2	0	492.33	136.65	13.7970	8.35	8.60
403	2	2	1	2	1	2	1	0	450.83	134.97	12.7310	8.05	7.50
404	2	2	1	2	1	2	2	0	461.15	136.93	13.1910	8.35	8.30
405	2	2	1	2	1	3	1	0	452.85	135.51	12.5840	7.90	8.25
406	2	2	1	2	1	3	2	0	463.17	137.47	13.0440	8.20	9.05
407	2	2	1	2	1	4	1	0	450.90	134.30	12.6260	7.90	8.25
408	2	2	1	2	1	4	2	0	461.23	136.26	13.0860	8.20	9.05
409	2	2	1	2	2	1	1	0	484.80	136.65	13.3220	8.05	7.50
410	2	2	1	2	2	1	2	0	495.12	138.61	13.7820	8.35	8.30
411	2	2	1	2	2	2	1	0	453.63	136.93	12.7160	8.05	7.20
412	2	2	1	2	2	2	2	0	463.95	138.89	13.1760	8.35	8.00
413	2	2	1	2	2	3	1	0	455.65	137.47	12.5690	7.90	7.95
414	2	2	1	2	2	3	2	0	465.97	139.43	13.0290	8.20	8.75

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
415	2	2	1	2	2	4	1	0	453.70	136.26	12.6110	7.90	7.95
416	2	2	1	2	2	4	2	0	464.02	138.22	13.0710	8.20	8.75
417	2	2	1	3	1	1	1	0	486.10	134.70	13.8380	8.05	7.80
418	2	2	1	3	1	1	2	0	496.43	136.66	14.2980	8.35	8.60
419	2	2	1	3	1	2	1	0	454.93	134.98	13.2320	8.05	7.50
420	2	2	1	3	1	2	2	0	465.25	136.94	13.6920	8.35	8.30
421	2	2	1	3	1	3	1	0	456.95	135.52	13.0850	7.90	8.25
422	2	2	1	3	1	3	2	0	467.27	137.48	13.5450	8.20	9.05
423	2	2	1	3	1	4	1	0	455.00	134.31	13.1270	7.90	8.25
424	2	2	1	3	1	4	2	0	465.32	136.27	13.5870	8.20	9.05
425	2	2	1	3	2	1	1	0	488.90	136.66	13.8230	8.05	7.50
426	2	2	1	3	2	1	2	0	499.22	138.62	14.2830	8.35	8.30
427	2	2	1	3	2	2	1	0	457.72	136.94	13.2170	8.05	7.20
428	2	2	1	3	2	2	2	0	468.05	138.90	13.6770	8.35	8.00
429	2	2	1	3	2	3	1	0	459.74	137.48	13.0700	7.90	7.95
430	2	2	1	3	2	3	2	0	470.07	139.44	13.5300	8.20	8.75
431	2	2	1	3	2	4	1	0	457.80	136.27	13.1120	7.90	7.95
432	2	2	1	3	2	4	2	0	468.12	138.23	13.5720	8.20	8.75
433	2	2	1	4	1	1	1	0	483.91	135.19	13.2850	8.05	7.90
434	2	2	1	4	1	1	2	0	494.23	137.15	13.7450	8.35	8.70

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
435	2	2	1	4	1	2	1	0	452.73	135.47	12.6790	8.05	7.60
436	2	2	1	4	1	2	2	0	463.06	137.43	13.1390	8.35	8.40
437	2	2	1	4	1	3	1	0	454.76	136.01	12.5320	7.90	8.35
438	2	2	1	4	1	3	2	0	465.08	137.97	12.9920	8.20	9.15
439	2	2	1	4	1	4	1	0	452.81	134.80	12.5740	7.90	8.35
440	2	2	1	4	1	4	2	0	463.13	136.76	13.0340	8.20	9.15
441	2	2	1	4	2	1	1	0	486.71	137.15	13.2700	8.05	7.60
442	2	2	1	4	2	1	2	0	497.03	139.11	13.7300	8.35	8.40
443	2	2	1	4	2	2	1	0	455.53	137.43	12.6640	8.05	7.30
444	2	2	1	4	2	2	2	0	465.85	139.39	13.1240	8.35	8.10
445	2	2	1	4	2	3	1	0	457.55	137.97	12.5170	7.90	8.05
446	2	2	1	4	2	3	2	0	467.88	139.93	12.9770	8.20	8.85
447	2	2	1	4	2	4	1	0	455.61	136.76	12.5590	7.90	8.05
448	2	2	1	4	2	4	2	0	465.93	138.72	13.0190	8.20	8.85
449	2	2	2	1	1	1	1	0	497.23	129.11	13.4410	8.05	7.45
450	2	2	2	1	1	1	2	0	507.56	131.07	13.9010	8.35	8.25
451	2	2	2	1	1	2	1	0	466.06	129.39	12.8350	8.05	7.15
452	2	2	2	1	1	2	2	0	476.38	131.35	13.2950	8.35	7.95
453	2	2	2	1	1	3	1	0	468.08	129.93	12.6880	7.90	7.90
454	2	2	2	1	1	3	2	0	478.40	131.89	13.1480	8.20	8.70

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
455	2	2	2	1	1	4	1	0	466.13	128.72	12.7300	7.90	7.90
456	2	2	2	1	1	4	2	0	476.45	130.68	13.1900	8.20	8.70
457	2	2	2	1	2	1	1	0	500.03	131.07	13.4260	8.05	7.15
458	2	2	2	1	2	1	2	0	510.35	133.03	13.8860	8.35	7.95
459	2	2	2	1	2	2	1	0	468.85	131.35	12.8200	8.05	6.85
460	2	2	2	1	2	2	2	0	479.18	133.31	13.2800	8.35	7.65
461	2	2	2	1	2	3	1	0	470.87	131.89	12.6730	7.90	7.60
462	2	2	2	1	2	3	2	0	481.20	133.85	13.1330	8.20	8.40
463	2	2	2	1	2	4	1	0	468.93	130.68	12.7150	7.90	7.60
464	2	2	2	1	2	4	2	0	479.25	132.64	13.1750	8.20	8.40
465	2	2	2	2	1	1	1	0	482.42	135.41	13.4370	7.95	7.85
466	2	2	2	2	1	1	2	0	492.74	137.37	13.8970	8.25	8.65
467	2	2	2	2	1	2	1	0	451.24	135.69	12.8310	7.95	7.55
468	2	2	2	2	1	2	2	0	461.57	137.65	13.2910	8.25	8.35
469	2	2	2	2	1	3	1	0	453.26	136.23	12.6840	7.80	8.30
470	2	2	2	2	1	3	2	0	463.59	138.19	13.1440	8.10	9.10
471	2	2	2	2	1	4	1	0	451.32	135.02	12.7260	7.80	8.30
472	2	2	2	2	1	4	2	0	461.64	136.98	13.1860	8.10	9.10
473	2	2	2	2	2	1	1	0	485.22	137.37	13.4220	7.95	7.55
474	2	2	2	2	2	1	2	0	495.54	139.33	13.8820	8.25	8.35

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
475	2	2	2	2	2	2	1	0	454.04	137.65	12.8160	7.95	7.25
476	2	2	2	2	2	2	2	0	464.36	139.61	13.2760	8.25	8.05
477	2	2	2	2	2	3	1	0	456.06	138.19	12.6690	7.80	8.00
478	2	2	2	2	2	3	2	0	466.38	140.15	13.1290	8.10	8.80
479	2	2	2	2	2	4	1	0	454.11	136.98	12.7110	7.80	8.00
480	2	2	2	2	2	4	2	0	464.44	138.94	13.1710	8.10	8.80
481	2	2	2	3	1	1	1	0	486.52	135.42	13.9380	7.95	7.85
482	2	2	2	3	1	1	2	0	496.84	137.38	14.3980	8.25	8.65
483	2	2	2	3	1	2	1	0	455.34	135.70	13.3320	7.95	7.55
484	2	2	2	3	1	2	2	0	465.66	137.66	13.7920	8.25	8.35
485	2	2	2	3	1	3	1	0	457.36	136.24	13.1850	7.80	8.30
486	2	2	2	3	1	3	2	0	467.68	138.20	13.6450	8.10	9.10
487	2	2	2	3	1	4	1	0	455.42	135.03	13.2270	7.80	8.30
488	2	2	2	3	1	4	2	0	465.74	136.99	13.6870	8.10	9.10
489	2	2	2	3	2	1	1	0	489.31	137.38	13.9230	7.95	7.55
490	2	2	2	3	2	1	2	0	499.64	139.34	14.3830	8.25	8.35
491	2	2	2	3	2	2	1	0	458.14	137.66	13.3170	7.95	7.25
492	2	2	2	3	2	2	2	0	468.46	139.62	13.7770	8.25	8.05
493	2	2	2	3	2	3	1	0	460.16	138.20	13.1700	7.80	8.00
494	2	2	2	3	2	3	2	0	470.48	140.16	13.6300	8.10	8.80

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
495	2	2	2	3	2	4	1	0	458.21	136.99	13.2120	7.80	8.00
496	2	2	2	3	2	4	2	0	468.54	138.95	13.6720	8.10	8.80
497	2	2	2	4	1	1	1	0	484.33	135.91	13.3850	7.95	7.95
498	2	2	2	4	1	1	2	0	494.65	137.87	13.8450	8.25	8.75
499	2	2	2	4	1	2	1	0	453.15	136.19	12.7790	7.95	7.65
500	2	2	2	4	1	2	2	0	463.47	138.15	13.2390	8.25	8.45
501	2	2	2	4	1	3	1	0	455.17	136.73	12.6320	7.80	8.40
502	2	2	2	4	1	3	2	0	465.49	138.69	13.0920	8.10	9.20
503	2	2	2	4	1	4	1	0	453.22	135.52	12.6740	7.80	8.40
504	2	2	2	4	1	4	2	0	463.55	137.48	13.1340	8.10	9.20
505	2	2	2	4	2	1	1	0	487.12	137.87	13.3700	7.95	7.65
506	2	2	2	4	2	1	2	0	497.45	139.83	13.8300	8.25	8.45
507	2	2	2	4	2	2	1	0	455.95	138.15	12.7640	7.95	7.35
508	2	2	2	4	2	2	2	0	466.27	140.11	13.2240	8.25	8.15
509	2	2	2	4	2	3	1	0	457.97	138.69	12.6170	7.80	8.10
510	2	2	2	4	2	3	2	0	468.29	140.65	13.0770	8.10	8.90
511	2	2	2	4	2	4	1	0	456.02	137.48	12.6590	7.80	8.10
512	2	2	2	4	2	4	2	0	466.34	139.44	13.1190	8.10	8.90
513	3	1	1	1	1	1	1	0	492.47	134.12	13.5080	7.95	6.75
514	3	1	1	1	1	1	2	0	502.80	136.08	13.9680	8.25	7.55

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
515	3	1	1	1	1	2	1	0	461.30	134.40	12.9020	7.95	6.45
516	3	1	1	1	1	2	2	0	471.62	136.36	13.3620	8.25	7.25
517	3	1	1	1	1	3	1	0	463.32	134.94	12.7550	7.80	7.20
518	3	1	1	1	1	3	2	0	473.64	136.90	13.2150	8.10	8.00
519	3	1	1	1	1	4	1	0	461.37	133.73	12.7970	7.80	7.20
520	3	1	1	1	1	4	2	0	471.70	135.69	13.2570	8.10	8.00
521	3	1	1	1	2	1	1	0	495.27	136.08	13.4930	7.95	6.45
522	3	1	1	1	2	1	2	0	505.59	138.04	13.9530	8.25	7.25
523	3	1	1	1	2	2	1	0	464.09	136.36	12.8870	7.95	6.15
524	3	1	1	1	2	2	2	0	474.42	138.32	13.3470	8.25	6.95
525	3	1	1	1	2	3	1	0	466.12	136.90	12.7400	7.80	6.90
526	3	1	1	1	2	3	2	0	476.44	138.86	13.2000	8.10	7.70
527	3	1	1	1	2	4	1	0	464.17	135.69	12.7820	7.80	6.90
528	3	1	1	1	2	4	2	0	474.49	137.65	13.2420	8.10	7.70
529	3	1	1	2	1	1	1	0	477.66	140.42	13.5040	7.85	7.15
530	3	1	1	2	1	1	2	0	487.98	142.38	13.9640	8.15	7.95
531	3	1	1	2	1	2	1	0	446.48	140.70	12.8980	7.85	6.85
532	3	1	1	2	1	2	2	0	456.81	142.66	13.3580	8.15	7.65
533	3	1	1	2	1	3	1	0	448.50	141.24	12.7510	7.70	7.60
534	3	1	1	2	1	3	2	0	458.83	143.20	13.2110	8.00	8.40

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
535	3	1	1	2	1	4	1	0	446.56	140.03	12.7930	7.70	7.60
536	3	1	1	2	1	4	2	0	456.88	141.99	13.2530	8.00	8.40
537	3	1	1	2	2	1	1	0	480.46	142.38	13.4890	7.85	6.85
538	3	1	1	2	2	1	2	0	490.78	144.34	13.9490	8.15	7.65
539	3	1	1	2	2	2	1	0	449.28	142.66	12.8830	7.85	6.55
540	3	1	1	2	2	2	2	0	459.60	144.62	13.3430	8.15	7.35
541	3	1	1	2	2	3	1	0	451.30	143.20	12.7360	7.70	7.30
542	3	1	1	2	2	3	2	0	461.62	145.16	13.1960	8.00	8.10
543	3	1	1	2	2	4	1	0	449.35	141.99	12.7780	7.70	7.30
544	3	1	1	2	2	4	2	0	459.68	143.95	13.2380	8.00	8.10
545	3	1	1	3	1	1	1	0	481.76	140.43	14.0050	7.85	7.15
546	3	1	1	3	1	1	2	0	492.08	142.39	14.4650	8.15	7.95
547	3	1	1	3	1	2	1	0	450.58	140.71	13.3990	7.85	6.85
548	3	1	1	3	1	2	2	0	460.90	142.67	13.8590	8.15	7.65
549	3	1	1	3	1	3	1	0	452.60	141.25	13.2520	7.70	7.60
550	3	1	1	3	1	3	2	0	462.93	143.21	13.7120	8.00	8.40
551	3	1	1	3	1	4	1	0	450.66	140.04	13.2940	7.70	7.60
552	3	1	1	3	1	4	2	0	460.98	142.00	13.7540	8.00	8.40
553	3	1	1	3	2	1	1	0	484.55	142.39	13.9900	7.85	6.85
554	3	1	1	3	2	1	2	0	494.88	144.35	14.4500	8.15	7.65

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
555	3	1	1	3	2	2	1	0	453.38	142.67	13.3840	7.85	6.55
556	3	1	1	3	2	2	2	0	463.70	144.63	13.8440	8.15	7.35
557	3	1	1	3	2	3	1	0	455.40	143.21	13.2370	7.70	7.30
558	3	1	1	3	2	3	2	0	465.72	145.17	13.6970	8.00	8.10
559	3	1	1	3	2	4	1	0	453.45	142.00	13.2790	7.70	7.30
560	3	1	1	3	2	4	2	0	463.78	143.96	13.7390	8.00	8.10
561	3	1	1	4	1	1	1	0	479.57	140.92	13.4520	7.85	7.25
562	3	1	1	4	1	1	2	0	489.89	142.88	13.9120	8.15	8.05
563	3	1	1	4	1	2	1	0	448.39	141.20	12.8460	7.85	6.95
564	3	1	1	4	1	2	2	0	458.71	143.16	13.3060	8.15	7.75
565	3	1	1	4	1	3	1	0	450.41	141.74	12.6990	7.70	7.70
566	3	1	1	4	1	3	2	0	460.73	143.70	13.1590	8.00	8.50
567	3	1	1	4	1	4	1	0	448.46	140.53	12.7410	7.70	7.70
568	3	1	1	4	1	4	2	0	458.79	142.49	13.2010	8.00	8.50
569	3	1	1	4	2	1	1	0	482.36	142.88	13.4370	7.85	6.95
570	3	1	1	4	2	1	2	0	492.69	144.84	13.8970	8.15	7.75
571	3	1	1	4	2	2	1	0	451.19	143.16	12.8310	7.85	6.65
572	3	1	1	4	2	2	2	0	461.51	145.12	13.2910	8.15	7.45
573	3	1	1	4	2	3	1	0	453.21	143.70	12.6840	7.70	7.40
574	3	1	1	4	2	3	2	0	463.53	145.66	13.1440	8.00	8.20

NO	MODULE. A	B	C	D	E	F	G	H	COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
575	3	1	1	4	2	4	1	0	451.26	142.49	12.7260	7.70	7.40
576	3	1	1	4	2	4	2	0	461.58	144.45	13.1860	8.00	8.20
577	3	1	2	1	1	1	1	0	492.89	134.84	13.6080	7.85	6.80
578	3	1	2	1	1	1	2	0	503.21	136.80	14.0680	8.15	7.60
579	3	1	2	1	1	2	1	0	461.71	135.12	13.0020	7.85	6.50
580	3	1	2	1	1	2	2	0	472.04	137.08	13.4620	8.15	7.30
581	3	1	2	1	1	3	1	0	463.73	135.66	12.8550	7.70	7.25
582	3	1	2	1	1	3	2	0	474.06	137.62	13.3150	8.00	8.05
583	3	1	2	1	1	4	1	0	461.79	134.45	12.8970	7.70	7.25
584	3	1	2	1	1	4	2	0	472.11	136.41	13.3570	8.00	8.05
585	3	1	2	1	2	1	1	0	495.69	136.80	13.5930	7.85	6.50
586	3	1	2	1	2	1	2	0	506.01	138.76	14.0530	8.15	7.30
587	3	1	2	1	2	2	1	0	464.51	137.08	12.9870	7.85	6.20
588	3	1	2	1	2	2	2	0	474.83	139.04	13.4470	8.15	7.00
589	3	1	2	1	2	3	1	0	466.53	137.62	12.8400	7.70	6.95
590	3	1	2	1	2	3	2	0	476.85	139.58	13.3000	8.00	7.75
591	3	1	2	1	2	4	1	0	464.58	136.41	12.8820	7.70	6.95
592	3	1	2	1	2	4	2	0	474.91	138.37	13.3420	8.00	7.75
593	3	1	2	2	1	1	1	0	478.07	141.14	13.6040	7.75	7.20
594	3	1	2	2	1	1	2	0	488.40	143.10	14.0640	8.05	8.00

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
595	3	1	2	2	1	2	1	0	446.90	141.42	12.9980	7.75	6.90
596	3	1	2	2	1	2	2	0	457.22	143.38	13.4580	8.05	7.70
597	3	1	2	2	1	3	1	0	448.92	141.96	12.8510	7.60	7.65
598	3	1	2	2	1	3	2	0	459.24	143.92	13.3110	7.90	8.45
599	3	1	2	2	1	4	1	0	446.97	140.75	12.8930	7.60	7.65
600	3	1	2	2	1	4	2	0	457.30	142.71	13.3530	7.90	8.45
601	3	1	2	2	2	1	1	0	480.87	143.10	13.5890	7.75	6.90
602	3	1	2	2	2	1	2	0	491.19	145.06	14.0490	8.05	7.70
603	3	1	2	2	2	2	1	0	449.69	143.38	12.9830	7.75	6.60
604	3	1	2	2	2	2	2	0	460.02	145.34	13.4430	8.05	7.40
605	3	1	2	2	2	3	1	0	451.72	143.92	12.8360	7.60	7.35
606	3	1	2	2	2	3	2	0	462.04	145.88	13.2960	7.90	8.15
607	3	1	2	2	2	4	1	0	449.77	142.71	12.8780	7.60	7.35
608	3	1	2	2	2	4	2	0	460.09	144.67	13.3380	7.90	8.15
609	3	1	2	3	1	1	1	0	482.17	141.15	14.1050	7.75	7.20
610	3	1	2	3	1	1	2	0	492.50	143.11	14.5650	8.05	8.00
611	3	1	2	3	1	2	1	0	451.00	141.43	13.4990	7.75	6.90
612	3	1	2	3	1	2	2	0	461.32	143.39	13.9590	8.05	7.70
613	3	1	2	3	1	3	1	0	453.02	141.97	13.3520	7.60	7.65
614	3	1	2	3	1	3	2	0	463.34	143.93	13.8120	7.90	8.45

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
615	3	1	2	3	1	4	1	0	451.07	140.76	13.3940	7.60	7.65
616	3	1	2	3	1	4	2	0	461.39	142.72	13.8540	7.90	8.45
617	3	1	2	3	2	1	1	0	484.97	143.11	14.0900	7.75	6.90
618	3	1	2	3	2	1	2	0	495.29	145.07	14.5500	8.05	7.70
619	3	1	2	3	2	2	1	0	453.79	143.39	13.4840	7.75	6.60
620	3	1	2	3	2	2	2	0	464.12	145.35	13.9440	8.05	7.40
621	3	1	2	3	2	3	1	0	455.81	143.93	13.3370	7.60	7.35
622	3	1	2	3	2	3	2	0	466.14	145.89	13.7970	7.90	8.15
623	3	1	2	3	2	4	1	0	453.87	142.72	13.3790	7.60	7.35
624	3	1	2	3	2	4	2	0	464.19	144.68	13.8390	7.90	8.15
625	3	1	2	4	1	1	1	0	479.98	141.64	13.5520	7.75	7.30
626	3	1	2	4	1	1	2	0	490.30	143.60	14.0120	8.05	8.10
627	3	1	2	4	1	2	1	0	448.80	141.92	12.9460	7.75	7.00
628	3	1	2	4	1	2	2	0	459.13	143.88	13.4060	8.05	7.80
629	3	1	2	4	1	3	1	0	450.83	142.46	12.7990	7.60	7.75
630	3	1	2	4	1	3	2	0	461.15	144.42	13.2590	7.90	8.55
631	3	1	2	4	1	4	1	0	448.88	141.25	12.8410	7.60	7.75
632	3	1	2	4	1	4	2	0	459.20	143.21	13.3010	7.90	8.55
633	3	1	2	4	2	1	1	0	482.78	143.60	13.5370	7.75	7.00
634	3	1	2	4	2	1	2	0	493.10	145.56	13.9970	8.05	7.80

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
635	3	1	2	4	2	2	1	0	451.60	143.88	12.9310	7.75	6.70
636	3	1	2	4	2	2	2	0	461.92	145.84	13.3910	8.05	7.50
637	3	1	2	4	2	3	1	0	453.62	144.42	12.7840	7.60	7.45
638	3	1	2	4	2	3	2	0	463.95	146.38	13.2440	7.90	8.25
639	3	1	2	4	2	4	1	0	451.68	143.21	12.8260	7.60	7.45
640	3	1	2	4	2	4	2	0	462.00	145.17	13.2860	7.90	8.25
641	3	2	1	1	1	1	1	0	497.68	128.99	13.3610	8.35	6.90
642	3	2	1	1	1	1	2	0	508.01	130.95	13.8210	8.65	7.70
643	3	2	1	1	1	2	1	0	466.51	129.27	12.7550	8.35	6.60
644	3	2	1	1	1	2	2	0	476.83	131.23	13.2150	8.65	7.40
645	3	2	1	1	1	3	1	0	468.53	129.81	12.6080	8.20	7.35
646	3	2	1	1	1	3	2	0	478.85	131.77	13.0680	8.50	8.15
647	3	2	1	1	1	4	1	0	466.58	128.60	12.6500	8.20	7.35
648	3	2	1	1	1	4	2	0	476.91	130.56	13.1100	8.50	8.15
649	3	2	1	1	2	1	1	0	500.48	130.95	13.3460	8.35	6.60
650	3	2	1	1	2	1	2	0	510.80	132.91	13.8060	8.65	7.40
651	3	2	1	1	2	2	1	0	469.30	131.23	12.7400	8.35	6.30
652	3	2	1	1	2	2	2	0	479.63	133.19	13.2000	8.65	7.10
653	3	2	1	1	2	3	1	0	471.32	131.77	12.5930	8.20	7.05
654	3	2	1	1	2	3	2	0	481.65	133.73	13.0530	8.50	7.85

