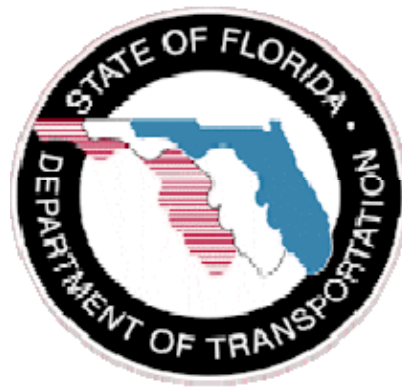


# TECHNICAL REPORT FSUTMS Transit Model Application Guide

---



Submitted to:

Florida Department of Transportation

Submitted by:

AECOM Consult, Inc.

September 2008

## CONTENTS

<b>LIST OF FIGURES .....</b>	<b>III</b>
<b>LIST OF TABLES .....</b>	<b>IV</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>CHAPTER 1: IMPORTING THE TRANSIT MODEL APPLICATION.....</b>	<b>2</b>
<b>CHAPTER 2: MODEL PROCEDURE .....</b>	<b>6</b>
2.1    TRANSITPREP MODULE .....	6
2.2    TRANSIT MODULE .....	7
2.3    MODE CHOICE MODULE .....	8
2.4    TASSIGNMENT MODULE .....	9
2.5    REPORTING MODULE .....	10
<b>CHAPTER 3: CATALOG KEYS, INPUT AND OUTPUT FILES.....</b>	<b>13</b>
3.1    CATALOG KEYS .....	13
3.2    INPUT FILES.....	14
3.2.1    Transit line file (TROUTE_{year}{alt}.LIN) .....	14
3.2.2    System file (system.pts).....	14
3.2.3    Fares file (TFAREStp_{year}{alt}.FAR).....	16
3.2.4    Transit Coefficients file (TRN_COEFFICIENTS.DBF).....	17
3.2.5    Mode Choice constants file (MC_CONSTANTS.DBF ) .....	17
3.2.6    Percent walk file (PCWALK_{Year}{Alt}.DAT) .....	18
3.2.7    Station node and name file –ASCII file (STATREP_{year}{alt}.DAT) .....	19
3.2.8    Highway networks .....	19
3.2.9    Highway skim files.....	20
3.2.10    Person trip file (PSNTRIPS_{Alt}{Year}.MAT) .....	21
3.2.11    Zonal data files.....	21
3.2.12    Mode choice targets (MC_TARGETS.DBF) .....	21
3.3    KEY OUTPUT FILES.....	24
3.3.1    Transit assignment summary report (TASUM_{ALT}{YEAR}.PRN) .....	24
3.3.2    Transit Assignment Route-Level Report (TASROUTE_{ALT}{YEAR}.PRN).....	25
3.3.3    Station Activity Report(Stations_{Alt}{Year}.prn) .....	26
<b>CHAPTER 4: CHANGES IN SCRIPTS .....</b>	<b>28</b>
4.1    TPNET00C.S (TRANSIT SPEED FOR PEAK PERIOD).....	28
4.2    TPNET00C.S (TRANSIT SPEED FOR OFFPEAK PERIOD).....	28
4.3    TPPTR00A.S (BUILD PEAK ACCESS CONNECTORS).....	29
4.4    TPPTR00B.S (BUILD OFFPEAK ACCESS CONNECTORS) .....	29
4.5    TRPTR00A.S (WALK-ACCESS PATHS/SKIMS – PEAK) .....	29
4.6    TRPTR00B.S (AUTO-ACCESS PATHS/SKIMS – PEAK) .....	29
4.7    TRPTR00C.S (WALK-ACCESS PATHS/SKIMS – OFFPEAK) .....	30
4.8    TRPTR00D.S (AUTO-ACCESS PATHS/SKIMS – OFFPEAK) .....	30
4.9    MCPREP.S (AUTO OWNERSHIP PERCENTAGE BY TAZ FOR WORK AND NON-WORK PURPOSES) .....	30
4.10    MCPREP.S AND MCMAT00B.S.....	32
<b>APPENDIX: TRANSIT MODEL TIER A APPLICATION SCREENSHOTS.....</b>	<b>33</b>

**LIST OF FIGURES**

FIGURE 1: TRANSIT MODEL APPLICATION	2
FIGURE 2: NEW APPLICATION DIRECTORY	3
FIGURE 3: NEW APPLICATION DIRECTORY DIALOG BOX	3
FIGURE 4: NEW APPLICATION DIRECTORY DIALOG BOX II	4
FIGURE 5: INSERT APPLICATION GROUP	4
FIGURE 6: TRANSIT MODEL APPLICATION IN OLYMPUS TRAINING MODEL	5
FIGURE 7: TRANSITPREP MODULE	7
FIGURE 8: TRANSIT MODULE	8
FIGURE 9: MODE CHOICE MODULE	9
FIGURE 10: TASSIGNMENT MODULE	11
FIGURE 11: REPORTING MODULE	12
FIGURE 12: STATION NODE AND NAME FILE	19
FIGURE 13: TRANSIT ASSIGNMENT SUMMARY REPORT (SNIPPET)	25
FIGURE 14: TRANSIT ASSIGNMENT ROUTE- LEVEL REPORT (SNIPPET)	26
FIGURE 15: STATION ACTIVITY REPORT (SNIPPET)	27
FIGURE 16: TRANSITPREP MODULE	34
FIGURE 17: TRANSIT MODULE	35
FIGURE 18: MODE CHOICE MODULE	36
FIGURE 19: TASSIGNMENT MODULE	37
FIGURE 20: REPORTING MODULE	38

## **LIST OF TABLES**

TABLE 1: CATALOG KEYS	13
TABLE 2: KEYWORDS TO LINE CONTROL STATEMENT AND THEIR RECOMMENDED VALUES	15
TABLE 3: SUB-KEYWORDS TO KEYWORD N IN LINE CONTROL STATEMENT	15
TABLE 4: DEFAULT MODES AND MODE NUMBERS IN SYSTEM.PTS FILE	15
TABLE 5: DEFAULT OPERATORS, OPERATOR NUMBERS, AND FARESYSTEMS IN SYSTEM.PTS FILE	16
TABLE 6: KEYWORDS TO FARESYSTEM CONTROL STATEMENT AND THEIR RECOMMENDED VALUES	16
TABLE 7: DEFAULT FARES USED IN THE FARES FILE	17
TABLE 8: DEFAULT TRANSFER FARES USED IN THE FARES FILE	17
TABLE 9: DEFAULT TRANSIT COEFFICIENTS	17
TABLE 10: DEFAULT MODE CHOICE CONSTANTS	18
TABLE 11: PERCENT WALK FILE FORMAT	19
TABLE 12: STATION NODE AND NAME FILE FORMAT	19
TABLE 13: HIGHWAY NETWORK LINK VARIABLES	20
TABLE 14: HIGHWAY NETWORK NODE VARIABLES	20
TABLE 15: HIGHWAY SKIM TABLES FOR AUTOCON PROGRAM	21
TABLE 16: HIGHWAY SKIM TABLES FOR MODE CHOICE MODULE	21
TABLE 17: REQUIRED FIELDS IN ZONAL DATA FILES	22
TABLE 18: DEFAULT MODE SHARE TARGETS	23
TABLE 19: TRANSIT ASSIGNMENT SUMMARY REPORT FORMAT	24
TABLE 20: TRANSIT ASSIGNMENT ROUTE-LEVEL REPORT FORMAT	25

## ***Executive Summary***

The Florida Department of Transportation updated the transit modeling standards in 2006 for the State of Florida. A CUBE Voyager transit model application is being developed that incorporates the updated transit modeling standards. This document provides the instructions for importing the transit model into a travel demand model (Chapter 1), descriptions of the model procedure (Chapter 2), the catalog keys, input and output files of the transit model (Chapter 3), and the scripts that must be modified by the user to customize the transit model application to fit the model at hand (Chapter 4).

Just like a travel demand model, the transit model must be calibrated and validated with observed data. The data required to calibrate and validate the transit model application includes:

- Appropriate zonal area and connections to the highway network (zones larger than one square mile may not be able to connect to transit);
- Reasonable estimates of person travel patterns, which can be verified by using the Census Transportation Planning Package 2000 (work trips only) or other relatively large-sampled surveys;
- Reliable estimates of auto and transit travel times, which could be gathered from car probes, data from freeway management centers, automatic vehicle locators (AVLs) and public transit time tables;
- Observed linked transit trips by trip purpose, access mode, market segments and potentially by other dimensions, which can be developed via a transit on-board survey; and
- Boardings by route and potentially by other dimensions, which could be gathered from ridecheck (on/off) surveys, automated passenger counters (APCs) or fare collections.

The following steps must be followed in order to properly import and modify the transit model application in a travel demand model:

- Import the transit model to the travel demand model (refer to Chapter 1),
- Review the modules within the transit model (Chapter 2),
- Connect input and output files from the model to the files in transit model (Chapter 3),
- Modify the appropriate scripts and input files (Chapter 4),
- For the best year, calibrate the auto and transit speeds (or travel times) and compare them against observed data,
- Calibrate the mode choice model for the base year,
- Validate the base year transit assignments by comparing them to observed counts, and
- Test the transit model against at least one future alternative to assess its forecasting ability.

## CHAPTER 1: Importing the Transit Model Application

This chapter explains the procedures for importing the transit model application into the user's travel demand model. The formats of the input and output files, the required fields for the input files, and the detailed description of the logic of the different groups of applications are noted in the subsequent chapters. The transit model application can be downloaded from <http://www.fsutmsonline.net/images/uploads/mtf-files/TransitApp.zip>. The screenshot of the application is shown in Figure 1 below.

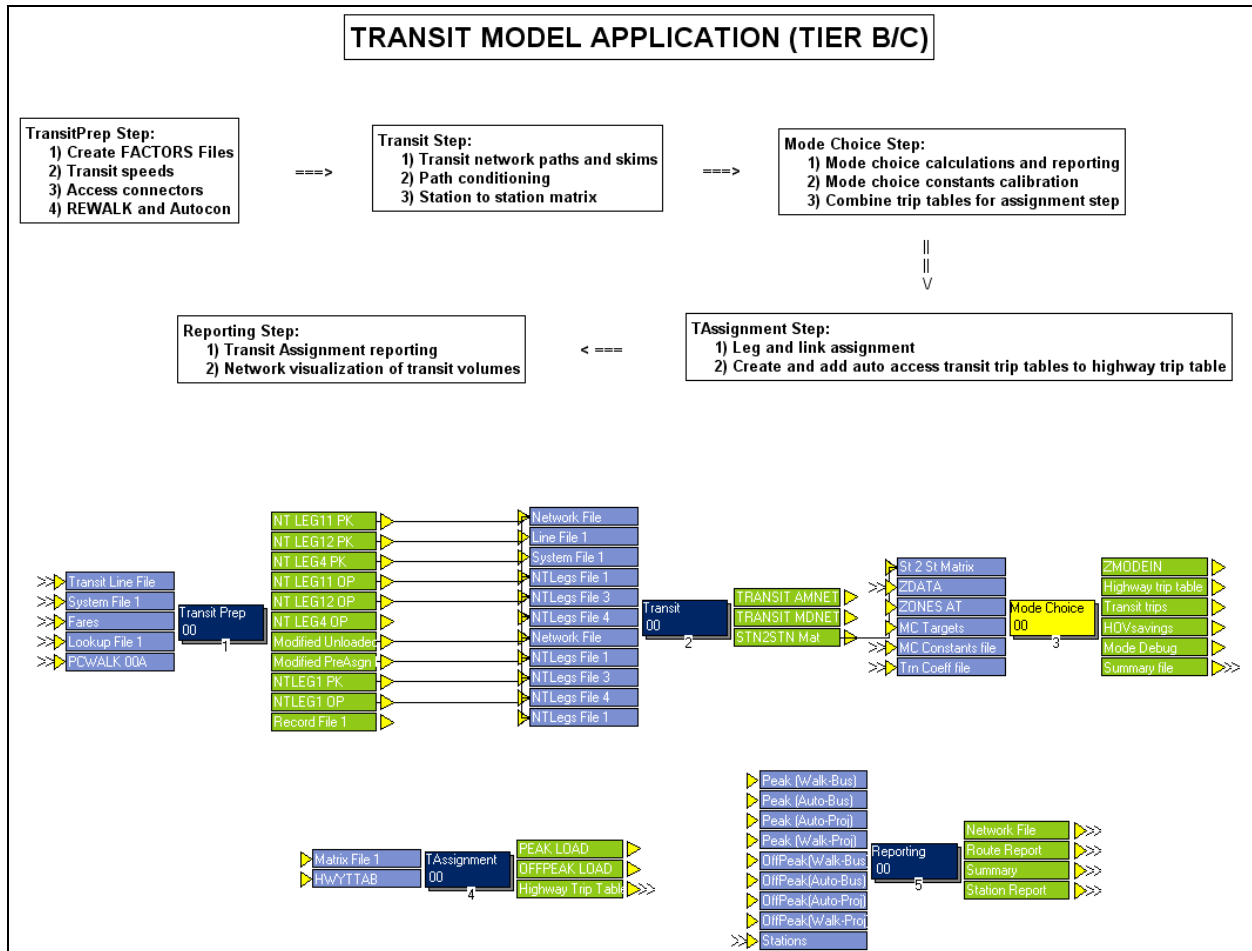


FIGURE1: Transit Model Application

The transit model application is used to prepare the transit network from the highway network, generate transit access connectors, transit skims and paths, obtain the shares and vehicle trips of all the modes/paths (both auto and transit) from the person trip table, assign the transit trips to transit service routes and produce transit assignment reports (summary, route-level, and station level reports). So, the transit model should be placed after the trip distribution step and before the highway assignment step.

The following steps must be followed to insert the transit model application into a model:

- 1) Open the transit model application in CUBE Voyager
  - a. Open *TRANSITMODEL.app* file from the *applications\transitmodel.app* folder. The screenshot of the application is shown in Figure 1.
- 2) Create a new directory for this application and save it in the *applications* folder of the model
  - a. Go to 'Application' Tab and click on 'New Application Directory' (see the screenshot below).

