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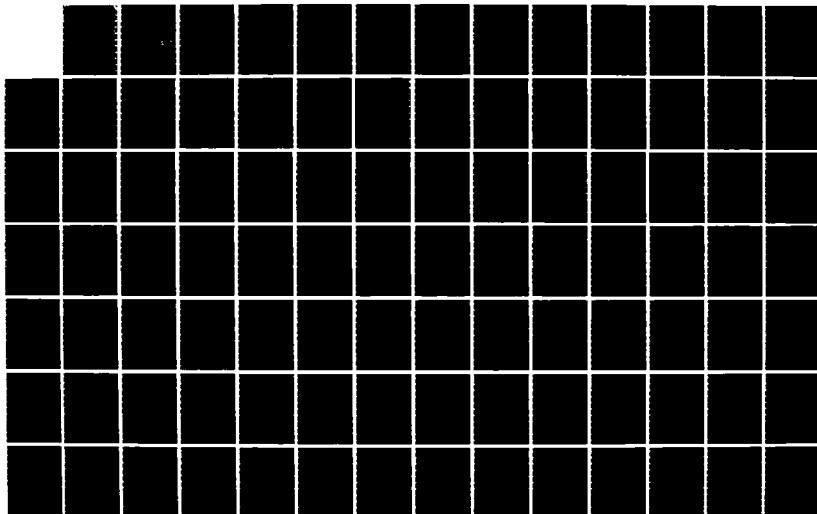
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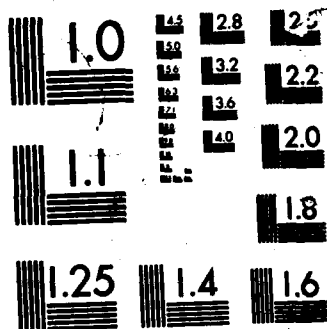
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Draper, Stephen A. (M.S., Telecommunications)

A Computer Program for Optimizing Long Haul Telephone Networks for Least Cost Via Common Carrier Wide Area Telephone Service (WATS)

Thesis directed by Professor Floyd K. Becker

With the breakup of American Telephone and Telegraph (AT&T) nearly two years old, many businesses and government agencies are just starting to feel the impact. Equal access, the process of making four wire direct trunk connections available for all long haul common carriers to the local telephone switch, is now being offered incrementally throughout the country. People are being asked to choose the carrier they want to carry their traffic.)

Businesses and governments have had WATS available as a cost saving measure even before the divestiture of AT&T; however, divestiture has created additional savings possibilities for WATS through competition. A tool is needed for businesses and governments to make an informed decision. It would be simple if one carrier was the cheapest for all network configurations, but that is not the case. The least costly alternative is different for each specific network configuration and usage pattern of the customer. 4

Various algorithms have been designed⁴ for this purpose; however, the real test of their worth as decision making tools is the development and use of a final product. The purpose of this thesis is to develop

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Various algorithms have been designed⁴ for this purpose; however, the real test of their worth as decision making tools is the development and use of a final product. The purpose of this thesis is to develop an actual applications software program to optimize WATS service for lowest cost. The program will provide cost information for the customer's current configuration for each of the major common carriers, i.e. AT&T, Microwave Communications Incorporated (MCI), General Telephone and Electric (GTE) SPRINT, and Satellite Business Systems (SBS) Skyline. Additionally, the program will optimize the customer's network configuration for each of those carriers.

A COMPUTER PROGRAM FOR OPTIMIZING
LONG HAUL TELEPHONE NETWORKS FOR LEAST COST
VIA COMMON CARRIER WIDE AREA TELEPHONE SERVICE (WATS)

by

Stephen A. Draper

B.M., Berklee College of Music, 1979

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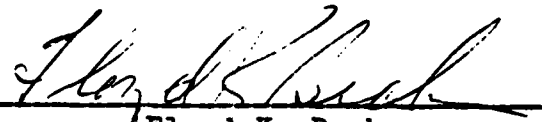
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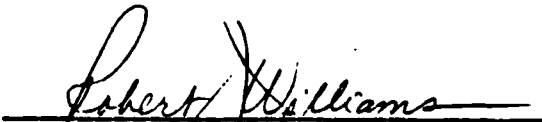
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Chapter I introduces the goals and criteria used in development of the software. Chapter II identifies the assumptions used in the algorithms along with data for each carrier's method of calculating charges. Chapter III contains a step by step view of screen displays, how to use the program, required data input, and expected output. Chapter IV contains an example of a network configuration, results from the program, and how the program can be used in making a management decision to decrease costs and/or improve service. Chapter V contains conclusions.

To Dottie, my wife
and Joshua, Benjamin, Michael,
Noah, and Abraham, my children

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Laurie Cullip of AT&T, Cindy Schmidt of MCI, Pat Smith of GTE SPRINT, and Carol Pettibone of SBS Skyline provided key data and information on customer billing procedures and calculation of circuit usage. John Nolan of the 1837 Information Systems Squadron was very helpful in providing phone bills for Lowry Air Force Base, Colorado.