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
655	3	2	1	1	2	4	1	0	469.38	130.56	12.6350	8.20	7.05
656	3	2	1	1	2	4	2	0	479.70	132.52	13.0950	8.50	7.85
657	3	2	1	2	1	1	1	0	482.87	135.29	13.3570	8.25	7.30
658	3	2	1	2	1	1	2	0	493.19	137.25	13.8170	8.55	8.10
659	3	2	1	2	1	2	1	0	451.69	135.57	12.7510	8.25	7.00
660	3	2	1	2	1	2	2	0	462.02	137.53	13.2110	8.55	7.80
661	3	2	1	2	1	3	1	0	453.71	136.11	12.6040	8.10	7.75
662	3	2	1	2	1	3	2	0	464.04	138.07	13.0640	8.40	8.55
663	3	2	1	2	1	4	1	0	451.77	134.90	12.6460	8.10	7.75
664	3	2	1	2	1	4	2	0	462.09	136.86	13.1060	8.40	8.55
665	3	2	1	2	2	1	1	0	485.67	137.25	13.3420	8.25	7.00
666	3	2	1	2	2	1	2	0	495.99	139.21	13.8020	8.55	7.80
667	3	2	1	2	2	2	1	0	454.49	137.53	12.7360	8.25	6.70
668	3	2	1	2	2	2	2	0	464.81	139.49	13.1960	8.55	7.50
669	3	2	1	2	2	3	1	0	456.51	138.07	12.5890	8.10	7.45
670	3	2	1	2	2	3	2	0	466.83	140.03	13.0490	8.40	8.25
671	3	2	1	2	2	4	1	0	454.56	136.86	12.6310	8.10	7.45
672	3	2	1	2	2	4	2	0	464.89	138.82	13.0910	8.40	8.25
673	3	2	1	3	1	1	1	0	486.97	135.30	13.8580	8.25	7.30
674	3	2	1	3	1	1	2	0	497.29	137.26	14.3180	8.55	8.10

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
675	3	2	1	3	1	2	1	0	455.79	135.58	13.2520	8.25	7.00
676	3	2	1	3	1	2	2	0	466.11	137.54	13.7120	8.55	7.80
677	3	2	1	3	1	3	1	0	457.81	136.12	13.1050	8.10	7.75
678	3	2	1	3	1	3	2	0	468.14	138.08	13.5650	8.40	8.55
679	3	2	1	3	1	4	1	0	455.87	134.91	13.1470	8.10	7.75
680	3	2	1	3	1	4	2	0	466.19	136.87	13.6070	8.40	8.55
681	3	2	1	3	2	1	1	0	489.76	137.26	13.8430	8.25	7.00
682	3	2	1	3	2	1	2	0	500.09	139.22	14.3030	8.55	7.80
683	3	2	1	3	2	2	1	0	458.59	137.54	13.2370	8.25	6.70
684	3	2	1	3	2	2	2	0	468.91	139.50	13.6970	8.55	7.50
685	3	2	1	3	2	3	1	0	460.61	138.08	13.0900	8.10	7.45
686	3	2	1	3	2	3	2	0	470.93	140.04	13.5500	8.40	8.25
687	3	2	1	3	2	4	1	0	458.66	136.87	13.1320	8.10	7.45
688	3	2	1	3	2	4	2	0	468.99	138.83	13.5920	8.40	8.25
689	3	2	1	4	1	1	1	0	484.78	135.79	13.3050	8.25	7.40
690	3	2	1	4	1	1	2	0	495.10	137.75	13.7650	8.55	8.20
691	3	2	1	4	1	2	1	0	453.60	136.07	12.6990	8.25	7.10
692	3	2	1	4	1	2	2	0	463.92	138.03	13.1590	8.55	7.90
693	3	2	1	4	1	3	1	0	455.62	136.61	12.5520	8.10	7.85
694	3	2	1	4	1	3	2	0	465.94	138.57	13.0120	8.40	8.65

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
695	3	2	1	4	1	4	1	0	453.67	135.40	12.5940	8.10	7.85
696	3	2	1	4	1	4	2	0	464.00	137.36	13.0540	8.40	8.65
697	3	2	1	4	2	1	1	0	487.57	137.75	13.2900	8.25	7.10
698	3	2	1	4	2	1	2	0	497.90	139.71	13.7500	8.55	7.90
699	3	2	1	4	2	2	1	0	456.40	138.03	12.6840	8.25	6.80
700	3	2	1	4	2	2	2	0	466.72	139.99	13.1440	8.55	7.60
701	3	2	1	4	2	3	1	0	458.42	138.57	12.5370	8.10	7.55
702	3	2	1	4	2	3	2	0	468.74	140.53	12.9970	8.40	8.35
703	3	2	1	4	2	4	1	0	456.47	137.36	12.5790	8.10	7.55
704	3	2	1	4	2	4	2	0	466.79	139.32	13.0390	8.40	8.35
705	3	2	2	1	1	1	1	0	498.10	129.71	13.4610	8.25	6.95
706	3	2	2	1	1	1	2	0	508.42	131.67	13.9210	8.55	7.75
707	3	2	2	1	1	2	1	0	466.92	129.99	12.8550	8.25	6.65
708	3	2	2	1	1	2	2	0	477.24	131.95	13.3150	8.55	7.45
709	3	2	2	1	1	3	1	0	468.94	130.53	12.7080	8.10	7.40
710	3	2	2	1	1	3	2	0	479.27	132.49	13.1680	8.40	8.20
711	3	2	2	1	1	4	1	0	467.00	129.32	12.7500	8.10	7.40
712	3	2	2	1	1	4	2	0	477.32	131.28	13.2100	8.40	8.20
713	3	2	2	1	2	1	1	0	500.89	131.67	13.4460	8.25	6.65
714	3	2	2	1	2	1	2	0	511.22	133.63	13.9060	8.55	7.45

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
715	3	2	2	1	2	2	1	0	469.72	131.95	12.8400	8.25	6.35
716	3	2	2	1	2	2	2	0	480.04	133.91	13.3000	8.55	7.15
717	3	2	2	1	2	3	1	0	471.74	132.49	12.6930	8.10	7.10
718	3	2	2	1	2	3	2	0	482.06	134.45	13.1530	8.40	7.90
719	3	2	2	1	2	4	1	0	469.79	131.28	12.7350	8.10	7.10
720	3	2	2	1	2	4	2	0	480.12	133.24	13.1950	8.40	7.90
721	3	2	2	2	1	1	1	0	483.28	136.01	13.4570	8.15	7.35
722	3	2	2	2	1	1	2	0	493.61	137.97	13.9170	8.45	8.15
723	3	2	2	2	1	2	1	0	452.11	136.29	12.8510	8.15	7.05
724	3	2	2	2	1	2	2	0	462.43	138.25	13.3110	8.45	7.85
725	3	2	2	2	1	3	1	0	454.13	136.83	12.7040	8.00	7.80
726	3	2	2	2	1	3	2	0	464.45	138.79	13.1640	8.30	8.60
727	3	2	2	2	1	4	1	0	452.18	135.62	12.7460	8.00	7.80
728	3	2	2	2	1	4	2	0	462.51	137.58	13.2060	8.30	8.60
729	3	2	2	2	2	1	1	0	486.08	137.97	13.4420	8.15	7.05
730	3	2	2	2	2	1	2	0	496.40	139.93	13.9020	8.45	7.85
731	3	2	2	2	2	2	1	0	454.90	138.25	12.8360	8.15	6.75
732	3	2	2	2	2	2	2	0	465.23	140.21	13.2960	8.45	7.55
733	3	2	2	2	2	3	1	0	456.93	138.79	12.6890	8.00	7.50
734	3	2	2	2	2	3	2	0	467.25	140.75	13.1490	8.30	8.30

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
735	3	2	2	2	2	4	1	0	454.98	137.58	12.7310	8.00	7.50
736	3	2	2	2	2	4	2	0	465.30	139.54	13.1910	8.30	8.30
737	3	2	2	3	1	1	1	0	487.38	136.02	13.9580	8.15	7.35
738	3	2	2	3	1	1	2	0	497.70	137.98	14.4180	8.45	8.15
739	3	2	2	3	1	2	1	0	456.21	136.30	13.3520	8.15	7.05
740	3	2	2	3	1	2	2	0	466.53	138.26	13.8120	8.45	7.85
741	3	2	2	3	1	3	1	0	458.23	136.84	13.2050	8.00	7.80
742	3	2	2	3	1	3	2	0	468.55	138.80	13.6650	8.30	8.60
743	3	2	2	3	1	4	1	0	456.28	135.63	13.2470	8.00	7.80
744	3	2	2	3	1	4	2	0	466.60	137.59	13.7070	8.30	8.60
745	3	2	2	3	2	1	1	0	490.18	137.98	13.9430	8.15	7.05
746	3	2	2	3	2	1	2	0	500.50	139.94	14.4030	8.45	7.85
747	3	2	2	3	2	2	1	0	459.00	138.26	13.3370	8.15	6.75
748	3	2	2	3	2	2	2	0	469.33	140.22	13.7970	8.45	7.55
749	3	2	2	3	2	3	1	0	461.02	138.80	13.1900	8.00	7.50
750	3	2	2	3	2	3	2	0	471.35	140.76	13.6500	8.30	8.30
751	3	2	2	3	2	4	1	0	459.08	137.59	13.2320	8.00	7.50
752	3	2	2	3	2	4	2	0	469.40	139.55	13.6920	8.30	8.30
753	3	2	2	4	1	1	1	0	485.19	136.51	13.4050	8.15	7.45
754	3	2	2	4	1	1	2	0	495.51	138.47	13.8650	8.45	8.25

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
755	3	2	2	4	1	2	1	0	454.01	136.79	12.7990	8.15	7.15
756	3	2	2	4	1	2	2	0	464.34	138.75	13.2590	8.45	7.95
757	3	2	2	4	1	3	1	0	456.03	137.33	12.6520	8.00	7.90
758	3	2	2	4	1	3	2	0	466.36	139.29	13.1120	8.30	8.70
759	3	2	2	4	1	4	1	0	454.09	136.12	12.6940	8.00	7.90
760	3	2	2	4	1	4	2	0	464.41	138.08	13.1540	8.30	8.70
761	3	2	2	4	2	1	1	0	487.99	138.47	13.3900	8.15	7.15
762	3	2	2	4	2	1	2	0	498.31	140.43	13.8500	8.45	7.95
763	3	2	2	4	2	2	1	0	456.81	138.75	12.7840	8.15	6.85
764	3	2	2	4	2	2	2	0	467.13	140.71	13.2440	8.45	7.65
765	3	2	2	4	2	3	1	0	458.83	139.29	12.6370	8.00	7.60
766	3	2	2	4	2	3	2	0	469.15	141.25	13.0970	8.30	8.40
767	3	2	2	4	2	4	1	0	456.89	138.08	12.6790	8.00	7.60
768	3	2	2	4	2	4	2	0	467.21	140.04	13.1390	8.30	8.40
769	4	1	1	1	1	1	1	0	491.45	118.02	12.0600	8.35	6.50
770	4	1	1	1	1	1	2	0	501.77	119.98	12.5200	8.65	7.30
771	4	1	1	1	1	2	1	0	460.27	118.30	11.4540	8.35	6.20
772	4	1	1	1	1	2	2	0	470.60	120.26	11.9140	8.65	7.00
773	4	1	1	1	1	3	1	0	462.30	118.84	11.3070	8.20	6.95
774	4	1	1	1	1	3	2	0	472.62	120.80	11.7670	8.50	7.75

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
775	4	1	1	1	1	4	1	0	460.35	117.63	11.3490	8.20	6.95
776	4	1	1	1	1	4	2	0	470.67	119.59	11.8090	8.50	7.75
777	4	1	1	1	2	1	1	0	494.25	119.98	12.0450	8.35	6.20
778	4	1	1	1	2	1	2	0	504.57	121.94	12.5050	8.65	7.00
779	4	1	1	1	2	2	1	0	463.07	120.26	11.4390	8.35	5.90
780	4	1	1	1	2	2	2	0	473.40	122.22	11.8990	8.65	6.70
781	4	1	1	1	2	3	1	0	465.09	120.80	11.2920	8.20	6.65
782	4	1	1	1	2	3	2	0	475.42	122.76	11.7520	8.50	7.45
783	4	1	1	1	2	4	1	0	463.15	119.59	11.3340	8.20	6.65
784	4	1	1	1	2	4	2	0	473.47	121.55	11.7940	8.50	7.45
785	4	1	1	2	1	1	1	0	476.64	124.32	12.0560	8.25	6.90
786	4	1	1	2	1	1	2	0	486.96	126.28	12.5160	8.55	7.70
787	4	1	1	2	1	2	1	0	445.46	124.60	11.4500	8.25	6.60
788	4	1	1	2	1	2	2	0	455.78	126.56	11.9100	8.55	7.40
789	4	1	1	2	1	3	1	0	447.48	125.14	11.3030	8.10	7.35
790	4	1	1	2	1	3	2	0	457.81	127.10	11.7630	8.40	8.15
791	4	1	1	2	1	4	1	0	445.54	123.93	11.3450	8.10	7.35
792	4	1	1	2	1	4	2	0	455.86	125.89	11.8050	8.40	8.15
793	4	1	1	2	2	1	1	0	479.43	126.28	12.0410	8.25	6.60
794	4	1	1	2	2	1	2	0	489.76	128.24	12.5010	8.55	7.40

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
795	4	1	1	2	2	2	1	0	448.26	126.56	11.4350	8.25	6.30
796	4	1	1	2	2	2	2	0	458.58	128.52	11.8950	8.55	7.10
797	4	1	1	2	2	3	1	0	450.28	127.10	11.2880	8.10	7.05
798	4	1	1	2	2	3	2	0	460.60	129.06	11.7480	8.40	7.85
799	4	1	1	2	2	4	1	0	448.33	125.89	11.3300	8.10	7.05
800	4	1	1	2	2	4	2	0	458.66	127.85	11.7900	8.40	7.85
801	4	1	1	3	1	1	1	0	480.73	124.33	12.5570	8.25	6.90
802	4	1	1	3	1	1	2	0	491.06	126.29	13.0170	8.55	7.70
803	4	1	1	3	1	2	1	0	449.56	124.61	11.9510	8.25	6.60
804	4	1	1	3	1	2	2	0	459.88	126.57	12.4110	8.55	7.40
805	4	1	1	3	1	3	1	0	451.58	125.15	11.8040	8.10	7.35
806	4	1	1	3	1	3	2	0	461.90	127.11	12.2640	8.40	8.15
807	4	1	1	3	1	4	1	0	449.63	123.94	11.8460	8.10	7.35
808	4	1	1	3	1	4	2	0	459.96	125.90	12.3060	8.40	8.15
809	4	1	1	3	2	1	1	0	483.53	126.29	12.5420	8.25	6.60
810	4	1	1	3	2	1	2	0	493.86	128.25	13.0020	8.55	7.40
811	4	1	1	3	2	2	1	0	452.36	126.57	11.9360	8.25	6.30
812	4	1	1	3	2	2	2	0	462.68	128.53	12.3960	8.55	7.10
813	4	1	1	3	2	3	1	0	454.38	127.11	11.7890	8.10	7.05
814	4	1	1	3	2	3	2	0	464.70	129.07	12.2490	8.40	7.85

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
815	4	1	1	3	2	4	1	0	452.43	125.90	11.8310	8.10	7.05
816	4	1	1	3	2	4	2	0	462.75	127.86	12.2910	8.40	7.85
817	4	1	1	4	1	1	1	0	478.54	124.82	12.0040	8.25	7.00
818	4	1	1	4	1	1	2	0	488.87	126.78	12.4640	8.55	7.80
819	4	1	1	4	1	2	1	0	447.37	125.10	11.3980	8.25	6.70
820	4	1	1	4	1	2	2	0	457.69	127.06	11.8580	8.55	7.50
821	4	1	1	4	1	3	1	0	449.39	125.64	11.2510	8.10	7.45
822	4	1	1	4	1	3	2	0	459.71	127.60	11.7110	8.40	8.25
823	4	1	1	4	1	4	1	0	447.44	124.43	11.2930	8.10	7.45
824	4	1	1	4	1	4	2	0	457.76	126.39	11.7530	8.40	8.25
825	4	1	1	4	2	1	1	0	481.34	126.78	11.9890	8.25	6.70
826	4	1	1	4	2	1	2	0	491.66	128.74	12.4490	8.55	7.50
827	4	1	1	4	2	2	1	0	450.16	127.06	11.3830	8.25	6.40
828	4	1	1	4	2	2	2	0	460.49	129.02	11.8430	8.55	7.20
829	4	1	1	4	2	3	1	0	452.19	127.60	11.2360	8.10	7.15
830	4	1	1	4	2	3	2	0	462.51	129.56	11.6960	8.40	7.95
831	4	1	1	4	2	4	1	0	450.24	126.39	11.2780	8.10	7.15
832	4	1	1	4	2	4	2	0	460.56	128.35	11.7380	8.40	7.95
833	4	1	2	1	1	1	1	0	491.87	118.74	12.1600	8.25	6.55
834	4	1	2	1	1	1	2	0	502.19	120.70	12.6200	8.55	7.35

NO	MODULE. A	B	C	D	E	F	G	H	COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
835	4	1	2	1	1	2	1	0	460.69	119.02	11.5540	8.25	6.25
836	4	1	2	1	1	2	2	0	471.01	120.98	12.0140	8.55	7.05
837	4	1	2	1	1	3	1	0	462.71	119.56	11.4070	8.10	7.00
838	4	1	2	1	1	3	2	0	473.03	121.52	11.8670	8.40	7.80
839	4	1	2	1	1	4	1	0	460.76	118.35	11.4490	8.10	7.00
840	4	1	2	1	1	4	2	0	471.09	120.31	11.9090	8.40	7.80
841	4	1	2	1	2	1	1	0	494.66	120.70	12.1450	8.25	6.25
842	4	1	2	1	2	1	2	0	504.99	122.66	12.6050	8.55	7.05
843	4	1	2	1	2	2	1	0	463.49	120.98	11.5390	8.25	5.95
844	4	1	2	1	2	2	2	0	473.81	122.94	11.9990	8.55	6.75
845	4	1	2	1	2	3	1	0	465.51	121.52	11.3920	8.10	6.70
846	4	1	2	1	2	3	2	0	475.83	123.48	11.8520	8.40	7.50
847	4	1	2	1	2	4	1	0	463.56	120.31	11.4340	8.10	6.70
848	4	1	2	1	2	4	2	0	473.88	122.27	11.8940	8.40	7.50
849	4	1	2	2	1	1	1	0	477.05	125.04	12.1560	8.15	6.95
850	4	1	2	2	1	1	2	0	487.37	127.00	12.6160	8.45	7.75
851	4	1	2	2	1	2	1	0	445.88	125.32	11.5500	8.15	6.65
852	4	1	2	2	1	2	2	0	456.20	127.28	12.0100	8.45	7.45
853	4	1	2	2	1	3	1	0	447.90	125.86	11.4030	8.00	7.40
854	4	1	2	2	1	3	2	0	458.22	127.82	11.8630	8.30	8.20

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
855	4	1	2	2	1	4	1	0	445.95	124.65	11.4450	8.00	7.40
856	4	1	2	2	1	4	2	0	456.27	126.61	11.9050	8.30	8.20
857	4	1	2	2	2	1	1	0	479.85	127.00	12.1410	8.15	6.65
858	4	1	2	2	2	1	2	0	490.17	128.96	12.6010	8.45	7.45
859	4	1	2	2	2	2	1	0	448.67	127.28	11.5350	8.15	6.35
860	4	1	2	2	2	2	2	0	459.00	129.24	11.9950	8.45	7.15
861	4	1	2	2	2	3	1	0	450.69	127.82	11.3880	8.00	7.10
862	4	1	2	2	2	3	2	0	461.02	129.78	11.8480	8.30	7.90
863	4	1	2	2	2	4	1	0	448.75	126.61	11.4300	8.00	7.10
864	4	1	2	2	2	4	2	0	459.07	128.57	11.8900	8.30	7.90
865	4	1	2	3	1	1	1	0	481.15	125.05	12.6570	8.15	6.95
866	4	1	2	3	1	1	2	0	491.47	127.01	13.1170	8.45	7.75
867	4	1	2	3	1	2	1	0	449.97	125.33	12.0510	8.15	6.65
868	4	1	2	3	1	2	2	0	460.30	127.29	12.5110	8.45	7.45
869	4	1	2	3	1	3	1	0	451.99	125.87	11.9040	8.00	7.40
870	4	1	2	3	1	3	2	0	462.32	127.83	12.3640	8.30	8.20
871	4	1	2	3	1	4	1	0	450.05	124.66	11.9460	8.00	7.40
872	4	1	2	3	1	4	2	0	460.37	126.62	12.4060	8.30	8.20
873	4	1	2	3	2	1	1	0	483.95	127.01	12.6420	8.15	6.65
874	4	1	2	3	2	1	2	0	494.27	128.97	13.1020	8.45	7.45

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
875	4	1	2	3	2	2	1	0	452.77	127.29	12.0360	8.15	6.35
876	4	1	2	3	2	2	2	0	463.09	129.25	12.4960	8.45	7.15
877	4	1	2	3	2	3	1	0	454.79	127.83	11.8890	8.00	7.10
878	4	1	2	3	2	3	2	0	465.11	129.79	12.3490	8.30	7.90
879	4	1	2	3	2	4	1	0	452.84	126.62	11.9310	8.00	7.10
880	4	1	2	3	2	4	2	0	463.17	128.58	12.3910	8.30	7.90
881	4	1	2	4	1	1	1	0	478.96	125.54	12.1040	8.15	7.05
882	4	1	2	4	1	1	2	0	489.28	127.50	12.5640	8.45	7.85
883	4	1	2	4	1	2	1	0	447.78	125.82	11.4980	8.15	6.75
884	4	1	2	4	1	2	2	0	458.10	127.78	11.9580	8.45	7.55
885	4	1	2	4	1	3	1	0	449.80	126.36	11.3510	8.00	7.50
886	4	1	2	4	1	3	2	0	460.13	128.32	11.8110	8.30	8.30
887	4	1	2	4	1	4	1	0	447.86	125.15	11.3930	8.00	7.50
888	4	1	2	4	1	4	2	0	458.18	127.11	11.8530	8.30	8.30
889	4	1	2	4	2	1	1	0	481.75	127.50	12.0890	8.15	6.75
890	4	1	2	4	2	1	2	0	492.08	129.46	12.5490	8.45	7.55
891	4	1	2	4	2	2	1	0	450.58	127.78	11.4830	8.15	6.45
892	4	1	2	4	2	2	2	0	460.90	129.74	11.9430	8.45	7.25
893	4	1	2	4	2	3	1	0	452.60	128.32	11.3360	8.00	7.20
894	4	1	2	4	2	3	2	0	462.92	130.28	11.7960	8.30	8.00

