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REPUBLIC OF THE PHILIPPINES

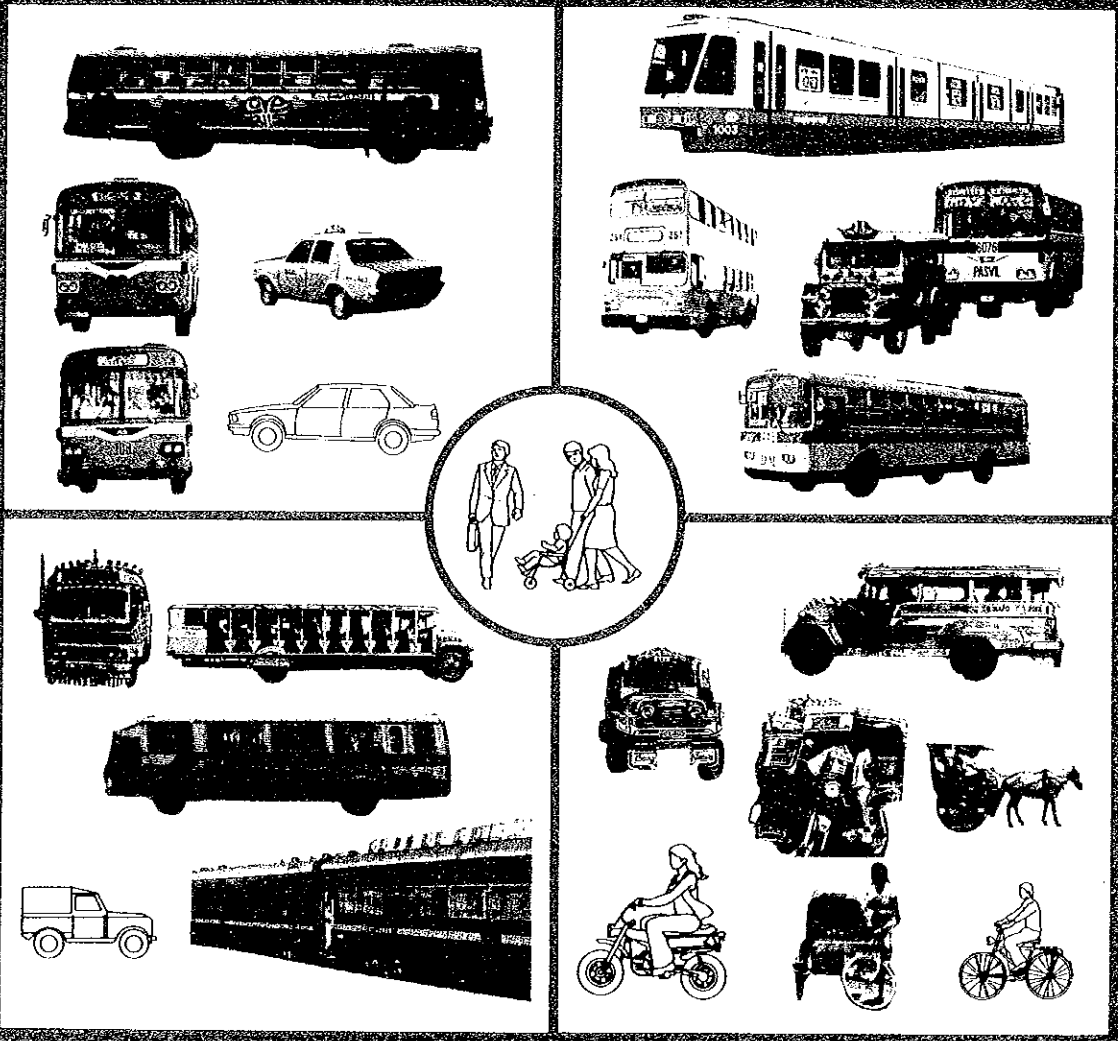
No. 24

THE METRO MANILA TRANSPORTATION PLANNING STUDY (JUMSUT)

FINAL REPORT

SUPPORTING DOCUMENTS/MANUALS

No. 3 : Micro Computer Transportation Planning Software Manual



March 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

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1. INTRODUCTION

- This manual describes the software programs which have been developed in the JUMSUT study using the NEC Micro Computer, Model PC 9801. The programs and models designed are:
  1) Jeepney Route Information Management System
  2) JUMSUT Highway Type Traffic Assignment System
  3) HIS Data Base System
- It is considered that various areas in transportation planning methodologies and procedures may be covered conveniently and effectively through the use of the micro computer. The abovementioned software programs have been selected to best meet the immediate requirements of MOTC's planning function.

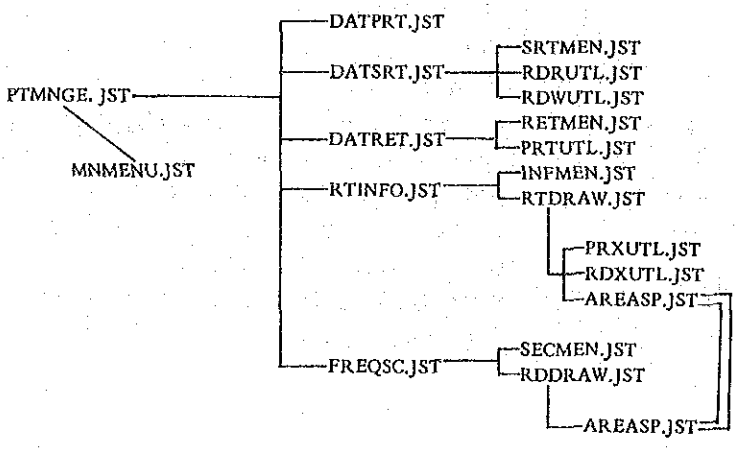
2. JEEPNEY ROUTE INFORMATION MANAGEMENT SYSTEM

2.1 GENERAL

- LTPD/MOTC considers it a most important and urgent issue to control jeepneys well. However, because of the complexity of jeepney operation with its 744 routes in Metro Manila, it was nearly impossible to monitor and control its operation in a timely manner. This can be partially attributed to insufficiency of up-to-date information regarding existing routes.
- The jeepney route information management system has been designed to contribute to the MOTC's administrative requirements on the above aspect.
- In consideration of its accessibility and cost, the system has been developed on the micro computer. It was designed basically as a manual-free system. The user is requested to follow the instructions appearing on the CRT.
- Although this system is, so far, applicable only to jeepney, it is desirable that it be applied also to bus.