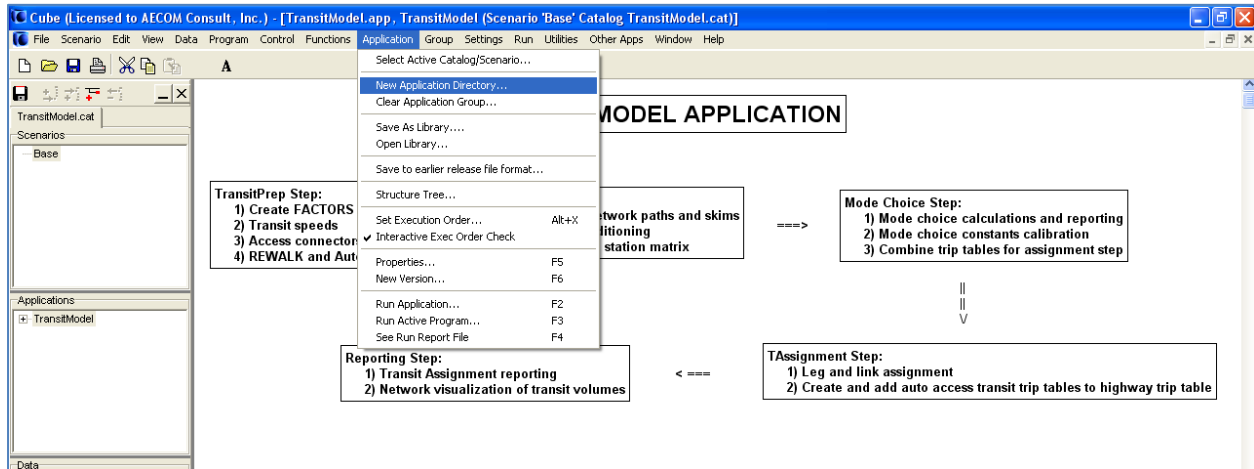


Figure 2: New Application Directory

- b. A dialog box as shown will appear. Click Ok.

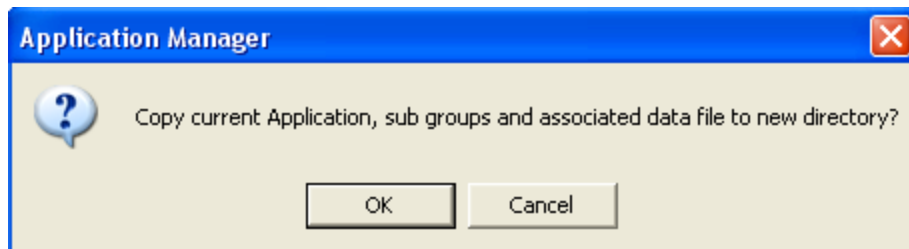


Figure 3: New Application Directory Dialog Box

- c. In the “choose directory” dialog box that follows, select the applications folder of the model, as the initial folder points to the folder where the current *TRANSITMODEL.app* file is.
      - d. A dialog box as shown will appear. Click “Yes”. Please be aware that when clicking “Yes” to the dialog box, a message will pop up saying “the project has program files that contains @...@ and %...%, file names cannot be saved!”

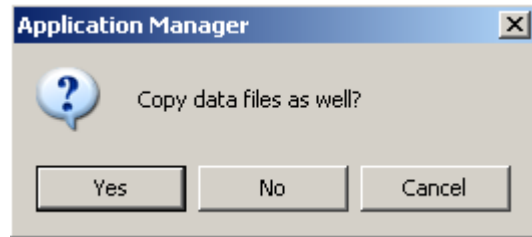


Figure 4: New Application Directory Dialog Box II

- e. Close the application.
- 3) Open the model into which transit model application needs to be imported:
  - a. Choose Group tab and Click on 'Insert Application Group' (screenshot is shown below).

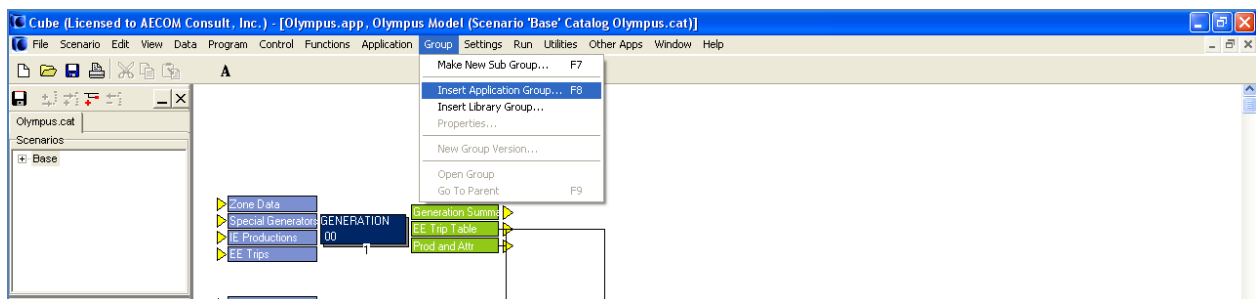


Figure 5: Insert Application Group

- b. Select *TRANSITMODEL.app* from the list. This will insert the TRANSITMODEL subgroup into the model.
- c. Change the execution order of this step so that it is run after the trip distribution step. Execution order can be changed by right-clicking on the subgroup.
- d. Link the input and output files from the transit model application to the files in other steps. This can be done by dragging and dropping the appropriate files that need to be connected from other steps to the location of the files in transit model application. Similarly, the output files of the transit model that need to be connected to other steps can be dragged and dropped into the location of the files in the other steps.
- e. Follow the instructions mentioned in *Readme.txt* file present in the model folder to install the AUTOCON program.
- f. Refer to Chapter 2 for a detailed account of the formats, required fields, and naming conventions of the input files. All the input files must be consistent with the formats and names mentioned in Chapter 2. The user may have to add some steps to change either the formats or the names of the files before connecting them to the transit model application.
- g. The transit model application is now imported into the model.

Step 4 of the Olympus model is the transit model application. The transit model application, when imported into the user's model, should look like the screenshot.



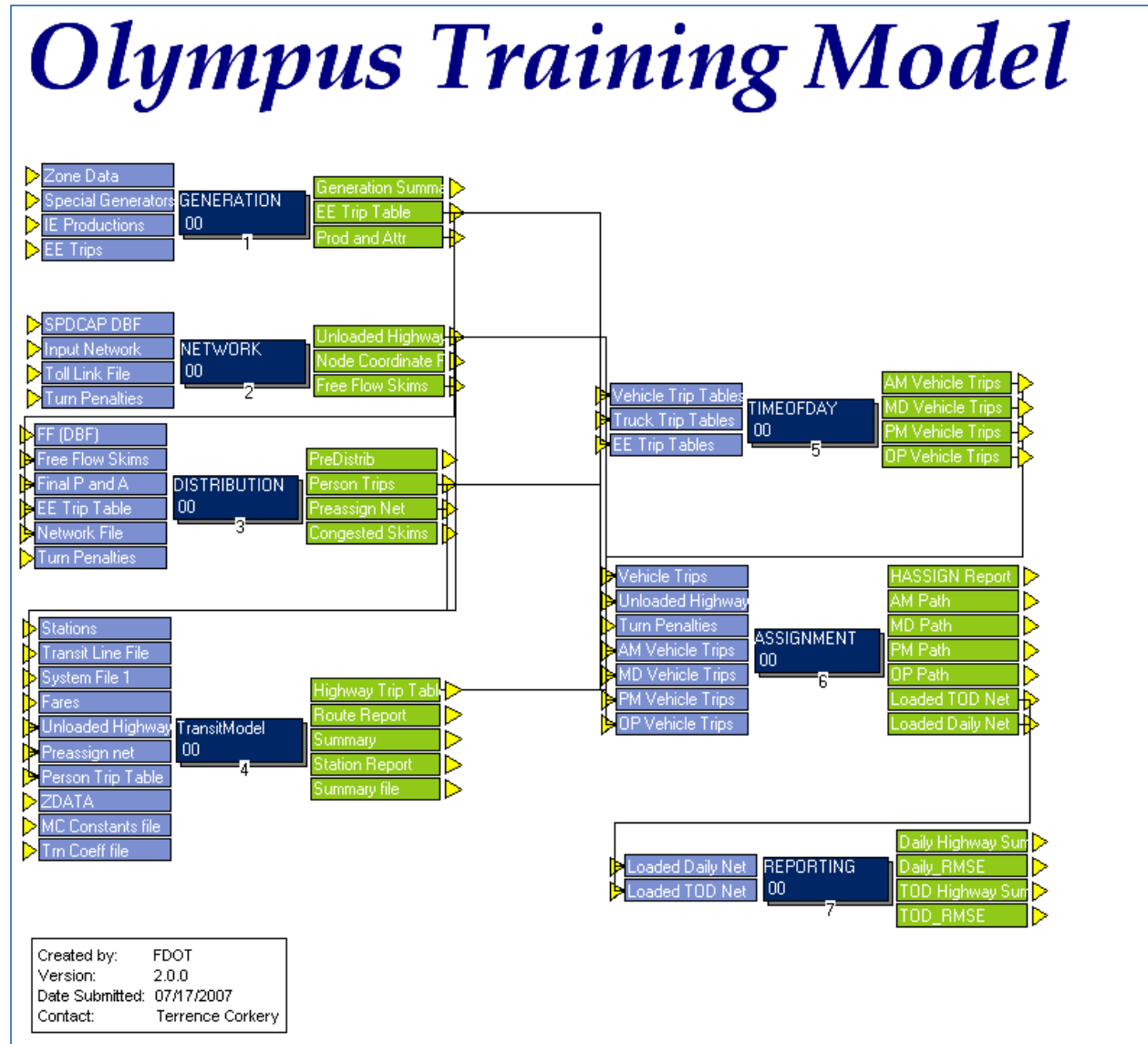


Figure 6: Transit Model Application in Olympus Training Model

## **CHAPTER 2: Model Procedure**

The transit model consists of five modules. In the first module (TransitPrep), the factors files are created and the speeds of various transit modes are assigned. Next, access connectors are built and adjustments are made to walk access connectors. In the Transit module, paths and skims are built. This is followed by path conditioning to eliminate certain paths from evaluation. The modal choice model is scripted in the Mode Choice module. The mode choice model may also be calibrated in this module. Transit trip tables are loaded onto the transit paths in the TAssignment module. In the Reporting module, transit assignment summary reports are generated. A station report that notes the activity at selected stations is also produced. Each of these modules is discussed in detail in this section. The Tier B/C application screenshots are presented in this chapter and the Tier A application screenshots are presented in the Appendix.

### **2.1 TransitPrep Module**

The TransitPrep module is shown in Figure 7. This module is divided into three groups of steps. In the first group, the TRANSIT.MAS file is created. Next, four factors files that specify the weights of the various travel components (e.g., transit fare, wait time, in-vehicle time, boarding and transfer penalties) are created.

Transit travel times are computed for various transit modes in the second group of steps. Travel times for mixed-flow transit vehicles are typically a function of auto times stratified by mode, area type and facility type. Travel times for vehicles that operate on exclusive right-of-way (e.g., fixed-guideway and bus-only lanes) are commonly computed using equations of motion. By default, transit speeds are set equal to auto speeds and the user has to appropriately change the speeds for all the transit modes present in the model.

Access and transfer connectors are generated in the final group of steps. Two types of access connectors are generated: walk access and auto access. Three types of transfer connectors are generated: one for CBD sidewalks, another to connect transit platforms, and a third to connect fixed-guideway platforms with nearby bus stops. All-walk connectors are also generated in this group of steps. Step 18 of the module is the REWALK application. Please refer to REWALK documentation located at <http://www.fsutmsonline.net/images/uploads/mtf-files/Rewalk-041508.zip> for more details about REWALK application.

In the Tier A application, two factors files are created: WalkTransit.Fac and AutoTransit.Fac. Also, REWALK application is not necessary for Tier A model since percent walks are not calculated for Tier A areas.

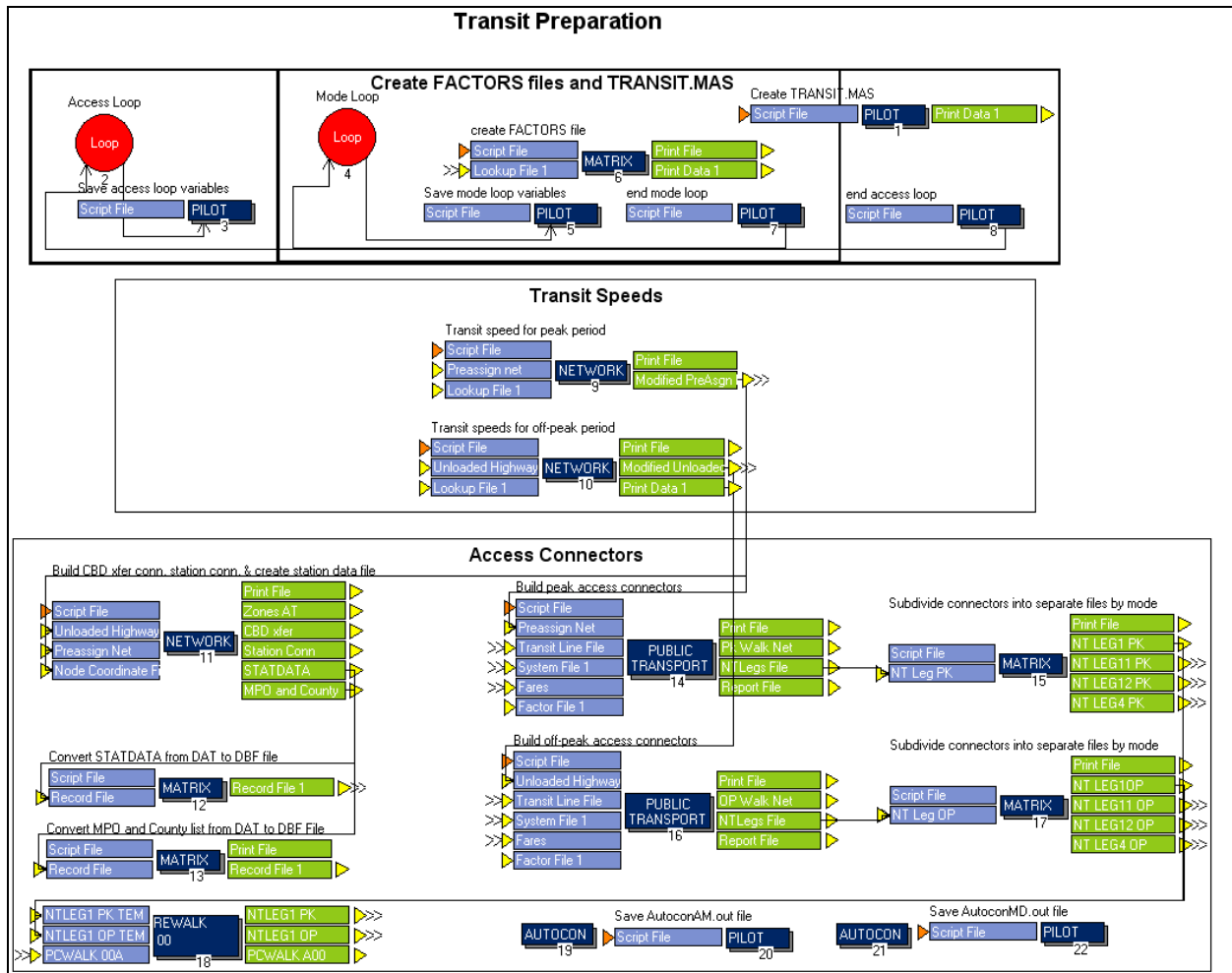


Figure 7: TransitPrep Module

## 2.2 Transit Module

Transit paths are built by period in this module. Figure 8 shows the module for the Tier B/C application. Walk and auto access paths and skims are built in steps 1 through 9. Four different sets of paths are built for the Tier B/C model while two sets of paths are built for the Tier A model. Transit paths for different tier areas are explained in Section 2.2 of the *FSUTMS Transit Model Development Guide* located at [http://www.fsutmsonline.net/images/uploads/mtf-files/TM\\_DevelopmentGuide.pdf](http://www.fsutmsonline.net/images/uploads/mtf-files/TM_DevelopmentGuide.pdf). All-walk paths are also generated in this module.