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
895	4	1	2	4	2	4	1	0	450.65	127.11	11.3780	8.00	7.20
896	4	1	2	4	2	4	2	0	460.98	129.07	11.8380	8.30	8.00
897	4	2	1	1	1	1	1	0	496.66	112.89	11.9130	8.75	6.65
898	4	2	1	1	1	1	2	0	506.98	114.85	12.3730	9.05	7.45
899	4	2	1	1	1	2	1	0	465.48	113.17	11.3070	8.75	6.35
900	4	2	1	1	1	2	2	0	475.81	115.13	11.7670	9.05	7.15
901	4	2	1	1	1	3	1	0	467.51	113.71	11.1600	8.60	7.10
902	4	2	1	1	1	3	2	0	477.83	115.67	11.6200	8.90	7.90
903	4	2	1	1	1	4	1	0	465.56	112.50	11.2020	8.60	7.10
904	4	2	1	1	1	4	2	0	475.88	114.46	11.6620	8.90	7.90
905	4	2	1	1	2	1	1	0	499.46	114.85	11.8980	8.75	6.35
906	4	2	1	1	2	1	2	0	509.78	116.81	12.3580	9.05	7.15
907	4	2	1	1	2	2	1	0	468.28	115.13	11.2920	8.75	6.05
908	4	2	1	1	2	2	2	0	478.60	117.09	11.7520	9.05	6.85
909	4	2	1	1	2	3	1	0	470.30	115.67	11.1450	8.60	6.80
910	4	2	1	1	2	3	2	0	480.63	117.63	11.6050	8.90	7.60
911	4	2	1	1	2	4	1	0	468.36	114.46	11.1870	8.60	6.80
912	4	2	1	1	2	4	2	0	478.68	116.42	11.6470	8.90	7.60
913	4	2	1	2	1	1	1	0	481.85	119.19	11.9090	8.65	7.05
914	4	2	1	2	1	1	2	0	492.17	121.15	12.3690	8.95	7.85

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
915	4	2	1	2	1	2	1	0	450.67	119.47	11.3030	8.65	6.75
916	4	2	1	2	1	2	2	0	460.99	121.43	11.7630	8.95	7.55
917	4	2	1	2	1	3	1	0	452.69	120.01	11.1560	8.50	7.50
918	4	2	1	2	1	3	2	0	463.01	121.97	11.6160	8.80	8.30
919	4	2	1	2	1	4	1	0	450.74	118.80	11.1980	8.50	7.50
920	4	2	1	2	1	4	2	0	461.07	120.76	11.6580	8.80	8.30
921	4	2	1	2	2	1	1	0	484.64	121.15	11.8940	8.65	6.75
922	4	2	1	2	2	1	2	0	494.97	123.11	12.3540	8.95	7.55
923	4	2	1	2	2	2	1	0	453.47	121.43	11.2880	8.65	6.45
924	4	2	1	2	2	2	2	0	463.79	123.39	11.7480	8.95	7.25
925	4	2	1	2	2	3	1	0	455.49	121.97	11.1410	8.50	7.20
926	4	2	1	2	2	3	2	0	465.81	123.93	11.6010	8.80	8.00
927	4	2	1	2	2	4	1	0	453.54	120.76	11.1830	8.50	7.20
928	4	2	1	2	2	4	2	0	463.87	122.72	11.6430	8.80	8.00
929	4	2	1	3	1	1	1	0	485.94	119.20	12.4100	8.65	7.05
930	4	2	1	3	1	1	2	0	496.27	121.16	12.8700	8.95	7.85
931	4	2	1	3	1	2	1	0	454.77	119.48	11.8040	8.65	6.75
932	4	2	1	3	1	2	2	0	465.09	121.44	12.2640	8.95	7.55
933	4	2	1	3	1	3	1	0	456.79	120.02	11.6570	8.50	7.50
934	4	2	1	3	1	3	2	0	467.11	121.98	12.1170	8.80	8.30

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
955	4	2	1	4	2	2	1	0	455.37	121.93	11.2360	8.65	6.55
956	4	2	1	4	2	2	2	0	465.70	123.89	11.6960	8.95	7.35
957	4	2	1	4	2	3	1	0	457.39	122.47	11.0890	8.50	7.30
958	4	2	1	4	2	3	2	0	467.72	124.43	11.5490	8.80	8.10
959	4	2	1	4	2	4	1	0	455.45	121.26	11.1310	8.50	7.30
960	4	2	1	4	2	4	2	0	465.77	123.22	11.5910	8.80	8.10
961	4	2	2	1	1	1	1	0	497.07	113.61	12.0130	8.65	6.70
962	4	2	2	1	1	1	2	0	507.40	115.57	12.4730	8.95	7.50
963	4	2	2	1	1	2	1	0	465.90	113.89	11.4070	8.65	6.40
964	4	2	2	1	1	2	2	0	476.22	115.85	11.8670	8.95	7.20
965	4	2	2	1	1	3	1	0	467.92	114.43	11.2600	8.50	7.15
966	4	2	2	1	1	3	2	0	478.24	116.39	11.7200	8.80	7.95
967	4	2	2	1	1	4	1	0	465.97	113.22	11.3020	8.50	7.15
968	4	2	2	1	1	4	2	0	476.30	115.18	11.7620	8.80	7.95
969	4	2	2	1	2	1	1	0	499.87	115.57	11.9980	8.65	6.40
970	4	2	2	1	2	1	2	0	510.20	117.53	12.4580	8.95	7.20
971	4	2	2	1	2	2	1	0	468.70	115.85	11.3920	8.65	6.10
972	4	2	2	1	2	2	2	0	479.02	117.81	11.8520	8.95	6.90
973	4	2	2	1	2	3	1	0	470.72	116.39	11.2450	8.50	6.85
974	4	2	2	1	2	3	2	0	481.04	118.35	11.7050	8.80	7.65

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
935	4	2	1	3	1	4	1	0	454.84	118.81	11.6990	8.50	7.50
936	4	2	1	3	1	4	2	0	465.17	120.77	12.1590	8.80	8.30
937	4	2	1	3	2	1	1	0	488.74	121.16	12.3950	8.65	6.75
938	4	2	1	3	2	1	2	0	499.06	123.12	12.8550	8.95	7.55
939	4	2	1	3	2	2	1	0	457.57	121.44	11.7890	8.65	6.45
940	4	2	1	3	2	2	2	0	467.89	123.40	12.2490	8.95	7.25
941	4	2	1	3	2	3	1	0	459.59	121.98	11.6420	8.50	7.20
942	4	2	1	3	2	3	2	0	469.91	123.94	12.1020	8.80	8.00
943	4	2	1	3	2	4	1	0	457.64	120.77	11.6840	8.50	7.20
944	4	2	1	3	2	4	2	0	467.96	122.73	12.1440	8.80	8.00
945	4	2	1	4	1	1	1	0	483.75	119.69	11.8570	8.65	7.15
946	4	2	1	4	1	1	2	0	494.08	121.65	12.3170	8.95	7.95
947	4	2	1	4	1	2	1	0	452.58	119.97	11.2510	8.65	6.85
948	4	2	1	4	1	2	2	0	462.90	121.93	11.7110	8.95	7.65
949	4	2	1	4	1	3	1	0	454.60	120.51	11.1040	8.50	7.60
950	4	2	1	4	1	3	2	0	464.92	122.47	11.5640	8.80	8.40
951	4	2	1	4	1	4	1	0	452.65	119.30	11.1460	8.50	7.60
952	4	2	1	4	1	4	2	0	462.97	121.26	11.6060	8.80	8.40
953	4	2	1	4	2	1	1	0	486.55	121.65	11.8420	8.65	6.85
954	4	2	1	4	2	1	2	0	496.87	123.61	12.3020	8.95	7.65

NO	MODULE.								COST	LABDUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
975	4	2	2	1	2	4	1	0	468.77	115.18	11.2870	8.50	6.85
976	4	2	2	1	2	4	2	0	479.09	117.14	11.7470	8.80	7.65
977	4	2	2	2	1	1	1	0	482.26	119.91	12.0090	8.55	7.10
978	4	2	2	2	1	1	2	0	492.58	121.87	12.4690	8.85	7.90
979	4	2	2	2	1	2	1	0	451.08	120.19	11.4030	8.55	6.80
980	4	2	2	2	1	2	2	0	461.41	122.15	11.8630	8.85	7.60
981	4	2	2	2	1	3	1	0	453.11	120.73	11.2560	8.40	7.55
982	4	2	2	2	1	3	2	0	463.43	122.69	11.7160	8.70	8.35
983	4	2	2	2	1	4	1	0	451.16	119.52	11.2980	8.40	7.55
984	4	2	2	2	1	4	2	0	461.48	121.48	11.7580	8.70	8.35
985	4	2	2	2	2	1	1	0	485.06	121.87	11.9940	8.55	6.80
986	4	2	2	2	2	1	2	0	495.38	123.83	12.4540	8.85	7.60
987	4	2	2	2	2	2	1	0	453.88	122.15	11.3880	8.55	6.50
988	4	2	2	2	2	2	2	0	464.21	124.11	11.8480	8.85	7.30
989	4	2	2	2	2	3	1	0	455.90	122.69	11.2410	8.40	7.25
990	4	2	2	2	2	3	2	0	466.23	124.65	11.7010	8.70	8.05
991	4	2	2	2	2	4	1	0	453.96	121.48	11.2830	8.40	7.25
992	4	2	2	2	2	4	2	0	464.28	123.44	11.7430	8.70	8.05
993	4	2	2	3	1	1	1	0	486.36	119.92	12.5100	8.55	7.10
994	4	2	2	3	1	1	2	0	496.68	121.88	12.9700	8.85	7.90

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
995	4	2	2	3	1	2	1	0	455.18	120.20	11.9040	8.55	6.80
996	4	2	2	3	1	2	2	0	465.51	122.16	12.3640	8.85	7.60
997	4	2	2	3	1	3	1	0	457.20	120.74	11.7570	8.40	7.55
998	4	2	2	3	1	3	2	0	467.53	122.70	12.2170	8.70	8.35
999	4	2	2	3	1	4	1	0	455.26	119.53	11.7990	8.40	7.55
1000	4	2	2	3	1	4	2	0	465.58	121.49	12.2590	8.70	8.35
1001	4	2	2	3	2	1	1	0	489.16	121.88	12.4950	8.55	6.80
1002	4	2	2	3	2	1	2	0	499.48	123.84	12.9550	8.85	7.60
1003	4	2	2	3	2	2	1	0	457.98	122.16	11.8890	8.55	6.50
1004	4	2	2	3	2	2	2	0	468.30	124.12	12.3490	8.85	7.30
1005	4	2	2	3	2	3	1	0	460.00	122.70	11.7420	8.40	7.25
1006	4	2	2	3	2	3	2	0	470.32	124.66	12.2020	8.70	8.05
1007	4	2	2	3	2	4	1	0	458.05	121.49	11.7840	8.40	7.25
1008	4	2	2	3	2	4	2	0	468.38	123.45	12.2440	8.70	8.05
1009	4	2	2	4	1	1	1	0	484.17	120.41	11.9570	8.55	7.20
1010	4	2	2	4	1	1	2	0	494.49	122.37	12.4170	8.85	8.00
1011	4	2	2	4	1	2	1	0	452.99	120.69	11.3510	8.55	6.90
1012	4	2	2	4	1	2	2	0	463.31	122.65	11.8110	8.85	7.70
1013	4	2	2	4	1	3	1	0	455.01	121.23	11.2040	8.40	7.65
1014	4	2	2	4	1	3	2	0	465.33	123.19	11.6640	8.70	8.45

NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
1015	4	2	2	4	1	4	1	0	453.07	120.02	11.2460	8.40	7.65
1016	4	2	2	4	1	4	2	0	463.39	121.98	11.7060	8.70	8.45
1017	4	2	2	4	2	1	1	0	486.96	122.37	11.9420	8.55	6.90
1018	4	2	2	4	2	1	2	0	497.29	124.33	12.4020	8.85	7.70
1019	4	2	2	4	2	2	1	0	455.79	122.65	11.3360	8.55	6.60
1020	4	2	2	4	2	2	2	0	466.11	124.61	11.7960	8.85	7.40
1021	4	2	2	4	2	3	1	0	457.81	123.19	11.1890	8.40	7.35
1022	4	2	2	4	2	3	2	0	468.13	125.15	11.6490	8.70	8.15
1023	4	2	2	4	2	4	1	0	455.86	121.98	11.2310	8.40	7.35
1024	4	2	2	4	2	4	2	0	466.19	123.94	11.6910	8.70	8.15

THE TABLE SHOW MINIMUM PRIME COST.

COST = FACTORY PRIME-COST IN BATH.

LABOUR = NORMAL TIME IN MINUTE.

RELIABILITY = FAILOUR RATE PERCENT IN 1000 HOURS.

SCORE A = TECHNICAL PERFORMANCE FOR CITY.

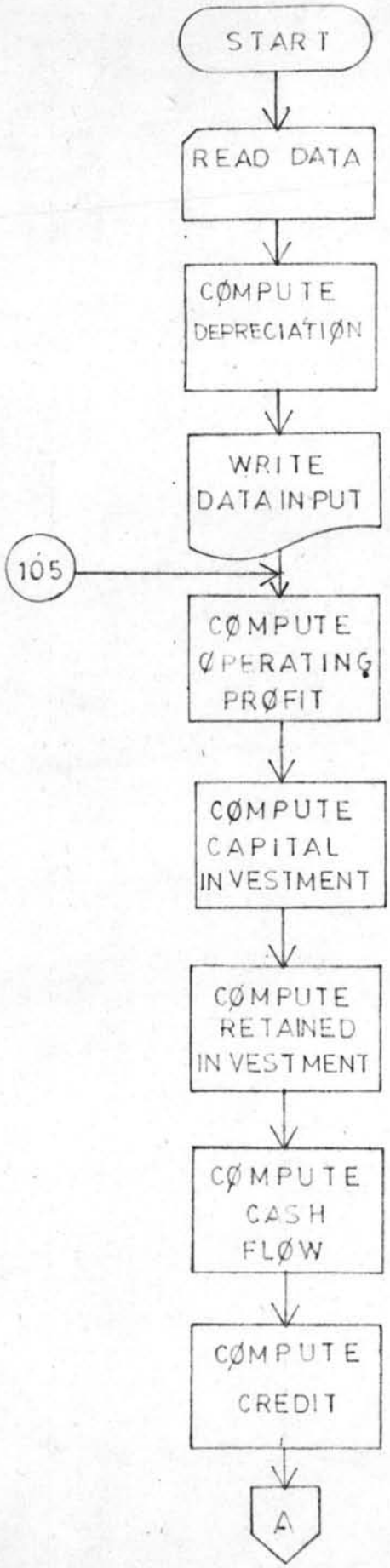
SCORE B = TECHNICAL PERFORMANCE FOR COUNTRY-SIDE.

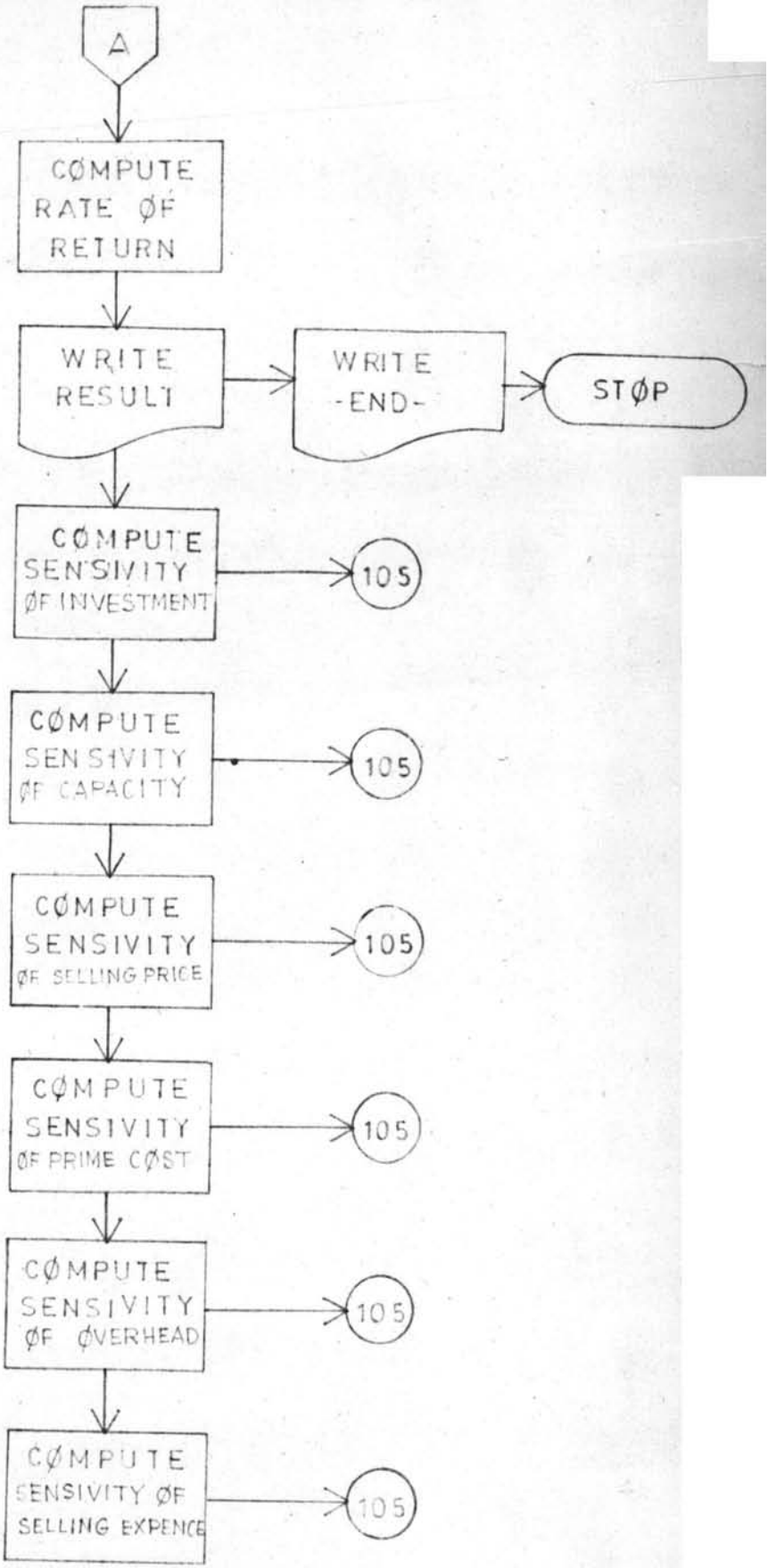
NO	MODULE.								COST	LABOUR	RELIABILITY.	SCORE A.	SCORE B.
	A	B	C	D	E	F	G	H					
787	4	1	1	2	1	2	1	0	445.46	124.60	11.4500	8.25	6.60
791	4	1	1	2	1	4	1	0	445.54	123.93	11.3450	8.10	7.35
275	2	1	1	2	1	2	1	0	445.62	140.10	12.8780	7.65	7.35
279	2	1	1	2	1	4	1	0	445.69	139.43	12.7730	7.50	8.10
851	4	1	2	2	1	2	1	0	445.88	125.32	11.5500	8.15	6.65
855	4	1	2	2	1	4	1	0	445.95	124.65	11.4450	8.00	7.40
339	2	1	2	2	1	2	1	0	446.03	140.82	12.9780	7.55	7.40
19	1	1	1	2	1	2	1	0	446.05	140.40	12.8880	8.05	7.10
343	2	1	2	2	1	4	1	0	446.11	140.15	12.8730	7.40	8.15
23	1	1	1	2	1	4	1	0	446.13	139.73	12.7830	7.90	7.85

***** E N D *****

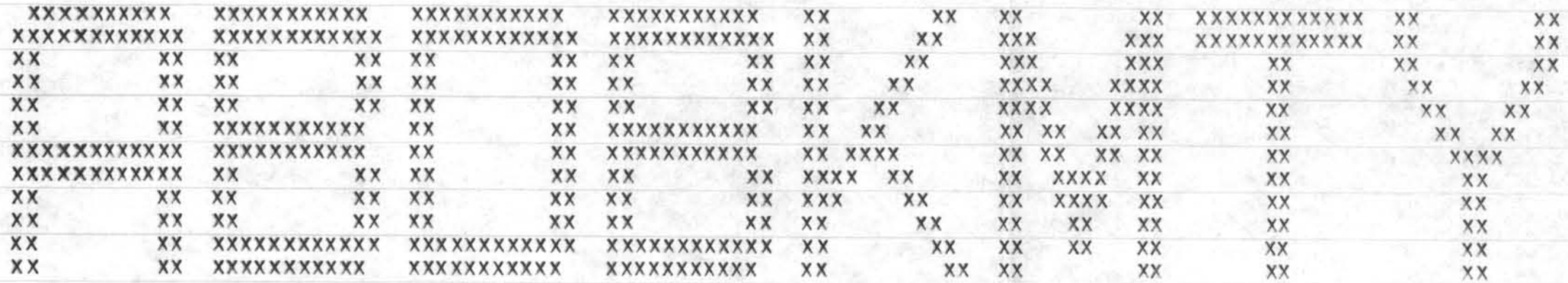
ภาคผนวก ค.