2.2 STRUCTURE OF THE SYSTEM

- This system is composed of program files and data files. The program files have a complicated structure and consist of many function programs and utility programs. However, most of these programs are controlled by a single main program called "PTMNGE.JST". When run, this displays a menu and calls other programs and data files according to the user's specifications. The program files controlled by "PTMNGE. JST" are as follows:



In addition to the above, some independent programs have been prepared as follows:

a) FILCMB.JST
b) FILCNV.JST
c) PRTASC.JST
d) PRTBIN.JST
e) XFILE.JST

- The data files are as follows:

a) "routel.dat" : Mode No.
JUMSUT Route No.
MOTC Route Code
JUMSUT Route Name

b) "route2.dat": Mode No.
JUMSUT Route No.
BOT Route Code
Terminal Code
Terminal Zone Code
Route Length
Route Type
No. of Units Running
No. of Units Operating
No. of Units Authorized

c) "route3.dat": Mode No.
JUMSUT Route No.
Frequency by Hour (6 a.m.-10 p.m.)

d) "route4.dat": Mode No.
JUMSUT Route No.
Average Travel Speed by Time Period
Average Seating Capacity
Daily Average Travel Time (min.)
Daily Average Terminal Time (min.)
Average Turn-Around Time by Time Period (min.)

e) "route5.dat": Mode No.
JUMSUT Route No.
Vehicle-Kms.
Vehicle-Hrs.
Average No. of Round Trips/Day/Vehicle
Average Daily Kms/Vehicle
Average Load Factor by Time Period
Corridor Nos. Passed
No. of Passengers/Day/Route
Passenger-Kms/Day/Route
Average Trip Length

f) "corr.dat": Corridor No.
Corridor Name
Section Name
Number of Lanes
Capacity (pcu's/day)
Traffic Volume (Car/Taxi)
Traffic Volume (Van/Truck)
Traffic Volume (Jeepney)
Traffic Volume (Bus)
Traffic Volume (Total)
Volume/Capacity Ratio

g) "term.dat": Terminal Code
Terminal Name
Number of Pass. Boarding/Alighting
Terminal Type (Through/Terminating)
No. of Routes
Combined Frequency per Day
No. of Units Operating Daily

In addition to these primary data, there are three (3) data files that give a graphic display of the road network and route configuration. They are:

a) "mapxy.dat": (x,y) Coordinates of Points
b) "roadnt.dat": Road Sections defined by Points included in "mapxy.dat"
c) "jroute.dat": Jeepney Routes defined by Road Sections included in "roadnt.dat"

It should be noted, however, that the above three files were developed only to provide a graphic display with no linkage to the JUMSUT data base.

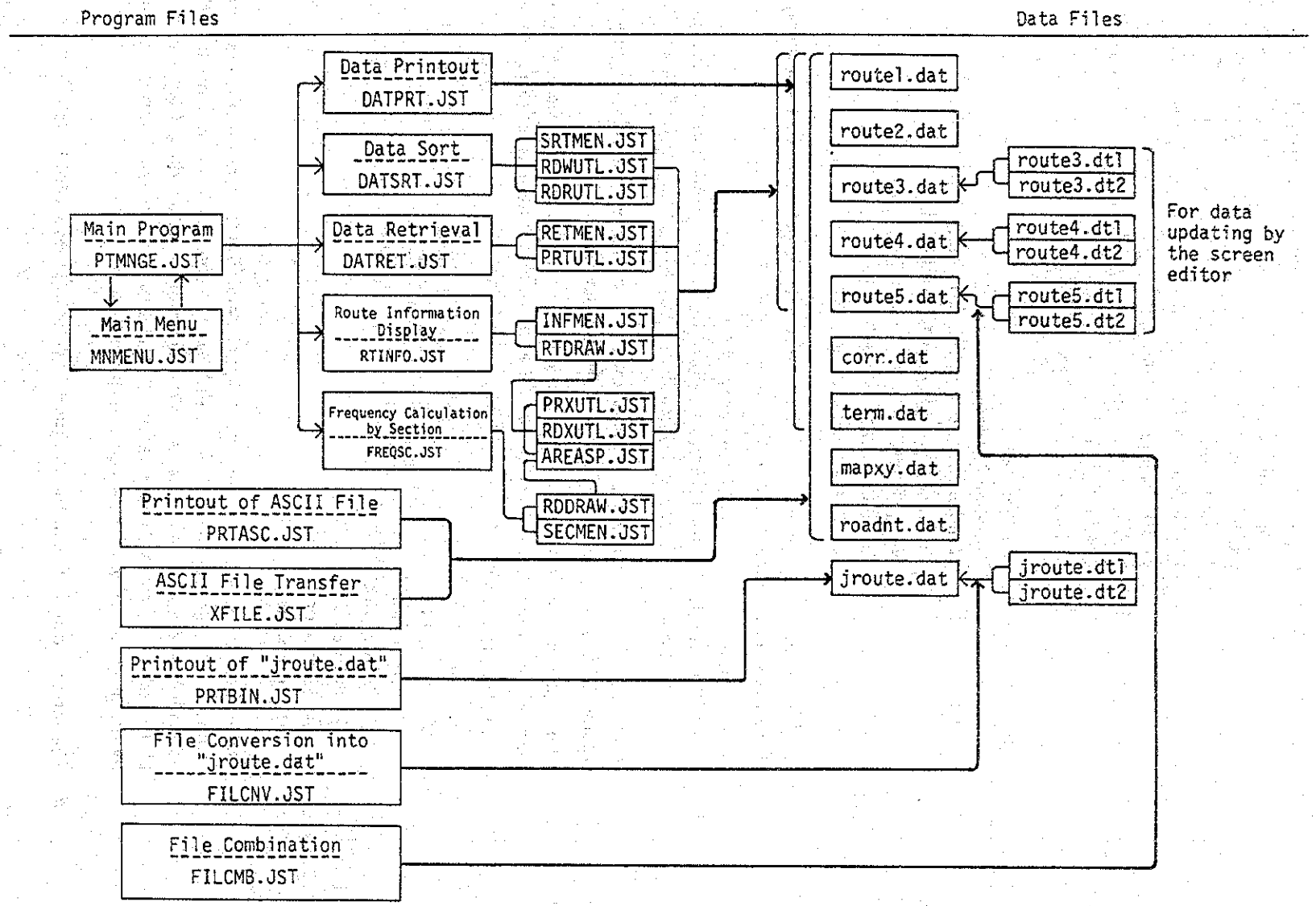
Although the data files mentioned above are the only ones that can be used by this system, there are other data files on the second diskette of this system as follows:

a) "route3.dt1"
b) "route3.dt2"
c) "route4.dt1"
d) "route4.dt2"
e) "route5.dt1"
f) "route5.dt2"
g) "jroute.dt1"
h) "jroute.dt2"

These files are segregated from the original data files in order to facilitate data update; "route3.dat", "route4.dat", "route5.dat" and "jroute.dat" are so large that they cannot be loaded to the main memory all at the same time. After these files have been updated by the screen editor of the operating system, they are converted into the proper data files by the programs which are provided in this system.

- The interrelation between the program files and the data files is illustrated in Figure 2.1.

Figure 2.1
Interrelationship of Program Files and Data Files



2.3 FUNCTIONS AND USAGE OF THE SYSTEM

2.3.1 Data Printout

- This function intends to produce printouts of data files with due formats. This is applicable to the following files:

  a) "route1.dat"
  b) "route2.dat"
  c) "route3.dat"
  d) "route4.dat"
  e) "route 5.dat"
  f) "corr.dat"
  g) "term.dat"
  h) "other data files that have the same structure as "route?.dat" (from 'a' to 'e' above)

  The "h" option above has been prepared for files which can be created by the "Data Sort" function.

- The usage is given as follows:

CRT Display	Input by User (Example)
	RUN "PTMNGE.JST
What are you going to do?	
1 : Data Printout	
2 : Data Sort	
3 : Data Retrieval	
4 : Route Information Display	
5 : Frequency Calculation by Section	
0 : Bye	1
1 : Data Printout	
OK? (Y or N)	Y
Which file do you select?	
route1.dat (=1)	
route2.dat (=2)	
route3.dat (=3)	
route4.dat (=4)	
route5.dat (=5)	
corr.dat (=6)	
term.dat (=7)	
user's specification (=8)	
Select No. = ?	3

(Then the computer produces a printout of "route3.dat" with due format. If no. 8 is chosen, the procedure is as follows:)

Select No. = ? 8

File name for printout = ? 2 : rsort4.dat
Is this file the same type as "route?.dat" (Y/N) = ? Y

(If 'N', the system goes back to the main menu).

Give the No. = ? 4

(Then the computer produces the printout of "rsort4.dat". After producing it, the system automatically returns to the main menu).

2.3.2 Data Sort

- This function was prepared in order to facilitate the changing of orders of data which often becomes necessary in the course of public transport planning and management.
- This is applicable only to the following route data files:
  a) "route1.dat"
  b) "route2.dat"
  c) "route3.dat"
  d) "route4.dat"
  e) "route5.dat"

  When running this program, the user has to specify the key data and the sorting orders (ascending/alphabetical or descending/counter-alphabetical). For instance, if "route length" is chosen as the key data and "ascending sort" is selected, this program changes the orders of all route data files according to route length (from small to large); it then creates five (5) new files on the second disk drive. Therefore, prior to the usage of this function, a diskette must be mounted on the second drive. The user can specify the name of the new files to be created using five (5) characters. For example, if "rtest" is specified, the following files will be created:

1st Drive	2nd Drive
routel.dat	rtest1.dat
route2.dat	rtest2.dat
route3.dat	rtest 3.dat
route4.dat	rtest4.dat
route5.dat	rtest5.dat

  It is to be noted that the created files have the same structrure as the original files. Therefore, they can be printed out by the "Data Printout" function of this system.
- This data sorting program is the most time-consuming function in this system. The user is requested to be patient even if the computer becomes silent for a long time. One run will take more or less one hour.
- The actual utilization of this function is as follows:

CRT Display	Input by User (Example)
	RUN "PTMNGE.JST"
What are you going to do? 1 : Data Printout 2 : Data sort 3 : Data Retrieval 4 : Route Information Display 5 : Frequency Calculation by Section 0 : Bye	2
2 : Data Sort OK? (Y/N)	Y
What are you going to use as a key? 0 : Mode No. 1 : JUMSUT Route No. 2 : BOT Route Code 3 : JUMSUT Route Name ↓ 38 : Ave. Trip Length (16 hrs.) 100 : First Screen	
Select No. [Next Screen (=99) or First Screen (=100)] =	7 (Since the menu is large, type "99" to proceed, or type "100" to return, before selecting the No.)
7 : Route Length OK (Y/N)?	Y (If "N" is typed, the system displays the menu again).
What order do you choose? A : Ascending (Alphabetical) D : Descending (Counter-Alphabetical)	
Please type A or D	D
Sort Method = Descending OK /Y/N)?	Y (If "N" is typed, the system goes back to the menu above).

What name do you like to
put to the new file?

File Name (5 characters) =? rtest

Reading the key data file.

(The computer starts reading the key data file.)

Sorting started.

(After this message, the computer displays on the CRT several messages and the sorted data is saved in the new files. However, the user has no need to take any action, unless an error message is shown on the CRT. Usually, errors are caused by mis-operation. When an error occurs, the user is requested to type "close" first in order to protect data files opened).