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CHAPTER I

INTRODUCTION

Purpose

The purpose of this thesis is to develop an applications software to optimize a common carrier long haul telephone communications network for least cost utilizing Wide Area Telephone Service (WATS). The software is designed to be menu driven and requires no computer programming expertise by the user. The software is also self correcting; i.e., only valid data entries are accepted with the user receiving instructions on how to provide valid entries.

Goals and Criteria

- 1) A person with no computer experience should be able to use the program.
- 2) The user should not have to consult other documentation to use the program; i.e., explanatory information about each aspect should be provided on the display screen as the program progresses through each level of the menu.

- 3) The program should accept only valid data entries. It should ensure data is valid before computations are attempted.
- 4) The program should contain a provision to easily update all carriers' rate tables and criteria by loading from a floppy disk. The date of the rate tariff on file with the Federal Communications Commission (FCC) that is being utilized will be displayed when the program is started. When new rate tables are loaded, the date will be updated.
- 5) The user should have the option of seeing the results on the screen, having them printed, or saving them for later use.
- 6) Output should be in individual reports to enable a communications manager to quickly make an informed decision on the least cost alternative for long distance common carrier WATS.

CHAPTER II

ALGORITHM

Definitions

- A. Access Charge: The monthly amount which the local telephone company charges to use its facilities to connect to the long distance carrier. This reimburses the telephone company for circuit usage attributed to long distance use.
- B. Band: A geographic service area for WATS extending from the originating location of the service. Band 0 is intrastate service only and can only be provided by the local telephone company. Band 1 includes the contiguous states but does not provide Band 0 service. Bands 2 through 5 extend service further from the originating location with corresponding increases in usage charges. Band 5 service includes the entire continental United States. Any band of service includes all lower bands of coverage (except Band 0). Band 6 also includes Alaska and Hawaii.

- C. Busy Hour: The continuous 60 minute period during the day when maximum calling volume occurs.
- D. Carried Traffic: The amount of time a circuit or equipment is busy. Carried traffic equals connected traffic plus processing time.
- E. Connected Traffic: The amount of time the origin and destination can communicate with each other. This is the total time both parties are off-hook. Bills received from common carriers are figured using connected traffic.
- F. Connection Charge: A one time charge by the long distance carrier to establish service. The amount is based on the number of lines being provided.
- G. Direct Distance Dialing (DDD): A method of calling long distance without operator assistance. Business and residential customers pay the same rates. Each call is calculated according to distance, time of day, and length of the call.
- H. Erlang: A measure of telephone traffic as 60 minutes or one hour of equipment use.
- I. Grade of Service: The probability that a caller will receive a busy signal on the first attempt. It is designated by a "P" plus a number. For example, "P.03" means a 3 percent probability of

a busy signal. Other conventions express it as "PO3" which signifies the same thing. This program will use the latter.

- J. Off-hook: Opening the loop between the user and the central office by lifting the receiver off the telephone.
- K. Off-net: Utilizing AT&T facilities for any part of a connection.
- L. On-hook: Closing the loop between the user and the central office by replacing the receiver on the telephone.
- M. On-net: No AT&T facilities are utilized for any part of a connection.
- N. Processing Time: The time used to establish and terminate a connection. Circuits are tied up during this time even though no actual connection or communication can occur. For this reason, connection time on a single line can never equal one erlang or 60 minutes.
- O. Station Message Detail Recording (SMDR): A device to measure all user calling activity. Data provided includes date, time, origin, destination, and duration of the call. The duration includes some of the processing time.
- P. Trunk: A communications path between switches.

- Q. Usage Charge: The amount per minute or hour of connection time charged by the carrier for the connection.
- R. Wide Area Telephone Service (WATS): A service to high usage business or government users with reduced rates per minute of connection. Service areas are identified by bands with all locations connected on a given line charged at the same rate. For example, all calls made on a Band 4 line would be charged at the Band 4 rate even though some destinations are in the lower rate Bands 1, 2, or 3.

Assumptions

This program is designed in order to accomodate many types of models one of which a particular network may approximate. Because the program operates through look-up tables, changing algorithms is a simple matter of loading a new look-up table for the grade of service. The program does not calculate costs of blocked calls which are redirected to DDD trunks. For purposes of this thesis, the poisson distribution is used for the look-up table² because it is simple, widely used, and in many cases the results are close to those given by Erlang B and Erlang C.³ In Erlang B, calls are assumed to arrive in a random order so as to approximate an exponential distribution. Blocked calls are cleared from the system

and do not return; i.e., there is no queue so the caller must redial in order to make the call. This is especially true of military installations because accountability is needed to prevent abuses of the system. Erlang B is also accurate in an automatic route selection system which allows blocked calls to immediately try the next higher band.

In systems where blocked calls are not cleared from the system and immediate overflow to the next higher band is not available, Extended Erlang B should be used. In systems where an infinite queue is available, Erlang C should be used. For unusual situations where a peaked or smooth traffic pattern exists, other formulas must be used. Additional details on traffic models are in Appendix D.