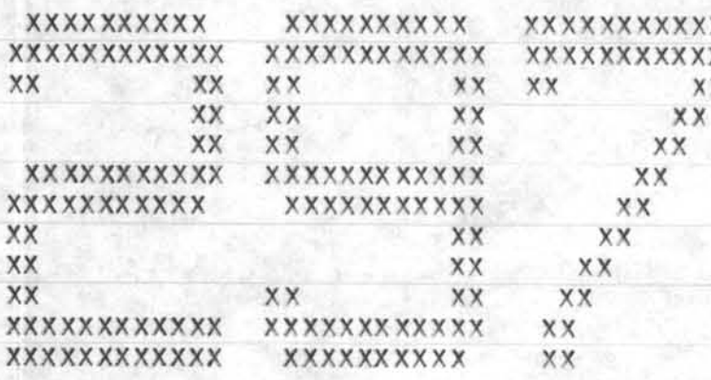
แสดงผลการลงทุน


START
READ DATA
CØMPUTE DEPRECIATIØN
WRITE DATA INPUT
105
CØMPUTE ØPERATING PRØFIT
CØMPUTE CAPITAL INVESTMENT
CØMPUTE RETAINED INVESTMENT
CØMPUTE CASH FLØW
CØMPUTE CREDIT
A


A
COMPUTE RATE OF RETURN
WRITE RESULT
WRITE -END-
STOP
COMPUTE SENSIVITY OF INVESTMENT
105
COMPUTE SENSIVITY OF CAPACITY
105
COMPUTE SENSIVITY OF SELLING PRICE
105
COMPUTE SENSIVITY OF PRIME COST
105
COMPUTE SENSIVITY OF OVERHEAD
105
COMPUTE SENSIVITY OF SELLING EXPENCE
105

********** START ABDBKMTY 00297 LAST 21 OCT 80 13.36.45 **********
********** START ABDBKMTY 00297 LAST 21 OCT 80 13.36.45 **********
********** START ABDBKMTY 00297 LAST 21 OCT 80 13.36.45 **********





DOS FORTRAN IV 360N-FO-479 3-8

OPTIONS IN EFFECT

LOAD =4

DECK NO

LIST YES

LISTX NO

EBCDIC

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C
C     VARIABLE NOTE.
C
C     N  = NUMBER OF INVESTMENT YEARS.
C     KI = NUMBER OF DEPRECIABLE ASSET.
C     AINV = INITIAL DEPRECIABLE CAPITAL INVESTMENT.
C     APRO = NUMBER OF UNIT PRODUCED PER YEAR.
C     ASEL = UNIT SELLING PRICE.
C     AMAT = DIRECT MATERIAL COST PER UNIT PROUDCED.
C     ALAB = DIRECT LABOUR COST PER UNIT PRODUCED.
C     ADEP = DEPRECIABLE CHARGED PER YEAR.
C     AFEX = OUT OFF POCKET FACTORY EXPENCE PER YEAR.
C     AMEX = FACTORY MANAGEMENT AND ADMINISTRATION EXPENCE PER YEAR.
C     AIVR = AVERAGE INVENTORY FOR RAW MATERIAL(MONTH).
C     AIVW = AVERAGE INVENTORY FOR WORK INPROCESS(MONTH).
C     AIVF = AVERAGE INVENTORY FOR FINISH GOOD(MONTH).
C     AACR = AVERAGE ACCOUNT RECIVEABLE(MONTH).
C     AFGP = FACTORY GROSS PROFIT BEFORE SALE TAX.
C     RATES = SALE TAX RATE.
C     RATEP = OPERATING PROFIT TAX RATE.
C     RATEL = BANK LOAN RATE.
C     RATED = BANK DEPOSIT RATE.
C     RATER = INTERNAL RATE OF RETURN FROM INVESTMENT.
C     RATEC  = RATE OF DECLINE VALUE OR RATE OF INTEREST CHARGED.
C     FCOST  = FIST COST OF DEPRECIABLE ASSET.
C     SALVUE = SALVAGE VALUE OF DEPRECIABLE ASSET.
C     ECOLIF = ECONOMIC LIFE OF DEPRECIABLE ASSET.
C     METHOD = METHOD TO COMPUTE DEPRECIABLE ASSET.
C     BOOKVA = BOOK VALUE OF DEPRECIABLE ASSET.
C     DEPRE  = DEPRECIATION OF AN ASSET.
C     TOTREV = TOTAL REVENUE.
C     TOTMAT = TOTAL DIRECT MATERIAL COST.
C     TOTLAB = TOTAL DIRECT LABOUR COST.
C     TOTPRC = TOTAL PRIME COST.
C     TOTFOH = TOTAL FACTORY OVERHEAD.
C     TOTCGS = TOTAL COST OF GOOD SOLD.
C     TOTIVT = TOTAL INVENTORY.
C     TOTFAR = TOTAL FACTORY REVENUE.
C     TOTTAX = TOTAL SELLING TAX.
C     TOTSEX = TOTAL SELLING EXPENCE.
C     TOTACR = TOTAL ACCOUNT RECIVEABLE.
C     TOTBIT = TOTAL INTEREST PAID TO BANK.
C     TOTOPB = TOTAL OPERATING PROFIT(LOSS) BEFORE TAX.
C     TOTOPA = TOTAL OPERATING PROFIT(LOSS) AFTER TAX.
C     TOTINV = TOTAL OWNER CAPITAL INVESTMENT.
C     TOTDCI = TOTAL DEPRECIABLE CAPITAL INVESTMENT.
C     TOTDEP = TOTAL DEPRECIABLE CHARGED.
C     TOTDCR = TOTAL DEPRECIABLE CAPITAL INVESTMENT RETAINED.
C     Q      = CASH FLOW.
C     FINV = FACTOR OF INVESTMENT.
C     FCAP = FACTOR OF CAPACITY.
C     FUNP = FACTOR OF UNIT SELLING PRICE.
C     FPRC = FACTOR OF PRIME COST.
C     FFOH = FACTOR OF FACTORY OVERHEAD.
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C     FSEX = FACTOR OF SELLING EXPENCE.
C     N1 = NUMBER OF INVESTMENT FACTOR.
C     N2 = NUMBER OF CAPACITY FACTOR.
C     N3 = NUMBER OF UNIT SELLING PRICE FACTOR.
C     N4 = NUMBER OF PRIME COST FACTOR.
C     N5 = NUMBER OF FACTORY OVERHEAD FACTOR.
C     N6 = NUMBER OF SEILLG EXPENCE FACTOR.
C     FINVN = EXPECTED NORMAL VALUE FOR FACTOR OF INVESTMENT.
C     FCAPN = EXPECTED NORMAL VALUE FOR FACTOR OF CAPACITY.
C     FUNPN = EXPECTED NORMAL VALUE FOR FACTOR OF UNIT SELLING PRICE FACTOR.
C     FPRCN = EXPECTED NORMAL VALUE FOR FACTOR OF PRIME COST.
C     FFOHN = EXPECTED NORMAL VALUE FOR FACTOR OF FACTORY OVERHEAD.
C     FSEXN = EXPECTED NORMAL VALUE FOR FACTOR OF SELLING EXPENCE.
C     FINVS = START NUMBER FOR TEST FACTOR OF INVESTMENT.
C     FCAPS = START NUMBER FOR TEST FACTOR OF CAPACITY.
C     FUNCS = START NUMBER FOR TEST FACTOR OF UNIT SELLING PRICE.
C     FPRCS = START NUMBER FOR TEST FACTOR OF PRIME COST.
C     FFOHS = START NUMBER FOR TEST FACTOR OF FACTORY OVERHEAD.
C     FSEXS = START NUMBER FOR TEST FACTOR OF SELLING EXPENCE.
C     FINVR = INCREMENT NUMBER EACH RUN FOR FACTOR OF INVESTMENT.
C     FCAPR = INCREMENT NUMBER EACH RUN FOR FACTOR OF CAPACITY.
C     FUNPR = INCREMENT NUMBER EACH RUN FOR FACTOR OF UNIT SELLING PRICE.
C     FPRCR = INCREMENT NUMBER EACH RUN FOR FACTOR OF PRIME COST.
C     FFOHR = INCREMENT NUMBER EACH RUN FOR FACTOR OF FACTORY OVERHEAD.
C     FSEXR = INCREMENT NUMBER EACH RUN FOR FACTOR OF SELLING EXPENCE.
C     K1 = NUMBER OF RUN REQUIRED TO TEST FACTOR OF INVESTMENT.
C     K2 = NUMBER OF RUN REQUIRED TO TEST FACTOR OF CAPACITY.
C     K3 = NUMBER OF RUN REQUIRED TO TEST FACTOR OF UNIT SELLING PRICE.
C     K4 = NUMBER OF RUN REQUIRED TO TEST FACTOR OF PRIME COST.
C     K5 = NUMBER OF RUN REQUIRED TO TEST FACTOR OF FACTORY OVERHEAD.
C     K6 = NUMBER OF RUN REQUIRED TO TEST FACTOR OF SELLING EXPENCE.
0001        DIMENSION DEPRE(60,60),BOOKVA(60)
0002        DIMENSION AINV(10),APRO(10),ASEL(10),AMAT(10)
0003        DIMENSION ALAB(10),ADEP(10),AFEX(10),AMEX(10)
0004        DIMENSION TOTREV(10),TOTMAT(10),TOTLAB(10)
0005        DIMENSION TOTPRC(10),TOTFOH(10),TOTCGS(10)
0006        DIMENSION TOTIVT(10),TOTFAR(10),TOTTAX(10)
0007        DIMENSION TOTSEX(10),TOTACR(10),TOTBIT(10)
0008        DIMENSION TOTOPB(10),TOTOPA(10),TOTDCI(10)
0009        DIMENSION TOTDEP(10),TOTDCR(10),TOTINV(10)
0010        DIMENSION FINV(60),FCAP(60),FUNP(60),FPRC(60),FFOH(60),FSEX(60)
0011        DIMENSION V(10),Q(10)
0012        DIMENSION NAME(3)
C
C-----READ DATA INPUT.
C
0013        READ (1,10) N,KI
0014        READ (1,15) (AINV(I),APRO(I),ASEL(I),AMAT(I),ALAB(I),AFEX(I),AMEX(
           *I),I=1,N)
0015        READ (1,20) AIVR
0016        READ (1,20) AIVW
0017        READ (1,20) AIVF
0018        READ (1,20) AACR
0019        READ (1,20) AFGP
```

```
0020              READ (1,20) RATES
0021              READ (1,20) RATEP
0022              READ (1,20) RATEL
0023              READ (1,20) RATED
0024              READ (1,10) N1,N2,N3,N4,N5,N6
0025              READ (1,20) (FINV(I),I=1,N1)
0026              READ (1,20) (FCAP(I),I=1,N2)
0027              READ (1,20) (FUNP(I),I=1,N3)
0028              READ (1,20) (FPRC(I),I=1,N4)
0029              READ (1,20) (FFOH(I),I=1,N5)
0030              READ (1,20) (FSEX(I),I=1,N6)
0031              READ (1,10) K1,K2,K3,K4,K5,K6
0032              READ (1,15) FINVN,FCAPN,FUNPN,FPRCN,FFOHN,FSEXN
0033              READ (1,15) FINVS,FCAPS,FUNPS,FPRCS,FFOHS,FSEXS
0034              READ (1,15) FINVR,FCAPR,FUNPR,FPRCR,FFOHR,FSEXR
0035              WRITE (3,25)
                  C
                  C-----COMPUTE DEPRECIATION.
                  C
0036              WRITE (3,2005)
0037              DO 2010 KIND=1,KI
0038              ITEM = KIND
0039              READ (1,2015) NAME,FCOST,SALVUE,ECOLIF,RATEC,METHOD
0040              IF (METHOD.EQ.1) GO TO 2100
0041              IF (METHOD.EQ.2) GO TO 2200
0042              IF (METHOD.EQ.3) GO TO 2300
0043              IF (METHOD.EQ.4) GO TO 2400
0044         2100 WRITE (3,2105) ITEM,NAME,FCOST,SALVUE,ECOLIF
0045              DO 2110 L=1,N
0046              DEPRE(L,KIND) = (FCOST-SALVUE)/ECOLIF
0047         2110 CONTINUE
0048              GO TO 2010
0049         2200 WRITE (3,2205) ITEM,NAME,FCOST,ECOLIF,RATEC
0050              BOOKVA(1) = FCOST
0051              DO 2210 L=1,N
0052              DEPRE(L,KIND) = BOOKVA(L)*RATEC
0053              LX = L+1
0054              BOOKVA(LX) = BOOKVA(L)-DEPRE(L,KIND)
0055         2210 CONTINUE
0056              GO TO 2010
0057         2300 WRITE (3,2305) ITEM,NAME,FCOST,SALVUE,ECOLIF
0058              DO 2310 L=1,N
0059              DEPRE(L,KIND) = (FCOST-SALVUE)*2.*(ECOLIF-L+1.)/(ECOLIF*(ECOLIF+1.
                 *))
0060         2310 CONTINUE
0061              GO TO 2010
0062         2400 WRITE (3,2405) ITEM,NAME,FCOST,SALVUE,ECOLIF,RATEC
0063              DO 2410 L=1,N
0064              DEPRE(L,KIND) = (FCOST-SALVUE)*(RATEC/((1.+RATEC)**ECOLIF-1.))
0065         2410 CONTINUE
0066         2010 CONTINUE
0067              ADEP(1) = 0.
0068              DO 2500 L=2,N
0069              SUM = 0.
```

```
0070              DO 2500 KIND=1,KI
0071              SUM = SUM+DEPRE(L-1,KIND)
0072              ADEP(L) = SUM
0073           2500 CONTINUE
                  C
                  C-----PRINTOUT DATA INPUT.
                  C
0074              WRITE (3,30)
0075              DO 40 I=1,N
0076              IYEAR = I-1
0077              WRITE (3,35) IYEAR,AINV(I),APRO(I),ASEL(I),AMAT(I),ALAB(I),ADEP(I)
                 *,AFEX(I),AMEX(I)
0078             40 CONTINUE
0079              WRITE (3,41) AIVR
0080              WRITE (3,42) AIVW
0081              WRITE (3,43) AIVF
0082              WRITE (3,44) AACR
0083              WRITE (3,45) AFGP
0084              WRITE (3,46) RATES
0085              WRITE (3,47) RATEP
0086              WRITE (3,48) RATEL
0087              WRITE (3,49) RATED
0088              WRITE (3,51) (FINV(I),I=1,N1)
0089              WRITE (3,52) (FCAP(I),I=1,N2)
0090              WRITE (3,53) (FUNP(I),I=1,N3)
0091              WRITE (3,54) (FPRC(I),I=1,N4)
0092              WRITE (3,55) (FFOH(I),I=1,N5)
0093              WRITE (3,56) (FSEX(I),I=1,N6)
0094              WRITE (3,905)
0095              WRITE (3,910)
                  C
                  C-----COMPUTE OPERATING PROFIT FOR GIVEN CONDITION.
                  C
0096              NUX = 1
0097            105 NUM = 0
0098              NEXT = 0
0099              DO 70 I1=1,N1
0100              DO 70 I2=1,N2
0101              DO 70 I3=1,N3
0102              DO 70 I4=1,N4
0103              DO 70 I5=1,N5
0104              DO 70 I6=1,N6
0105              DO 80 I=1,N
0106              IF (FCAP(I2).LE.1.) GO TO 84
0107              FINV(1) = FINVN*1.20
0108             84 TOTREV(I) = APRO(I)*FCAP(I2)*ASEL(I)*FUNP(I3)
0109              TOTMAT(I) = APRO(I)*FCAP(I2)*AMAT(I)
0110              TOTLAB(I) = APRO(I)*FCAP(I2)*ALAB(I)
0111              TOTPRC(I) = (TOTMAT(I)+TOTLAB(I))*FPRC(I4)
0112              TOTFOH(I) = ((ADEP(I)*FINV(I1)+AFEX(I))*FFOH(I5))
0113              TOTCGS(I) = TOTPRC(I)+TOTFOH(I)+AMEX(I)
0114              TOTIVT(I) = (TOTMAT(I)*(AIVR/12.))+(TOTPRC(I)*(AIVW/12.))+(TOTCGS(
                 *I)*(AIVF/12.))
0115              TOTFAR(I) = TOTCGS(I)*(1.+AFGP)
```

```
0116                TOTTAX(I) = TOTFAR(I)*RATES
0117                TOTSEX(I) = TOTREV(I)*FSEX(I6)
0118                TOTACR(I) = TOTREV(I)*(AACR/12.)
0119                TOTBIT(I) = TOTACR(I)*RATEL
0120                TOTOPB(I) = TOTREV(I)-TOTCGS(I)-TOTBIT(I)-TOTTAX(I)-TOTSEX(I)
0121                IF (TOTOPB(I).LE.0.) GO TO 85
0122                TOTOPA(I) = TOTOPB(I)*(1.-RATEP)
0123                GO TO 80
0124             85 TOTOPA(I) = TOTOPB(I)
0125             80 CONTINUE
                 C
                 C-----COMPUTE CAPITAL INVESTMENT AND INVENTORY.
                 C
0126                TOTIVT(N+1) = 0.
0127                DO 90 I=1,N
0128                TOTINV(I) = (AINV(I)*FINV(I1))+TOTIVT(I+1)-TOTIVT(I)
0129             90 CONTINUE
                 C
                 C-----COMPUTE RETAINED VALUE OF DEPRECIABLE CAPITAL INVESTMENT.
                 C
0130                TOTDCI(1) = AINV(1)*FINV(I1)
0131                TOTDEP(1) = ADEP(1)*FINV(I1)
0132                DO 95 I=2,N
0133                TOTDCI(I) = TOTDCI(I-1)+AINV(I)*FINV(I1)
0134                TOTDEP(I) = TOTDEP(I-1)+ADEP(I)*FINV(I1)
0135                TOTDCR(I) = TOTDCI(I)-TOTDEP(I)
0136             95 CONTINUE
                 C
                 C-----COMPUTE CASH FLOW.
                 C
0137                DO 100 I=1,N
0138                Q(I) = -TOTINV(I)+TOTOPA(I)
0139                IF (I.LT.N) GO TO 100
0140                Q(I) = Q(I)+TOTDCR(I)
0141             100 CONTINUE
                 C
                 C-----COMPUTE BANK CREDIT BALANCE AT THE END OF INVESTMENT.
                 C
0142                NUM = NUM + 1
0143                V(1) = Q(1)
0144                DO 130 J = 2,N
0145                IF (V(J-1).GT.0.) GO TO 135
0146                V(J) = V(J-1)*(1.+RATEL)+Q(J)
0147                GO TO 140
0148             135 V(J) = V(J-1)*(1.+RATED)+Q(J)
0149             140 SUMA = V(J)
0150                 CREDIT = SUMA
0151             130 CONTINUE
                 C
                 C-----COMPUTE RATE OF RETERN FOR GIVEN SET OF CASHFLOW.
                 C
0152                RATE = 1.
0153                NFLAG = 1
0154                ERROR = Q(1)*0.00001
```

```
0155              V(1) = Q(1)
0156              IF (V(1)) 150,240,240
0157          150 DO 160 J = 2,N
0158              V(J) = V(J-1)*(1. + RATE) + Q(J)
0159              IF (V(J) + ERROR) 160,160,220
0160          160 CONTINUE
0161              IF (V(N)-ERROR) 170,260,260
0162          170 NFLAG = 0
0163              M = N
0164          180 DRATE = V(1)
0165              M1 = M-1
0166              M2 = M1-1
0167              IF (M2) 190,210,190
0168          190 DO 200 I = 2,M1
0169              DRATE = DRATE*(1. + RATE) +V(I)
0170          200 CONTINUE
0171          210 RATE = RATE-V(M)/DRATE
0172              GO TO 150
0173          220 IF (NFLAG) 260,250,230
0174          230 M = J
0175              GO TO 180
0176          240 JYEAR = 0
0177              GO TO 620
0178          250 JYEAR = J-1
0179              GO TO 620
0180          260 RATER = RATE
0181              GO TO 630
              C
              C-----PRINT OUT RESULT.
              C
0182            620 WRITE (3,920) NUM,FINV(I1),FCAP(I2),FUNP(I3),FPRC(I4),FFOH(I5),
                   *FSEX(I6),CREDIT
0183              GO TO 270
0184            630 WRITE (3,930) NUM,FINV(I1),FCAP(I2),FUNP(I3),FPRC(I4),FFOH(I5),
                   *FSEX(I6),CREDIT,RATER
0185            270 NEXT = NEXT+1
0186              IF (NUM.EQ.34) GO TO 280
0187              IF (NEXT.LE.50) GO TO 70
0188            280 WRITE (3,911)
0189              NEXT = 1
0190             70 CONTINUE
0191              IF (NUX.EQ.1) GO TO 1010
0192              IF (NUX.EQ.2) GO TO 1020
0193              IF (NUX.EQ.3) GO TO 1030
0194              IF (NUX.EQ.4) GO TO 1040
0195              IF (NUX.EQ.5) GO TO 1050
0196              IF (NUX.EQ.6) GO TO 1060
0197              IF (NUX.EQ.7) GO TO 290
              C
              C-----SENSIVITY TEST FOR INVESTMENT.
              C
0198           1010 WRITE (3,905)
0199              WRITE (3,910)
0200              FINV(1) = FINVS
```