2.3.3 Data Retrieval

- This function aims to screen and collect route data that fall in a specified value/range of a specified data item. Although this objective can be attained by the "Data Sort" function, the user can obtain the necessary route data (screened by the value/range specified) more quickly. This program can optionally create a new data file under a name specified by the user. It will be noted, however, that the created file cannot be applied by the "Data Printout" function due to its file structure which is different from the original route data files. If a hard copy of the retrieved data is needed, there are two (2) ways of doing so:
  a) Push the "COPY" key of the computer keyboard while the necessary information is displayed on the CRT.
  b) Call and run "PRTASC.JST" separately prepared in this system. In this case, the retrieved data must be saved on a diskette beforehand; moreover, the printout format will not be arranged.
- The usage of this program is as follows:

CRT Display	Input by User (Example)
	RUN "PTMNGE.JST"
What are you going to do?	
1 : Data Printout	
2 : Data Sort	
3 : Data Retrieval	
4 : Route Information Display	
5 : Frequency Calculation by Section	
0 : Bye	3
3 : Data Retrieval	
OK? (Y/N)	Y

What are you going to use as a key?

0 : Mode No.
1 : JUMSUT Route No.
2 : MOTC Route Code
3 : JUMSUT Route Name
:
:
38 : Ave. Trip Length (16 hrs.)
100 : First Screen

Select No. [Next Scree (=99) or
First Screen (=100)] = 38

38 : Ave. Trip Length (16 hrs.)
OK (Y/N)?

Reading the key data now. For a while.

(The computer reads the data specified.)

Any range to specify?
(Y/N) = Y

(If "N" is specified, the computer skips the following process and directly goes to the data display. In this case all the routes will be indicated on the CRT.)

from? 4.0
to? 4.9

(If the specified data are characters, the following message will appear before specifying the range:

The key data you specified are characters. When specifying the range, use the format "&&&&& including blanks.

In this case, user has to specify the range as follows:

from? AAAAA
to? AZZZZ

After specifying value/range, the computer will display the retrieved data on the CRT. Type "99" or "100" to go forward or backward. If other keys are touched, the computer stops the display. When a hard copy is needed, push "COPY" key.)

Do you want to save these data (Y/N)? Y

(If "N" is typed, the computer proceeds to ask "continue (Y/N)?" as explained below).

New file (=1) or Append the file (=2) = ?	1 (If "2" is specified, the data will be added to an existing file. This option will be used for accumulating the data retrieved.)
File name = ?	2 : testrt.dat
(Then the computer saves the data.)	
Continue (Y/N)?	N (The computer goes back to the main menu. If "Y" is specified, the menu for selecting key data is displayed again.)

2.3.4 Route Information Display

- This program has been developed so that the user may easily understand the characteristics of a specified route. It gives a graphical display of the route on the Metro Manila road network, and at the same time, summarized information of the route. This function may be used as follows:

CRT Display	Input by User (Example)
	RUN "PTMNGE.JST
What are you going to do? 1 : Data Printout 2 : Data Sort 3 : Data Retrieval 4 : Route Information Display 5 : Frequency Calculation by Section 0 : Bye	4
4 : Route Information Display OK? (Y/N)	Y
Just a moment, please.	
(After a while, the computer sets a frame on the CRT for graphic display.)	
Do you need the area code list (Y/N)?	Y

(Then the computer prints out the area code list as follows:)

1 Metro Manila
2 Northern Metro Manila
3 Inside EDSA
. .
. .
. .
. .
32 Baclaran/Pasay Rtda.
33 User's Specification

(This will be used later in order to determine the scale of the graphic display. It is advisable to use the above listed codes, until the user gets accustomed to the display.)

Reading "mapxy.dat"
Reading "roadnt.dat"

(The computer reads the graphic data to display the road network. The progress is indicated on the CRT by ">".)

Route No. = ?	46
Area Code (1 – 32) = ?	33
x : ?	0
y : ?	50
▲ : ?	80

("x" above refers to the coordinate of the leftmost point on the X axis of the window set on the CRT, while "y" is the coordinate of the uppermost point on the Y axis. " ▲ " means the width of the window. The maximum value for "x" and "y" are 200. If an area code is selected from the list, this process can be skipped.

Soon after this, the computer displays the specified route together with the road network, and indicates the route information on the right side of the window.

If the user needs a hard copy, press "COPY"key.

If the user wants to change the scale, touch any key. Then it will ask for the "Area Code" again. If the user changes the route no., then type "0" when "Area Code" is asked. The message "Route No. =?" will appear once more.

If "0" is typed for the route number the system will return to the main menu.)

2.3.5 Frequency Calculation by Section

- The program for this function was prepared to display the jeepney traffic flow on the road network. The scale of the display can be changed in the same manner as the "Route Information Display" function; and the hour of the day can be varied between 6:00 a.m. and 10:00 p.m. according to the user's specification.

  This function is useful also for identifying route coverage.

- The actual operation can be done as follows:

CRT Display	Input by User (Example)
	RUN "PTMNGE. JST"
What are you going to do? 1 : Data Printout 2 : Data Sort 3 : Data Retrieval 4 : Route Information Display 5 : Frequency Calculation by Section 0 : Bye	5
Just a moment, please.	
Which data do you choose? 0 : Frequency Morning Peak (7-8 a.m.) 1 : Frequency Afternoon Off-Peak (2-3 p.m.) 2 : Frequency Evening Peak (5-6 p.m.) 3 : Frequency (16 hours) ⋮ ⋮ 19 : Frequency (9-10 p.m.) 100 : First Screen	
Select No. [Next Screen (=99) or First Screen (=100)] ?	3
3 : Frequency (16 hours) OK (Y/N)?	Y
Reading frequency data. Reading link data by route.	
(The computer reads the necessary data stored on the diskette. After a while, the computer sets a frame on the CRT for graphic display.)	
Do you need the area code list (Y/N)?	N
Reading "mapxy.dat" Reading "roadnt.dat"	
Area Code (1-32) = ?	3
Inside EDSA	
frqmax = 3957	
r = ?	30000 (The "r" means the number of frequency per dot of the CRT. The user has to specify this, considering the value of "frqmax".)

(Then the computer displays the flow diagram of jeepney traffic on the CRT with a legend. If the user wants to change the scale, touch any key to call the "r=?" message. If "0" is typed for "r", "Area Code" will be asked again to change the window. If "0" is specified, the system will go back to the main menu.)

2.3.6 Other Functions

- Aside from the five (5) functions mentioned above, there are five (5) small programs independent from the main program "PTMNGE.JST". Their function and usage are briefly explained below.