Next, the transit paths are tested through the process of path conditioning to ensure that viable transit paths are evaluated by the mode choice model. For a path to be considered viable it must have in-vehicle time on the path (usually for a specific mode or group of modes) and it must be less onerous than an all-walk path. Both tests are conducted in steps 11 (for walk-access paths) and 12 (for auto-access paths). Finally, the transit station zone number of the first

boarding, the parking cost and the terminal times at the station are stored in the station-to-station matrix.

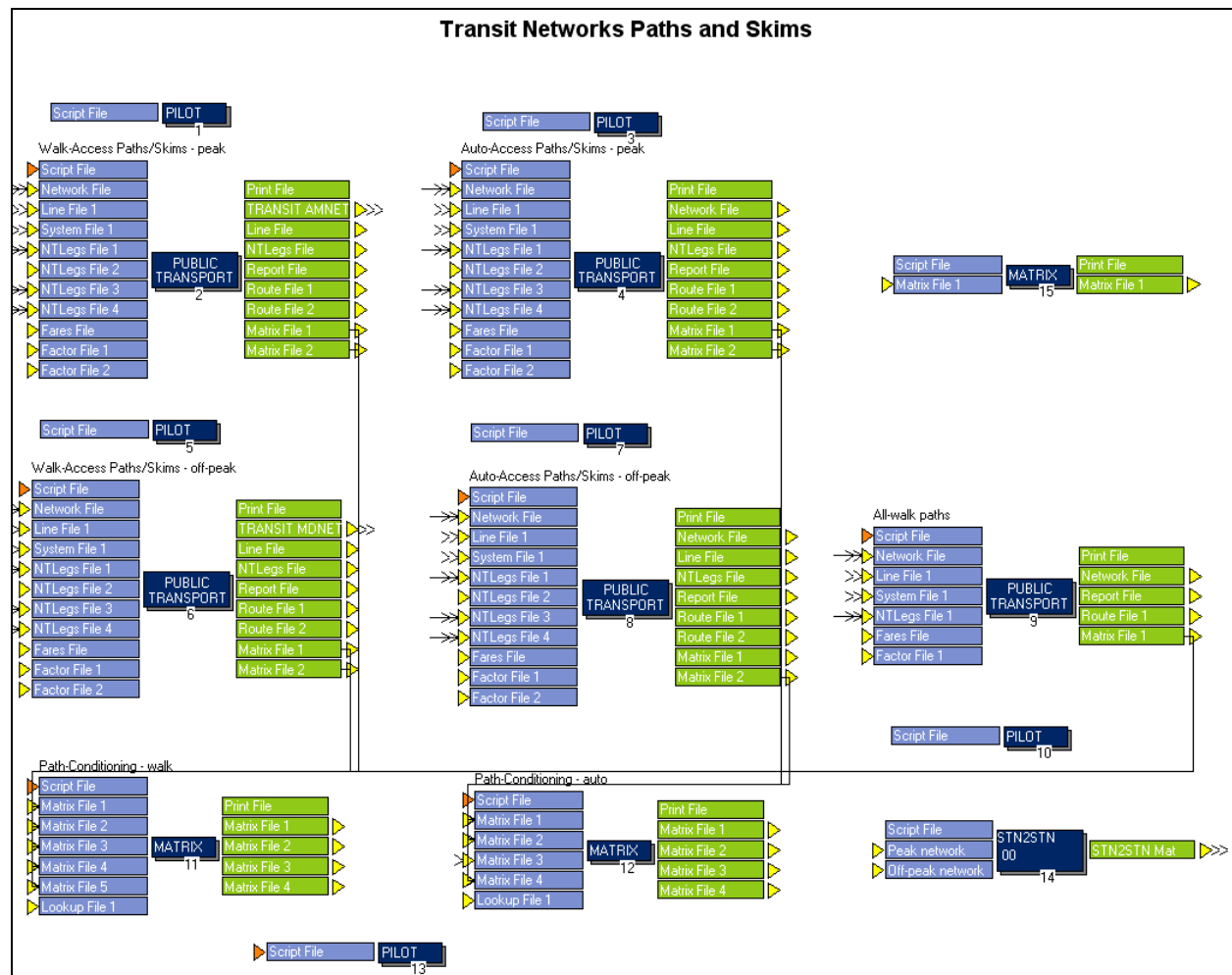


Figure 8: Transit Module

### 2.3 Mode Choice Module

The mode choice model is executed in this module (Figure 9 shows the module). Steps 1 through 6 involve preparations for running the mode choice utility calculations. This includes noting the date and time of model run, calculating the auto ownership markets, and combining the percent walk data, socio-economic data, and area type data to create a single zonal data file. Next, the travel time savings of heavy occupancy vehicles (HOVs) as compared to single occupancy vehicles (SOVs) are computed.

The mode choice utility calculations are performed in step 12. The sub-modal shares of different paths are calculated by access (can walk, must drive, and no transit) and by auto ownership. In

the next step, mode choice calculations are reported in a mode choice summary report and the trip tables are combined by purpose.

The mode choice model can then be calibrated by adjusting the bias constants. Please note that this loop does not run by default. It must be activated by changing the {MC\_Calib} key, which is described in Table 2 in the next chapter. The trip tables are then combined to create a single transit trip table.

For the Tier A application, percent walks are not used in the zonal data file created during mode choice preparation. Also, the sub-modal shares of different paths are calculated by auto ownership only.

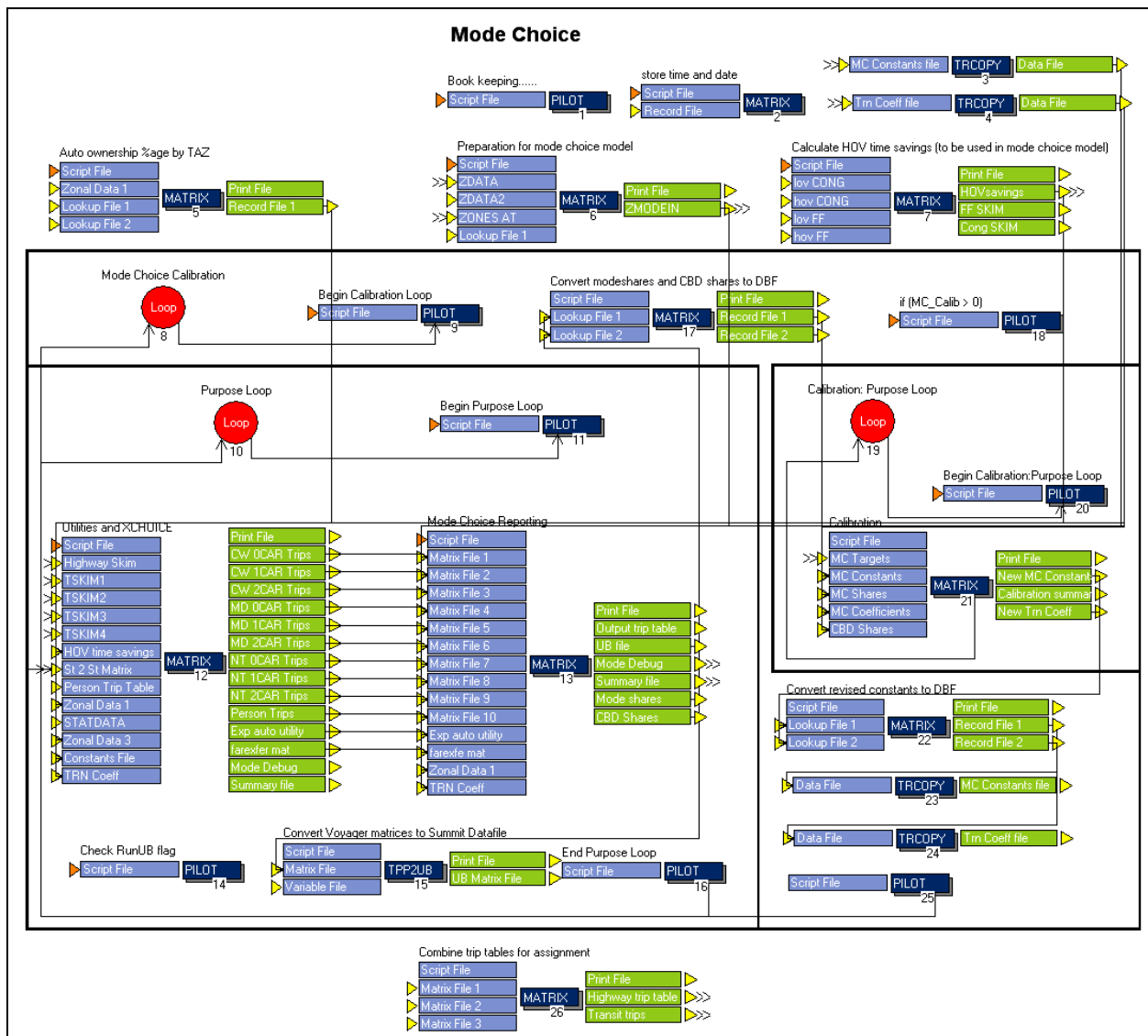


Figure 9: Mode Choice Module

## **2.4 TAssignment Module**

Figure 10 below shows the TAssignment module. The transit trip table obtained from the Mode Choice module is loaded onto the various transit paths in this module. Transit trips are assigned to paths in two different iterations by varying transit assignment parameters: legs, and links assignment. For each iteration, transit trips are assigned by period (peak and off-peak), access mode (walk and auto), and transit mode (bus and project). The auto access trips are then added to the highway trip table to be used for highway assignment.

## **2.5 Reporting Module**

Figure 11 shows the Reporting module. Three transit assignment reports and a network for visualization are produced in this module. TAREport application produces a summary report, a route-level report and a station activity report. Please refer to TAREport documentation located at <http://www.fsutmsonline.net/images/uploads/mtf-files/TAREport-041508.zip> for more details. Next, total transit volumes along corridors (by each link in the corridor) are visually displayed in a specially-prepared network.