```
0201              FCAP(1) = FCAPN
0202              FUNP(1) = FUNPN
0203              FPRC(1) = FPRCN
0204              FFOH(1) = FFOHN
0205              FSEX(1) = FSEXN
0206              N1 = K1+1
0207              N2 = 1
0208              N3 = 1
0209              N4 = 1
0210              N5 = 1
0211              N6 = 1
0212              J = K1+1
0213              DO 1015 K = 2,J
0214              FINV(K) = FINV(K-1)+FINVR
0215           1015 CONTINUE
0216              NUX = 2
0217              GO TO 105
                  C
                  C-----SENSIVITY TEST FOR CAPACITY.
                  C
0218           1020 WRITE (3,905)
0219              WRITE (3,910)
0220              FINV(1) = FINVN
0221              FCAP(1) = FCAPS
0222              N1 = 1
0223              N2 = K2+1
0224              J = K2+1
0225              DO 1025 K = 2,J
0226              FCAP(K) = FCAP(K-1)+FCAPR
0227           1025 CONTINUE
0228              NUX = 3
0229              GO TO 105
                  C
                  C-----SENTIVITY TEST FOR UNIT SELLING PRICE.
                  C
0230           1030 WRITE (3,905)
0231              WRITE (3,910)
0232              FINV(1) = FINVN
0233              FCAP(1) = FCAPN
0234              FUNP(1) = FUNPS
0235              N2 = 1
0236              N3 = K3+1
0237              J = K3+1
0238              DO 1035 K = 2,J
0239              FUNP(K) = FUNP(K-1)+FUNPR
0240           1035 CONTINUE
0241              NUX = 4
0242              GO TO 105
                  C
                  C-----SENSIVITY TEST FOR PRIME COST.
                  C
0243           1040 WRITE (3,905)
0244              WRITE (3,910)
0245              FUNP(1) = FUNPN
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0246                FPRC(1) = FPRCS
0247                N3 = 1
0248                N4 = K4+1
0249                J = K4+1
0250                DO 1045 K = 2,J
0251                FPRC(K) = FPRC(K-1)+FPRCR
0252             1045 CONTINUE
0253                NUX = 5
0254                GO TO 105
                    C
                    C-----SENSIVITY TEST FOR FACTORY OVERHEAD.
                    C
0255             1050 WRITE (3,905)
0256                WRITE (3,910)
0257                FPRC(1) = FPRCN
0258                FFOH(1) = FFOHS
0259                N4 = 1
0260                N5 = K5+1
0261                J = K5+1
0262                DO 1055 K = 2,J
0263                FFOH(K) = FFOH(K-1)+FFOHR
0264             1055 CONTINUE
0265                NUX = 6
0266                GO TO 105
                    C
                    C-----SENSIVITY TEST FOR SALE EXPENCE.
                    C
0267             1060 WRITE (3,905)
0268                WRITE (3,910)
0269                FFOH(1) = FFOHN
0270                FSEX(1) = FSEXS
0271                N5 = 1
0272                N6 = K6+1
0273                J = K6+1
0274                DO 1065 K = 2,J
0275                FSEX(K) = FSEX(K-1)+FSEXR
0276             1065 CONTINUE
0277                NUX = 7
0278                GO TO 105
0279              290 WRITE (3,935)
0280               10 FORMAT (10I5)
0281               15 FORMAT (7F10.2)
0282               20 FORMAT (F10.2)
0283               25 FORMAT ('1',T21,'*** DATA INPUT ***')
0284               30 FORMAT (//,T21,'YEAR',6X,'AINV',6X,'APRO',6X,'ASEL',6X,'AMAT',6X,'
                     *ALAB',6X,'ADEP',6X,'AFEX',6X,'AMEX')
0285               35 FORMAT (/,T21,I3,1X,8F10.2)
0286               41 FORMAT (/T21,'INVENTORY FOR RAW MATERIAL   =',F10.2,' MONTH.')
0287               42 FORMAT (/T21,'INVENTORY FOR WORK INPROCESS =',F10.2,' MONTH.')
0288               43 FORMAT (/T21,'INVENTORY FOR FINISH GOOD    =',F10.2,' MONTH.')
0289               44 FORMAT (/T21,'ACCOUNT RECIVEABLE           =',F10.2,' MONTH.')
0290               45 FORMAT (/T21,'FACTORY PRIME REVENUE FACTOR =',F10.2)
0291               46 FORMAT (/T21,'SELLING TAX RATE             =',F10.2)
0292               47 FORMAT (/T21,'PROFIT TAX RATE              =',F10.2)
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0293          48 FORMAT (/T21,'BANK LOAN INTEREST RATE      =',F10.2)
0294          49 FORMAT (/T21,'BANK DEDOSIT INTEREST RATE   =',F10.2)
0295          51 FORMAT (/T21,'FACTOR OF INVESTMENT         =',10F6.2)
0296          52 FORMAT (/T21,'FACTOR OF CAPACITY           =',10F6.2)
0297          53 FORMAT (/T21,'FACTOR OF UNIT SELLING PRICE =',10F6.2)
0298          54 FORMAT (/T21,'FACTOR OF PRIME COST         =',10F6.2)
0299          55 FORMAT (/T21,'FACTOR OF FACTORY OVERHEAD   =',10F6.2)
0300          56 FORMAT (/T21,'FACTOR OF SELLING EXPENCE    =',10F6.2)
0301         905 FORMAT ('1',//,T30,'THE TABLE SHOW SENSIVITY OF INVESTMENT.',/
                *//T21,'FINV = FACTOR OF INVESTMENT.',
                *//T21,'FCAP = FACTOR OF CAPACITY.',
                *//T21,'FUNP = FACTOR OF UNIT SELLING PRICE.',
                *//T21,'FPRC = FACTOR OF PRIME COST.',
                *//T21,'FFOH = FACTOR OF FACTORY OVERHEAD.',
                *//T21,'FSEX = FACTOR OF SALE EXPENCE.',
                *//T21,'CREDIT = BANK BALANCE SHEET BATH AT THE END OF INVESTMENT.
                *',
                *//T21,'RATE   = RETURN RATE FROM INVESTMENT.')
0302         910 FORMAT (/,17X,
                *4X,'NUM',3X,'FINV',3X,'FCAP',3X,'FUNP',3X'FPRC'3X,'FFOH',3X,
                *'FSEX',6X,'CREDIT',6X,'RATE'/)
0303         911 FORMAT ('1',//,17X,
                *4X,'NUM',3X,'FINV',3X,'FCAP',3X,'FUNP',3X'FPRC'3X,'FFOH',3X,
                *'FSEX',6X,'CREDIT',6X,'RATE'/)
0304         920 FORMAT (17X,
                *3X,I4,F7.2,F7.2,F7.2,F7.2,F7.2,F7.2,F14.2,
                *3X,'ERROR')
0305          930 FORMAT (17X,
                *3X,I4,F7.2,F7.2,F7.2,F7.2,F7.2,F7.2,F14.2,F9.4)
0306          935 FORMAT (//T45,'***** E N D *****')
0307         2005 FORMAT (//,T21,'ITEM',4X,'DESCRIPTION',4X,'FIST COST',7X,'SALVAGE'
                *,3X,'LIFE',3X,'RATE',3X,'METHOD')
0308         2015 FORMAT (3A4,8X,4F10.2,I5)
0309         2105 FORMAT (/,T21,I3,4X,3A4,3X,F10.2,4X,F10.2,3X,F4.1,10X,'STRAIGHT LI
                *NE.')
0310         2205 FORMAT (/,T21,I3,4X,3A4,3X,F10.2,17X,F4.1,3X,F4.2,3X,'DECLINING BA
                *LANCE.')
0311         2305 FORMAT (/,T21,I3,4X,3A4,3X,F10.2,4X,F10.2,3X,F4.1,10X,'SUM OF THE
                *YEARS DIGIT.')
0312         2405 FORMAT (/,T21,I3,4X,3A4,3X,F10.2,4X,F10.2,3X,F4.1,3X,F4.2,3X,'SINK
                *ING FUND.')
0313          950 STOP
0314              END
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SCALAR MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
N	290	KI	294	I	298	AIVR	29C	AIVW	2A0
AIVF	2A4	AACR	2A8	AFGP	2AC	RATES	2B0	RATEP	2B4
RATEL	2B8	RATED	2BC	N1	2C0	N2	2C4	N3	2C8
N4	2CC	N5	2D0	N6	2D4	K1	2D8	K2	2DC
K3	2E0	K4	2E4	K5	2E8	K6	2EC	FINVN	2F0
FCAPN	2F4	FUNPN	2F8	FPRCN	2FC	FFOHN	300	FSEXN	304
FINVS	308	FCAPS	30C	FUNPS	310	FPRCS	314	FFOHS	318
FSEXS	31C	FINVR	320	FCAPR	324	FUNPR	328	FPRCR	32C
FFOHR	330	FSEXR	334	KIND	338	ITEM	33C	FCOST	340
SALVUE	344	ECOLIF	348	RATEC	34C	METHOD	350	L	354
LX	358	SUM	35C	IYEAR	360	NUX	364	NUM	368
NEXT	36C	I1	370	I2	374	I3	378	I4	37C
I5	380	I6	384	J	388	SUMA	38C	CREDIT	390
RATE	394	NFLAG	398	ERROR	39C	M	3A0	DRATE	3A4
M1	3A8	M2	3AC	JYEAR	3B0	RATER	3B4	K	3B8

ARRAY MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
DEPRE	3BC	BOOKVA	3BFC	AINV	3CEC	APRO	3D14	ASEL	3D3C
AMAT	3D64	ALAB	3D8C	ADEP	3DB4	AFEX	3DDC	AMEX	3E04
TOTREV	3E2C	TOTMAT	3E54	TOTLAB	3E7C	TOTPRC	3EA4	TOTFOH	3ECC
TOTCGS	3EF4	TOTIVT	3F1C	TOTFAR	3F44	TOTTAX	3F6C	TOTSEX	3F94
TOTACR	3FBC	TOTBIT	3FE4	TOTOPB	400C	TOTOPA	4034	TOTDCI	405C
TOTDEP	4084	TOTDCR	40AC	TOTINV	40D4	FINV	40FC	FCAP	41EC
FUNP	42DC	FPRC	43CC	FFOH	44BC	FSEX	45AC	V	469C
Q	46C4	NAME	46EC						

SUBPROGRAMS CALLED

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
IBCOM#	46F8	FRXPR#	46FC						

FORMAT STATEMENT MAP

SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION	SYMBOL	LOCATION
10	4708	15	470E	20	4715	25	471A	30	4735
35	4781	41	478F	42	47C0	43	47F1	44	4822
45	4853	46	487B	47	48A3	48	48CB	49	48F3
51	491B	52	4945	53	496F	54	4999	55	49C3
56	49ED	905	4A17	910	4B90	911	4BDF	920	4C32
930	4C58	935	4C78	2005	4C91	2015	4CDE	2105	4CED
2205	4D1B	2305	4D4D	2405	4D84				

STATEMENT LABEL MAP

LOCATION	STA NUM	LABEL	LOCATION	STA NUM	LABEL	LOCATION	STA NUM	LABEL
004EB8	13		004EE0	14		004F58	15	
004E78	16		004F94	17		004FB0	18	
004FCC	19		004FE8	20		005004	21	
005020	22		00503C	23		005058	24	
00509C	25		0050E4	26		005130	27	
00517C	28		0051C8	29		005214	30	
005260	31		0052A8	32		0052EC	33	
005330	34		005374	35		005388	36	
00539C	37		0053B4	38		0053BC	39	
005408	40		00541A	41		005428	42	
005436	43		005444	44	2100	005488	45	
005496	46		0054A6	47	2110	0054C2	48	
0054C8	49	2200	00550C	50		005514	51	
005522	52		00552E	53		00553E	54	
00555A	55	2210	005572	56		005578	57	2300
0055BC	58		0055CA	59		005614	60	2310
00562C	61		005632	62	2400	005680	63	
00568E	64		0056CE	65	2410	0056E6	66	2010
005706	67		005716	68		005726	69	
005732	70		00573C	71		005748	72	
005750	73	2500	005788	74		0057A4	75	
0057B4	76		0057C4	77		005824	78	40
00583C	79		00585C	80		005878	81	
005894	82		0058B0	83		0058CC	84	
0058E8	85		005904	86		005920	87	
00593C	88		005984	89		0059D0	90	
005A1C	91		005A68	92		005AB4	93	
005B00	94		005B18	95		005B2C	96	
005B38	97	105	005B44	98		005B4C	99	
005B5C	100		005B70	101		005B84	102	
005B98	103		005BAC	104		005BC0	105	
005BDC	106		005BF2	107		005BFE	108	84
005C1E	109		005C32	110		005C4A	111	
005C5E	112		005C7E	113		005C8E	114	
005CBA	115		005CCA	116		005CD6	117	
005CE6	118		005CF6	119		005D02	120	
005D1A	121		005D28	122		005D38	123	
005D3E	124	85	005D46	125	80	005D62	126	
005D7A	127		005D8A	128		005DA6	129	90
005DBE	130		005DE2	131		005E02	132	
005E1A	133		005E32	134		005E4A	135	
005E5E	136	95	005E76	137		005E86	138	
005E94	139		005EA2	140		005EAE	141	100
005ECA	142		005EDA	143		005EF6	144	
005F02	145		005F14	146		005F28	147	
005F2E	148	135	005F46	149	140	005F4E	150	
005F56	151	130	005F72	152		005F7E	153	
005F86	154		005F9A	155		005FB6	156	
005FCE	157	150	005FDE	158		005FF6	159	
006006	160	160	006022	161		00603E	162	170
00604A	163		006052	164	180	006066	165	

006072	166		00607E	167		00608A	168	190
00609A	169		0060B2	170	200	0060CA	171	210
0060E8	172		0060EE	173	220	006100	174	230
006108	175		00610E	176	240	00611A	177	
006120	178	250	006130	179		006136	180	260
00613E	181		006144	182	620	0061BC	183	
0061C2	184	630	006244	185	270	006254	186	
006262	187		006270	188	280	006288	189	
006294	190	70	00636C	191		00637E	192	
00638C	193		00639A	194		0063A8	195	
0063B6	196		0063C4	197		0063D2	198	1010
0063EC	199		006400	200		006408	201	
006410	202		006418	203		006420	204	
006428	205		006430	206		006440	207	
006448	208		006450	209		006458	210	
006460	211		006468	212		006474	213	
006480	214		00648C	215	1015	0064A8	216	
0064B4	217		0064BA	218	1020	0064D4	219	
0064E8	220		0064F0	221		0064F8	222	
006504	223		006510	224		00651C	225	
006528	226		006534	227	1025	006550	228	
00655C	229		006562	230	1030	00657C	231	
006590	232		006598	233		0065A0	234	
0065A8	235		0065B4	236		0065C0	237	
0065CC	238		0065D8	239		0065E4	240	1035
006600	241		00660C	242		006612	243	1040
00662C	244		006640	245		006648	246	
006650	247		00665C	248		006668	249	
006674	250		006680	251		00668C	252	1045
0066A8	253		0066B4	254		0066BA	255	1050
0066D4	256		0066E8	257		0066F0	258	
0066F8	259		006704	260		006710	261	
00671C	262		006728	263		006734	264	1055
006750	265		00675C	266		006762	267	1060
00677C	268		006790	269		006798	270	
0067A0	271		0067AC	272		0067B8	273	
0067C4	274		0067D0	275		0067DC	276	1065
0067F8	277		006804	278		00680A	279	290
006824	313	950						

TOTAL MEMORY REQUIREMENTS 006832 BYTES

HIGHEST SEVERITY LEVEL OF ERRORS FOR THIS MODULE WAS 0

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13.15.34,TOTAL COMPILATION TIME,00.01.15
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*** DATA INPUT ***

ITEM	DESCRIPTION	FIST COST	SALVAGE	LIFE	RATE	METHOD
1	EQUIPMENT	80000.00	20000.00	8.0	0.15	SINKING FUND.
2	PROTOTYPE	200000.00	0.0	5.0		STRAIGHT LINE.
3	CAR	200000.00	40000.00	9.0		SUM OF THE YEARS DIGIT.
4	WORK PLACE	100000.00		10.0	0.20	DECLINING BALANCE.

YEAR	AINV	APRO	ASEL	AMAT	ALAB	ADEP	AFEX	AMEX
0	580000.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.0	2000.00	8000.00	2350.00	48.00	96370.94	378000.00	120000.00
2	0.0	2300.00	8400.00	2540.00	55.00	88815.38	415000.00	132000.00
3	0.0	2650.00	8800.00	2750.00	63.00	82059.88	457000.00	145000.00
4	0.0	3000.00	9200.00	2960.00	73.00	75944.31	503000.00	160000.00
5	0.0	3500.00	9700.00	3200.00	84.00	70340.75	550000.00	175000.00

INVENTORY FOR RAW MATERIAL = 3.00 MONTH.
INVENTORY FOR WORK INPROCESS = 0.50 MONTH.
INVENTORY FOR FINISH GOOD = 1.00 MONTH.
ACCOUNT RECIVEABLE = 3.00 MONTH.
FACTORY PRIME REVENUE FACTOR = 0.50
SELLING TAX RATE = 0.30
PROFIT TAX RATE = 0.45
BANK LOAN INTEREST RATE = 0.18
BANK DEDOSIT INTEREST RATE = 0.12
FACTOR OF INVESTMENT = 1.00 1.20
FACTOR OF CAPACITY = 1.00 0.90 0.80 0.70 0.60 0.50
FACTOR OF UNIT SELLING PRICE = 0.70 0.60 0.50
FACTOR OF PRIME COST = 0.80 1.00 1.20
FACTOR OF FACTORY OVERHEAD = 1.00 1.20
FACTOR OF SELLING EXPENCE = 0.15 0.20 0.25

THE TABLE SHOW SENSIVITY OF INVESTMENT.

FINV = FACTOR OF INVESTMENT.

FCAP = FACTOR OF CAPACITY.

FUNP = FACTOR OF UNIT SELLING PRICE.

FPRC = FACTOR OF PRIME COST.

FFOH = FACTOR OF FACTORY OVERHEAD.

FSEX = FACTOR OF SALE EXPENCE.

CREDIT = BANK BALANCE SHEET BATH AT THE END OF INVESTMENT.

RATE = RETURN RATE FROM INVESTMENT.

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
1	1.00	1.00	0.70	0.80	1.00	0.15	8723604.00	0.5959
2	1.00	1.00	0.70	0.80	1.00	0.20	5744054.00	0.4519
3	1.00	1.00	0.70	0.80	1.00	0.25	2630327.00	0.3056
4	1.00	1.00	0.70	0.80	1.20	0.15	8152992.00	0.5644
5	1.00	1.00	0.70	0.80	1.20	0.20	5126299.00	0.4210
6	1.00	1.00	0.70	0.80	1.20	0.25	2012569.00	0.2755
7	1.00	1.00	0.70	1.00	1.00	0.15	376503.00	0.1974
8	1.00	1.00	0.70	1.00	1.00	0.20	-2737230.00	0.0522
9	1.00	1.00	0.70	1.00	1.00	0.25	-6886661.00	-0.1660
10	1.00	1.00	0.70	1.00	1.20	0.15	-241253.00	0.1689
11	1.00	1.00	0.70	1.00	1.20	0.20	-3380579.00	0.0229
12	1.00	1.00	0.70	1.00	1.20	0.25	-7930756.00	-0.2163
13	1.00	1.00	0.70	1.20	1.00	0.15	-10724317.00	-0.3578
14	1.00	1.00	0.70	1.20	1.00	0.20	-16385635.00	-0.6464
15	1.00	1.00	0.70	1.20	1.00	0.25	-22046960.00	-0.9202
16	1.00	1.00	0.70	1.20	1.20	0.15	-11838179.00	-0.4061
17	1.00	1.00	0.70	1.20	1.20	0.20	-17499488.00	-0.6892
18	1.00	1.00	0.70	1.20	1.20	0.25	-23160816.00	-0.9584
19	1.00	1.00	0.60	0.80	1.00	0.15	1696210.00	0.2612
20	1.00	1.00	0.60	0.80	1.00	0.20	-972706.00	0.1330
21	1.00	1.00	0.60	0.80	1.00	0.25	-3698068.00	-0.0013
22	1.00	1.00	0.60	0.80	1.20	0.15	1078452.00	0.2313
23	1.00	1.00	0.60	0.80	1.20	0.20	-1590461.00	0.1037
24	1.00	1.00	0.60	0.80	1.20	0.25	-4460182.00	-0.0395
25	1.00	1.00	0.60	1.00	1.00	0.15	-8515292.00	-0.2534
26	1.00	1.00	0.60	1.00	1.00	0.20	-13367863.00	-0.5097
27	1.00	1.00	0.60	1.00	1.00	0.25	-18220416.00	-0.7607
28	1.00	1.00	0.60	1.00	1.20	0.15	-9629151.00	-0.3043
29	1.00	1.00	0.60	1.00	1.20	0.20	-14481722.00	-0.5566
30	1.00	1.00	0.60	1.00	1.20	0.25	-19334256.00	-0.8031
31	1.00	1.00	0.60	1.20	1.00	0.15	-23745344.00	-0.9996
32	1.00	1.00	0.60	1.20	1.00	0.20	-28597920.00	-1.2219
33	1.00	1.00	0.60	1.20	1.00	0.25	-33450496.00	-1.4368
34	1.00	1.00	0.60	1.20	1.20	0.15	-24859216.00	-1.0368

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
35	1.00	1.00	0.60	1.20	1.20	0.20	-29711760.00	-1.2569
36	1.00	1.00	0.60	1.20	1.20	0.25	-34564336.00	-1.4690
37	1.00	1.00	0.50	0.80	1.00	0.15	-6319145.00	-0.1456
38	1.00	1.00	0.50	0.80	1.00	0.20	-10350036.00	-0.3626
39	1.00	1.00	0.50	0.80	1.00	0.25	-14393853.00	-0.5820
40	1.00	1.00	0.50	0.80	1.20	0.15	-7420088.00	-0.1984
41	1.00	1.00	0.50	0.80	1.20	0.20	-11463898.00	-0.4133
42	1.00	1.00	0.50	0.80	1.20	0.25	-15507702.00	-0.6292
43	1.00	1.00	0.50	1.00	1.00	0.15	-21536336.00	-0.9264
44	1.00	1.00	0.50	1.00	1.00	0.20	-25580144.00	-1.1235
45	1.00	1.00	0.50	1.00	1.00	0.25	-29623936.00	-1.3166
46	1.00	1.00	0.50	1.00	1.20	0.15	-22650176.00	-0.9664
47	1.00	1.00	0.50	1.00	1.20	0.20	-26693984.00	-1.1613
48	1.00	1.00	0.50	1.00	1.20	0.25	-30737808.00	-1.3525
49	1.00	1.00	0.50	1.20	1.00	0.15	-36766384.00	-1.5738
50	1.00	1.00	0.50	1.20	1.00	0.20	-40810208.00	ERROR
51	1.00	1.00	0.50	1.20	1.00	0.25	-44854048.00	ERROR
52	1.00	1.00	0.50	1.20	1.20	0.15	-37880272.00	ERROR
53	1.00	1.00	0.50	1.20	1.20	0.20	-41924080.00	ERROR
54	1.00	1.00	0.50	1.20	1.20	0.25	-45967872.00	ERROR
55	1.00	0.90	0.70	0.80	1.00	0.15	7386747.00	0.5596
56	1.00	0.90	0.70	0.80	1.00	0.20	4662230.00	0.4191
57	1.00	0.90	0.70	0.80	1.00	0.25	1859875.00	0.2763
58	1.00	0.90	0.70	0.80	1.20	0.15	6800427.00	0.5258
59	1.00	0.90	0.70	0.80	1.20	0.20	4044477.00	0.3860
60	1.00	0.90	0.70	0.80	1.20	0.25	1242119.00	0.2439
61	1.00	0.90	0.70	1.00	1.00	0.15	-168565.00	0.1715
62	1.00	0.90	0.70	1.00	1.00	0.20	-2972996.00	0.0291
63	1.00	0.90	0.70	1.00	1.00	0.25	-6956930.00	-0.2015
64	1.00	0.90	0.70	1.00	1.20	0.15	-786317.00	0.1408
65	1.00	0.90	0.70	1.00	1.20	0.20	-3671702.00	-0.0066
66	1.00	0.90	0.70	1.00	1.20	0.25	-8070784.00	-0.2574
67	1.00	0.90	0.70	1.20	1.00	0.15	-10473608.00	-0.3906
68	1.00	0.90	0.70	1.20	1.00	0.20	-15568806.00	-0.6738
69	1.00	0.90	0.70	1.20	1.00	0.25	-20663984.00	-0.9435
70	1.00	0.90	0.70	1.20	1.20	0.15	-11587464.00	-0.4426
71	1.00	0.90	0.70	1.20	1.20	0.20	-16682651.00	-0.7202
72	1.00	0.90	0.70	1.20	1.20	0.25	-21777824.00	-0.9852
73	1.00	0.90	0.60	0.80	1.00	0.15	1019173.00	0.2329
74	1.00	0.90	0.60	0.80	1.00	0.20	-1382852.00	0.1075
75	1.00	0.90	0.60	0.80	1.00	0.25	-3921293.00	-0.0305
76	1.00	0.90	0.60	0.80	1.20	0.15	401416.00	0.2007
77	1.00	0.90	0.60	0.80	1.20	0.20	-2000604.00	0.0759
78	1.00	0.90	0.60	0.80	1.20	0.25	-4742197.00	-0.0760
79	1.00	0.90	0.60	1.00	1.00	0.15	-8485478.00	-0.2888
80	1.00	0.90	0.60	1.00	1.00	0.20	-12852790.00	-0.5405
81	1.00	0.90	0.60	1.00	1.00	0.25	-17220080.00	-0.7873
82	1.00	0.90	0.60	1.00	1.20	0.15	-9599332.00	-0.3437
83	1.00	0.90	0.60	1.00	1.20	0.20	-13966645.00	-0.5912
84	1.00	0.90	0.60	1.00	1.20	0.25	-18333952.00	-0.8335