1) **FILCMB.JST:** This program combines several data files into one. After updating segregated data files on the second diskette, using the screen editor, this program is run to create an aggregated data file which can be used by "PTMNGE.JST". An example is shown below.

CRT Display	Input by User(Example)
	RUN "FILCMB.JST"
How many files are to be combined?	2
Input File Name 1 ?	2 : route5.dt1
Input File Name 2 ?	2 : route5.dt2
Output File Name = ?	route5.dat
For a while, please.	
Completed.	

2) **FILCNV.JST:** This program works in a similar manner as "FILCMB.JST". However, this is applicable only to update "jroute.dat" which is a random access file; while "FILCMB.JST" is used to update sequential data files including "route3.dat", "route4.dat" and "route5.dat". This is operated as shown below.

CRT Display	Input by User (Example)
	RUN "FILCNV.JST"
File name (input) =?	2 : jroute.dt1
File name (input) =?	2 : jroute.dt2
	(These two files must be updated beforehand by the screen editor.)
File name (output) =?	jroute.dat

(Then the computer starts data processing with indications of the progress on the CRT.)

Do you want to test the data? (Y/N) = ?	Y
	(When "N" is typed, operation will be finished at once.)

When you stop testing,
type "0".

Route No. ? 400

(Then the computer indicates the processed data on the CRT.)

Route No. ? 744
Route No. ? 631
Route No. ? 0

(When "0" is typed, operation ends.)

3) **PRTASC.JST:** This program produces a printout of any file saved on a diskette in ASCII code. Formatting of the printout is not taken into account.

CRT Display	Input by User (Example)
	RUN "PRTASC.JST"
Input file name = ?	mapxy.dat

(Then the computer produces a printout of "mapxy.dat".)

4) **PRTBIN.JST:** This program was developed to produce a printout of only the random access file "jroute.dat". This is not applicable to any other files.

CRT Display	Input by User (Example)
	RUN "PRTBIN.JST"

(Then the computer produces a printout of "jroute.dat" automatically from route nos. 1 to 744. If the number of routes is changed, this program must be modified (program line 1040.))

5) **XFILE.JST:** Although a file transfer program "xfiles.n88" is provided with the computer, this transfers all the files from one diskette to another. "XFILE.JST" was prepared to transfer a specified file from one diskette to another. However, this program is applicable only to ASCII files.

CRT Display	Input by User (Example)
	RUN "XFILE.JST"
Input file name = ?	roadnt.dat
Output file name = ?	2 : ptnt.dat

(Then the computer transfers "roadnt.dat" on the first diskette to the second diskette under the name of "ptnt.dat".)

2.4 APPLICATION

- With these functions, various types of information may be processed, for example:

  1) Listing of all Jeepney Routes with a Route Length of Less than 4 kilometers
     a) Use "Data Retrieval" function and input "0-3.9" for the route length.
     b) Although a list will be produced by the above, the "Route Information Display" function may be called if more detailed information for the listed routes is necessary.

  2) Listing of Jeepney Routes Competitive to Specific Jeepney Routes
     a) Get a printout of "route5.dat" using the "Data Printout" function of the System.
     b) Get "Corridor Nos. Passed" of a specific route from the printout.
     c) Call "Data Retrieval" function of the System and input the corridor numbers to obtain the necessary list. If the corridor numbers are discrete like 1 and 5 (skipping 2, 3, and 4), iteration of this process is needed.

  3) Listing of Jeepney Routes feeding a specific Jeepney Terminal
     a) Get a printout of "term.dat" using the "Data Printout" function of the system to obtain the code of a specific terminal.
     b) Use "Data Retrieval" function of the system and input the terminal code to obtain the necessary list.

3. JUMSUT HIGHWAY TYPE TRAFFIC ASSIGNMENT SYSTEM

3.1 GENERAL

- In order to evaluate road traffic under different conditions, a traffic assignment program has been developed. This assumes a predetermined traffic volume of public transport vehicles by link and assigns private traffic onto the network taking the public vehicle traffic into account.
- Although the traffic assignment was carried out using the TTC computer, it was discovered that the program could be transferred to the newly introduced micro computer of JUMSUT. It has been decided, therefore, to develop a new program using the BASIC language and suitable for the micro computer. The following points have been considered:
  - Easy operation
  - Negligible cost
  - Facilitates training and technology transfer
- The program for the micro computer is basically the same as that of the TTC computer. Description of the usage of this program is given in the following sections.
- This system was designed basically as a manual-free system. The user is requested to follow the instructions which appear on the CRT.

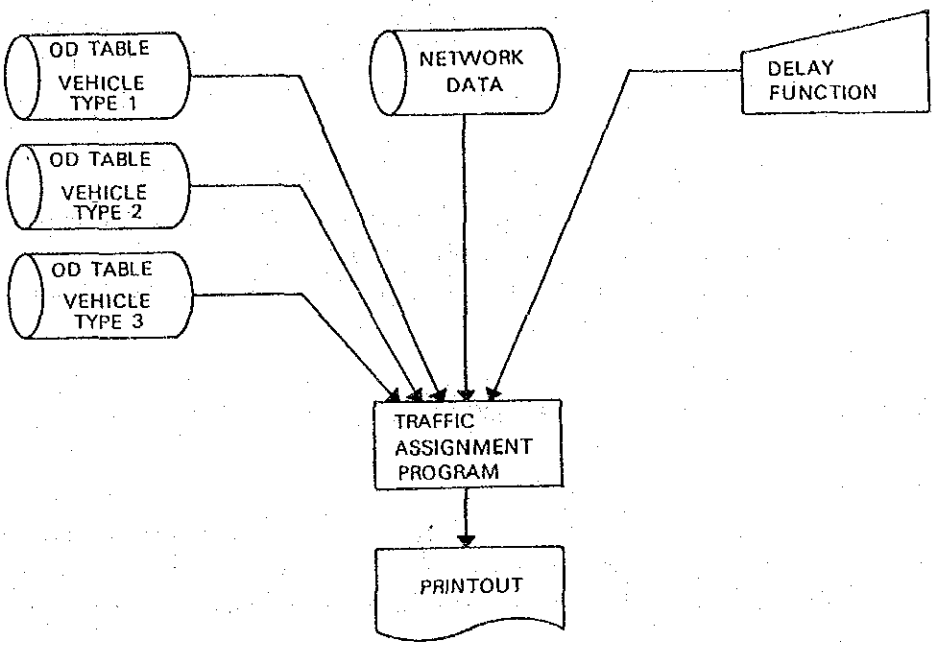
3.2 STRUCTURE OF THE PROGRAM

- The basic structure of the program is shown in Figure 3.1. The system requires two data files on a diskette, i.e.:
  a) OD Tables
  b) Link Data

The maximum number of OD table files is up to three (3). In principle, other data are to be input manually from the keyboard.