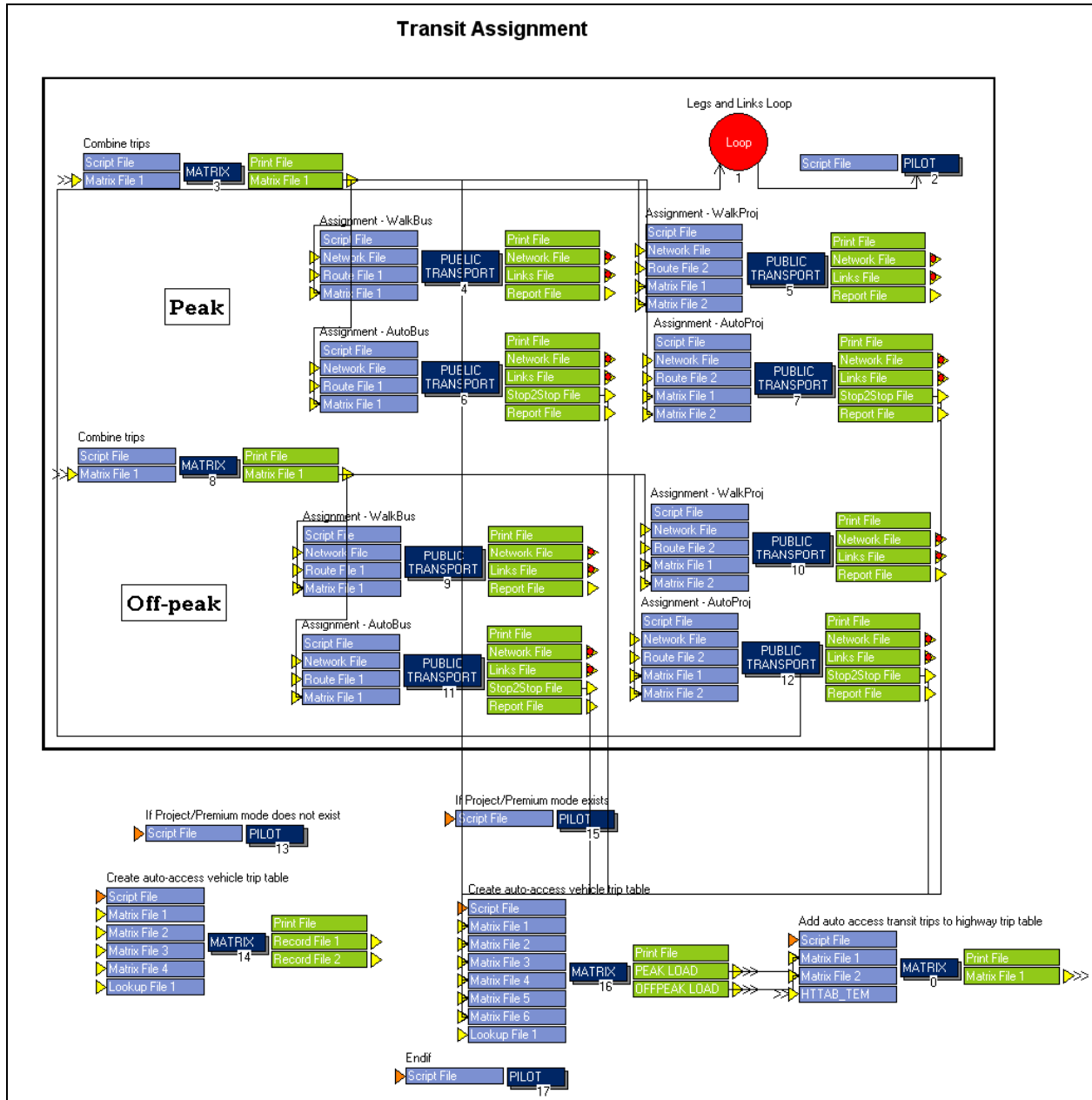


Figure 10: TAssignment Module

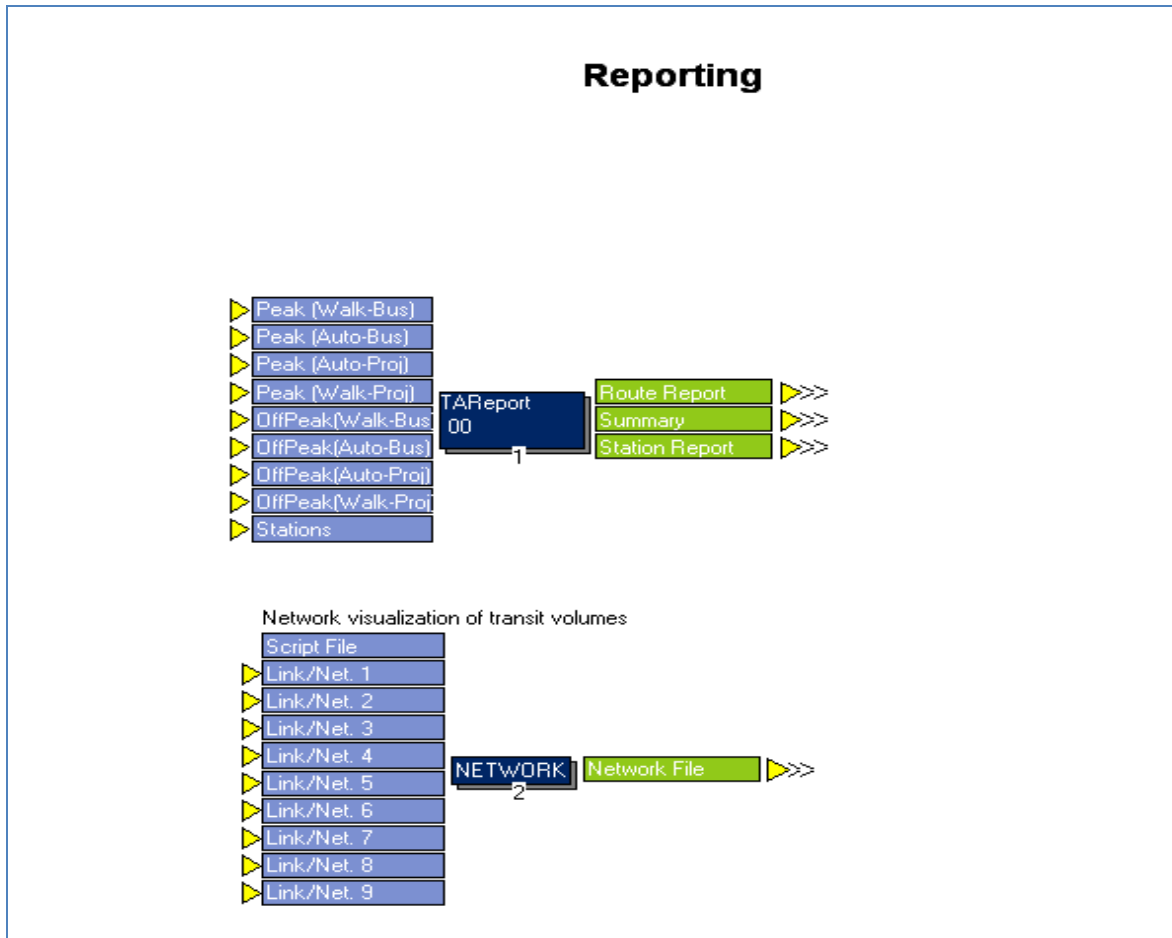


Figure 11: Reporting Module



### CHAPTER 3: Catalog keys, input and output files

This chapter details the catalog keys, input files and output files of the application. The following sections also explain the default input values and how they may be modified by the user to customize the application to fit the model at hand.

#### 3.1 Catalog Keys

Table 2 summarizes the catalog keys that need to be defined before running the transit model application, along with their default values (if applicable) and a brief description.

**Table 1: Catalog Keys**

Catalog Key	Format	Default value	Description
{alt}	A1	-	Alternative letter
{year}	A2	-	Model year
{FromNode}	A	-	Origin zone number for transit path tracing
{ToNode}	A	-	Destination zone number for transit path tracing
{Units}	-	5280	Coordinate units per mile
{isMicroCode}	Boolean	-	1 if fixed-guideway station nodes (for example skyway or BRT) are coded separately from the bus stop nodes in the network, 0 otherwise
{XFERACC}	-	0.6	Maximum cost on a transfer connector
{MAXWLKACCLNKS}	-	99	Maximum number of walk access connectors per mode
{ZONES}	A	-	Total number of zones including internal and external
{NODEMIN}	A	-	Minimum non-centroid node number
{WALKACC}	-	0.6	Maximum cost on a walk access connector
{AVGWLKSPD}	-	2.5	Average walk speed in mph (usually 2.5)
{AVGWALK}	-	0.5	Average walk distance in miles (usually 0.5 miles)
{MINIPCW}	-	15	Minimum threshold percent walk (usually 15%)
{OCTA}	-	-	Average auto occupancy for auto-access transit trips
{IsAutoAccess}	Boolean	0	Boolean key set to 1 if passengers can access transit by auto mode (for example, by a park-and-ride lot), 0 otherwise
{IsProjectMode}	Boolean	0	Boolean key set to 1 if the model contains a project mode, 0 otherwise (only in Tier B/C model)
{ZONESA}	A	-	Maximum external zone number
{DebugMC}	-	0	Debug Mode Choice (greater than 0 if yes)
{SelOrigin}	A	-	Selected origin zone for reporting purposes
{SelDest}	A	-	Selected destination zone for reporting purposes
{hwyopcost}	F	9.5	Auto operating cost (cents/mile)
{CTOLL}	F	0.1	Coefficient of Toll used in assignment and pathing
{Zapzero}	I	1	Zero out the drive alone and pnr-access trips for zero-car households
{oc3vhbw}	F	3.37	Home-based work (HBW)- Avg 3+ Persons/Car
{oc3vnhbw}	F	3.48	Home-based other(HBO)- Avg 3+ Persons/Car
{oc3vnhb}	F	3.59	Non-home based (NHB)Avg 3+ Persons/Car
{InflationToll}	F	1	Inflation factor for auto tolls
{InflationAOC}	F	1	Inflation factor for auto operating cost
{InflationParkCost}	F	1	Inflation factor for parking cost
{InflationFare}	F	1	Inflation factor for transit fare
{OCCPNRAccess}	F	1.2	Average occpncy rate for PNR access trips
{MinDistWalkAcc}	F	0.6	Minimum distance on I-J pair required for evaluation of walk-access transit paths

{MinDistAutoAcc}	F	1.2	Minimum distance on I-J pair required for evaluation of auto-access transit paths
{ZONESI}	I	-	Maximum internal zone number
{OCCKNRAccess}	F	1.2	Auto occupancy for KNR trips
{MC_Calib}	I	0	Mode Choice Calibration (1 if yes)
{RunUB}	Boolean	0	Dummy variable to run (=1) or not run (=0) user benefits & generate user benefit files
{HOVMIN}	F	3	Minimum time savings (in minutes) on HOV lanes before being accounted for in the mode choice equation
{CBDZONE}	I	-	Zone that best represents the core of the area's Central Business District

### 3.2 Input files

This section describes the input file formats, required fields, naming conventions and their locations. The default versions of all the input files are already present in the model and the user has to replace them with the corresponding files for the model at hand.

#### 3.2.1 Transit line file (*TROUTE\_{year}{alt}.LIN*)

The transit line file must represent all time periods in order to simplify data maintenance. Each line is coded with at least two headways (PT can accommodate up to five), one for the AM peak period and another for the off-peak period. If a line does not conduct service in any time period, the headway should be coded as zero for that time period. Two-way coding is used for those lines whose routing does not vary in either direction. The transit line fields and their recommended values are shown in Table 2. The default transit line file has two transit lines and may be used as a guide to code the transit lines of the model. The user has to code the transit lines corresponding to his/her model in the transit line file. The transit line file can be coded manually offline and must be stored in the *input* folder of the alternative. The keyword N can have sub-keywords to add further details within the node list to show dwell times and layovers. This is explained in Table 3.

#### 3.2.2 System file (*system.pts*)

The system data file defines the modes, transit operators, vehicle types and wait-curves used in the transit system. This file is stored in the *parameters* folder of the model. The default system file present in the application is for guidance only. The user needs to change this file to tailor it to his/her model. The modes and operators used in the default file are explained below.

**Table 2: Keywords to LINE Control Statement and Their Recommended Values**

Keyword to LINE control statement	Type	Description	Recommended Value
LONGNAME	Character	40-character description	None
NAME	Character	10-character description	None
ONEWAY	Boolean	If true line travels in coded direction. If false, line travels in both directions	None
HEADWAY[1]	Numeric	Time between consecutive vehicles (1=peak period; 2=offpeak period)	Minutes (0 if not offered in period)
HEADWAY[2]	Numeric		
MODE	Numeric	Transit mode (defined in system data file)	None
OPERATOR	Numeric	Transit operator (defined in system data file)	None
N	Numeric string	String of nodes traversed	Positive if vehicle stops for boarding, negative if vehicle does not stop
TIME	Numeric	Sets the actual node-to-node travel time	None
CIRCULAR	Boolean	If true, the line is circular (it operates in a loop or circle). If false, the line is not circular	None

**Table 3: Sub-keywords to Keyword N in LINE Control Statement**

Sub-keywords to N	Example	Description
DELAY	N=5001,5002,DELAY=5,5004	Additional time delay (minutes) added to link time
DWELL	N=5001,5002,DWELL=8,5004	Dwell time (minutes) at preceding node

a) Mode definitions

The default mode definitions used in the transit model application are summarized in the table below. The first 20 mode numbers are reserved for non-transit modes. Each transit route in the transit line file is assigned a mode number. To assist in New/Small Starts analysis, mode 26 is reserved for “other mode” (i.e., a new transit mode that is built between the base and horizon years) and mode 27 is reserved for “project mode” (i.e., the mode under analysis), respectively. The user can define additional modes in the SYSTEM.PTS file.

**Table 4: Default Modes and Mode Numbers in SYSTEM.PTS File**

Mode	Number	Type
Walk connectors	1	Non-transit mode
PNR connectors	2	Non-transit mode
All walk connectors	4	Non-transit mode
Transfer connectors	11	Non-transit mode
Sidewalk connectors	12	Non-transit mode
Local bus	21	Transit mode
Premium service	22	Transit mode
Circulators (trolley/streetcar)	23	Transit mode
Urban(light/heavy) rail	24	Transit mode
Commuter rail	25	Transit mode
Other mode	26	Transit mode
Project mode	27	Transit mode

b) Operator definitions

Operators represent different types of services offered by a system. Operators are also used to define the boarding and transfer fares. Each line is assigned an operator number and the fare attached to the line is mapped to the operators in the factors file. The default operators defined in the transit model application are shown in the table below.

**Table 5: Default Operators, Operator Numbers, and FareSystems in SYSTEM.PTS File**

Operator	Operator number	FareSystem
Local service	1	1
Circulator	2	2
Commuter rail	3	3

3.2.3 Fares file (TFAREStp\_{year}{alt}.FAR)

Fare structures are defined in the fares file and stored in the *input* folder of the alternative. A fare structure is related to each transit route using its operator number in the factors file. It is not important that the fare system number correspond to the operator number. Three fare systems are likely to be used: free, flat, and zone-based. The first system is for services that are offered for free. Flat-fare systems charge flat boarding and transfer fares regardless of journey length. Zone-based fare systems base the fare on the number of fare zones encountered during a trip. When using zone-based systems, it is important to remember to code FAREZONE on the node of each station in the highway network. The recommend values for all fare systems are shown below.

**Table 6: Keywords to FARESYSTEM Control Statement and Their Recommended Values**

Keyword to FARESYSTEM control statement	Description	Recommended value
NUMBER	Fare system number	None
LONGNAME	40-character description	None
NAME	10-character description	None
STRUCTURE	Type of fare system	“FREE” (free) “FLAT” (flat-fare) “ACCUMULATE” (zone-based)
SAME	Determines how the fare is produced for consecutive legs using the same fare system	n/a (free) “CUMULATIVE” (flat-fare & zone-based)
IBOARDFARE	Initial boarding fare (in dollars)	n/a (free) None (flat-fare & zone-based)
FAREFROMFS	Transfer fares when transferring from other fare systems	n/a (free) None (flat-fare & zone-based)

The default fares file present in application are for guidance and need to be changed by the user to reflect the fares of the model at hand. The boarding and transfer fares used in the default file are shown below.

**Table 7: Default Fares Used In the Fares File**

Operator	Boarding Fare	FareSystem
Local service	\$1.50	1
Circulator	\$0.00	2
Commuter Rail	\$2.00	3

**Table 8: Default Transfer Fares Used In the Fares File**

Faresystem	From To	1	2	3
1		Free	1.50	Free
2		Free	Free	Free
3		0.50	2.00	Free

**3.2.4 Transit Coefficients file (TRN\_COEFFICIENTS.DBF)**

This file is named TRN\_COEFFICIENTS.DBF and is located in the *parameters* folder. The CBD constants are also in this file. Their default values are set to 5.00 and need to be calibrated by the user.

**Table 9: Default Transit Coefficients**

Row #	HBW	HBNW	NHB	Description
1	-0.025000	-0.012500	-0.025000	IVTT coefficient
2	-0.025000	-0.012500	-0.025000	IVTT coefficient for commuter rail
3	-0.050000	-0.025000	-0.050000	OVT coefficient
4	-0.002500	-0.002500	-0.005000	Cost coefficient
5	-0.037500	-0.018750	-0.037500	Auto access time coefficient
6	-0.250000	-0.125000	-0.250000	Number of transfers coefficient
7	0.000000	0.000000	0.000000	Not used
8	0.000000	0.000000	0.000000	Not used
9	0.000000	0.000000	0.000000	Not used
10	0.500000	0.500000	0.500000	Transit access nest coefficient
11	0.500000	0.500000	0.300000	Transit nest coefficient
12	0.800000	0.800000	0.800000	Auto nest coefficient
13	0.200000	0.200000	0.200000	Auto access nest coefficient
14	0.000000	0.000000	0.000000	Not used
15	5.000000	5.000000	5.000000	CBD Constant Walk Paths
16	5.000000	5.000000	5.000000	CBD Constant PNR Paths
17	5.000000	5.000000	5.000000	CBD Constant KNR Paths
18	0.000000	0.000000	0.000000	Not used

**3.2.5 Mode Choice constants file (MC\_CONSTANTS.DBF )**

This file contains the utility and nesting constants, and is located in *parameters* folder. The default constants are all set to 5.00 and need to be adjusted by the user. Utility constants having a value of -999.99 effectively mandate zero trips for that particular utility. The table below shows the default constants used in the application.