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
85	1.00	0.90	0.60	1.20	1.00	0.15	-22192528.00	-1.0220
86	1.00	0.90	0.60	1.20	1.00	0.20	-26559840.00	-1.2421
87	1.00	0.90	0.60	1.20	1.00	0.25	-30927136.00	-1.4544
88	1.00	0.90	0.60	1.20	1.20	0.15	-23306384.00	-1.0627
89	1.00	0.90	0.60	1.20	1.20	0.20	-27673696.00	-1.2804
90	1.00	0.90	0.60	1.20	1.20	0.25	-32041024.00	-1.4895
91	1.00	0.90	0.50	0.80	1.00	0.15	-6497320.00	-0.1834
92	1.00	0.90	0.50	0.80	1.00	0.20	-10136750.00	-0.3969
93	1.00	0.90	0.50	0.80	1.00	0.25	-13776179.00	-0.6126
94	1.00	0.90	0.50	0.80	1.20	0.15	-7611178.00	-0.2407
95	1.00	0.90	0.50	0.80	1.20	0.20	-11250607.00	-0.4516
96	1.00	0.90	0.50	0.80	1.20	0.25	-14890038.00	-0.6638
97	1.00	0.90	0.50	1.00	1.00	0.15	-20204416.00	-0.9508
98	1.00	0.90	0.50	1.00	1.00	0.20	-23843840.00	-1.1458
99	1.00	0.90	0.50	1.00	1.00	0.25	-27483248.00	-1.3369
100	1.00	0.90	0.50	1.00	1.20	0.15	-21318256.00	-0.9945
101	1.00	0.90	0.50	1.00	1.20	0.20	-24957696.00	-1.1872
102	1.00	0.90	0.50	1.00	1.20	0.25	-28597104.00	-1.3762
103	1.00	0.90	0.50	1.20	1.00	0.15	-33911472.00	ERROR
104	1.00	0.90	0.50	1.20	1.00	0.20	-37550896.00	ERROR
105	1.00	0.90	0.50	1.20	1.00	0.25	-41190304.00	ERROR
106	1.00	0.90	0.50	1.20	1.20	0.15	-35025312.00	ERROR
107	1.00	0.90	0.50	1.20	1.20	0.20	-38664720.00	ERROR
108	1.00	0.90	0.50	1.20	1.20	0.25	-42304176.00	ERROR
109	1.00	0.80	0.70	0.80	1.00	0.15	6032642.00	ERROR
110	1.00	0.80	0.70	0.80	1.00	0.20	3580424.00	0.3805
111	1.00	0.80	0.70	0.80	1.00	0.25	1089443.00	0.2417
112	1.00	0.80	0.70	0.80	1.20	0.15	5441798.00	0.4804
113	1.00	0.80	0.70	0.80	1.20	0.20	2962676.00	0.3447
114	1.00	0.80	0.70	0.80	1.20	0.25	471688.00	0.2065
115	1.00	0.80	0.70	1.00	1.00	0.15	-713610.00	0.1408
116	1.00	0.80	0.70	1.00	1.00	0.20	-3264100.00	-0.0028
117	1.00	0.80	0.70	1.00	1.00	0.25	-7096926.00	-0.2457
118	1.00	0.80	0.70	1.00	1.20	0.15	-1331368.00	0.1074
119	1.00	0.80	0.70	1.00	1.20	0.20	-4029150.00	-0.0468
120	1.00	0.80	0.70	1.00	1.20	0.25	-8210784.00	-0.3064
121	1.00	0.80	0.70	1.20	1.00	0.15	-10222853.00	-0.4298
122	1.00	0.80	0.70	1.20	1.00	0.20	-14751922.00	-0.7070
123	1.00	0.80	0.70	1.20	1.00	0.25	-19280960.00	-0.9721
124	1.00	0.80	0.70	1.20	1.20	0.15	-11336714.00	-0.4864
125	1.00	0.80	0.70	1.20	1.20	0.20	-15865781.00	-0.7577
126	1.00	0.80	0.70	1.20	1.20	0.25	-20394832.00	-1.0180
127	1.00	0.80	0.60	0.80	1.00	0.15	342148.00	0.1994
128	1.00	0.80	0.60	0.80	1.00	0.20	-1792983.00	0.0771
129	1.00	0.80	0.60	0.80	1.00	0.25	-4181618.00	-0.0684
130	1.00	0.80	0.60	0.80	1.20	0.15	-275607.00	0.1645
131	1.00	0.80	0.60	0.80	1.20	0.20	-2410736.00	0.0428
132	1.00	0.80	0.60	0.80	1.20	0.25	-5149522.00	-0.1260
133	1.00	0.80	0.60	1.00	1.00	0.15	-8455643.00	-0.3312
134	1.00	0.80	0.60	1.00	1.00	0.20	-12337698.00	-0.5776

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
135	1.00	0.80	0.60	1.00	1.00	0.25	-16219751.00	-0.8197
136	1.00	0.80	0.60	1.00	1.20	0.15	-9569501.00	-0.3908
137	1.00	0.80	0.60	1.00	1.20	0.20	-13451556.00	-0.6329
138	1.00	0.80	0.60	1.00	1.20	0.25	-17333600.00	-0.8703
139	1.00	0.80	0.60	1.20	1.00	0.15	-20639680.00	-1.0495
140	1.00	0.80	0.60	1.20	1.00	0.20	-24521744.00	-1.2669
141	1.00	0.80	0.60	1.20	1.00	0.25	-28403808.00	-1.4758
142	1.00	0.80	0.60	1.20	1.20	0.15	-21753552.00	-1.0944
143	1.00	0.80	0.60	1.20	1.20	0.20	-25635616.00	-1.3093
144	1.00	0.80	0.60	1.20	1.20	0.25	-29517648.00	-1.5143
145	1.00	0.80	0.50	0.80	1.00	0.15	-6688392.00	-0.2290
146	1.00	0.80	0.50	0.80	1.00	0.20	-9923441.00	-0.4381
147	1.00	0.80	0.50	0.80	1.00	0.25	-13158490.00	-0.6496
148	1.00	0.80	0.50	0.80	1.20	0.15	-7802251.00	-0.2911
149	1.00	0.80	0.50	0.80	1.20	0.20	-11037300.00	-0.4976
150	1.00	0.80	0.50	0.80	1.20	0.25	-14272349.00	-0.7055
151	1.00	0.80	0.50	1.00	1.00	0.15	-18872480.00	-0.9806
152	1.00	0.80	0.50	1.00	1.00	0.20	-22107504.00	-1.1731
153	1.00	0.80	0.50	1.00	1.00	0.25	-25342560.00	-1.3618
154	1.00	0.80	0.50	1.00	1.20	0.15	-19986320.00	-1.0288
155	1.00	0.80	0.50	1.00	1.20	0.20	-23221360.00	-1.2190
156	1.00	0.80	0.50	1.00	1.20	0.25	-26456416.00	-1.4051
157	1.00	0.80	0.50	1.20	1.00	0.15	-31056512.00	ERROR
158	1.00	0.80	0.50	1.20	1.00	0.20	-34291536.00	ERROR
159	1.00	0.80	0.50	1.20	1.00	0.25	-37526592.00	ERROR
160	1.00	0.80	0.50	1.20	1.20	0.15	-32170368.00	ERROR
161	1.00	0.80	0.50	1.20	1.20	0.20	-35405408.00	ERROR
162	1.00	0.80	0.50	1.20	1.20	0.25	-38640448.00	ERROR
163	1.00	0.70	0.70	0.80	1.00	0.15	4674013.00	ERROR
164	1.00	0.70	0.70	0.80	1.00	0.20	2498626.00	0.3342
165	1.00	0.70	0.70	0.80	1.00	0.25	319013.00	0.1999
166	1.00	0.70	0.70	0.80	1.20	0.15	4060482.00	0.4261
167	1.00	0.70	0.70	0.80	1.20	0.20	1880874.00	0.2951
168	1.00	0.70	0.70	0.80	1.20	0.25	-298740.00	0.1615
169	1.00	0.70	0.70	1.00	1.00	0.15	-1258660.00	0.1036
170	1.00	0.70	0.70	1.00	1.00	0.20	-3606359.00	-0.0461
171	1.00	0.70	0.70	1.00	1.00	0.25	-7236920.00	-0.2997
172	1.00	0.70	0.70	1.00	1.20	0.15	-1876417.00	0.0669
173	1.00	0.70	0.70	1.00	1.20	0.20	-4448889.00	-0.1011
174	1.00	0.70	0.70	1.00	1.20	0.25	-8350782.00	-0.3660
175	1.00	0.70	0.70	1.20	1.00	0.15	-9972110.00	-0.4780
176	1.00	0.70	0.70	1.20	1.00	0.20	-13935043.00	-0.7481
177	1.00	0.70	0.70	1.20	1.00	0.25	-17897968.00	-1.0078
178	1.00	0.70	0.70	1.20	1.20	0.15	-11085969.00	-0.5399
179	1.00	0.70	0.70	1.20	1.20	0.20	-15048901.00	-0.8041
180	1.00	0.70	0.70	1.20	1.20	0.25	-19011824.00	-1.0590
181	1.00	0.70	0.60	0.80	1.00	0.15	-334874.00	0.1590
182	1.00	0.70	0.60	0.80	1.00	0.20	-2203112.00	0.0404
183	1.00	0.70	0.60	0.80	1.00	0.25	-4558323.00	-0.1222
184	1.00	0.70	0.60	0.80	1.20	0.15	-952627.00	0.1208

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
185	1.00	0.70	0.60	0.80	1.20	0.20	-2820865.00	0.0027
186	1.00	0.70	0.60	0.80	1.20	0.25	-5672181.00	-0.1914
187	1.00	0.70	0.60	1.00	1.00	0.15	-8425802.00	-0.3831
188	1.00	0.70	0.60	1.00	1.00	0.20	-11822602.00	-0.6234
189	1.00	0.70	0.60	1.00	1.00	0.25	-15219399.00	-0.8600
190	1.00	0.70	0.60	1.00	1.20	0.15	-9539663.00	-0.4483
191	1.00	0.70	0.60	1.00	1.20	0.20	-12936460.00	-0.6842
192	1.00	0.70	0.60	1.00	1.20	0.25	-16333261.00	-0.9162
193	1.00	0.70	0.60	1.20	1.00	0.15	-19086848.00	-1.0839
194	1.00	0.70	0.60	1.20	1.00	0.20	-22483616.00	-1.2980
195	1.00	0.70	0.60	1.20	1.00	0.25	-25880448.00	-1.5023
196	1.00	0.70	0.60	1.20	1.20	0.15	-20200688.00	-1.1341
197	1.00	0.70	0.60	1.20	1.20	0.20	-23597488.00	-1.3453
198	1.00	0.70	0.60	1.20	1.20	0.25	-26994288.00	-1.5448
199	1.00	0.70	0.50	0.80	1.00	0.15	-6879463.00	-0.2845
200	1.00	0.70	0.50	0.80	1.00	0.20	-9710130.00	-0.4887
201	1.00	0.70	0.50	0.80	1.00	0.25	-12540797.00	-0.6954
202	1.00	0.70	0.50	0.80	1.20	0.15	-7993321.00	-0.3524
203	1.00	0.70	0.50	0.80	1.20	0.20	-10823987.00	-0.5540
204	1.00	0.70	0.50	0.80	1.20	0.25	-13654652.00	-0.7571
205	1.00	0.70	0.50	1.00	1.00	0.15	-17540528.00	-1.0179
206	1.00	0.70	0.50	1.00	1.00	0.20	-20371200.00	-1.2074
207	1.00	0.70	0.50	1.00	1.00	0.25	-23201856.00	-1.3928
208	1.00	0.70	0.50	1.00	1.20	0.15	-18654384.00	-1.0716
209	1.00	0.70	0.50	1.00	1.20	0.20	-21485040.00	-1.2587
210	1.00	0.70	0.50	1.00	1.20	0.25	-24315712.00	-1.4409
211	1.00	0.70	0.50	1.20	1.00	0.15	-28201584.00	ERROR
212	1.00	0.70	0.50	1.20	1.00	0.20	-31032208.00	ERROR
213	1.00	0.70	0.50	1.20	1.00	0.25	-33862880.00	ERROR
214	1.00	0.70	0.50	1.20	1.20	0.15	-29315408.00	ERROR
215	1.00	0.70	0.50	1.20	1.20	0.20	-32146096.00	ERROR
216	1.00	0.70	0.50	1.20	1.20	0.25	-34976752.00	ERROR
217	1.00	0.60	0.70	0.80	1.00	0.15	3285053.00	0.4034
218	1.00	0.60	0.70	0.80	1.00	0.20	1416815.00	0.2775
219	1.00	0.60	0.70	0.80	1.00	0.25	-451427.00	0.1485
220	1.00	0.60	0.70	0.80	1.20	0.15	2667300.00	0.3599
221	1.00	0.60	0.70	0.80	1.20	0.20	799063.00	0.2345
222	1.00	0.60	0.70	0.80	1.20	0.25	-1069178.00	0.1061
223	1.00	0.60	0.70	1.00	1.00	0.15	-1803717.00	0.0574
224	1.00	0.60	0.70	1.00	1.00	0.20	-4023128.00	-0.1075
225	1.00	0.60	0.70	1.00	1.00	0.25	-7376932.00	-0.3672
226	1.00	0.60	0.70	1.00	1.20	0.15	-2421471.00	0.0168
227	1.00	0.60	0.70	1.00	1.20	0.20	-5093991.00	-0.1813
228	1.00	0.60	0.70	1.00	1.20	0.25	-8490791.00	-0.4407
229	1.00	0.60	0.70	1.20	1.00	0.15	-9721378.00	-0.5387
230	1.00	0.60	0.70	1.20	1.00	0.20	-13118177.00	-0.8006
231	1.00	0.60	0.70	1.20	1.00	0.25	-16514979.00	-1.0537
232	1.00	0.60	0.70	1.20	1.20	0.15	-10835238.00	-0.6073
233	1.00	0.60	0.70	1.20	1.20	0.20	-14232038.00	-0.8632
234	1.00	0.60	0.70	1.20	1.20	0.25	-17628832.00	-1.1118

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
235	1.00	0.60	0.60	0.80	1.00	0.15	-1011899.00	0.1092
236	1.00	0.60	0.60	0.80	1.00	0.20	-2613246.00	-0.0052
237	1.00	0.60	0.60	0.80	1.00	0.25	-5080990.00	-0.1962
238	1.00	0.60	0.60	0.80	1.20	0.15	-1629652.00	0.0669
239	1.00	0.60	0.60	0.80	1.20	0.20	-3315890.00	-0.0552
240	1.00	0.60	0.60	0.80	1.20	0.25	-6194848.00	-0.2727
241	1.00	0.60	0.60	1.00	1.00	0.15	-8395972.00	-0.4482
242	1.00	0.60	0.60	1.00	1.00	0.20	-11307513.00	-0.6815
243	1.00	0.60	0.60	1.00	1.00	0.25	-14219058.00	-0.9117
244	1.00	0.60	0.60	1.00	1.20	0.15	-9509832.00	-0.5205
245	1.00	0.60	0.60	1.00	1.20	0.20	-12421373.00	-0.7493
246	1.00	0.60	0.60	1.00	1.20	0.25	-15332916.00	-0.9749
247	1.00	0.60	0.60	1.20	1.00	0.15	-17534000.00	-1.1283
248	1.00	0.60	0.60	1.20	1.00	0.20	-20445552.00	-1.3381
249	1.00	0.60	0.60	1.20	1.00	0.25	-23357088.00	-1.5358
250	1.00	0.60	0.60	1.20	1.20	0.15	-18647872.00	-1.1853
251	1.00	0.60	0.60	1.20	1.20	0.20	-21559392.00	-1.3916
252	1.00	0.60	0.60	1.20	1.20	0.25	-24470944.00	ERROR
253	1.00	0.60	0.50	0.80	1.00	0.15	-7070536.00	-0.3539
254	1.00	0.60	0.50	0.80	1.00	0.20	-9496824.00	-0.5525
255	1.00	0.60	0.50	0.80	1.00	0.25	-11923107.00	-0.7536
256	1.00	0.60	0.50	0.80	1.20	0.15	-8184394.00	-0.4293
257	1.00	0.60	0.50	0.80	1.20	0.20	-10610680.00	-0.6252
258	1.00	0.60	0.50	0.80	1.20	0.25	-13036966.00	-0.8227
259	1.00	0.60	0.50	1.00	1.00	0.15	-16208603.00	-1.0660
260	1.00	0.60	0.50	1.00	1.00	0.20	-18634880.00	-1.2518
261	1.00	0.60	0.50	1.00	1.00	0.25	-21061136.00	-1.4326
262	1.00	0.60	0.50	1.00	1.20	0.15	-17322448.00	-1.1268
263	1.00	0.60	0.50	1.00	1.20	0.20	-19748736.00	-1.3099
264	1.00	0.60	0.50	1.00	1.20	0.25	-22175008.00	-1.4865
265	1.00	0.60	0.50	1.20	1.00	0.15	-25346624.00	ERROR
266	1.00	0.60	0.50	1.20	1.00	0.20	-27772912.00	ERROR
267	1.00	0.60	0.50	1.20	1.00	0.25	-30199184.00	ERROR
268	1.00	0.60	0.50	1.20	1.20	0.15	-26460480.00	ERROR
269	1.00	0.60	0.50	1.20	1.20	0.20	-28886736.00	ERROR
270	1.00	0.60	0.50	1.20	1.20	0.25	-31313024.00	ERROR
271	1.00	0.50	0.70	0.80	1.00	0.15	1891872.00	0.3254
272	1.00	0.50	0.70	0.80	1.00	0.20	335007.00	0.2061
273	1.00	0.50	0.70	0.80	1.00	0.25	-1221862.00	0.0835
274	1.00	0.50	0.70	0.80	1.20	0.15	1274116.00	0.2770
275	1.00	0.50	0.70	0.80	1.20	0.20	-282748.00	0.1582
276	1.00	0.50	0.70	0.80	1.20	0.25	-1839613.00	0.0359
277	1.00	0.50	0.70	1.00	1.00	0.15	-2348776.00	-0.0016
278	1.00	0.50	0.70	1.00	1.00	0.20	-4686282.00	-0.2022
279	1.00	0.50	0.70	1.00	1.00	0.25	-7516947.00	-0.4548
280	1.00	0.50	0.70	1.00	1.20	0.15	-3043699.00	-0.0556
281	1.00	0.50	0.70	1.00	1.20	0.20	-5800140.00	-0.2871
282	1.00	0.50	0.70	1.00	1.20	0.25	-8630808.00	-0.5377
283	1.00	0.50	0.70	1.20	1.00	0.15	-9470659.00	-0.6179
284	1.00	0.50	0.70	1.20	1.00	0.20	-12301324.00	-0.8699

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
285	1.00	0.50	0.70	1.20	1.00	0.25	-15131990.00	-1.1154
286	1.00	0.50	0.70	1.20	1.20	0.15	-10584517.00	-0.6953
287	1.00	0.50	0.70	1.20	1.20	0.20	-13415184.00	-0.9414
288	1.00	0.50	0.70	1.20	1.20	0.25	-16245849.00	-1.1824
289	1.00	0.50	0.60	0.80	1.00	0.15	-1688922.00	0.0459
290	1.00	0.50	0.60	0.80	1.00	0.20	-3177369.00	-0.0790
291	1.00	0.50	0.60	0.80	1.00	0.25	-5603656.00	-0.2913
292	1.00	0.50	0.60	0.80	1.20	0.15	-2306677.00	-0.0015
293	1.00	0.50	0.60	0.80	1.20	0.20	-4291229.00	-0.1656
294	1.00	0.50	0.60	0.80	1.20	0.25	-6717516.00	-0.3775
295	1.00	0.50	0.60	1.00	1.00	0.15	-8366150.00	-0.5330
296	1.00	0.50	0.60	1.00	1.00	0.20	-10792436.00	-0.7580
297	1.00	0.50	0.60	1.00	1.00	0.25	-13218721.00	-0.9805
298	1.00	0.50	0.60	1.00	1.20	0.15	-9480007.00	-0.6146
299	1.00	0.50	0.60	1.00	1.20	0.20	-11906294.00	-0.8349
300	1.00	0.50	0.60	1.00	1.20	0.25	-14332581.00	-1.0530
301	1.00	0.50	0.60	1.20	1.00	0.15	-15981191.00	-1.1881
302	1.00	0.50	0.60	1.20	1.00	0.20	-18407456.00	-1.3916
303	1.00	0.50	0.60	1.20	1.00	0.25	-20833744.00	ERROR
304	1.00	0.50	0.60	1.20	1.20	0.15	-17095040.00	-1.2539
305	1.00	0.50	0.60	1.20	1.20	0.20	-19521328.00	-1.4526
306	1.00	0.50	0.60	1.20	1.20	0.25	-21947600.00	ERROR
307	1.00	0.50	0.50	0.80	1.00	0.15	-7261612.00	-0.4440
308	1.00	0.50	0.50	0.80	1.00	0.20	-9283517.00	-0.6362
309	1.00	0.50	0.50	0.80	1.00	0.25	-11305427.00	-0.8307
310	1.00	0.50	0.50	0.80	1.20	0.15	-8375474.00	-0.5291
311	1.00	0.50	0.50	0.80	1.20	0.20	-10397378.00	-0.7186
312	1.00	0.50	0.50	0.80	1.20	0.25	-12419288.00	-0.9095
313	1.00	0.50	0.50	1.00	1.00	0.15	-14876677.00	-1.1305
314	1.00	0.50	0.50	1.00	1.00	0.20	-16898576.00	-1.3112
315	1.00	0.50	0.50	1.00	1.00	0.25	-18920480.00	-1.4848
316	1.00	0.50	0.50	1.00	1.20	0.15	-15990535.00	-1.2006
317	1.00	0.50	0.50	1.00	1.20	0.20	-18012432.00	-1.3779
318	1.00	0.50	0.50	1.00	1.20	0.25	-20034336.00	-1.5454
319	1.00	0.50	0.50	1.20	1.00	0.15	-22491696.00	ERROR
320	1.00	0.50	0.50	1.20	1.00	0.20	-24513600.00	ERROR
321	1.00	0.50	0.50	1.20	1.00	0.25	-26535504.00	ERROR
322	1.00	0.50	0.50	1.20	1.20	0.15	-23605568.00	ERROR
323	1.00	0.50	0.50	1.20	1.20	0.20	-25627456.00	ERROR
324	1.00	0.50	0.50	1.20	1.20	0.25	-27649376.00	ERROR
325	1.20	1.00	0.70	0.80	1.00	0.15	8427278.00	0.5647
326	1.20	1.00	0.70	0.80	1.00	0.20	5413334.00	0.4264
327	1.20	1.00	0.70	0.80	1.00	0.25	2299604.00	0.2858
328	1.20	1.00	0.70	0.80	1.20	0.15	7827539.00	0.5337
329	1.20	1.00	0.70	0.80	1.20	0.20	4775856.00	0.3960
330	1.20	1.00	0.70	0.80	1.20	0.25	1662126.00	0.2559
331	1.20	1.00	0.70	1.00	1.00	0.15	45785.00	0.1820
332	1.20	1.00	0.70	1.00	1.00	0.20	-3067949.00	0.0415
333	1.20	1.00	0.70	1.00	1.00	0.25	-7272208.00	-0.1741
334	1.20	1.00	0.70	1.00	1.20	0.15	-591695.00	0.1538