- The minimum path search method adopted was the Dixtra algorithm.

Figure 3.1
Basic Structure of Traffic Assignment
Program for the Micro Computer



3.3 LIMITATIONS

- The program has the following limitations (computer memory size is 256 K Bytes):
  - Maximum No. of Zones : 100
  - Maximum No. of Nodes : 350
  - Maximum No. of Links (One-Way) : 1000
  - Maximum No. of OD Tables Assigned at a Time : 3
  - Maximum No. of OD Tables Divisions : 10

3.4 INPUT DATA

- The input data required are:
  - Number of Zones
  - Number of Links
  - Number of Nodes
  - Number of OD Tables
  - PCU pertaining to OD Table

- Number of OD Table Division
- Share of Each Division
- Node Number for each Zone Centroid
- Number of Delay Functions
- Delay Functions
- Link Data
- OD Tables

- The file for OD tables should be created on a diskette. The user can put any name to the file. Data are stored as statements of BASIC according to the following format:

```
1000 DATA  11,  12,  16,  38,  9,---,  87
1000 DATA  13,  0,   3,   29,  32,---, 137
```

(one row of OD tables should be written as one statement)

- Likewise, the network data are also stored on a diskette under a name according to the user's choice. The format is:

```
1000 DATA  1,  101,  102,  0.5,  3,  2000,  2
1000 DATA  2,  101,  103,  1.7,  4,  500,   2
```

Link No.	Node No.	Node No.	Distance (kms.)	Delay Function No.	Pre-Determined Traffic Volume in PCU	One-way or Two-way

- As mentioned earlier, other data are to be input manually from the keyboard. However, in order to facilitate the data input, an option to create a "Control File" was prepared. If the user chooses this option, the micro computer will not ask the user on the CRT but will read the necessary data from the control file.

An example of the control file is shown below:

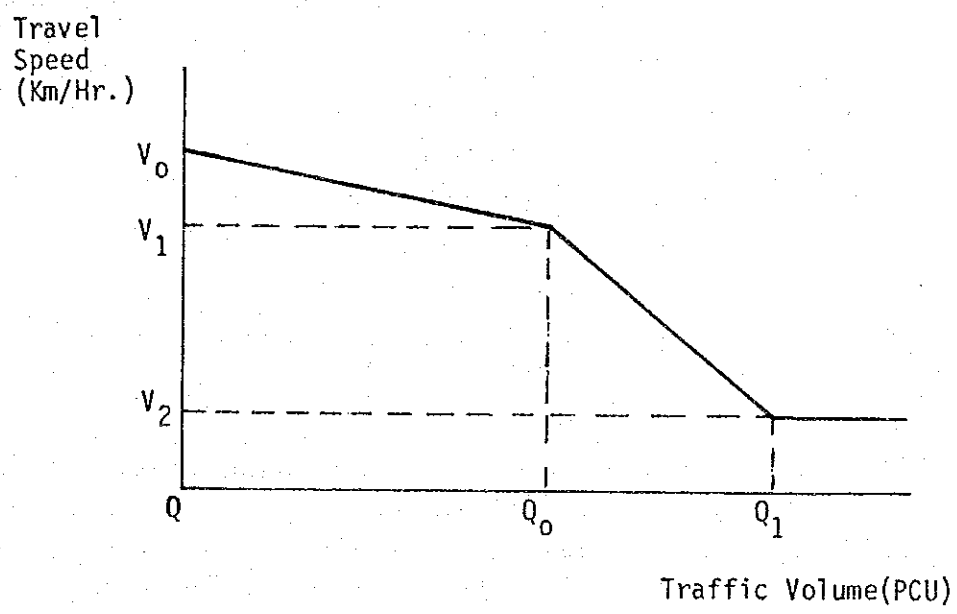
```
10 DATA "***(27 traffic assignment zones)***"      Title
20 DATA 27,244          No. of zones, No. of Links
30 DATA 220,1           No. of Nodes, No. of OD Tables
40 DATA 1               PCU pertaining to the OD Table (to be repeated the same time as the
                        No. of OD Tables)
50 DATA 1               No. of OD Table Divisions
60 DATA 1               Share of each OD Table Division (to be repeated the same time as the
                        No. of OD Table Divisions.)
70 DATA 0               Switch showing correspondence between zone Nos. and Node Nos.;
                        0: Zone Nos. same as Node Nos., 1: Zone Nos. to be specified by the
                        user (followed by data of node nos. in sequence of zone nos.)
80 DATA 5               No. of Delay Functions
90 DATA 60, 40, 20, 1000, 2000      V0, V1, V2, Q0, Q1; Delay
                                    Function No. 1
100 DATA 60, 40, 20, 2000, 4000     V0, V1, V2, Q0, Q1; Delay
                                    Function No. 2
```

110 DATA 60, 40, 10, 100, 200	
120 DATA 40, 20, 10, 1000, 2000	
130 DATA 40, 20, 5, 100, 200	V0, V1, V2, Q0, Q1; Delay Function No. 5
140 DATA "link 27.dat"	File Name of Link Data
150 DATA "od 27.dat"	File Name of OD Tables (to be repeated the same time as the No. of OD Tables)

Delay function parameters have the following meanings according to Figure 3.2.

V0 : Initial Speed
V1 : Travel Speed at Road Capacity
V2 : Travel Speed at Critical Point
Q0 : Road Capacity
Q1 : Road Capacity at Critical Point

Figure 3.2
Speed-Flow Relationship
(Delay Function)



- If the user will not create a control file, he has to input data manually from the keyboard according to the instructions which appear on the CRT. The order of the input data is basically the same as that of the control file.