**Table 10: Default Mode Choice Constants**

Row #	HBW	HBNW	NHB	Market	Description
1	-999.990000	-999.990000	0.000000	Zero-car households	Drive alone
2	5.000000	5.000000	5.000000		Shared ride 2 passenger
3	5.000000	5.000000	5.000000		Shared ride 3+ passengers
4	5.000000	5.000000	5.000000		Walk bus
5	5.000000	5.000000	5.000000		Walk project
6	-999.990000	-999.990000	5.000000		PNR bus
7	-999.990000	-999.990000	5.000000		PNR project
8	5.000000	5.000000	5.000000		KNR bus
9	5.000000	5.000000	5.000000		KNR project
10	-999.990000	-999.990000	-999.990000		Not used
11	-999.990000	-999.990000	-999.990000		Not used
12	-999.990000	-999.990000	-999.990000		Not used
13	5.000000	5.000000	-999.990000	One-car households	Drive alone
14	5.000000	5.000000	-999.990000		Shared ride 2 passenger
15	5.000000	5.000000	-999.990000		Shared ride 3+ passengers
16	5.000000	5.000000	-999.990000		Walk bus
17	5.000000	5.000000	-999.990000		Walk project
18	5.000000	5.000000	-999.990000		PNR bus
19	5.000000	5.000000	-999.990000		PNR project
20	5.000000	5.000000	-999.990000		KNR bus
21	5.000000	5.000000	-999.990000		KNR project
22	5.000000	5.000000	-999.990000		Not used
23	-999.990000	-999.990000	-999.990000		Not used
24	-999.990000	-999.990000	-999.990000		Not used
25	0.000000	0.000000	-999.990000	Two-car households	Drive alone
26	5.000000	5.000000	-999.990000		Shared ride 2 passenger
27	5.000000	5.000000	-999.990000		Shared ride 3+ passengers
28	5.000000	5.000000	-999.990000		Walk bus
29	5.000000	5.000000	-999.990000		Walk project
30	5.000000	5.000000	-999.990000		PNR bus
31	5.000000	5.000000	-999.990000		PNR project
32	5.000000	5.000000	-999.990000		KNR bus
33	5.000000	5.000000	-999.990000		KNR project
34	-999.990000	-999.990000	-999.990000		Not used
35	-999.990000	-999.990000	-999.990000		Not used
36	-999.990000	-999.990000	-999.990000	Not used	

**3.2.6 Percent walk file (PCWALK\_{Year}{Alt}.DAT)**

The percent walk of a zone is the proportion of the zonal area within walking distance to transit. This file is generated offline using a GIS buffer of 0.5 mile around the stops. Individual percent walk values are generated for peak and off-peak transit services. The percent walk at attraction end of the trip is twice the percent walk at the production end to reflect that attractions are normally oriented near major streets where transit is located. The format of the percent walk file is shown in the Table 11. The percent walks need to be generated by the user for every alternative. Percent walks are generated for the Tier B/C model only.

**Table 11: Percent Walk File Format**

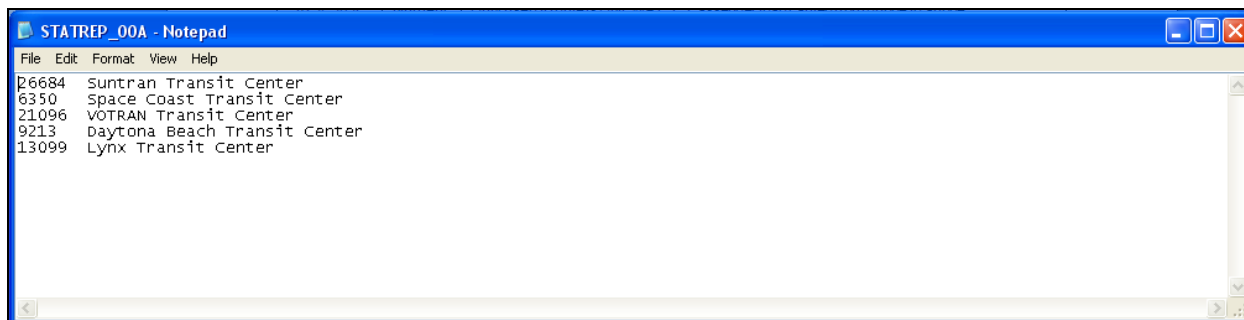
Columns	Format	Description
1-5	I4	TAZ
6-11	I3	Peak period percent walk at production-end of the trip
12-17	I3	Peak period percent walk at attraction-end of the trip
18-23	I3	Off-peak period percent walk at production-end of the trip
24-29	I3	Off-Peak period percent walk at attraction-end of the trip

**3.2.7 Station node and name file –ASCII file (STATREP\_{year}{alt}.DAT)**

This file contains the list of the stations for which a detailed station level report is generated. This file should be provided in the *input* folder of the alternative. The following table shows the formatting used in this file. The figure below shows a screenshot of this file.

**Table 12: Station Node and Name File Format**

Columns	Format	Description
1-5	I5	Station node number (field may be right or left justified)
8-49	A42	Station name



**Figure 12: Station Node and Name File**

**3.2.8 Highway networks**

The transit model application requires two network files, the unloaded highway network file (UNLOADED\_{Alt} {Year}.NET) and the loaded highway network file (HWYLOAD\_{Alt} {Year}.NET) to be present in the *output* folder of the alternative. The unloaded highway network file is the basic highway network file with updated highway speeds and capacities. The loaded highway network file contains the pre-assignment volumes along with the unloaded highway network file fields. The following tables show the node and link variables that need to be present in the highway network files. There may be other variables present in the network files but the following variables are required to be present.

**Table 13: Highway Network Link Variables**

Link variable	Type	Description	Units
A	Numeric	A node	-
B	Numeric	B node	-
DISTANCE	Numeric	Calculated distance	Miles
FTYPE	Numeric	Facility type	-
ATYPE	Numeric	Area type	-
TIME (unloaded highway network only)	Numeric	Calculated travel time	Minutes
TIME_1 (loaded highway network only)	Numeric	Calculated travel time	Minutes
TBSTIME	Numeric	Travel time for bus transit	Minutes
TBSDIST	Numeric	Distance for bus transit	
TFGDIST	Numeric	Distance for fixed-guideway transit	Miles
TFGTIME	Numeric	Travel time for fixed-guideway transit	Minutes
TFGMODE	Numeric	Applicable fixed-guideway transit mode	-

**Table 14: Highway Network Node Variables**

Node variable	Type	Description	Units
N	Numeric	Node number	-
TSRANGE	Numeric	Maximum roadway distance allowed for auto-access connector	Miles
TSPARK	Numeric	Number of parking spaces (park-and-ride stations only)	-
TCOSTAM	Numeric	Peak parking cost	-
TCOSTMD	Numeric	Off-peak parking cost	-
TSPNRTERM	Numeric	Park and ride terminal time	Minutes
TSKNRTERM	Numeric	Kiss and ride terminal time	Minutes
TSTYPE	Numeric	Set to : <ul style="list-style-type: none"> <li>• “0” for a station not used in the alternative,</li> <li>• “1” for a PNR/KNR station (assumed to be both),</li> <li>• “2” for fringe park-ride locations</li> <li>• “3” for park-ride only locations available throughout the day,</li> <li>• “4” for kiss-ride locations, and</li> <li>• “5” park-ride only locations available only in the peak period</li> </ul>	-
TSNAME	Character	Travel time for fixed-guideway transit	Minutes
MPO	Numeric	MPO number	
County	Numeric	County number	

### 3.2.9 Highway skim files

The free-flow (FF) and congested-flow (CF) highway skim files are an input to the AUTOCON program and the mode choice module. However, the order of tables in the skim files that AUTOCON and mode choice expect are different. Two different versions of the skim files must be made for the two programs. The skim files for both the programs must be placed in the *output* folder of the alternative. The following tables show the orders of tables for both the programs. The file names for FF and CF skims used for AUTOCON must be *FHSKIMS.{Alt}{Year}* and *RHSKIMS.{Alt}{Year}* and those used for the mode choice module must be *CONGSKIM\_{ALT}{YEAR}.MAT* and *FREESKIM\_{ALT}{YEAR}.MAT*.



**Table 15: Highway skim tables for AUTOCON program**

Table	Name	Description
1	Cost	Toll cost
2	Distance	Highway distance between interchange
3	Time	Travel time
4	Time2	Weighted travel time (including toll)

**Table 16: Highway skim tables for mode choice module**

Table	Name	SOV/HOV	Description
1	Toll	SOV	Toll cost
2	Distance		Highway distance between interchange
3	Time		Travel time
4	Time2		Weighted travel time
5	Toll	HOV	Toll cost
6	Distance		Highway distance between interchange
7	Time		Travel time
8	Time2		Weighted travel time
9	Terminal	SOV/HOV	Terminal time at parking lot

**3.2.10 Person trip file (PSNTRIPS\_{Alt}{Year}.MAT)**

The mode choice module expects the “HBW”, “HBO” and “NHB” purpose trip tables (with those table names and order) from the person trip file. This file must be placed in the *output* folder of the alternative.

**3.2.11 Zonal data files**

The zonal data files (placed in *input* folder of the alternative) contain information about the zones in the model. The user can have more than one data file, and may also have field names other than the ones used by default. Section 4.10 mentions the changes in scripts in order to use alternate variable names. Table 17 shows the default fields used in the model.

**3.2.12 Mode choice targets (MC\_TARGETS.DBF)**

This file contains the mode share targets obtained from on-board surveys. When the mode choice model is calibrated, the model shares are matched with the shares present in this file. This file is located in *parameters* folder. The default shares are shown in Table 18 below and need to be changed by the user to reflect the shares calculated from surveys.

**Table 17: Required fields in zonal data files**

<b>Field</b>	<b>Description</b>
TAZ	Zone number
SFDU	Total single family dwelling units
SFSEAS	Percent households seasonal+vacant
SFVAC	Percent households vacant
SFPOP	Population in single families
SF0CAR	Percent zero car households in single families
SF1CAR	Percent one car households in single families
SF2CAR	Percent two car households in single families
MFDU	Total multiple family dwelling units
MFSEAS	Percent households seasonal+vacant
MFVAC	Percent households vacant
MFPOP	Population in multiple families
MF0CAR	Percent zero car households in single families
MF1CAR	Percent zero car households in single families
MF2CAR	Percent zero car households in single families
HMUNITS	Number of hotel/motel rooms
HMPCTOCC	Percent hotels/motels occupied
HMPOP	Population in hotels/motels
STPKCST	Short term parking cost
LTPKCST	Long term parking cost

**Table 18: Default mode share targets**

No.	HBW	HBO	NHB	Market	Description
1	0.000000	0.000000	0.476689	Zero car households	Drive alone
2	0.660530	0.569756	0.300240		Shared ride 2
3	0.230621	0.396549	0.217821		Shared ride 3+
4	0.104479	0.032681	0.003850		Walk to bus
5	0.000000	0.000000	0.000000		Walk to project
6	0.000000	0.000000	0.000154		PNR bus
7	0.000000	0.000000	0.000000		PNR project
8	0.002978	0.000523	0.000831		KNR bus
9	0.000000	0.000000	0.000000		KNR project
10				Not used	
11				Not used	
12				Not used	
13	0.769378	0.376048	0.000000	One car households	Drive alone
14	0.152346	0.356571	0.000000		Shared ride 2
15	0.062191	0.264244	0.000000		Shared ride 3+
16	0.012085	0.002895	0.000000		Walk to bus
17	0.000000	0.000000	0.000000		Walk to project
18	0.000406	0.000059	0.000000		PNR bus
19	0.000000	0.000000	0.000000		PNR project
20	0.000389	0.000095	0.000000		KNR bus
21	0.000000	0.000000	0.000000		KNR project
22				Not used	
23				Not used	
24				Not used	
25	0.777356	0.380251	0.000000	Two+ car households	Drive alone
26	0.153644	0.353765	0.000000		Shared ride 2
27	0.062826	0.264855	0.000000		Shared ride 3+
28	0.002797	0.000935	0.000000		Walk to bus
29	0.000000	0.000000	0.000000		Walk to project
30	0.000450	0.000055	0.000000		PNR bus
31	0.000000	0.000000	0.000000		PNR project
32	0.000306	0.000072	0.000000		KNR bus
33	0.000000	0.000000	0.000000		KNR project
34				Not used	
35				Not used	
36				Not used	
37	0.148000	0.170000	0.107000	CBD walk constant	
38	0.840000	0.500000	0.500000	CBD PNR constant	
39	0.313000	0.333000	0.114000	CBD KNR constant	

### 3.3 Key output files

#### 3.3.1 Transit assignment summary report (TASUM\_{ALT}{YEAR}.PRN)

This report is located in the *output* folder and presents the travel time, frequency, number of passengers, passenger miles, passenger hours, and maximum load by route, mode, and operator. The following table shows the formatting used in this file and the figure below shows a screenshot.