This thesis assumes that the average length of each call exceeds one minute. The reason for this is that most common carriers charge a minimum time of one minute times the number of calls. Telephone voice traffic will most always exhibit this behavior. The average would fall below one minute if most traffic was short data inquiries to a computer such as bank accounts. Even then, the user can still use the program by entering his time as one minute times the number of calls.

In optimizing the network for lowest cost, the algorithm uses as a default value, the worst grade of service for any of the customer's existing lines. If the

customer is satisfied with the existing grade of service, there is no need to pay for any better. If the customer is not satisfied with the present grade of service, a different one can be entered.

The network is optimized according to the busy hour service requirement of the customer. If the busy hour service is adequate, all other times will be better than the busy hour.

AT&T Costs

AT&T calculates each WATS call to the nearest tenth of a second for the total time that both parties are off-hook. Charges are based on band, time of day, and the total accumulated time charged so far that month. The first 15 hours of use are charged at the highest rate, the next 25 hours at a lower rate, the next 40 hours at a still lower rate, and anything over 80 hours total use at the lowest rate. The hours for all lines of a given band are averaged before determining the charges. For example, if one had two Band 2 lines, one with 50 hours/month of use and another with 100 hours/month of use, charges would be calculated for two lines, each with 75 hours/month of use. This is done for usage during each of three time periods:

- 1) DAY - 8:00 A.M. to 5:00 P.M. Monday through Friday.

- 2) EVENING - 5:00 P.M. to 11:00 P.M. Sunday through Friday.
- 3) NIGHT/WEEKEND - 11:00 P.M. to 8:00 A.M. Sunday through Friday and all day Saturday.

AT&T has no minimum monthly usage charge. The access charge is \$37.65/month for each outbound WATS line and \$42.80/month for each inbound WATS line. Connection charges are \$222.00 for the first line and \$123.00 for each additional line. AT&T is the only carrier with true incoming WATS; i.e., the user dials "1-800-XXX-XXXX."

MCI Costs

MCI uses the same procedure as AT&T except each call is rounded to the nearest six second interval. MCI has a minimum usage charge of \$75.00 per line. Access charge is \$100.00/month per line. Connection charge is \$120.00 per line. MCI also has separate on-net and off-net rates. Unless the customer knows his actual calling pattern through use of a detail call recording device, default values of 80% on-net and 20% off-net are used for calculating costs in the algorithm. The customer can enter his own values if he chooses. For example, a stock brokerage would probably have close to 100% of his calls on-net (large metropolitan cities); whereas, a farm implement company would be just the opposite.

GTE SPRINT Costs

SPRINT uses the same procedure as MCI; however, its crossover points for reduced rates occur at 40, 70, and 100 total usage hours/month. SPRINT has no minimum usage charge. Access charge is \$100.00 per line. Connection charge is \$105.00 per line. SPRINT also has a feature which AT&T and MCI do not. SPRINT bills for the exact band of the call, not the band of the trunk utilized. All calls can travel over a single line (provided busy hour traffic permits this) and each call will be billed according to the band of the destination. SPRINT breaks out its calls at the switch location and routes them over separate WATS band lines.

SBS Skyline Costs

SBS Skyline does not have separate bands as the other carriers do. It has a four tier structure as follows:

- 1) TIER I - Major metrolitan areas.
- 2) TIER II - Includes additional frequently called cities.
- 3) TIER III - Remainder of contiguous U.S., Puerto Rico, and the Virgin Islands not covered by Tier I, II, or IV.
- 4) TIER IV - Equivalent to WATS Band 1 coverage.

All traffic regardless of destination travels over the same channel. There are only two time of day

billing periods: day, 8:00 A.M. to 5:00 P.M., and all others. There is a minimum usage charge of \$400.00 per channel if usage is below 50 hours/channel/month. Connection charge is \$105.00 per line. Access charge is based on the distance from the customer to the SBS Skyline access point as follows:

0-1 Mile	\$85.00/month
2-15 Miles	\$100.00/month
16-25 Miles	\$125.00/month
26-35 Miles	\$150.00/month
36-50 Miles	\$175.00/month
Over 50 Miles	\$12.00/month plus other common carrier charges.

Table 2-1 provides a summary of all four carriers.

Overview

The name of the program is OPTICOM. There are five menu options for the user to choose in the main menu:

- 1) Determine Least Cost WATS Carrier for Current Network.
- 2) Optimize Current Network for WATS Carrier.
- 3) Load New Carrier Rate Tables.
- 4) View Existing Result Files.
- 5) Delete Existing File.

TABLE 2-1
Comparison of Common Carrier Rate Structures

	<u>AT&T</u>	<u>MCI</u>	<u>SPRINT</u>	<u>SBS</u>
Minimum Avg Call Length	60 sec.	60 sec.	60 sec.	30 sec.
Billing Period	1/10 sec.	6 sec.	6 sec.	1 sec.
Minimum Use	NONE	\$75	NONE	\$400 *
Access/Out	\$37.65	\$100	\$100	**
Access/In	\$42.80	N/A	N/A	N/A
Connection 1st	\$222	\$120	\$105	\$105
2nd	\$123	\$120	\$105	\$105
Use Reduction (Hours)	15 40 80	15 40 80	40 70 100	40 45 : : 250
Separate Band Trunks	Yes	Yes	No	No
Time of Day Periods	Day Eve Night	Day Eve Night	Day Eve Night	Day Other
Net Structure	N/A	2 Rates	2 Rates	4 Tiers

* If less than 50 hours.