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
335	1.20	1.00	0.70	1.00	1.20	0.20	-3742036.00	0.0116
336	1.20	1.00	0.70	1.00	1.20	0.25	-8376250.00	-0.2249
337	1.20	1.00	0.70	1.20	1.00	0.15	-11134248.00	-0.3619
338	1.20	1.00	0.70	1.20	1.00	0.20	-16795552.00	-0.6462
339	1.20	1.00	0.70	1.20	1.00	0.25	-22456880.00	-0.9177
340	1.20	1.00	0.70	1.20	1.20	0.15	-12283671.00	-0.4104
341	1.20	1.00	0.70	1.20	1.20	0.20	-17944992.00	-0.6896
342	1.20	1.00	0.70	1.20	1.20	0.25	-23606320.00	-0.9564
343	1.20	1.00	0.60	0.80	1.00	0.15	1365489.00	0.2430
344	1.20	1.00	0.60	0.80	1.00	0.20	-1303426.00	0.1192
345	1.20	1.00	0.60	0.80	1.00	0.25	-4037969.00	-0.0115
346	1.20	1.00	0.60	0.80	1.20	0.15	728009.00	0.2134
347	1.20	1.00	0.60	0.80	1.20	0.20	-1940903.00	0.0901
348	1.20	1.00	0.60	0.80	1.20	0.25	-4835673.00	-0.0504
349	1.20	1.00	0.60	1.00	1.00	0.15	-8925220.00	-0.2598
350	1.20	1.00	0.60	1.00	1.00	0.20	-13777792.00	-0.5112
351	1.20	1.00	0.60	1.00	1.00	0.25	-18630352.00	-0.7593
352	1.20	1.00	0.60	1.00	1.20	0.15	-10074645.00	-0.3108
353	1.20	1.00	0.60	1.00	1.20	0.20	-14927210.00	-0.5586
354	1.20	1.00	0.60	1.00	1.20	0.25	-19779760.00	-0.8024
355	1.20	1.00	0.60	1.20	1.00	0.15	-24155280.00	-0.9965
356	1.20	1.00	0.60	1.20	1.00	0.20	-29007856.00	-1.2174
357	1.20	1.00	0.60	1.20	1.00	0.25	-33860416.00	-1.4308
358	1.20	1.00	0.60	1.20	1.20	0.15	-25304704.00	-1.0343
359	1.20	1.00	0.60	1.20	1.20	0.20	-30157264.00	-1.2529
360	1.20	1.00	0.60	1.20	1.20	0.25	-35009824.00	-1.4634
361	1.20	1.00	0.50	0.80	1.00	0.15	-6716160.00	-0.1546
362	1.20	1.00	0.50	0.80	1.00	0.20	-10759971.00	-0.3667
363	1.20	1.00	0.50	0.80	1.00	0.25	-14803787.00	-0.5826
364	1.20	1.00	0.50	0.80	1.20	0.15	-7865584.00	-0.2076
365	1.20	1.00	0.50	0.80	1.20	0.20	-11909393.00	-0.4177
366	1.20	1.00	0.50	0.80	1.20	0.25	-15953208.00	-0.6304
367	1.20	1.00	0.50	1.00	1.00	0.15	-21946256.00	-0.9237
368	1.20	1.00	0.50	1.00	1.00	0.20	-25990064.00	-1.1193
369	1.20	1.00	0.50	1.00	1.00	0.25	-30033872.00	-1.3111
370	1.20	1.00	0.50	1.00	1.20	0.15	-23095680.00	-0.9643
371	1.20	1.00	0.50	1.00	1.20	0.20	-27139456.00	-1.1578
372	1.20	1.00	0.50	1.00	1.20	0.25	-31183296.00	-1.3475
373	1.20	1.00	0.50	1.20	1.00	0.15	-37176320.00	ERROR
374	1.20	1.00	0.50	1.20	1.00	0.20	-41220128.00	ERROR
375	1.20	1.00	0.50	1.20	1.00	0.25	-45263952.00	ERROR
376	1.20	1.00	0.50	1.20	1.20	0.15	-38325776.00	ERROR
377	1.20	1.00	0.50	1.20	1.20	0.20	-42369552.00	ERROR
378	1.20	1.00	0.50	1.20	1.20	0.25	-46413360.00	ERROR
379	1.20	0.90	0.70	0.80	1.00	0.15	7078557.00	0.5276
380	1.20	0.90	0.70	0.80	1.00	0.20	4331513.00	0.3931
381	1.20	0.90	0.70	0.80	1.00	0.25	1529156.00	0.2561
382	1.20	0.90	0.70	0.80	1.20	0.15	6468881.00	0.4944
383	1.20	0.90	0.70	0.80	1.20	0.20	3694032.00	0.3605
384	1.20	0.90	0.70	0.80	1.20	0.25	891674.00	0.2241

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
385	1.20	0.90	0.70	1.00	1.00	0.15	-499282.00	0.1559
386	1.20	0.90	0.70	1.00	1.00	0.20	-3312894.00	0.0176
387	1.20	0.90	0.70	1.00	1.00	0.25	-7366858.00	-0.2098
388	1.20	0.90	0.70	1.00	1.20	0.15	-1136761.00	0.1254
389	1.20	0.90	0.70	1.00	1.20	0.20	-4039561.00	-0.0184
390	1.20	0.90	0.70	1.00	1.20	0.25	-8516280.00	-0.2656
391	1.20	0.90	0.70	1.20	1.00	0.15	-10883538.00	-0.3943
392	1.20	0.90	0.70	1.20	1.00	0.20	-15978723.00	-0.6733
393	1.20	0.90	0.70	1.20	1.00	0.25	-21073920.00	-0.9406
394	1.20	0.90	0.70	1.20	1.20	0.15	-12032959.00	-0.4466
395	1.20	0.90	0.70	1.20	1.20	0.20	-17128144.00	-0.7203
396	1.20	0.90	0.70	1.20	1.20	0.25	-22223344.00	-0.9829
397	1.20	0.90	0.60	0.80	1.00	0.15	688452.00	0.2144
398	1.20	0.90	0.60	0.80	1.00	0.20	-1713570.00	0.0935
399	1.20	0.90	0.60	0.80	1.00	0.25	-4272886.00	-0.0414
400	1.20	0.90	0.60	0.80	1.20	0.15	50973.00	0.1825
401	1.20	0.90	0.60	0.80	1.20	0.20	-2351049.00	0.0622
402	1.20	0.90	0.60	0.80	1.20	0.25	-5135586.00	-0.0878
403	1.20	0.90	0.60	1.00	1.00	0.15	-8895407.00	-0.2949
404	1.20	0.90	0.60	1.00	1.00	0.20	-13262721.00	-0.5417
405	1.20	0.90	0.60	1.00	1.00	0.25	-17630016.00	-0.7856
406	1.20	0.90	0.60	1.00	1.20	0.15	-10044828.00	-0.3498
407	1.20	0.90	0.60	1.00	1.20	0.20	-14412140.00	-0.5929
408	1.20	0.90	0.60	1.00	1.20	0.25	-18779440.00	-0.8324
409	1.20	0.90	0.60	1.20	1.00	0.15	-22602464.00	-1.0184
410	1.20	0.90	0.60	1.20	1.00	0.20	-26969792.00	-1.2370
411	1.20	0.90	0.60	1.20	1.00	0.25	-31337088.00	-1.4476
412	1.20	0.90	0.60	1.20	1.20	0.15	-23751872.00	-1.0597
413	1.20	0.90	0.60	1.20	1.20	0.20	-28119184.00	-1.2758
414	1.20	0.90	0.60	1.20	1.20	0.25	-32486496.00	-1.4831
415	1.20	0.90	0.50	0.80	1.00	0.15	-6907251.00	-0.1924
416	1.20	0.90	0.50	0.80	1.00	0.20	-10546680.00	-0.4007
417	1.20	0.90	0.50	0.80	1.00	0.25	-14186109.00	-0.6128
418	1.20	0.90	0.50	0.80	1.20	0.15	-8056674.00	-0.2495
419	1.20	0.90	0.50	0.80	1.20	0.20	-11696103.00	-0.4556
420	1.20	0.90	0.50	0.80	1.20	0.25	-15335534.00	-0.6645
421	1.20	0.90	0.50	1.00	1.00	0.15	-20614320.00	-0.9476
422	1.20	0.90	0.50	1.00	1.00	0.20	-24253760.00	-1.1411
423	1.20	0.90	0.50	1.00	1.00	0.25	-27893184.00	-1.3307
424	1.20	0.90	0.50	1.00	1.20	0.15	-21763744.00	-0.9919
425	1.20	0.90	0.50	1.00	1.20	0.20	-25403168.00	-1.1831
426	1.20	0.90	0.50	1.00	1.20	0.25	-29042608.00	-1.3706
427	1.20	0.90	0.50	1.20	1.00	0.15	-34321408.00	ERROR
428	1.20	0.90	0.50	1.20	1.00	0.20	-37960816.00	ERROR
429	1.20	0.90	0.50	1.20	1.00	0.25	-41600240.00	ERROR
430	1.20	0.90	0.50	1.20	1.20	0.15	-35470784.00	ERROR
431	1.20	0.90	0.50	1.20	1.20	0.20	-39110240.00	ERROR
432	1.20	0.90	0.50	1.20	1.20	0.25	-42749664.00	ERROR
433	1.20	0.80	0.70	0.80	1.00	0.15	5719926.00	0.4842
434	1.20	0.80	0.70	0.80	1.00	0.20	3249709.00	0.3540

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
435	1.20	0.80	0.70	0.80	1.00	0.25	758725.00	0.2211
436	1.20	0.80	0.70	0.80	1.20	0.15	5103212.00	ERROR
437	1.20	0.80	0.70	0.80	1.20	0.20	2612229.00	0.3189
438	1.20	0.80	0.70	0.80	1.20	0.25	121243.00	0.1865
439	1.20	0.80	0.70	1.00	1.00	0.15	-1044329.00	0.1249
440	1.20	0.80	0.70	1.00	1.00	0.20	-3603997.00	-0.0144
441	1.20	0.80	0.70	1.00	1.00	0.25	-7506854.00	-0.2535
442	1.20	0.80	0.70	1.00	1.20	0.15	-1681808.00	0.0919
443	1.20	0.80	0.70	1.00	1.20	0.20	-4404637.00	-0.0591
444	1.20	0.80	0.70	1.00	1.20	0.25	-8656277.00	-0.3140
445	1.20	0.80	0.70	1.20	1.00	0.15	-10632784.00	-0.4331
446	1.20	0.80	0.70	1.20	1.00	0.20	-15161850.00	-0.7061
447	1.20	0.80	0.70	1.20	1.00	0.25	-19690880.00	-0.9685
448	1.20	0.80	0.70	1.20	1.20	0.15	-11782207.00	-0.4899
449	1.20	0.80	0.70	1.20	1.20	0.20	-16311264.00	-0.7574
450	1.20	0.80	0.70	1.20	1.20	0.25	-20840304.00	-1.0151
451	1.20	0.80	0.60	0.80	1.00	0.15	11431.00	0.1806
452	1.20	0.80	0.60	0.80	1.00	0.20	-2123702.00	0.0630
453	1.20	0.80	0.60	0.80	1.00	0.25	-4548121.00	-0.0801
454	1.20	0.80	0.60	0.80	1.20	0.15	-626049.00	0.1462
455	1.20	0.80	0.60	0.80	1.20	0.20	-2761180.00	0.0291
456	1.20	0.80	0.60	0.80	1.20	0.25	-5595019.00	-0.1391
457	1.20	0.80	0.60	1.00	1.00	0.15	-8865571.00	-0.3368
458	1.20	0.80	0.60	1.00	1.00	0.20	-12747626.00	-0.5784
459	1.20	0.80	0.60	1.00	1.00	0.25	-16629683.00	-0.8175
460	1.20	0.80	0.60	1.00	1.20	0.15	-10014995.00	-0.3964
461	1.20	0.80	0.60	1.00	1.20	0.20	-13897050.00	-0.6342
462	1.20	0.80	0.60	1.00	1.20	0.25	-17779104.00	-0.8688
463	1.20	0.80	0.60	1.20	1.00	0.15	-21049616.00	-1.0453
464	1.20	0.80	0.60	1.20	1.00	0.20	-24931664.00	-1.2610
465	1.20	0.80	0.60	1.20	1.00	0.25	-28813712.00	-1.4680
466	1.20	0.80	0.60	1.20	1.20	0.15	-22199056.00	-1.0908
467	1.20	0.80	0.60	1.20	1.20	0.20	-26081088.00	-1.3039
468	1.20	0.80	0.60	1.20	1.20	0.25	-29963152.00	-1.5069
469	1.20	0.80	0.50	0.80	1.00	0.15	-7098321.00	-0.2374
470	1.20	0.80	0.50	0.80	1.00	0.20	-10333371.00	-0.4414
471	1.20	0.80	0.50	0.80	1.00	0.25	-13568420.00	-0.6493
472	1.20	0.80	0.50	0.80	1.20	0.15	-8247749.00	-0.2993
473	1.20	0.80	0.50	0.80	1.20	0.20	-11482797.00	-0.5011
474	1.20	0.80	0.50	0.80	1.20	0.25	-14717842.00	-0.7058
475	1.20	0.80	0.50	1.00	1.00	0.15	-19282400.00	-0.9768
476	1.20	0.80	0.50	1.00	1.00	0.20	-22517440.00	-1.1676
477	1.20	0.80	0.50	1.00	1.00	0.25	-25752480.00	-1.3547
478	1.20	0.80	0.50	1.00	1.20	0.15	-20431808.00	-1.0256
479	1.20	0.80	0.50	1.00	1.20	0.20	-23666864.00	-1.2141
480	1.20	0.80	0.50	1.00	1.20	0.25	-26901904.00	-1.3985
481	1.20	0.80	0.50	1.20	1.00	0.15	-31466432.00	ERROR
482	1.20	0.80	0.50	1.20	1.00	0.20	-34701472.00	ERROR
483	1.20	0.80	0.50	1.20	1.00	0.25	-37936528.00	ERROR
484	1.20	0.80	0.50	1.20	1.20	0.15	-32615872.00	ERROR

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
485	1.20	0.80	0.50	1.20	1.20	0.20	-35850896.00	ERROR
486	1.20	0.80	0.50	1.20	1.20	0.25	-39085936.00	ERROR
487	1.20	0.70	0.70	0.80	1.00	0.15	4347520.00	0.4327
488	1.20	0.70	0.70	0.80	1.00	0.20	2167909.00	0.3075
489	1.20	0.70	0.70	0.80	1.00	0.25	-11705.00	0.1793
490	1.20	0.70	0.70	0.80	1.20	0.15	3710038.00	0.3940
491	1.20	0.70	0.70	0.80	1.20	0.20	1530428.00	0.2693
492	1.20	0.70	0.70	0.80	1.20	0.25	-649186.00	0.1416
493	1.20	0.70	0.70	1.00	1.00	0.15	-1589378.00	0.0876
494	1.20	0.70	0.70	1.00	1.00	0.20	-3957956.00	-0.0584
495	1.20	0.70	0.70	1.00	1.00	0.25	-7646853.00	-0.3067
496	1.20	0.70	0.70	1.00	1.20	0.15	-2226854.00	0.0515
497	1.20	0.70	0.70	1.00	1.20	0.20	-4849319.00	-0.1144
498	1.20	0.70	0.70	1.00	1.20	0.25	-8796271.00	-0.3729
499	1.20	0.70	0.70	1.20	1.00	0.15	-10382040.00	-0.4806
500	1.20	0.70	0.70	1.20	1.00	0.20	-14344973.00	-0.7465
501	1.20	0.70	0.70	1.20	1.00	0.25	-18307888.00	-1.0034
502	1.20	0.70	0.70	1.20	1.20	0.15	-11531464.00	-0.5429
503	1.20	0.70	0.70	1.20	1.20	0.20	-15494395.00	-0.8031
504	1.20	0.70	0.70	1.20	1.20	0.25	-19457312.00	-1.0553
505	1.20	0.70	0.60	0.80	1.00	0.15	-665591.00	0.1402
506	1.20	0.70	0.60	0.80	1.00	0.20	-2533828.00	0.0264
507	1.20	0.70	0.60	0.80	1.00	0.25	-4968252.00	-0.1350
508	1.20	0.70	0.60	0.80	1.20	0.15	-1303070.00	0.1026
509	1.20	0.70	0.60	0.80	1.20	0.20	-3171310.00	-0.0108
510	1.20	0.70	0.60	0.80	1.20	0.25	-6117679.00	-0.2036
511	1.20	0.70	0.60	1.00	1.00	0.15	-8835734.00	-0.3879
512	1.20	0.70	0.60	1.00	1.00	0.20	-12232533.00	-0.6235
513	1.20	0.70	0.60	1.00	1.00	0.25	-15629334.00	-0.8571
514	1.20	0.70	0.60	1.00	1.20	0.15	-9985151.00	-0.4532
515	1.20	0.70	0.60	1.00	1.20	0.20	-13381950.00	-0.6849
516	1.20	0.70	0.60	1.00	1.20	0.25	-16778736.00	-0.9139
517	1.20	0.70	0.60	1.20	1.00	0.15	-19496784.00	-1.0788
518	1.20	0.70	0.60	1.20	1.00	0.20	-22893568.00	-1.2910
519	1.20	0.70	0.60	1.20	1.00	0.25	-26290352.00	-1.4932
520	1.20	0.70	0.60	1.20	1.20	0.15	-20646208.00	-1.1297
521	1.20	0.70	0.60	1.20	1.20	0.20	-24042992.00	-1.3390
522	1.20	0.70	0.60	1.20	1.20	0.25	-27439760.00	-1.5361
523	1.20	0.70	0.50	0.80	1.00	0.15	-7289391.00	-0.2921
524	1.20	0.70	0.50	0.80	1.00	0.20	-10120060.00	-0.4912
525	1.20	0.70	0.50	0.80	1.00	0.25	-12950725.00	-0.6943
526	1.20	0.70	0.50	0.80	1.20	0.15	-8438816.00	-0.3598
527	1.20	0.70	0.50	0.80	1.20	0.20	-11269484.00	-0.5568
528	1.20	0.70	0.50	0.80	1.20	0.25	-14100150.00	-0.7567
529	1.20	0.70	0.50	1.00	1.00	0.15	-17950464.00	-1.0133
530	1.20	0.70	0.50	1.00	1.00	0.20	-20781120.00	-1.2009
531	1.20	0.70	0.50	1.00	1.00	0.25	-23611792.00	-1.3845
532	1.20	0.70	0.50	1.00	1.20	0.15	-19099872.00	-1.0677
533	1.20	0.70	0.50	1.00	1.20	0.20	-21930528.00	-1.2529
534	1.20	0.70	0.50	1.00	1.20	0.25	-24761184.00	-1.4332

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
535	1.20	0.70	0.50	1.20	1.00	0.15	-28611472.00	ERROR
536	1.20	0.70	0.50	1.20	1.00	0.20	-31442160.00	ERROR
537	1.20	0.70	0.50	1.20	1.00	0.25	-34272800.00	ERROR
538	1.20	0.70	0.50	1.20	1.20	0.15	-29760912.00	ERROR
539	1.20	0.70	0.50	1.20	1.20	0.20	-32591568.00	ERROR
540	1.20	0.70	0.50	1.20	1.20	0.25	-35422256.00	ERROR
541	1.20	0.60	0.70	0.80	1.00	0.15	2954333.00	0.3704
542	1.20	0.60	0.70	0.80	1.00	0.20	1086097.00	0.2509
543	1.20	0.60	0.70	0.80	1.00	0.25	-782144.00	0.1282
544	1.20	0.60	0.70	0.80	1.20	0.15	2316859.00	0.3281
545	1.20	0.60	0.70	0.80	1.20	0.20	448621.00	0.2091
546	1.20	0.60	0.70	0.80	1.20	0.25	-1419621.00	0.0867
547	1.20	0.60	0.70	1.00	1.00	0.15	-2134435.00	0.0417
548	1.20	0.60	0.70	1.00	1.00	0.20	-4399918.00	-0.1207
549	1.20	0.60	0.70	1.00	1.00	0.25	-7786862.00	-0.3731
550	1.20	0.60	0.70	1.00	1.20	0.15	-2771912.00	0.0017
551	1.20	0.60	0.70	1.00	1.20	0.20	-5539483.00	-0.1949
552	1.20	0.60	0.70	1.00	1.20	0.25	-8936284.00	-0.4464
553	1.20	0.60	0.70	1.20	1.00	0.15	-10131309.00	-0.5403
554	1.20	0.60	0.70	1.20	1.00	0.20	-13528109.00	-0.7980
555	1.20	0.60	0.70	1.20	1.00	0.25	-16924896.00	-1.0483
556	1.20	0.60	0.70	1.20	1.20	0.15	-11280735.00	-0.6093
557	1.20	0.60	0.70	1.20	1.20	0.20	-14677534.00	-0.8613
558	1.20	0.60	0.70	1.20	1.20	0.25	-18074320.00	-1.1070
559	1.20	0.60	0.60	0.80	1.00	0.15	-1342618.00	0.0906
560	1.20	0.60	0.60	0.80	1.00	0.20	-2943965.00	-0.0189
561	1.20	0.60	0.60	0.80	1.00	0.25	-5490920.00	-0.2076
562	1.20	0.60	0.60	0.80	1.20	0.15	-1980094.00	0.0492
563	1.20	0.60	0.60	0.80	1.20	0.20	-3728799.00	-0.0723
564	1.20	0.60	0.60	0.80	1.20	0.25	-6640343.00	-0.2834
565	1.20	0.60	0.60	1.00	1.00	0.15	-8805901.00	-0.4520
566	1.20	0.60	0.60	1.00	1.00	0.20	-11717444.00	-0.6807
567	1.20	0.60	0.60	1.00	1.00	0.25	-14628989.00	-0.9076
568	1.20	0.60	0.60	1.00	1.20	0.15	-9955324.00	-0.5244
569	1.20	0.60	0.60	1.00	1.20	0.20	-12866866.00	-0.7490
570	1.20	0.60	0.60	1.00	1.20	0.25	-15778409.00	-0.9715
571	1.20	0.60	0.60	1.20	1.00	0.15	-17943936.00	-1.1221
572	1.20	0.60	0.60	1.20	1.00	0.20	-20855472.00	-1.3297
573	1.20	0.60	0.60	1.20	1.00	0.25	-23766992.00	-1.5249
574	1.20	0.60	0.60	1.20	1.20	0.15	-19093360.00	-1.1797
575	1.20	0.60	0.60	1.20	1.20	0.20	-22004912.00	-1.3838
576	1.20	0.60	0.60	1.20	1.20	0.25	-24916432.00	ERROR
577	1.20	0.60	0.50	0.80	1.00	0.15	-7480469.00	-0.3602
578	1.20	0.60	0.50	0.80	1.00	0.20	-9906755.00	-0.5540
579	1.20	0.60	0.50	0.80	1.00	0.25	-12333037.00	-0.7516
580	1.20	0.60	0.50	0.80	1.20	0.15	-8629890.00	-0.4354
581	1.20	0.60	0.50	0.80	1.20	0.20	-11056175.00	-0.6270
582	1.20	0.60	0.50	0.80	1.20	0.25	-13482462.00	-0.8213
583	1.20	0.60	0.50	1.00	1.00	0.15	-16618535.00	-1.0601
584	1.20	0.60	0.50	1.00	1.00	0.20	-19044800.00	-1.2438