**Table 19: Transit Assignment Summary Report Format**

Period	Field	Columns	Format	Description
Route	Route Name	1-16	Character	10-character description
	Mode	21-25	Numeric	Mode number
	Optr	26-30	Numeric	Operator number
	Dist	31-40	Numeric	Distance in miles
	Route Longname	202-241	Character	40-character description
Peak	Time	41-50	Numeric	Transit travel time in minutes
	Freq	51-60	Numeric	Transit service frequency in minutes
	Pax	61-70	Numeric	Total number of passengers boarding a transit route
	Maxld	71-80	Numeric	Maximum passenger load of a transit route
	PaxMi	81-90	Numeric	The total passenger miles of a transit route
	PaxHr	91-100	Numeric	The total passenger hours of a transit route
Off-Peak	Time	101-110	Numeric	Transit travel time in minutes
	Freq	111-120	Numeric	Transit service frequency in minutes
	Pax	121-130	Numeric	Total number of passengers boarding a transit route
	Maxld	131-140	Numeric	Maximum passenger load of a transit route
	PaxMi	141-150	Numeric	The total passenger miles of a transit route
	PaxHr	151-160	Numeric	The total passenger hours of a transit route
Daily	Pax	161-170	Numeric	Total number of passengers boarding a transit route
	Maxld	171-180	Numeric	Maximum passenger load of a transit route
	PaxMi	181-190	Numeric	The total passenger miles of a transit route
	PaxHr	191-200	Numeric	The total passenger hours of a transit route

Transit Assignment Summary Report

Title : Year 2000 Base Validated Network  
 Alternative : A  
 Year : 00

Date: Mon 04/07/2008  
 Time: 9:46:12.58

Route Name	Mode	Optr	Dist (mi)	Time (min)	Freq (min)	Peak				Time (min)	Freq (min)	Pax
						Pax	MaxLd	PaxMi	PaxHr			
LASER-Alafay	21	1	2.00	3.68	30.0	6.0	5.3	5.8	0.2	3.07	30.0	26.2
LASER-Alafay-	21	1	2.00	3.69	30.0	12.7	11.9	13.8	0.4	3.07	30.0	18.6
LASER-Quad	21	1	2.09	3.54	30.0	0.6	0.6	0.3	0.0	3.38	30.0	1.6
LASER-Quad -	21	1	2.09	3.54	30.0	2.0	2.0	1.0	0.0	3.38	30.0	3.5
LASER-Resear	21	1	5.04	9.20	30.0	50.1	41.9	106.7	3.4	8.64	30.0	106.0
LY1-OrgAltIB	21	1	12.85	99.36	60.0	166.3	89.1	336.2	44.0	25.74	60.0	429.0
LY1-OrgAltOB	21	1	13.04	70.47	60.0	337.2	188.9	934.2	75.4	26.15	60.0	784.6
LY10-StCldEB	21	1	19.00	35.42	60.0	71.4	50.4	256.5	7.6	30.91	60.0	157.2
LY10-StCldWB	21	1	12.31	22.44	60.0	31.0	15.9	65.3	1.9	18.41	60.0	66.5
LY11-OrOIANS	21	1	13.96	39.71	30.0	318.5	232.9	1075.7	61.5	23.03	30.0	595.7
LY11-OrOIASB	21	1	12.57	35.71	30.0	641.6	540.8	2236.5	119.1	20.89	30.0	971.7
LY12-BoggyCr	21	1	12.49	23.78	60.0	28.0	23.6	158.7	5.0	21.21	60.0	52.1
LY12-BoggyCr-	21	1	12.49	23.44	60.0	28.0	20.8	190.6	5.9	21.21	60.0	52.1
LY13-UCF EB	21	1	15.91	48.11	60.0	409.6	269.5	2274.0	122.5	28.08	60.0	864.1
LY13-UCF WB	21	1	16.49	46.61	60.0	965.9	824.2	3211.4	159.5	29.14	60.0	1310.2
LY13-UCFEB	21	1	16.55	48.82	60.0	405.7	270.6	2362.9	124.3	29.28	60.0	869.4
LY13-UCFWB	21	1	15.85	46.98	60.0	961.7	818.3	3130.9	156.4	27.94	60.0	1305.5
LY14-WestmNB	21	1	7.80	30.01	60.0	134.3	98.6	541.1	33.3	15.14	60.0	397.2
LY14-WestmSB	21	1	8.07	37.32	60.0	160.3	140.9	489.3	32.8	16.06	60.0	228.4
LY15-CurryEB	21	1	13.66	42.94	60.0	166.5	76.2	799.3	43.3	25.70	60.0	382.9
LY15-CurryWB	21	1	13.03	37.26	60.0	524.7	371.0	2886.8	152.4	24.44	60.0	643.0
LY15-Egan EB	21	1	12.80	37.58	60.0	383.2	266.8	1919.7	102.2	24.71	60.0	449.9
LY15-Egan OB	21	1	13.43	44.36	60.0	150.7	74.8	710.5	41.5	25.97	60.0	351.2
LY16-ColleNB	21	1	8.21	36.32	60.0	180.7	144.1	772.7	58.0	15.98	60.0	530.4
LY16-ColleSB	21	1	8.40	34.80	60.0	236.3	222.5	708.2	51.8	16.74	60.0	384.3
LY17-NOBT NB	21	1	14.35	47.99	30.0	549.8	359.3	2571.1	159.8	26.35	30.0	1102.1
LY17-NOBT SB	21	1	15.71	53.52	30.0	776.2	544.4	3777.7	264.1	29.51	30.0	972.8
LY18-OrKisNB	21	1	25.02	62.10	60.0	291.1	135.6	1423.9	65.4	44.01	60.0	501.1
LY18-OrKisSB	21	1	24.78	60.25	60.0	461.0	300.3	2127.4	97.7	43.29	60.0	807.7
LY19-Rich EB	21	1	3.59	14.03	30.0	214.5	178.3	411.9	27.0	7.97	30.0	234.2
LY19-Rich WB	21	1	5.75	21.79	30.0	203.8	161.7	486.4	29.1	12.19	30.0	302.0
LY2-ColonEB	21	1	5.78	18.01	60.0	22.7	20.9	76.3	4.2	11.78	60.0	51.7
LY2-ColonWB	21	1	5.66	18.50	60.0	63.1	55.4	138.7	7.6	11.45	60.0	75.2
LY20-MalibEB	21	1	11.04	49.26	30.0	683.3	398.1	3049.5	240.1	21.82	30.0	1149.9
LY20-MalibWB	21	1	11.10	42.91	30.0	371.1	188.3	1493.8	99.0	21.78	30.0	701.5
LY200-I4Expr	21	2	30.37	74.36	30.0	211.8	163.7	37.0	2.3	29.01	0	0

Figure 13: Transit Assignment Summary Report (Snippet)

3.3.2 Transit Assignment Route-Level Report (TASROUTE\_{ALT}{YEAR}.PRN)

This report is located in the *output* folder and presents the leg travel time, the cumulative travel time, ons, offs, leg distance, cumulative distance and the load for all the routes. The following table shows the formatting used in this file and the figure below shows a screenshot.

Table 20: Transit Assignment Route-Level Report Format

Period	Field	Columns	Format	Description
Link	Node	3-7	Numeric	Anode in anode→bnode link of a transit route
	Dist	8-17	Numeric	Distance of anode→bnode link in miles
	CumDist	18-27	Numeric	Cumulative distance of a transit route till that link
Peak	Time	28-37	Numeric	Transit travel time of anode→bnode link in minutes
	CumTime	38-47	Numeric	Cumulative travel time of a transit route till that link
	On	48-57	Numeric	Boardings at anode in anode→bnode direction
	Off	58-67	Numeric	Alightings at anode in anode→bnode direction
	Load	68-77	Numeric	Passenger load carried from anode to bnode
Off-Peak	Time	78-87	Numeric	Transit travel time of anode→bnode link in minutes
	CumTime	88-97	Numeric	Cumulative travel time of a transit route till that link
	On	98-107	Numeric	Boardings at anode in anode→bnode direction
	Off	108-117	Numeric	Alightings at anode in anode→bnode direction
Daily	Load	118-127	Numeric	Passenger load carried from anode to bnode
	On	128-137	Numeric	Boardings at anode in anode→bnode direction
	Off	138-147	Numeric	Alightings at anode in anode→bnode direction
	Load	148-157	Numeric	Passenger load carried from anode to bnode

Transit Assignment Route Level Report

Title : Year 2000 Base Validated Network  
 Alternative : A  
 Year : 00  
 Date : Mon 02/16/2008  
 Time : 17:33:38.90

Route name : IRide-MainNB  
 Long name : I-Ride Main NB  
 Mode : 23 Operator : 5 Peak Freq : 15.00 min ( 4.0 vph) Off-peak Freq : 15.00 min ( 4.0 vph)

Node	Dist (mi)	CumDist (mi)	Time (min)	CumTime (min)	Peak On (min)	Peak Off (min)	Load	Time	CumTime	Off-peak On	Off-peak Off	Load	On	Daily Off	Load
16156	0.21	0.21	0.69	0.69	0.4	0	0.4	0.94	0.94	3.38	0	3.38	3.77	0	3.77
16154	0.21	0.42	0.78	1.47	12.9	0	13.2	0.70	1.64	22.64	0	26.02	35.49	0	39.26
16155	0.13	0.55	0.48	1.95	0	0	13.2	0.43	2.07	0	0	26.02	6.96	0	39.26
16157	0.12	0.67	0.40	2.35	5.1	0	18.3	0.40	2.47	1.86	0	27.88	0	0	46.22
14505	0.09	0.76	0.30	2.65	0	0	18.3	0.30	2.77	0	0	27.88	0	0	46.22
18055	0.06	0.82	0.20	2.85	0	0	18.3	0.20	2.97	0	0	27.88	0	0	46.22
23090	0.17	0.99	0.57	3.42	0	0	18.3	0.57	3.54	0	0	27.88	0	0	46.22
14506	0.08	1.07	0.27	3.69	0	0	18.3	0.27	3.81	0	0	27.88	0	0	46.22
14515	0.07	1.14	0.23	3.92	0	0	18.3	0.23	4.04	0	0	27.88	0	0	46.22
23091	0.06	1.20	0.20	4.12	0	0	18.3	0.20	4.24	0	0	27.88	0	0	46.22
23092	0.07	1.27	0.23	4.35	0	0	18.3	0.23	4.47	0	0	27.88	0	0	46.22
14510	0.08	1.35	0.27	4.62	0	0	18.3	0.27	4.74	0	0	27.88	0	0	46.22
14511	0.11	1.46	0.37	4.99	0	0	18.3	0.37	5.11	0	0	27.88	0	0	46.22
14513	0.08	1.54	0.27	5.26	0	0	18.3	0.27	5.38	0	0	27.88	0	0	46.22
14504	0.15	1.69	0.51	5.79	0	0	18.3	0.50	5.88	0	0	27.88	0	0	46.22
16095	0.15	1.84	0.57	6.36	0	0	18.3	0.50	6.38	0	0	27.88	0	0	46.22
16097	0.27	2.11	0.90	7.26	0	0	18.1	0.90	7.26	0	0	27.88	0	0	46.22
16026	0.11	2.22	0.37	7.63	0	0	18.1	0.37	7.65	0	0	27.88	0	0	46.22
13672	0.26	2.48	0.87	8.50	0	0	18.1	0.87	8.52	0	0	27.88	0	0	46.22
16027	0.34	2.82	1.13	9.63	0	0	18.1	1.13	9.65	0	0	27.88	0	0	46.22
16026	0.34	3.16	1.13	10.76	0	0	4.8	13.4	10.78	0	0	7.91	19.76	0	12.68
16027	0.26	3.42	0.87	11.63	0	0	8.2	5.2	11.65	0	0	13.98	6.38	0	11.58
13672	0.11	3.53	0.37	12.00	0	0	5.2	0.37	12.02	0	0	6.38	0	0	11.58
16028	0.27	3.80	0.90	12.90	0	0	5.2	0.90	12.92	0	0	6.38	0	0	11.58
16097	0.15	3.95	0.50	13.40	0	0	5.2	0.50	13.42	0	0	6.38	0	0	11.58
16095	0.18	4.13	0.88	14.08	1.1	0	6.3	0.60	14.02	2.63	0	9.01	3.69	0	15.27
16089	0.15	4.28	0.57	14.65	0	0	6.3	0.50	14.52	0	0	9.01	0	0	15.27
16086	0.09	4.37	0.31	14.96	0	0	6.3	0.30	14.82	1.39	0	10.40	1.39	0	16.66
13886	0.21	4.58	0.73	15.69	0	0	6.3	0.70	15.52	0	0	10.40	0	0	16.66
16084	0.26	4.84	0.87	16.56	0	0	6.8	0.87	16.39	0	0	10.72	0	0	17.50
16092	0.33	5.17	1.14	17.70	0	0	6.8	1.10	17.49	0	0	10.80	0	0	17.58
16054	0.19	5.36	0.66	18.36	6.9	1.3	12.4	0.63	18.12	4.00	1.06	13.74	10.88	2.32	26.14
15999	0.28	5.64	1.05	19.41	1.7	0	14.1	0.93	19.05	1.01	0	14.75	2.66	0	28.80
13887	0.19	5.83	0.64	20.05	0	2.7	11.4	0.63	19.68	0.20	0.77	14.18	0.20	3.44	25.56
16040	0.12	5.95	0.41	20.46	0	0	11.4	0.40	20.08	0	0	14.18	0	0	25.56
16000	0.39	6.34	1.30	21.76	0	2.6	8.8	1.30	21.38	0	0	13.77	0.13	3.11	22.59
16002	0.47	6.81	1.57	23.33	0	1.0	7.8	1.57	22.95	0.03	0.25	13.55	0.03	1.29	21.33
16004	0.17	6.98	0.63	23.96	0	0.7	7.3	0.55	23.52	0.07	0.49	13.13	0.30	1.18	20.47
16005	0.18	7.16	0.68	24.64	0	0	7.3	0.60	24.12	0	0	13.13	0	0	20.47
13677	0.31	7.47	1.08	25.72	1.2	2.5	6.1	1.03	25.15	0.22	3.83	9.52	1.41	6.29	15.59
16006	0.14	7.61	0.49	26.21	0	0	6.1	0.47	25.62	0	0	9.52	0	0	15.59
17639	0.10	7.71	0.87	27.08	3.1	0.3	8.9	0.33	25.95	0.75	0.07	10.20	3.89	0.42	19.06

Figure 14: Transit Assignment Route- Level Report (Snippet)

### 3.3.3 Station Activity Report(Stations\_{Alt}{Year}.prn)

The station activity report, located in the *output* folder, presents the frequency of all the transit services visiting the station, the number of passengers accessing and egressing the station, and the boardings and alightings at the station.

The access and egress data presented in this report are based on P-to-A assignment. For example, if there are 100 trips from zone *i* to zone *j*, and 60 trips from zone *j* to zone *i*, P-to-A assignment assigns 160 trips in the *i-j* direction. The user will have to post process this information to produce O-D results. It should be noted that the boardings at a station can exceed the sum of accesses from all access modes as there can be transfers between transit routes at a station. Such transfers appear in the boardings but not in any of the access modes.

STATION ACTIVITY & ACCESS/EGRESS REPORT (station node is in paranthesis after name)

Title : Year 2000 Base Validated Network  
 Alternative : OOA  
 Date: Mon 02/18/2008 Time: 12:49:19.30

---

1. Station Name : Suntran Transit Center (26684)

Transit Service	PEAK		OFF PEAK	
	Frequency	vph	Frequency	vph
ST1-GreenOB	60.0	1.0	60.0	1.0
ST2-BlueOB	60.0	1.0	60.0	1.0
ST3-PurpleOB	60.0	1.0	60.0	1.0
ST4-OrangeOB	60.0	1.0	60.0	1.0
Total no. of services :	4	4.0	4.0	4.0

Activity	PEAK		OFF PEAK		DAILY	
	Access	Egress	Access	Egress	Access	Egress
Walk Access	12.7	12.2	23.8	21.3	36.5	33.5
Auto Access	0	0	0	0	0	0
Transfer Connector	0	0	0	0	0	0
Sidewalk Connector	0	0	0	0	0	0
Boardings		21.6		37.8		59.4
Alightings		0		0		0

Figure 15: Station Activity Report (Snippet)

## **CHAPTER 4: Changes in scripts**

This chapter details the parts of scripts that the user may adjust in order to customize the application for individual models. The adjustments discussed in this chapter represent the minimum amount needed but there may be other scripts or other parts in the discussed scripts that the user may have to adjust in the model. The script sections that the user has to adjust are denoted in the scripts by the following opening and closing lines:

```

;*****
; BEGIN POTENTIAL SCRIPT ADJUSTMENT
;*****

;*****
; END POTENTIAL SCRIPT ADJUSTMENT
;*****
    
```

### **4.1 TPNET00C.S (Transit speed for peak period)**

This script file is located in “TransitPrep” step (step 1). In this step, open the script file for NETWORK step 9 (Transit speed for peak period). The peak period speeds for the various transit modes (modes 21 through 27 in the default case) are defined in this script.