** \$85 to \$175 depending on distance.

Determine Least Cost WATS Carrier for Current Network

This option will use the information provided on the customer's present monthly phone bill to calculate what the cost would be for all four carriers. This does not optimize his network; it uses his existing network configuration. For SBS Skyline, the number of channels is equal to the total number of AT&T lines in order to keep the average grade of service equivalent for comparison purposes.

Optimize Current Network for WATS Carrier

This option will utilize information obtained from a detail call recording device to optimize a network for each carrier. The network will have been previously entered in option 1 above and stored. The optimum network configuration for each carrier will be separately provided. The algorithm calculates the cost for all possible configurations and saves the lowest cost and configuration for each carrier. The program is written for up to Band 6. The maximum number of possibilities occurs when there is Band 6 traffic. The user either does or doesn't have each of the other five band lines so the maximum number of possibilities is 2^5 or 32.

Load New Carrier Rate Tables

This option enables all carrier rate tables, parameters, and minimums to be updated when new ones are filed with the FCC. This is done from a floppy disk.

View Existing Result Files

This option allows the user to either view or have printed the results previously calculated in options 1 and 2 above.

Delete Result File

This option allows the user to delete results previously calculated in options 1 and 2 above.

CHAPTER III

USING THE OPTICOM PROGRAM

Requirements

OPTICOM is written in the dBASE III language for use on any IBM PC compatible computer with a minimum of 384K of RAM and two 360K floppy drives or one hard disk and one floppy drive. It can be used with as little as 256K of RAM; however, new carrier rate tables cannot be loaded then. Since the program has not been compiled, the user must already have the dBASE III software. The program is run with the dBASE III software in either the hard disk or floppy drive A and the OPTICOM floppy in drive B. A printer is required to obtain hard copy results.

Beginning the Program

When dBASE III is first started, the screen appears as in Fig. 3-1. With the OPTICOM floppy in drive B, type "DO B:OPTICOM" as shown in Fig. 3-2 and then press <Return>. <> will be used to denote keys on the keyboard. The screen will appear as in Fig. 3-3. From here on, using the program is just a matter of following

the directions on the screen. The program will accept valid entries only. The screen will stay the same until a valid entry is made. The main menu for OPTICOM appears in Fig. 3-4.

dBASE III version 1.10 IBM/MSDOS ***

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Press the F1 key for help
Type a command (or ASSIST) and press the return key (<--)

.

FIGURE 3-1

dBASE III version 1.10 IBM/MSDOS ***

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. DO B:OPTICOM

FIGURE 3-2

OPTICOM VERSION 1.00
DECEMBER 2, 1985
STEPHEN A. DRAPER

RATE TABLES AS OF: 1 JULY 1985

OPTICOM is a software package designed to aid you, the communications manager in making decisions to optimize your long haul communications network. This program is currently limited to telephone traffic; however, future versions may be expanded to include data traffic as well. The program is menu driven so you needn't worry if you are uncomfortable with computers or programming. Each option, when selected, will provide a description along with the information you are required to provide. If you need a different selection, you can return to any level of the menu to make a different selection. Press <Esc> any time you wish to terminate the OPTICOM program.

Press any key to continue...

FIGURE 3-3

MAIN MENU

- 1 - DETERMINE LEAST COST WATS CARRIER FOR CURRENT NETWORK
- 2 - OPTIMIZE CURRENT NETWORK FOR WATS CARRIER
- 3 - LOAD NEW CARRIER RATE TABLES
- 4 - VIEW EXISTING RESULT FILES
- 5 - DELETE EXISTING FILE

- 0 - FINISHED

CHOOSE ONE:

FIGURE 3-4

Option 1 - Determine Least Cost WATS Carrier for Current Network

Upon selecting this option, the screen appears as in Fig. 3-5. The default for continuing is "N." Any response other than "Y" will return to the main menu. Additional explanatory information appears as in Figs. 3-6 and 3-7. Fig. 3-8 begins the process of entering data. Entries can be corrected by using the <Back Space> or <Del> keys and retyping correct values. Also, the cursor can be positioned by using the directional arrow keys on the numerical keypad. If the entries are valid, the screen will then appear as in Fig. 3-9. If the entries are not valid, the screen will again appear as in Fig. 3-8 with a message to reenter the data. The program automatically calculates the SBS Skyline Tier 4 percentage after the other values are entered.

Data entry for each WATS band is shown in Figs. 3-10 and 3-11. These continue until the last entry is made. The screen then appears as in Fig. 3-12. In Fig. 3-13, corrections, deletions, or additions can be made before calculations are performed. Instructions appear at the top of the screen ("^" means the <Ctrl> key). Once all data is correct, the user presses <Ctrl><End> and the screen appears as in Fig. 3-14. Fig. 3-15 appears when all calculations are complete.