  If an iterative operation of this program is needed, it is advisable to use a control file.

3.5 OPERATION

- In order to run the program, the user is instructed to create two (2) data files on the diskette beforehand. They are the link data and OD table files. The OD table file might be segregated depending on the number of vehicle types to be assigned at the same time. Likewise, if the user wants to utilize the control file, it must be created prior to operation.
- When the data files have been prepared, the user is instructed to type:

  load "trasmt" C/R
  run C/R
  (where, C/R : carriage return)

  Then the program starts its function. The diskette is supposed to be on the first drive. If the second drive is used, "2:" should be added before the file name.
- Once the program is run, the user will just follow the instructions on the CRT. If a control file is available, this process will be much simpler.

3.6 OUTPUT FORM

- The results are two fold:

  a) One-way Link Loadings
  b) Two-way Link Loadings

  The former is useful for traffic analyses by direction.
- For both printouts, the output form is the same as shown in Figure 3.3.

Figure 3.3
Printout Example of Traffic Assignment Program

Traffic Assignment – by Link (two-way)

Link	A-E	B-E	dist	QV	1-2	KQ	pcu	total	1
201	196	200	2.7	4	2	0	53010	35340	35340
202	195	196	0.9	4	2	0	25649	17099	17099
203	3	173	1.4	2	2	46100	74744	49829	49829
204	172	173	0.4	2	2	46100	38981	25987	25987
205	171	172	2.1	2	2	20000	61787	41191	41191
206	171	188	1.0	2	2	20000	33447	22298	22298
207	188	190	1.5	2	2	20000	32892	21928	21928
↓	↓	↓	↘	↘	↘	↘	↘	↘	↘
Link No.	Node	Node	Distance (Kms.)	Delay Function Number		One-way or Two-way	Pre-Determined Traffic Volume in PCU	Assigned Total Traffic Volume in PCU	Assigned Total Traffic Volume	Assigned Traffic Volume of Vehicle Type I

4. HIS DATA BASE SYSTEM

4.1 GENERAL

- This system intends to facilitate the usage of the JUMSUT 1980 socio-economic data. All the programs and the data files are stored on a diskette for the micro computer.
- This system is also basically a manual-free system designed in such a way that the user has only to follow the instructions which appear on the CRT.

4.2 STRUCTURE OF THE SYSTEM

- Unlike the JUMSUT Jeepney Route Information Management System (PTMANAGE), this system is a combination of six programs and twelve data files, without any main program controlling the system.
- The six program files and their functions are as follows:

1) **TRNDAT.NAK:** Data transformation
2) **AGGZN.NAK :** Zone aggregation
3) **PRIDAT.NAK :** Data printout
4) **HGRAPH.NAK:** Histogram creation
5) **PAINMP.NAK :** Graphic display of zones based on a specified indicator
6) **ODLIN.NAK :** Graphic display of desired lines

- The twelve data files are as follows:

1) **SOCIO.202 :** Socio-economic data of 202 zones
    1. Area (ha)
    2. Number of households
    3. Population
    4. Household income zone total (₱000)
    5. Population (7 years old and above)
    6. Employment by residence
        - 6.1 Total
        - 6.2 Primary
        - 6.3 Secondary
        - 6.4 Tertiary
    7. Number of students
    8. Daytime population
    9. Employment by workplace
        - 9.1 Total
        - 9.2 Primary
        - 9.3 Secondary
        - 9.4 Tertiary
    10. Number of students in the daytime
2) **SOCIOE.202:** Socio-economic data of 202 zones
    1-10. Same as above (Except household income, which has been changed from zone total to household average)
    11. Car-owning rate

12. Rate of employment residence
    - 12.1 Total
    - 12.2 Primary
    - 12.3 Secondary
    - 12.4 Tertiary
13. Rate of employment by workplace
    - 13.1 Total
    - 13.2 Primary
    - 13.3 Secondary
    - 13.4 Tertiary
14. Population density
15. Population density in the daytime

3) SOCIO.24 : Socio-economic data of 24 zones
(Same data items as SOCIO.202)

4) SOCIOE.24: Socio-economic data of 24 zones
(Same data items as SOCIOE.202)

5) GATEB.202: Generation and attraction of trips by mode and by purpose, 202 zones. (Mode: public/private, purpose: home/to work/to school/private/ business)

6) GATEB.24 : Generation and attraction of trips by mode and by purpose, 24 zones. (Mode and purpose are the same as GATEB.202)

7) ZOD27B.DAT: 27-zone OD tables (24 internal zones plus 3 external zones) by mode and by purpose. (Mode and purpose are the same as GATEB.202)

8) ZONCV.DAT: Zone conversion table (from 202 zones to either 24 or 58 zones)

   * The 58-zoning was developed only for purpose of testing data and programs. This was not used in the JUMSUT Study. It is desirable that it be replaced by other zoning systems.

9) NOD24.DAT: (x,y) coordinates of the centroids of the 24 zones.

10) NOD202.DAT: (x,y) coordinates of the centroids of the 202 zones.

11) ZONE 24.DAT: Data for graphic display of the 24 zones.

12) ZONE.DAT : Data for graphic display of the 202 zones.

4.3 PROGRAM DESCRIPTION

4.3.1 TRNDAT.NAK

- This program was prepared to create a new data file under a name, at the user's specification, after producing new data calculated from the existing data file.

- Although any type of calculation may be accepted in this program, as long as the formula to calculate each new item is one (1) and is expressed in the form of BASIC, the level of zoning is maintained to be the same as the existing data file specified. If zone integration is needed, AGGZN.NAK should be used.

- The usage of this program is simple. The user has only to follow the instructions appearing on the CRT. However, the user is requested not to save the program (e.g. after modifying

the program) into the same file after usage, because the program modifies itself when operated and the original program will be lost when the modified program is saved over it.