By default, all the transit mode speeds are set equal to auto speeds. The user has to apply appropriate logic in this section to define the transit speeds to be used in the model. In the default case, the variable for the speed of transit mode 21 is `_TSPD21`. Similarly, the variables for the speeds of transit modes 22 through 27 are `_TSPD22` through `_TSPD27`. The user may follow the same naming convention to define transit speeds for new transit modes being defined. After defining the new transit speeds, the user has to delete the lines that set the default peak transit speeds for transit modes. At the end of this step, the variables `_TSPD21`, `_TSPD22`, `_TSPD23`, `_TSPD24`, `_TSPD25`, `_TSPD26`, `_TSPD27`, and the similar variables for any new transit modes must contain the speed for that transit mode.

### **4.2 TPNET00C.S (Transit speed for offpeak period)**

This script file is located in “TransitPrep” step (step 1). In this step, open the script file for NETWORK step 10 (Transit speed for offpeak period). The offpeak period speeds for the transit modes are defined in this script. The user has to delete those lines from the script file that set the default offpeak transit speeds for transit modes, just as in Section 4.1 and define new transit mode speeds.



#### 4.3 TPPTR00A.S (Build peak access connectors)

This script file is located in “TransitPrep” step (step 1). In this step, open the script file for PUBLIC TRANSPORT step 14 (Build peak access connectors). In this script, TRANTIME[I] denotes the transit time for mode number *I*. If the user defines transit times for new transit modes in a model, the transit times of these modes can be added in this script file. If the transit time of a mode is not added here, it is assigned the transit time of mode 21 (local bus) by default. A comma needs to be added at the end of each transit time definition except the last.

#### 4.4 TPPTR00B.S (Build offpeak access connectors)

This script file is located in “TransitPrep” step (step 1). In this step, open the script file for PUBLIC TRANSPORT step 16 (Build offpeak access connectors). The transit times for new user defined modes can be added here similar to the TPPTR00A.S script in Section 4.3 above.

#### 4.5 TRPTR00A.S (Walk-Access Paths/Skims – peak)

This script file is located in the “Transit” step (step 2). In this step, open the script file for PUBLIC TRANSPORT step 2 (Walk-Access Paths/Skims – peak). Two separate sections are identified for adjustment in the script. In the first section, the transit times for new user defined modes can be similar to the TPPTR00A.S script in Section 4.3 above. In the second section, the travel times are calculated for all the modes of the model and this is used to develop the transit skims. If the user defines new modes in a model, accordingly, they need to be added in the skim files. For example, if the user defines a new local bus service mode with mode number 31, and a new commuter rail mode 34, then this section must be changed to read the following:

```
PROCESS PHASE=SKIMIJ
MW[1]=TIMEA(0,1) ; Walk time
MW[2]=TIMEA(0,2) ; Auto time
MW[3]=TIMEA(0,11)+TIMEA(0,12) ; Sidewalk time
MW[4]=TIMEA(0,21)+TIMEA(0,31) ; Local bus time
MW[5]=TIMEA(0,22) ; Premium bus time
MW[6]=TIMEA(0,23) ; Circulator time
MW[7]=TIMEA(0,24)+TIMEA(0,34) ; Light/Heavy Rail time
MW[8]=TIMEA(0,25) ; Commuter Rail time
MW[9]=TIMEA(0,26) ; Other mode time
MW[10]=TIMEA(0,27) ; Project mode time
```

#### 4.6 TRPTR00B.S (Auto-Access Paths/Skims – peak)

This script file is located in the “Transit” step (step 2). In this step, open the script file for PUBLIC TRANSPORT step 4 (Auto-Access Paths/Skims – peak). The changes that need to be made in this script file are similar to the changes to be made in TRPTR00A.S in Section 4.5 above.

#### 4.7 TRPTR00C.S (Walk-Access Paths/Skims – offpeak)

This script file is located in the “Transit” step (step 2). In this step, open the script file for PUBLIC TRANSPORT step 6 (Walk-Access Paths/Skims – offpeak). The changes that need to be made in this script file are similar to the changes to be made in TRPTR00A.S in Section 4.5 above.

#### 4.8 TRPTR00D.S (Auto-Access Paths/Skims – offpeak)

This script file is located in the “Transit” step (step 2). In this step, open the script file for PUBLIC TRANSPORT step 8 (Auto-Access Paths/Skims – offpeak). The changes that need to be made in this script file are similar to the changes to be made in TRPTR00A.S in Section 4.5 above.

#### 4.9 MCPREP.S (Auto ownership percentage by TAZ for work and non-work purposes)

This script file is located in the “Mode Choice” step (step 3). In this step, open the script file for MATRIX step 5 (Auto ownership %age by TAZ for work and non-work purposes). This script computes the work and non-work purpose auto ownership percentages at a TAZ. If the model consists of a number of regions with different sets of trip generation rates, each of them can be accommodated in this step. By default, only one set of trip generation rates are used in the script. The user can modify this script to add more sets of trip generation rates. In order to do so, the user has to add a file that maps the TAZs to different sets of rates, and the files that contain the different sets of trip generation rates.

The script file provides an example of this with some commented lines. It must be noted that by default, only one set of trip generation rates is used (GRATE01\_LKP.DBF). The script contains some commented lines that demonstrate a case of multiple sets of trip generation rates. This is intended for guidance only. The user needs to change this file appropriately to tailor it to his/her model. In the example, the model has three MPOs and each MPO has a different set of trip generation rates. The mapping file contains the MPO number of each TAZ. A section of the script file reads the following:

```
;LOOKUP LOOKUPI=3,
;      NAME=TYPE,
;      LOOKUP[4]=1, RESULT=5,           ; Two-digit area type
;      LOOKUP[5]=1, RESULT=6,           ; County
;      LOOKUP[6]=1, RESULT=7,           ; MPO
;      FAIL[1]=0,FAIL[2]=0,FAIL[3]=0
```

In these lines, the lookup file that maps TAZ numbers with MPO numbers is read in. The first column of the lookup file is the TAZ number. Column 5 contains the two-digit area type, column 6 contains the county number and column 7 contains the MPO number. Now, different sets of generation rates can be based on area type or county or MPO. MPO numbers are used in this

example. The user has to similarly add and read in a lookup file that maps the TAZs to different sets of trip generation rates.

The following lines of the script read in the trip generation rates from the two MPOs (other than the default MPO):

```
;LOOKUP LOOKUPI=4,
;   NAME=RATES2,
;   LOOKUP[1]=COUNTER, RESULT=PPDU,
;   LOOKUP[2]=COUNTER, RESULT=APDU,
;   LOOKUP[3]=COUNTER, RESULT=DUTYPE,
;   LOOKUP[4]=COUNTER, RESULT=HBWPR,
;   LOOKUP[5]=COUNTER, RESULT=HBSHPR,
;   LOOKUP[6]=COUNTER, RESULT=HBSRPR,
;   LOOKUP[7]=COUNTER, RESULT=HBOPR,
;   FAIL[1]=0,FAIL[2]=0,FAIL[3]=0

;LOOKUP LOOKUPI=5,
;   NAME=RATES3,
;   LOOKUP[1]=COUNTER, RESULT=PPDU,
;   LOOKUP[2]=COUNTER, RESULT=APDU,
;   LOOKUP[3]=COUNTER, RESULT=DUTYPE,
;   LOOKUP[4]=COUNTER, RESULT=HBWPR,
;   LOOKUP[5]=COUNTER, RESULT=HBSHPR,
;   LOOKUP[6]=COUNTER, RESULT=HBSRPR,
;   LOOKUP[7]=COUNTER, RESULT=HBOPR,
;   FAIL[1]=0,FAIL[2]=0,FAIL[3]=0
```

The user has to similarly add and read in lookup files that correspond to the different trip generation rates of the different model regions. So, the file that maps TAZs to MPOs and the files that contain the trip generation rates of the three MPOs are read in. The MPO number of a TAZ is identified in the following IF loop in the example case:

```
:_mpo = TYPE(5,I)
:_gendist = 1
;IF (_mpo==1)           ; Region 1
;  _gendist = 1
;ELSEIF (_mpo==2)      ; Region 2
;  _gendist = 2
;ELSEIF (_mpo==3)      ; Region 3
;  _gendist = 3
;ENDIF
```

The user has to similarly add an IF loop that notes the different model regions that contain different trip generation rates.

In the example, three different rates of trip generations are read in the following lines:

```
; IF (_gendist==1)
   _HMTRIP = RATES1(L+3,_tmp1)*HMDUM[x]
   _SFTRIP1 = RATES1(L+3,_tmp2)*SFDUM1[x]
```

```

_SFTRIP2 = RATES1(L+3,_tmp3)*SFDUM2[x]
_SFTRIP3 = RATES1(L+3,_tmp4)*SFDUM3[x]
_MFTRIP1 = RATES1(L+3,_tmp5)*MFDUM1[x]
_MFTRIP2 = RATES1(L+3,_tmp6)*MFDUM2[x]
_MFTRIP3 = RATES1(L+3,_tmp7)*MFDUM3[x]

; ELSEIF (_gendist==2)
;   _HMTRIP = RATES2(L+3,_tmp1)*HMDUM[x]
;   _SFTRIP1 = RATES2(L+3,_tmp2)*SFDUM1[x]
;   _SFTRIP2 = RATES2(L+3,_tmp3)*SFDUM2[x]
;   _SFTRIP3 = RATES2(L+3,_tmp4)*SFDUM3[x]
;   _MFTRIP1 = RATES2(L+3,_tmp5)*MFDUM1[x]
;   _MFTRIP2 = RATES2(L+3,_tmp6)*MFDUM2[x]
;   _MFTRIP3 = RATES2(L+3,_tmp7)*MFDUM3[x]
; ELSEIF (_gendist==3)
;   _HMTRIP = RATES3(L+3,_tmp1)*HMDUM[x]
;   _SFTRIP1 = RATES3(L+3,_tmp2)*SFDUM1[x]
;   _SFTRIP2 = RATES3(L+3,_tmp3)*SFDUM2[x]
;   _SFTRIP3 = RATES3(L+3,_tmp4)*SFDUM3[x]
;   _MFTRIP1 = RATES3(L+3,_tmp5)*MFDUM1[x]
;   _MFTRIP2 = RATES3(L+3,_tmp6)*MFDUM2[x]
;   _MFTRIP3 = RATES3(L+3,_tmp7)*MFDUM3[x]
; ENDIF

```

The user has to similarly add an IF loop that reads in different trip generation rates corresponding to different model regions.

#### **4.10 MCPREP.S and MCMAT00B.S**

These two scripts are located in the “Mode Choice” step (step 3). In this step, MCPREP.S is the script file for MATRIX step 5 and MCMAT00B.S is the script file for MATRIX step 6. In these two scripts, the default zonal data file variables mentioned in Section 3.2.11 are used. The user may change these scripts to use alternative variable names. A variable X is used in the script as ZI.1.X and if the variable name is to be changed to Y, all instances of ZI.1.X in these two scripts need to be changed to ZI.1.Y.