DETERMINE THE LEAST COST WATS CARRIER

This option will determine which carrier is the least costly for your existing network. The carriers used are MCI, SPRINT, SBS Skyline, and AT&T. You must provide information on your current configuration for each line as follows:

- (1) Average hours billed each month.
- (2) WATS band.
- (3) WATS in or out.
- (4) Percentage of calls to metropolitan areas.

DO YOU WISH TO CONTINUE WITH THIS OPTION (Y/N)? N

FIGURE 3-5

MCI and SPRINT have two rate tables: one for calls that utilize only their facilities, such as large cities, and one for calls that must also utilize AT&T facilities, such as rural areas. The default values for MCI and SPRINT are 80% ON-NET (metropolitan) and 20% OFF-NET (rural).

Press any key to continue...

FIGURE 3-6

SBS Skyline has all WATS band calls over a single access channel rather than a separate line for different bands of service. Consequently, their rate tables take into account where the destination of the call is for billing purposes. SBS rates are based on a four tier structure as follows:

- TIER 1 - Major metropolitan areas.
- TIER 2 - Includes additional frequently called cities.
- TIER 3 - Includes remainder of contiguous US, Puerto Rico, and the Virgin Islands.
- TIER 4 - Equivalent WATS band 1 coverage of bordering states.

Default values for SBS Skyline are 65%/20%/10%/5% for TIERS 1 through 4 respectively. If your calling patterns are unusual, then enter different values. For example, a stock brokerage would have close to 100% of its calls to metropolitan areas and a farm implement company mostly to rural areas.

Press any key to continue...

FIGURE 3-7

PRESS RETURN KEY TO USE DEFAULT VALUES OR ENTER YOUR OWN.

MCI & SPRINT METROPOLITAN PERCENTAGE:	80
SBS SKYLINE TIER 1:	65
SBS SKYLINE TIER 2:	20
SBS SKYLINE TIER 3:	10

FIGURE 3-8

PRESS RETURN KEY TO USE DEFAULT VALUES OR ENTER YOUR OWN.

MCI & SPRINT METROPOLITAN PERCENTAGE:	80
SBS SKYLINE TIER 1:	65
SBS SKYLINE TIER 2:	20
SBS SKYLINE TIER 3:	10
SBS SKYLINE TIER 4:	5

Press any key to continue...

FIGURE 3-9

ENTER INFORMATION FOR EACH WATS BAND YOU CURRENTLY HAVE.

WATS BAND (1 THRU 6):

FIGURE 3-10

ENTER INFORMATION FOR EACH WATS BAND YOU CURRENTLY HAVE.

WATS BAND (1 THRU 6): 1
IS THIS AN OUT WATS (T/F)? T
NUMBER OF LINES: 2
AVERAGE HOURS BILLED PER LINE PER MONTH:
DAY: 45.00
EVENING: 12.00
NIGHT/WEEKEND: 5.00
IS THIS YOUR LAST ENTRY (T/F)? F

FIGURE 3-11

ENTER INFORMATION FOR EACH WATS BAND YOU CURRENTLY HAVE.

WATS BAND (1 THRU 6): 1
IS THIS AN OUT WATS (T/F)? T
NUMBER OF LINES: 2
AVERAGE HOURS BILLED PER LINE PER MONTH:
DAY: 45.00
EVENING: 12.00
NIGHT/WEEKEND: 5.00
IS THIS YOUR LAST ENTRY (T/F)? F
DOUBLE CHECK YOUR ENTRIES AND MAKE CORRECTIONS ON THE
NEXT SCREEN.
PRESS <Ctrl><End> WHEN FINISHED.
Press any key to continue...

FIGURE 3-12

Record No. 1 NOWNET

```

:CURSOR  <-- --> :      UP  DOWN :      DELETE : Insert Mode  Ins :
: Char:  <-- --> : Record: ↑  ↓ : Char: Del : Exit      ^ End :
: Field: Home End : Page: PgUp PgDn : Field: ^ Y : Abort      Esc :
: Pan:   ^<- ^-> :      : Record: ^ U : Set Options ^ Home:

```

BAND	OUT	QUANTITY	USE DAY	USE EVE	USE NIGHT
1	T	2	45.00	12.00	5.00
3	T	1	89.00	45.00	12.00
5	T	3	123.00	33.00	26.00
5	F	1	67.00	2.00	2.00

FIGURE 3-13

WAIT A MINUTE WHILE I DO SOME FIGURING.

FIGURE 3-14

- 1- DISPLAY RESULTS ON SCREEN
- 2- PRINT OUT THE RESULTS
- 0- FINISHED

CHOOSE ONE:

FIGURE 3-15

Suboption 1 - Display Results on Screen

Explanatory information appears as in Fig. 3-16 followed by reports of the results. If there are outgoing WATS lines, five reports will be generated as in Figs. 3-17 through 3-22. The percentage of on-net/off-net traffic entered appears at the top of each MCI and SPRINT report and the SBS Skyline percentages appear in that report. Fig. 3-22 shows a summary of all the carriers' outgoing WATS cost in order to select the lowest cost carrier for the current network. If there are incoming WATS lines, one report will be generated as in Fig. 3-23. Upon completion, the menu again appears as in Fig. 3-24.