- The usage is as follows:

CRT Display	Input by User (Example)
	RUN "TRNDAT.NAK"
(The computer displays the title of the program "Data Transformation Program". Touch any key to proceed.)	
Input File Name?	SOCIO.202 (Specify an existing file. If the file is on the second drive, type "2:" before the file name.)
(The computer displays the data items included in the specified file. Touch any key to proceed.)	
File is right (Y/N)?	Y
(The computer prints out the data items included in the specified file.)	
Description of a New File (to be used as a title)	Forecast Socio-Economic Data for the Year 1995. (This title is to be saved as the first line of the new file to be created.)
New Data Item 1	
Symbol : Data Name : Formula (to calculate the above):	P95 1995 Projected Population Y (1) = 1.283 * x (1) + 17.35 (Y (i) is used for the variables of the new file, while x(i) is used for the variables of the existing file.)
Sure (Y/N)?	Y
New Data Item 2	
Symbol : Data Name : Formula (to calculate the above):	E95 1995 Projected Employment Y(2) = 0.3 * x(1) + 0.7 * x(3)
New Data Item 3	
	(This process can be iterated up to 50 times. If the user wants to stop, type "END" or "end" for the "Symbol".)
New File Name?	SOCI95.202
(Then the computer creates a new file using the calculated data.)	

4.3.2 AGGZN.NAK

- This program aggregates the zonal data from the 202-zone basis to either the 24-zone basis or the 58-zone basis. If the data file "ZONCV.DAT" is modified in an appropriate manner, other zoning systems may be dealt with by AGGZN.NAK.

- The aggregate data are stored in a new file, which can be used by TRNDAT.NAK, PRIDAT.NAK and HGRAPH.NAK. If the JUMSUT 58-zone system is selected, PAINMP.NAK and ODLIN.NAK are, so far, not applicable due to the non-availability of a zone map and OD table data.

- The usage is as follows:

CRT Display	Input by User (Example)
	RUN "AGGZN.NAK"
(The computer displays the title of the program "Zone Aggregate Program". Touch any key to proceed.)	
Zone Level 24 : 1 Zone Level 58 : 2	
Select No. (1 or 2)	1
Input File Name	SOCIO.202
(The computer prints out the data items included in the specified file.)	
File is right (Y/N)?	Y
New File Name?	SOCIOX.24
(Then the computer creates a new 24-zone based data file on the diskette.)	

4.3.3 PRIDAT.NAK

- This program is used to printout the data files of socio-economic data and trip generation/attraction.
- The usage is as follows:

CRT Display	Input by User (Example)
	RUN "PRIDAT.NAK"
(The computer displays the title of the program "Data Print Out Program". Press any key to proceed.)	
Input File Name	SOCIOE.24
(The computer prints out the data items included in the specified file.)	
File is right (Y/N)?	Y
Press No. of decimals you want (0-7) for each data item. 8 or 9 exponential.	
for Item No. 1	0
for Item No. 2	1
:	
: (This process is reiterated until it reaches up to the number of data items	
: included.)	
(Then the computer lists out the data included in the file.)	

4.3.4 HGRAPH.NAK

- This program creates a histogram based on a specified file of socio-economic data or trip generation/attraction.
- The user has to specify the number of items to be displayed at the same time, as well as the file name.
- The usage is as follows:

CRT Display	Input by User (Example)
	RUN "HGRAPH.NAK"
(The computer displays the title of the program "Histogram". Type any key to proceed.)	
Input File Name?	GATEB.24
(The computer indicates the data items included in the specified file.)	
File is right (Y/N)?	Y
How many items do you select?	5
Select No.	10
Select No.	11
Select No.	12
Select No.	13
Select No.	14
Title of Histogram?	Trip Generation by Zone, 1980
(Then the computer displays the histogram. After this, the user can select the following options:	
L : Display of legend	
3 : Display of next screen or another selection of items, if it is the last screen	
1 : Display of the previous screen	
2 : Display of the same screen)	

4.3.5 PAINMP.NAK

- This program has been developed in order to obtain a display of the socio-economic characteristics of zones based on either the 202-zone system or the 24-zone system.
- If the data files of zones maps (like ZONE.DAT and ZONE24.DAT), zone centroids (like NOD202.DAT and NOD24.DAT) and zonal characteristics (socio-economic data for SOCIO.202, SOCIOE.202, SOCIO.24 and SOCIOE.24 and trip generation/attraction for GATEB.202 and GATEB.24) are properly converted or created according to a new zoning system, this program can be applied also to this new zones. It is noteworthy that socio-economic data and trip generation/attraction can be easily created for any new zoning system using AGGZN.NAK as long as it is an aggregation of the 202 zones.
- The usage is as follows:

CRT Display	Input by User (Example)
	RUN "PAINMP.NAK
(The computer displays a title "Drawing Color Maps". Type any key to proceed.)	
Input File Name?	SOCIOE.24

(The computer indicates on the CRT all the data items included in the specified file. Touch any key to change the screen.)

File is right (Y/N)?	Y
Select Item	11 (Item No.)

(The computer displays the color "menu" together with the maximum, minimum and average of the selected data item.)

Number of Categories	5 (Number of categories user wants to specify for the map)
Select Color Code No.	1 (Color code no. displayed on the CRT)
Minimum Maximum	0 (minimum and maximum values 100 for the 1st category)
Select Color Code No.	19
Minimum Maximum	100 200
	(This process is iterated 5 times in this case.)
File Name of Zone Map?	ZONE24.DAT (for 202 zones, ZONE.DAT should be specified)
File Name of NOD?	NOD24.DAT (for 202 zones, NOD202.DAT should be specified)

(Then the computer draws a colored map on the CRT. For reiteration of the process, press RETURN.)

4.3.6 ODLIN.NAK

- This program has been developed in order to draw the desired lines based on the JUMSUT OD tables. Although this program is, so far, applicable only to the 24-zone system, this can be used for other zoning systems if a set of appropriate data is provided.

- The usage is as follows:

CRT Display	Input by User (Example)
	RUN "ODLIN.NAK

(The computer displays a title "Desired Line". Touch any key to procced.)

File Name of Zone Centroids	NOD24. DAT
File Name of OD Tables?	ZOD27B.DAT
File Name of Zone Map?	ZONE24.DAT

(The computer indicates the list of OD tables on the CRT.)

Select No.	13 (OD Table No. user wants to use)
Rd. Rate?	30000 (This value means the number of trips represented by one dot on the CRT)

(Then the computer draws desired lines on the zone map. If the scale is inappropriate, type "0" to return to "Select No.")

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