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
585	1.20	0.60	0.50	1.00	1.00	0.25	-21471088.00	-1.4225
586	1.20	0.60	0.50	1.00	1.20	0.15	-17767936.00	-1.1216
587	1.20	0.60	0.50	1.00	1.20	0.20	-20194224.00	-1.3026
588	1.20	0.60	0.50	1.00	1.20	0.25	-22620512.00	-1.4769
589	1.20	0.60	0.50	1.20	1.00	0.15	-25756544.00	ERROR
590	1.20	0.60	0.50	1.20	1.00	0.20	-28182816.00	ERROR
591	1.20	0.60	0.50	1.20	1.00	0.25	-30609120.00	ERROR
592	1.20	0.60	0.50	1.20	1.20	0.15	-26905984.00	ERROR
593	1.20	0.60	0.50	1.20	1.20	0.20	-29332240.00	ERROR
594	1.20	0.60	0.50	1.20	1.20	0.25	-31758528.00	ERROR
595	1.20	0.50	0.70	0.80	1.00	0.15	1561150.00	0.2931
596	1.20	0.50	0.70	0.80	1.00	0.20	4286.00	0.1803
597	1.20	0.50	0.70	0.80	1.00	0.25	-1552580.00	0.0639
598	1.20	0.50	0.70	0.80	1.20	0.15	923673.00	0.2464
599	1.20	0.50	0.70	0.80	1.20	0.20	-633193.00	0.1338
600	1.20	0.50	0.70	0.80	1.20	0.25	-2190062.00	0.0176
601	1.20	0.50	0.70	1.00	1.00	0.15	-2679496.00	-0.0166
602	1.20	0.50	0.70	1.00	1.00	0.20	-5096213.00	-0.2146
603	1.20	0.50	0.70	1.00	1.00	0.25	-7926882.00	-0.4589
604	1.20	0.50	0.70	1.00	1.20	0.15	-3427767.00	-0.0726
605	1.20	0.50	0.70	1.00	1.20	0.20	-6245637.00	-0.2984
606	1.20	0.50	0.70	1.00	1.20	0.25	-9076303.00	-0.5416
607	1.20	0.50	0.70	1.20	1.00	0.15	-9880592.00	-0.6181
608	1.20	0.50	0.70	1.20	1.00	0.20	-12711257.00	-0.8660
609	1.20	0.50	0.70	1.20	1.00	0.25	-15541925.00	-1.1082
610	1.20	0.50	0.70	1.20	1.20	0.15	-11030017.00	-0.6959
611	1.20	0.50	0.70	1.20	1.20	0.20	-13860683.00	-0.9381
612	1.20	0.50	0.70	1.20	1.20	0.25	-16691351.00	-1.1759
613	1.20	0.50	0.60	0.80	1.00	0.15	-2019645.00	0.0282
614	1.20	0.50	0.60	0.80	1.00	0.20	-3587303.00	-0.0968
615	1.20	0.50	0.60	0.80	1.00	0.25	-6013590.00	-0.3006
616	1.20	0.50	0.60	0.80	1.20	0.15	-2657122.00	-0.0181
617	1.20	0.50	0.60	0.80	1.20	0.20	-4736726.00	-0.1817
618	1.20	0.50	0.60	0.80	1.20	0.25	-7163012.00	-0.3860
619	1.20	0.50	0.60	1.00	1.00	0.15	-8776083.00	-0.5352
620	1.20	0.50	0.60	1.00	1.00	0.20	-11202367.00	-0.7556
621	1.20	0.50	0.60	1.00	1.00	0.25	-13628654.00	-0.9747
622	1.20	0.50	0.60	1.00	1.20	0.15	-9925507.00	-0.6168
623	1.20	0.50	0.60	1.00	1.20	0.20	-12351792.00	-0.8331
624	1.20	0.50	0.60	1.00	1.20	0.25	-14778077.00	-1.0480
625	1.20	0.50	0.60	1.20	1.00	0.15	-16391125.00	-1.1800
626	1.20	0.50	0.60	1.20	1.00	0.20	-18817392.00	-1.3811
627	1.20	0.50	0.60	1.20	1.00	0.25	-21243680.00	ERROR
628	1.20	0.50	0.60	1.20	1.20	0.15	-17540544.00	-1.2465
629	1.20	0.50	0.60	1.20	1.20	0.20	-19966832.00	-1.4426
630	1.20	0.50	0.60	1.20	1.20	0.25	-22393088.00	ERROR
631	1.20	0.50	0.50	0.80	1.00	0.15	-7671547.00	-0.4485
632	1.20	0.50	0.50	0.80	1.00	0.20	-9693450.00	-0.6361
633	1.20	0.50	0.50	0.80	1.00	0.25	-11715360.00	-0.8270
634	1.20	0.50	0.50	0.80	1.20	0.15	-8820968.00	-0.5334

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
635	1.20	0.50	0.50	0.80	1.20	0.20	-10842874.00	-0.7188
636	1.20	0.50	0.50	0.80	1.20	0.25	-12864784.00	-0.9064
637	1.20	0.50	0.50	1.00	1.00	0.15	-15286609.00	-1.1227
638	1.20	0.50	0.50	1.00	1.00	0.20	-17308512.00	-1.3011
639	1.20	0.50	0.50	1.00	1.00	0.25	-19330400.00	-1.4723
640	1.20	0.50	0.50	1.00	1.20	0.15	-16436032.00	-1.1936
641	1.20	0.50	0.50	1.00	1.20	0.20	-18457920.00	-1.3685
642	1.20	0.50	0.50	1.00	1.20	0.25	-20479824.00	-1.5332
643	1.20	0.50	0.50	1.20	1.00	0.15	-22901616.00	ERROR
644	1.20	0.50	0.50	1.20	1.00	0.20	-24923536.00	ERROR
645	1.20	0.50	0.50	1.20	1.00	0.25	-26945440.00	ERROR
646	1.20	0.50	0.50	1.20	1.20	0.15	-24051040.00	ERROR
647	1.20	0.50	0.50	1.20	1.20	0.20	-26072944.00	ERROR
648	1.20	0.50	0.50	1.20	1.20	0.25	-28094880.00	ERROR

THE TABLE SHOW SENSIVITY OF INVESTMENT.

FINV = FACTOR OF INVESTMENT.

FCAP = FACTOR OF CAPACITY.

FUNP = FACTOR OF UNIT SELLING PRICE.

FPRC = FACTOR OF PRIME COST.

FFOH = FACTOR OF FACTORY OVERHEAD.

FSEX = FACTOR OF SALE EXPENCE.

CREDIT = BANK BALANCE SHEET BATH AT THE END OF INVESTMENT.

RATE = RETURN RATE FROM INVESTMENT.

NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
1	0.50	1.00	0.60	1.00	1.00	0.20	-12343034.00	-0.5056
2	0.55	1.00	0.60	1.00	1.00	0.20	-12445520.00	-0.5061
3	0.60	1.00	0.60	1.00	1.00	0.20	-12547995.00	-0.5065
4	0.65	1.00	0.60	1.00	1.00	0.20	-12650479.00	-0.5069
5	0.70	1.00	0.60	1.00	1.00	0.20	-12752967.00	-0.5073
6	0.75	1.00	0.60	1.00	1.00	0.20	-12855450.00	-0.5077
7	0.80	1.00	0.60	1.00	1.00	0.20	-12957924.00	-0.5081
8	0.85	1.00	0.60	1.00	1.00	0.20	-13060413.00	-0.5085
9	0.90	1.00	0.60	1.00	1.00	0.20	-13162895.00	-0.5089
10	0.95	1.00	0.60	1.00	1.00	0.20	-13265378.00	-0.5093
11	1.00	1.00	0.60	1.00	1.00	0.20	-13367862.00	-0.5097
12	1.05	1.00	0.60	1.00	1.00	0.20	-13470343.00	-0.5101
13	1.10	1.00	0.60	1.00	1.00	0.20	-13572826.00	-0.5105
14	1.15	1.00	0.60	1.00	1.00	0.20	-13675306.00	-0.5109
15	1.20	1.00	0.60	1.00	1.00	0.20	-13777788.00	-0.5112
16	1.25	1.00	0.60	1.00	1.00	0.20	-13880268.00	-0.5116
17	1.30	1.00	0.60	1.00	1.00	0.20	-13982746.00	-0.5120
18	1.35	1.00	0.60	1.00	1.00	0.20	-14085230.00	-0.5124
19	1.40	1.00	0.60	1.00	1.00	0.20	-14187714.00	-0.5127
20	1.45	1.00	0.60	1.00	1.00	0.20	-14290199.00	-0.5131
21	1.50	1.00	0.60	1.00	1.00	0.20	-14392673.00	-0.5135
22	1.55	1.00	0.60	1.00	1.00	0.20	-14495158.00	-0.5138
23	1.60	1.00	0.60	1.00	1.00	0.20	-14597639.00	-0.5142
24	1.65	1.00	0.60	1.00	1.00	0.20	-14700118.00	-0.5145
25	1.70	1.00	0.60	1.00	1.00	0.20	-14802589.00	-0.5149
26	1.75	1.00	0.60	1.00	1.00	0.20	-14905074.00	-0.5153
27	1.80	1.00	0.60	1.00	1.00	0.20	-15007559.00	-0.5156
28	1.85	1.00	0.60	1.00	1.00	0.20	-15110040.00	-0.5159
29	1.90	1.00	0.60	1.00	1.00	0.20	-15212524.00	-0.5163
30	1.95	1.00	0.60	1.00	1.00	0.20	-15314992.00	-0.5166
31	2.00	1.00	0.60	1.00	1.00	0.20	-15417492.00	-0.5170

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NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
1	1.00	0.30	0.60	1.00	1.00	0.20	-9762256.00	-1.0234
2	1.00	0.35	0.60	1.00	1.00	0.20	-10019798.00	-0.9347
3	1.00	0.40	0.60	1.00	1.00	0.20	-10277332.00	-0.8641
4	1.00	0.45	0.60	1.00	1.00	0.20	-10534870.00	-0.8063
5	1.00	0.50	0.60	1.00	1.00	0.20	-10792419.00	-0.7580
6	1.00	0.55	0.60	1.00	1.00	0.20	-11049964.00	-0.7169
7	1.00	0.60	0.60	1.00	1.00	0.20	-11307505.00	-0.6815
8	1.00	0.65	0.60	1.00	1.00	0.20	-11565054.00	-0.6506
9	1.00	0.70	0.60	1.00	1.00	0.20	-11822595.00	-0.6234
10	1.00	0.75	0.60	1.00	1.00	0.20	-12080136.00	-0.5993
11	1.00	0.80	0.60	1.00	1.00	0.20	-12337680.00	-0.5776
12	1.00	0.85	0.60	1.00	1.00	0.20	-12595232.00	-0.5582
13	1.00	0.90	0.60	1.00	1.00	0.20	-12852773.00	-0.5405
14	1.00	0.95	0.60	1.00	1.00	0.20	-13110321.00	-0.5244
15	1.00	1.00	0.60	1.00	1.00	0.20	-13367863.00	-0.5097
16	1.20	1.05	0.60	1.00	1.00	0.20	-14035345.00	-0.4978
17	1.20	1.10	0.60	1.00	1.00	0.20	-14292864.00	-0.4855
18	1.20	1.15	0.60	1.00	1.00	0.20	-14550427.00	-0.4740
19	1.20	1.20	0.60	1.00	1.00	0.20	-14807964.00	-0.4634
20	1.20	1.25	0.60	1.00	1.00	0.20	-15065483.00	-0.4535
21	1.20	1.30	0.60	1.00	1.00	0.20	-15323047.00	-0.4443
22	1.20	1.35	0.60	1.00	1.00	0.20	-15580571.00	-0.4356
23	1.20	1.40	0.60	1.00	1.00	0.20	-15838132.00	-0.4275
24	1.20	1.45	0.60	1.00	1.00	0.20	-16095632.00	-0.4198
25	1.20	1.50	0.60	1.00	1.00	0.20	-16353167.00	-0.4126
26	1.20	1.55	0.60	1.00	1.00	0.20	-16610678.00	-0.4058
27	1.20	1.60	0.60	1.00	1.00	0.20	-16868192.00	-0.3994
28	1.20	1.65	0.60	1.00	1.00	0.20	-17125712.00	-0.3933
29	1.20	1.70	0.60	1.00	1.00	0.20	-17383280.00	-0.3876
30	1.20	1.75	0.60	1.00	1.00	0.20	-17640864.00	-0.3821
31	1.20	1.80	0.60	1.00	1.00	0.20	-17898368.00	-0.3769

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NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
1	1.00	1.00	0.40	1.00	1.00	0.20	-37792416.00	ERROR
2	1.00	1.00	0.42	1.00	1.00	0.20	-35349968.00	-1.5749
3	1.00	1.00	0.44	1.00	1.00	0.20	-32907504.00	-1.4682
4	1.00	1.00	0.46	1.00	1.00	0.20	-30465040.00	-1.3560
5	1.00	1.00	0.48	1.00	1.00	0.20	-28022608.00	-1.2406
6	1.00	1.00	0.50	1.00	1.00	0.20	-25580160.00	-1.1235
7	1.00	1.00	0.52	1.00	1.00	0.20	-23137712.00	-1.0050
8	1.00	1.00	0.54	1.00	1.00	0.20	-20695232.00	-0.8848
9	1.00	1.00	0.56	1.00	1.00	0.20	-18252784.00	-0.7623
10	1.00	1.00	0.58	1.00	1.00	0.20	-15810337.00	-0.6372
11	1.00	1.00	0.60	1.00	1.00	0.20	-13367884.00	-0.5097
12	1.00	1.00	0.62	1.00	1.00	0.20	-10925427.00	-0.3807
13	1.00	1.00	0.64	1.00	1.00	0.20	-8482970.00	-0.2517
14	1.00	1.00	0.66	1.00	1.00	0.20	-6214911.00	-0.1289
15	1.00	1.00	0.68	1.00	1.00	0.20	-4306473.00	-0.0259
16	1.00	1.00	0.70	1.00	1.00	0.20	-2737250.00	0.0522
17	1.00	1.00	0.72	1.00	1.00	0.20	-1393900.00	0.1152
18	1.00	1.00	0.74	1.00	1.00	0.20	-50547.00	0.1777
19	1.00	1.00	0.76	1.00	1.00	0.20	1292809.00	0.2396
20	1.00	1.00	0.78	1.00	1.00	0.20	2636158.00	0.3009
21	1.00	1.00	0.80	1.00	1.00	0.20	3979514.00	0.3618
22	1.00	1.00	0.82	1.00	1.00	0.20	5322859.00	0.4223
23	1.00	1.00	0.84	1.00	1.00	0.20	6658313.00	0.4823
24	1.00	1.00	0.86	1.00	1.00	0.20	7947693.00	0.5419
25	1.00	1.00	0.88	1.00	1.00	0.20	9204329.00	0.6012
26	1.00	1.00	0.90	1.00	1.00	0.20	10455546.00	0.6602
27	1.00	1.00	0.92	1.00	1.00	0.20	11706750.00	0.7189
28	1.00	1.00	0.94	1.00	1.00	0.20	12946012.00	0.7773
29	1.00	1.00	0.96	1.00	1.00	0.20	14173353.00	0.8355
30	1.00	1.00	0.98	1.00	1.00	0.20	15400685.00	0.8935
31	1.00	1.00	1.00	1.00	1.00	0.20	16628007.00	0.9512

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NUM	FINV	FCAP	FUNP	FPRC	FFOH	FSEX	CREDIT	RATE
1	1.00	1.00	0.60	0.50	1.00	0.20	11387351.00	ERROR
2	1.00	1.00	0.60	0.55	1.00	0.20	9417360.00	0.6561
3	1.00	1.00	0.60	0.60	1.00	0.20	7443015.00	0.5490
4	1.00	1.00	0.60	0.65	1.00	0.20	5388252.00	0.4434
5	1.00	1.00	0.60	0.70	1.00	0.20	3267939.00	0.3390
6	1.00	1.00	0.60	0.75	1.00	0.20	1147623.00	0.2356
7	1.00	1.00	0.60	0.80	1.00	0.20	-972697.00	0.1330
8	1.00	1.00	0.60	0.85	1.00	0.20	-3093018.00	0.0310
9	1.00	1.00	0.60	0.90	1.00	0.20	-5894331.00	-0.1166
10	1.00	1.00	0.60	0.95	1.00	0.20	-9560299.00	-0.3113
11	1.00	1.00	0.60	1.00	1.00	0.20	-13367822.00	-0.5097
12	1.00	1.00	0.60	1.05	1.00	0.20	-17175312.00	-0.7018
13	1.00	1.00	0.60	1.10	1.00	0.20	-20982768.00	-0.8841
14	1.00	1.00	0.60	1.15	1.00	0.20	-24790224.00	-1.0569
15	1.00	1.00	0.60	1.20	1.00	0.20	-28597712.00	-1.2219
16	1.00	1.00	0.60	1.25	1.00	0.20	-32405136.00	-1.3788
17	1.00	1.00	0.60	1.30	1.00	0.20	-36212624.00	-1.5241
18	1.00	1.00	0.60	1.35	1.00	0.20	-40020096.00	ERROR
19	1.00	1.00	0.60	1.40	1.00	0.20	-43827568.00	-1.7634
20	1.00	1.00	0.60	1.45	1.00	0.20	-47635008.00	ERROR
21	1.00	1.00	0.60	1.50	1.00	0.20	-51442496.00	ERROR
22	1.00	1.00	0.60	1.55	1.00	0.20	-55249952.00	ERROR
23	1.00	1.00	0.60	1.60	1.00	0.20	-59057408.00	ERROR
24	1.00	1.00	0.60	1.65	1.00	0.20	-62864864.00	ERROR
25	1.00	1.00	0.60	1.70	1.00	0.20	-66672336.00	ERROR
26	1.00	1.00	0.60	1.75	1.00	0.20	-70479808.00	ERROR
27	1.00	1.00	0.60	1.80	1.00	0.20	-74287248.00	ERROR
28	1.00	1.00	0.60	1.85	1.00	0.20	-78094752.00	ERROR
29	1.00	1.00	0.60	1.90	1.00	0.20	-81902176.00	ERROR
30	1.00	1.00	0.60	1.95	1.00	0.20	-85709648.00	ERROR
31	1.00	1.00	0.60	2.00	1.00	0.20	-89517136.00	ERROR

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1	1.00	1.00	0.60	1.00	0.50	0.20	-10583220.00	-0.3854
2	1.00	1.00	0.60	1.00	0.55	0.20	-10861684.00	-0.3983
3	1.00	1.00	0.60	1.00	0.60	0.20	-11140148.00	-0.4111
4	1.00	1.00	0.60	1.00	0.65	0.20	-11418610.00	-0.4238
5	1.00	1.00	0.60	1.00	0.70	0.20	-11697078.00	-0.4364
6	1.00	1.00	0.60	1.00	0.75	0.20	-11975541.00	-0.4489
7	1.00	1.00	0.60	1.00	0.80	0.20	-12254004.00	-0.4612
8	1.00	1.00	0.60	1.00	0.85	0.20	-12532472.00	-0.4735
9	1.00	1.00	0.60	1.00	0.90	0.20	-12810931.00	-0.4857
10	1.00	1.00	0.60	1.00	0.95	0.20	-13089397.00	-0.4977
11	1.00	1.00	0.60	1.00	1.00	0.20	-13367863.00	-0.5097
12	1.00	1.00	0.60	1.00	1.05	0.20	-13646327.00	-0.5216
13	1.00	1.00	0.60	1.00	1.10	0.20	-13924787.00	-0.5333
14	1.00	1.00	0.60	1.00	1.15	0.20	-14203248.00	-0.5450
15	1.00	1.00	0.60	1.00	1.20	0.20	-14481701.00	-0.5566
16	1.00	1.00	0.60	1.00	1.25	0.20	-14760162.00	-0.5681
17	1.00	1.00	0.60	1.00	1.30	0.20	-15038626.00	-0.5795
18	1.00	1.00	0.60	1.00	1.35	0.20	-15317080.00	-0.5909
19	1.00	1.00	0.60	1.00	1.40	0.20	-15595534.00	-0.6021
20	1.00	1.00	0.60	1.00	1.45	0.20	-15874000.00	-0.6133
21	1.00	1.00	0.60	1.00	1.50	0.20	-16152454.00	-0.6244
22	1.00	1.00	0.60	1.00	1.55	0.20	-16430923.00	-0.6354
23	1.00	1.00	0.60	1.00	1.60	0.20	-16709379.00	-0.6463
24	1.00	1.00	0.60	1.00	1.65	0.20	-16987840.00	-0.6571
25	1.00	1.00	0.60	1.00	1.70	0.20	-17266288.00	-0.6679
26	1.00	1.00	0.60	1.00	1.75	0.20	-17544752.00	-0.6786
27	1.00	1.00	0.60	1.00	1.80	0.20	-17823216.00	-0.6893
28	1.00	1.00	0.60	1.00	1.85	0.20	-18101664.00	-0.6998
29	1.00	1.00	0.60	1.00	1.90	0.20	-18380144.00	-0.7103
30	1.00	1.00	0.60	1.00	1.95	0.20	-18658592.00	-0.7208
31	1.00	1.00	0.60	1.00	2.00	0.20	-18937040.00	-0.7311

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1	1.00	1.00	0.60	1.00	1.00	0.10	-4354012.00	-0.0284
2	1.00	1.00	0.60	1.00	1.00	0.11	-5067389.00	-0.0663
3	1.00	1.00	0.60	1.00	1.00	0.12	-5854403.00	-0.1090
4	1.00	1.00	0.60	1.00	1.00	0.13	-6664960.00	-0.1540
5	1.00	1.00	0.60	1.00	1.00	0.14	-7551721.00	-0.2026
6	1.00	1.00	0.60	1.00	1.00	0.15	-8515286.00	-0.2534
7	1.00	1.00	0.60	1.00	1.00	0.16	-9485798.00	-0.3045
8	1.00	1.00	0.60	1.00	1.00	0.17	-10456312.00	-0.3559
9	1.00	1.00	0.60	1.00	1.00	0.18	-11426826.00	-0.4072
10	1.00	1.00	0.60	1.00	1.00	0.19	-12397340.00	-0.4585
11	1.00	1.00	0.60	1.00	1.00	0.20	-13367853.00	-0.5097
12	1.00	1.00	0.60	1.00	1.00	0.21	-14338368.00	-0.5606
13	1.00	1.00	0.60	1.00	1.00	0.22	-15308870.00	-0.6112
14	1.00	1.00	0.60	1.00	1.00	0.23	-16279386.00	-0.6615
15	1.00	1.00	0.60	1.00	1.00	0.24	-17249888.00	-0.7113
16	1.00	1.00	0.60	1.00	1.00	0.25	-18220416.00	-0.7607
17	1.00	1.00	0.60	1.00	1.00	0.26	-19190912.00	-0.8096
18	1.00	1.00	0.60	1.00	1.00	0.27	-20161424.00	-0.8582
19	1.00	1.00	0.60	1.00	1.00	0.28	-21131920.00	-0.9064
20	1.00	1.00	0.60	1.00	1.00	0.29	-22102432.00	-0.9542
21	1.00	1.00	0.60	1.00	1.00	0.30	-23072976.00	-1.0018
22	1.00	1.00	0.60	1.00	1.00	0.31	-24043488.00	-1.0491
23	1.00	1.00	0.60	1.00	1.00	0.32	-25013984.00	-1.0961
24	1.00	1.00	0.60	1.00	1.00	0.33	-25984496.00	-1.1430
25	1.00	1.00	0.60	1.00	1.00	0.34	-26955024.00	-1.1896
26	1.00	1.00	0.60	1.00	1.00	0.35	-27925520.00	-1.2360
27	1.00	1.00	0.60	1.00	1.00	0.36	-28896032.00	-1.2822
28	1.00	1.00	0.60	1.00	1.00	0.37	-29866560.00	-1.3280
29	1.00	1.00	0.60	1.00	1.00	0.38	-30837056.00	-1.3734
30	1.00	1.00	0.60	1.00	1.00	0.39	-31807584.00	-1.4183
31	1.00	1.00	0.60	1.00	1.00	0.40	-32778080.00	-1.4624

***** E N D *****

ประวัติผู้เขียน

นาย โกเมนทร์ โสภณศิริ เกิดเมื่อวันที่ 28 กันยายน พ.ศ. 2491 ที่อำเภอคลองสาน จังหวัดธนบุรี ได้รับปริญญาวิศวกรรมศาสตรบัณฑิต สาขาวิศวกรรมอุตสาหการ จากสถาบันเทคโนโลยีพระจอมเกล้า วิทยาเขตธนบุรี ในปีการศึกษา 2517 ปัจจุบันรับราชการตำแหน่ง อาจารย์ระดับ 3 ประจำแผนกช่างกลโรงงาน วิทยาลัยเทคโนโลยีและอาชีวศึกษา วิทยาเขตเทเวทศน์ กระทรวงศึกษาธิการ