A report summary will be displayed for each carrier plus a comparison report of all the carriers. The display will wait between reports. Press <Ctrl><S> to stop the scrolling. Press <Ctrl><S> again to resume.

Press any key to continue...

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AT&T OUT WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT					
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D								
1	2	45.00	1452.80	12.00	275.52	5.00	61.40	75.30
3	1	89.00	1376.19	45.00	494.70	12.00	77.28	37.65
5	3	123.00	5719.05	33.00	1191.06	26.00	532.74	112.95
***	Total ***							
6			8548.04		1961.28		671.42	225.90
								11406.64

Press any key to continue...6

Access charge is \$ 37.65 per line.

Connection charge is \$222.00 for the first line and
\$123.00 for each successive line.

Total connection charge for this configuration is \$ 837.00.

Press any key to continue...

Figure 3-17

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MCI OUT WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT					
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D								
1	2	45.00	1122.78	12.00	270.58	5.00	60.08	200.00
3	1	89.00	1111.46	45.00	477.46	12.00	75.60	100.00
5	3	123.00	4826.25	33.00	1149.96	26.00	521.04	300.00
***	Total ***							
6			7060.49		1898.00		656.72	600.00
								10215.21

Press any key to continue...J

Access charge is \$100.00 per line.

Connection charge is \$120.00 per line.

Total connection charge for this configuration is \$ 720.00.

Minimum usage charge is \$ 75.00 per line exclusive of access charges.

Press any key to continue...

Figure 3-18

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80% ON-NET/ 20% OFF-NET

SPRINT OUT WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT					
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D								
1	2	45.00	1277.48	12.00	260.21	5.00	63.16	1750.85
3	1	89.00	1171.88	45.00	511.20	12.00	80.06	1838.14
5	3	123.00	5055.71	33.00	1179.88	26.00	539.91	7000.50
***	Total ***							
6			7505.07		1951.29		683.13	10589.49

Press any key to continue...6

Figure 3-19

Access charge is \$ 75.00 per line.

Connection charge is \$ 75.00 per line.

Total connection charge for this configuration is \$ 450.00.

Press any key to continue...

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SBS SKYLINE OUT WATS
MONTHLY COST SUMMARY

TIER	%	LINES	DAY	DAY	OTHER	OTHER	TOTAL
			HRS/	(\$)	HRS/	(\$)	(\$)
			LINE		LINE		
1	65	6	59.37	4511.63	29.03	1149.72	5661.35
2	20	6	18.27	1523.66	8.93	418.08	1941.74
3	10	6	9.13	929.19	4.47	281.72	1210.91
4	5	6	4.57	414.78	2.23	131.86	546.64
***	Total ***						
	100		91.33	7379.26	44.67	1981.38	9360.64

Press any key to continue...

Figure 3-20

4	5	6	4.57	414.78	2.23	131.86	546.64
*** Total ***							
100			91.33	7379.26	44.67	1981.38	9360.64

Press any key to continue...6

Access charge is \$100.00 per line.
 Total monthly access charge for this configuration is \$ 600.00.
 Minimum usage charge is \$400.00 if average use is less than 50 hours/line.
 Total monthly cost for this configuration is \$ 9960.64.
 Connection charges per line are based on the distance between your
 exchange carrier wire center and the SBS Skyline WATS access point.

DISTANCE	COST
0-1 mile	85.00
2-15 miles	100.00
16-25 miles	125.00
26-35 miles	150.00
36-50 miles	175.00

Press any key to continue...

Figure 3-21

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OUT WATS
 MONTHLY COST COMPARISON
 BY BAND

		DAY	EVE	NIGHT	AT&T	MCI	SPRINT
	#	HRS/ LINE	HRS/ LINE	HRS/ LINE	TOTAL (\$)	TOTAL (\$)	TOTAL (\$)
BAND LINES							
1	2	45.00	12.00	5.00	1865.02	1653.44	1750.85
3	1	89.00	45.00	12.00	1985.82	1764.52	1838.14
5	3	123.00	33.00	26.00	7555.80	6797.25	7000.50
*** Total ***							
	6				11406.64	10215.21	10589.49

SBS Skyline total monthly cost is \$ 9960.64.
 Press any key to continue...

Figure 3-22

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AT&T IN WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT					
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D								
5	1 67.00	1147.80	2.00	25.60	2.00	13.66	37.65	1224.71
***	Total ***							
	1	1147.80		25.60		13.66	37.65	1224.71

Press any key to continue...F

Access charge is \$ 42.80 per line.

Connection charge is \$222.00 for the first line and

\$123.00 for each successive line.

Total connection charge for this configuration is \$ 345.00.

Press any key to continue...

Figure 3-23

-1- DISPLAY RESULTS ON SCREEN.

-2- PRINT OUT THE RESULTS.

-0- FINISHED.