***Appendix: Transit Model Tier A Application Screenshots***

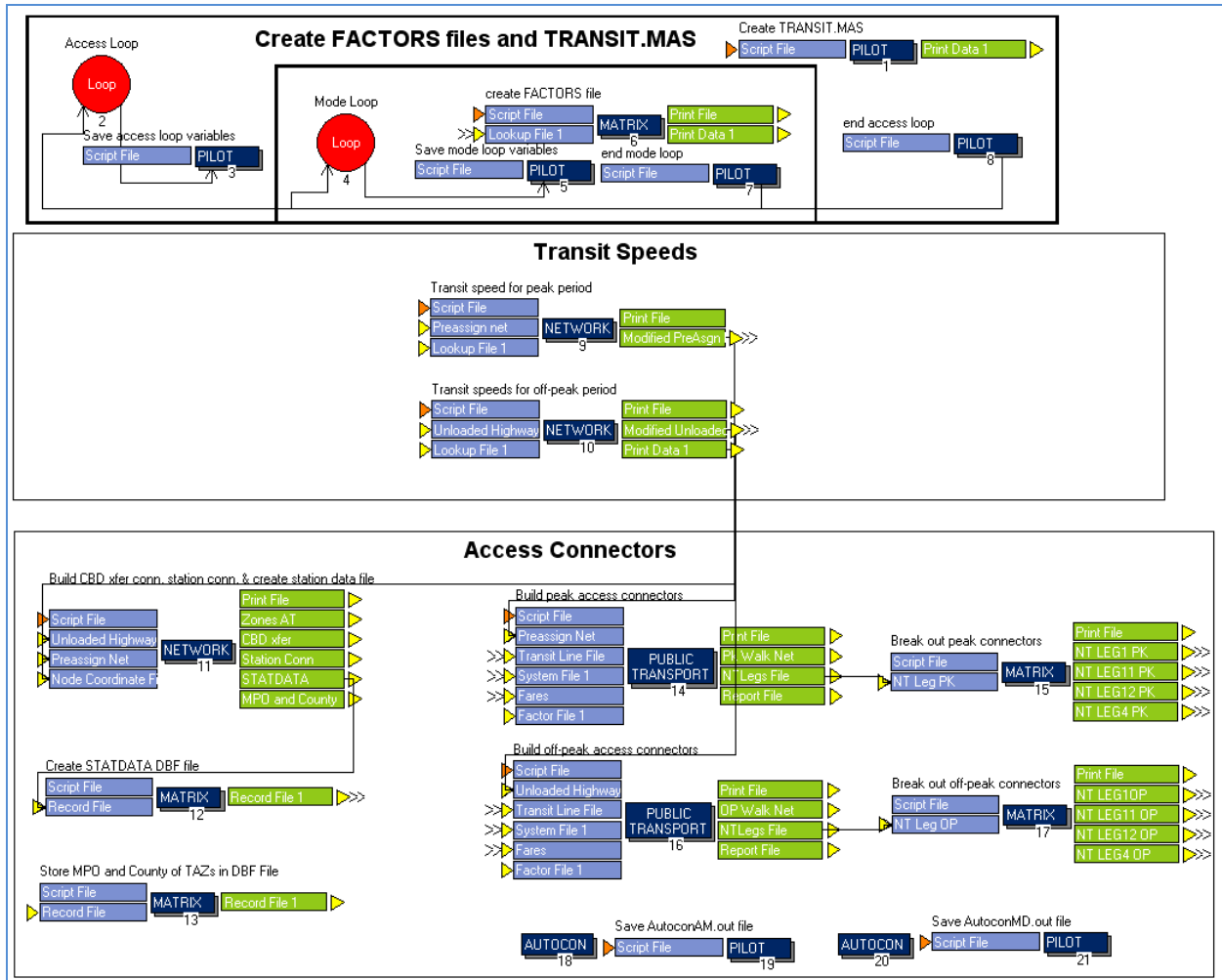


Figure 16: TransitPrep Module

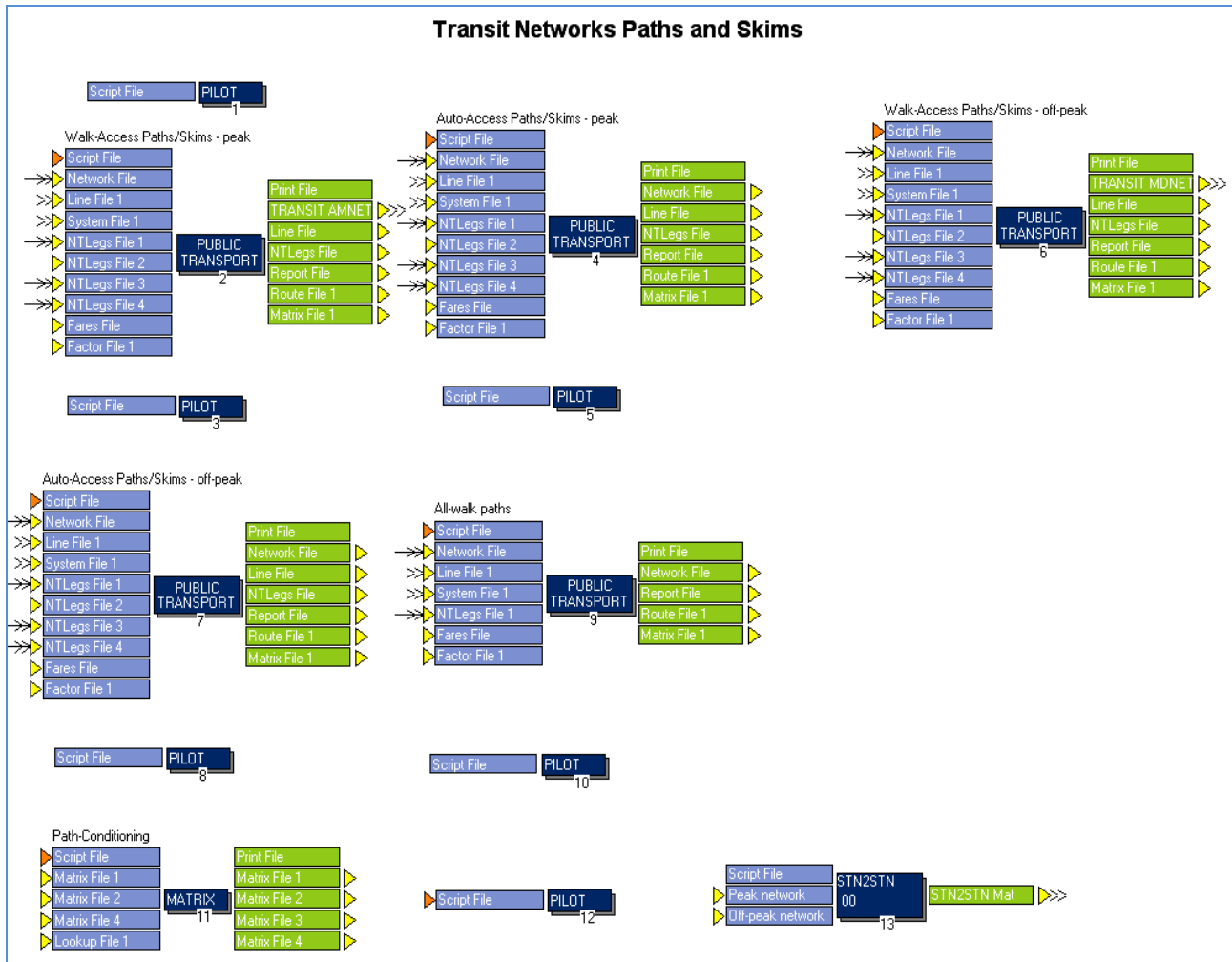


Figure 17: Transit Module

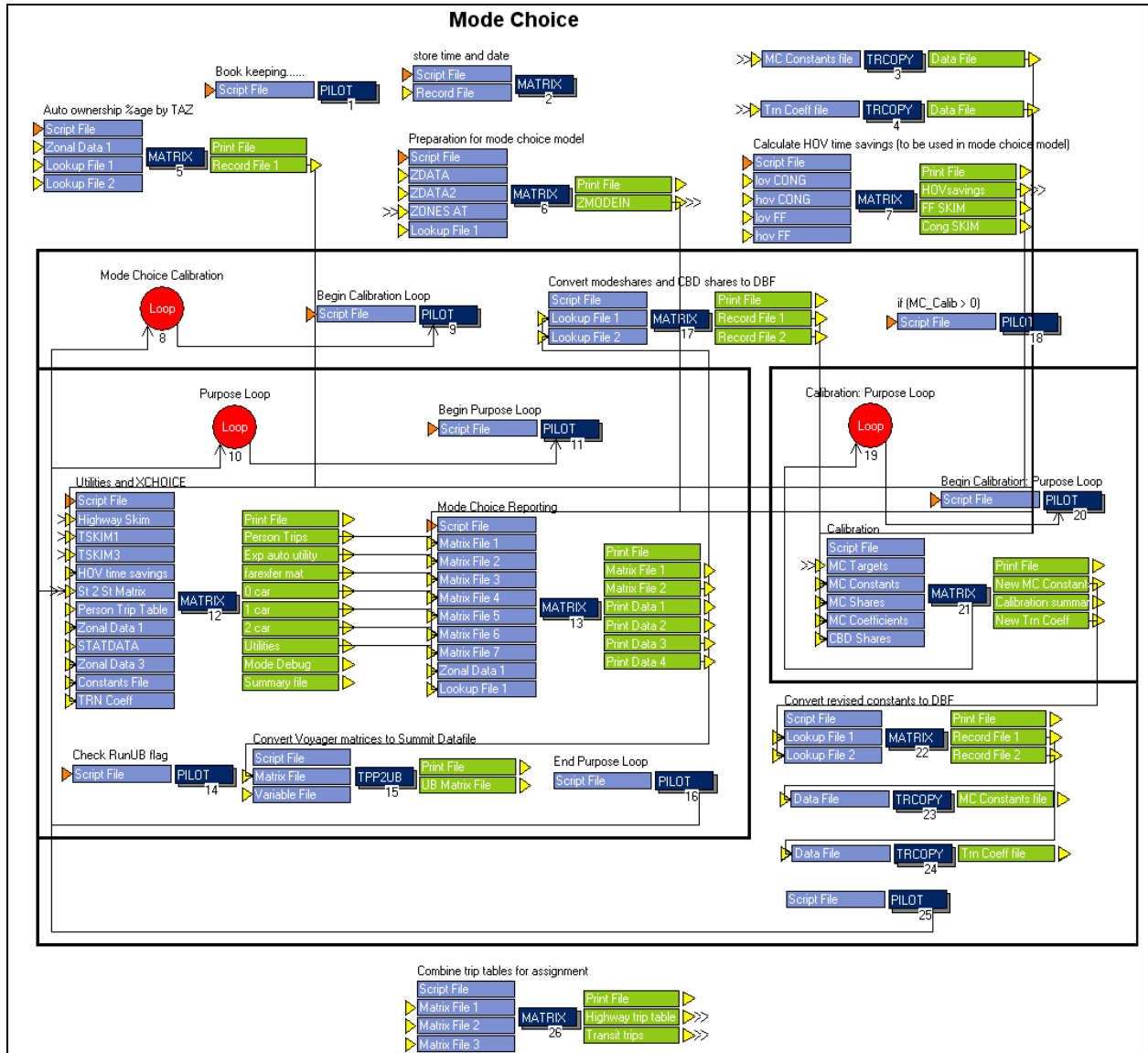


Figure 18: Mode Choice Module



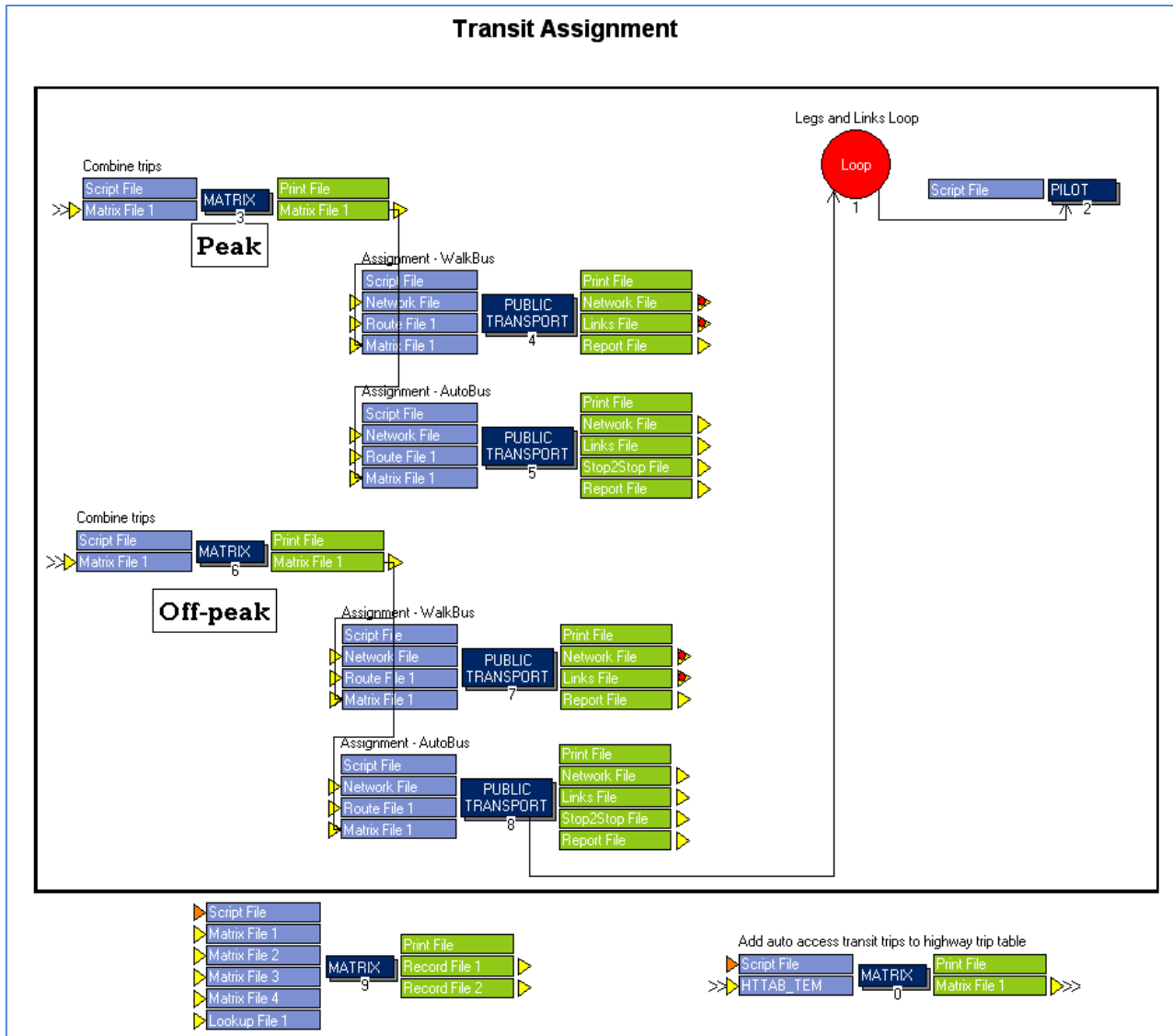


Figure 19: TAssignment Module

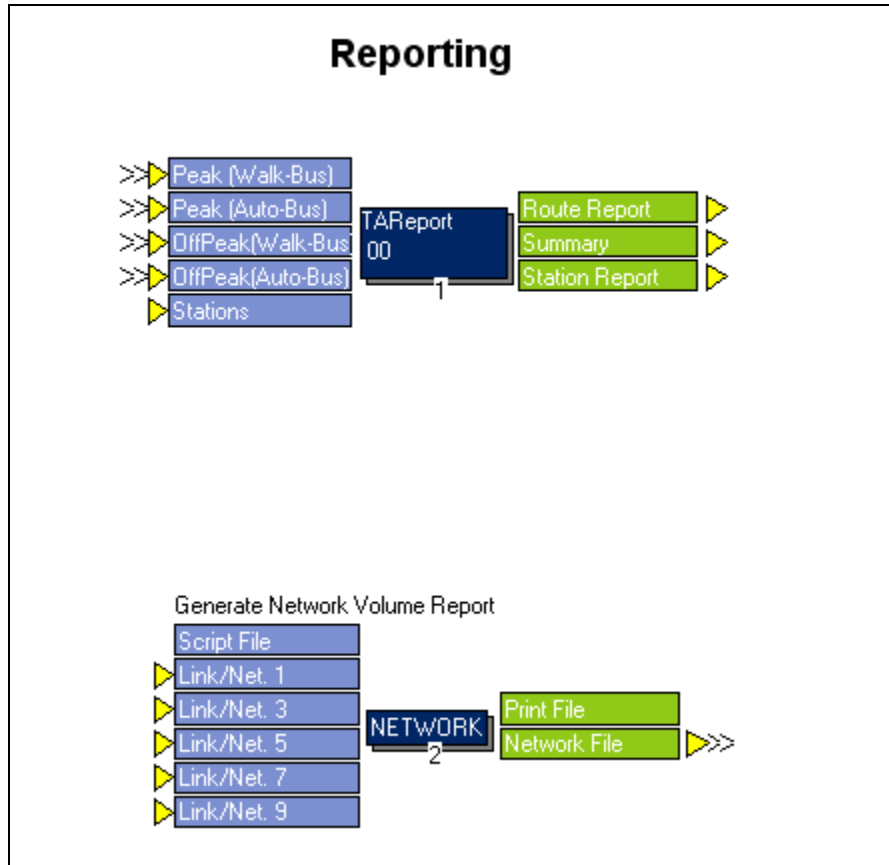


Figure 20: Reporting Module