CHOOSE ONE:

Figure 3-24

Suboption 2 - Print Out the Results

Upon selecting this option, the screen appears as in Fig. 3-25. If no printer is connected or the printer is turned off, an error message will appear as in Fig. 3-26. To correct, turn on the printer and press <R>. WARNING! DO NOT PRESS <A>! THIS WILL ABORT THE PROGRAM AND ALL DATA JUST ENTERED PLUS THE RESULTS WILL BE LOST! Just be sure you have a printer connected if you select suboption 2.

Individual reports will be printed as in Figs. 3-27 through 3-32. Upon completion, the screen will again return to the menu as in Fig. 3-33.

ALIGN PAPER AND TURN ON PRINTER
Press any key to continue...

FIGURE 3-25

Write fault error writing device PRN
Abort, Retry, Ignore?

FIGURE 3-26

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AT&T OUT WATS
MONTHLY COST SUMMARY

B		DAY		EVE		NIGHT			
A	#	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N	LMS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D									
1	2	45.00	1452.80	12.00	275.52	5.00	61.40	75.30	1865.02
3	1	89.00	1376.19	45.00	494.70	12.00	77.28	37.65	1985.82
5	3	123.00	5719.05	33.00	1191.06	26.00	532.74	112.95	7555.80
***	Total ***								
	6		8548.04		1961.28		671.42	225.90	11406.64

Access charge is \$ 37.65 per line.

Connection charge is \$222.00 for the first line and
\$123.00 for each successive line.

Total connection charge for this configuration is \$ 837.00.

Figure 3-27

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80% ON-NET/ 20% OFF-NET

NCI OUT WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT					
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D								
1	2 45.00	1122.78	12.00	270.58	5.00	60.08	200.00	1653.44
3	1 89.00	1111.46	45.00	477.46	12.00	75.60	100.00	1764.52
5	3 123.00	4826.25	33.00	1149.96	26.00	521.04	300.00	6797.25
***	Total ***							
	6	7060.49		1898.00		656.72	600.00	10215.21

Access charge is \$100.00 per line.

Connection charge is \$120.00 per line.

Total connection charge for this configuration is \$ 720.00.

Minimum usage charge is \$ 75.00 per line exclusive of access charges.

Figure 3-28

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80% ON-NET/ 20% OFF-NET

SPRINT OUT WATS
MONTHLY COST SUMMARY

B		DAY		EVE		NIGHT			
A	#	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N	LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D									
1	2	45.00	1277.48	12.00	260.21	5.00	63.16	150.00	1750.85
3	1	89.00	1171.88	45.00	511.20	12.00	80.06	75.00	1838.14
5	3	123.00	5055.71	33.00	1179.88	26.00	539.91	225.00	7000.50
***	Total ***								
	6		7505.07		1951.29		683.13	450.00	10589.49

Access charge is \$ 75.00 per line.

Connection charge is \$ 75.00 per line.

Total connection charge for this configuration is \$ 450.00.

Figure 3-29

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SBS SKYLINE OUT WATS
MONTHLY COST SUMMARY

TIER	# LINES	DAY HRS/ LINE	DAY (\$)	OTHER HRS/ LINE	OTHER (\$)	TOTAL (\$)	
1	65	6	59.37	4511.63	29.03	1149.72	5661.35
2	20	6	18.27	1523.66	8.93	418.08	1941.74
3	10	6	9.13	929.19	4.47	281.72	1210.91
4	5	6	4.57	414.78	2.23	131.86	546.64
*** Total ***							
	100		91.33	7379.26	44.67	1981.38	9360.64

Access charge is \$100.00 per line.

Total monthly access charge for this configuration is \$ 600.00.

Minimum usage charge is \$400.00 if average use is less than 50 hours/line.

Total monthly cost for this configuration is \$ 9960.64.

Connection charges per line are based on the distance between your exchange carrier wire center and the SBS Skyline WATS access point.

DISTANCE	COST
0-1 mile	85.00
2-15 miles	100.00
16-25 miles	125.00
26-35 miles	150.00
36-50 miles	175.00

Figure 3-30

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OUT WATS
MONTHLY COST COMPARISON
BY BAND

		DAY	EVE	NIGHT	AT&T	MCI	SPRINT
#		HRS/	HRS/	HRS/	TOTAL	TOTAL	TOTAL
BAND LINES		LINE	LINE	LINE	(#)	(#)	(#)
1	2	45.00	12.00	5.00	1865.02	1653.44	1750.85
3	1	89.00	45.00	12.00	1985.82	1764.52	1838.14
5	3	123.00	33.00	26.00	7555.80	6797.25	7000.50
*** Total ***							
	6				11406.64	10215.21	10589.49

SBS Skyline total monthly cost is \$ 9960.64.

Figure 3-31

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AT&T IN WATS
MONTHLY COST SUMMARY

B		DAY		EVE		NIGHT			
A	#	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N	LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D									
5	1	67.00	1147.80	2.00	25.60	2.00	13.66	37.65	1224.71
***	Total ***								
	1		1147.80		25.60		13.66	37.65	1224.71

Access charge is \$ 42.80 per line.

Connection charge is \$222.00 for the first line and
\$123.00 for each successive line.

Total connection charge for this configuration is \$ 345.00.

Figure 3-32

-1- DISPLAY RESULTS ON SCREEN

-2- PRINT OUT THE RESULTS

-0- FINISHED

CHOOSE ONE:

FIGURE 3-33

Suboption 0 - Finished

Upon selecting this option, Fig. 3-34 appears. The default is "Y." Anything other than "N" will cause the results to be saved. Fig. 3-35 appears with a list of the current filenames. The filename where the results are to be stored is entered as in Fig 3-36 (note that ".DBF" is not entered as part of the filename). Upon completion, the main menu reappears as in Fig. 3-37.

DO YOU WISH TO SAVE THESE RESULTS FOR LATER USE (Y/N)? Y

FIGURE 3-34

Filenames can have up to eight letters and/or numbers, must begin with a letter, and can have no imbedded blanks.

EXISTING FILENAMES ARE:

ONE.DBF	TWO.DBF	THREE.DBF	FOUR.DBF
---------	---------	-----------	----------

184342 bytes in 4 files.
123904 bytes remaining on drive.

ENTER FILENAME WHERE RESULTS ARE TO BE STORED:

FIGURE 3-35

Filenames can have up to eight letters and/or numbers, must begin with a letter, and can have no imbedded blanks.

EXISTING FILENAMES ARE:

ONE.DBF

TWO.DBF

THREE.DBF

FOUR.DBF

18432 bytes in 4 files.
123904 bytes remaining on drive.

ENTER FILENAME WHERE RESULTS ARE TO BE STORED: FIVE

FIGURE 3-36

MAIN MENU

- 1 - DETERMINE LEAST COST WATS CARRIER FOR CURRENT NETWORK
- 2 - OPTIMIZE CURRENT NETWORK FOR WATS CARRIER
- 3 - LOAD NEW CARRIER RATE TABLES
- 4 - VIEW EXISTING RESULT FILES
- 5 - DELETE EXISTING FILE

- 0 - FINISHED

CHOOSE ONE:

FIGURE 3-37

Option 2 - Optimize Current Network for WATS Carrier

Upon selecting this option, the screen appears as in Fig. 3-38. The default again is "N" with any response other than "Y" returning to the main menu. In Fig. 3-39 the screen displays the current configuration files which already exist so the user can pick one. If the user changes his mind and doesn't want any of the files listed, he can press <Return> to return to the main menu. After a file is selected as in Fig. 3-40, Fig. 3-41 will appear on the screen if the configuration has outgoing WATS lines.

Data for each WATS band is entered just as in Option 1. The computer will compute the grade of service for each of the existing trunks and display the results as in Fig. 3-42. The user can now optimize his network for the existing grade of service or choose his own. A value less than 1 or greater than 50 will not be accepted. If attempted, Fig. 3-43 will appear. Once a valid grade of service is entered, Fig. 3-44 followed by 3-45 will appear. This will appear for each band through the highest band trunk in the configuration. After data for the last band is entered, the screen will be similar to Fig. 3-46.

When computations to optimize the configuration begin, Fig. 3-47 will appear. The time displayed will vary from a minimum of 5 minutes for only band 1 trunks to a maximum of one hour for band 6 trunks.

If the configuration has incoming WATS lines, screens similarly will appear as shown in Figs. 3-48 through 3-51. Maximum time in Fig. 3-51 is 30 minutes for band 6 trunks. After all computations are complete, the results are stored and Fig. 3-52 appears to select output.

OPTIMIZE CURRENT NETWORK

This option will determine the number of trunks you need for each band in your network optimized for least cost for each carrier. Information is utilized from the present network which was entered in option <1> DETERMINE LEAST COST WATS CARRIER. To optimize your network requires a call recording device on each of your WATS lines to determine your actual calling patterns. You must provide the busy hour traffic for each WATS band.

Also, you must provide the "P" value required for your lines. A value of "P10" means that during the busy hour, 10 percent of the calls attempted will receive a busy signal on the first attempt. The lower the "P" value, the better the availability of lines; however, it requires more trunks at a higher expense. The default value is the highest "P" value of your present network.

DO YOU WISH TO CONTINUE WITH THIS OPTION (Y/N)? N

FIGURE 3-38

EXISTING RESULT FILES ARE:

ONE.DBF	TWO.DBF	THREE.DBF	FOUR.DBF
20480 bytes in 4 files.			
121856 bytes remaining on drive.			

CHOOSE ONE:

FIGURE 3-39

EXISTING RESULT FILES ARE:

ONE.DBF TWO.DBF THREE.DBF FOUR.DBF

20480 bytes in 4 files.
121856 bytes remaining on drive.

CHOOSE ONE:

FIGURE 3-40

ENTER TOTAL PEAK HOUR OUT WATS TRAFFIC IN MINUTES FOR
EACH BAND:

BAND1: 0.0
BAND2: 0.0
BAND3: 0.0
BAND4: 0.0
BAND5: 0.0

FIGURE 3-41

ENTER TOTAL PEAK HOUR OUT WATS TRAFFIC IN MINUTES FOR
EACH BAND:

BAND1: 65.0	BAND1 TRUNKS: P30
BAND2: 10.0	BAND3 TRUNKS: P34
BAND3: 15.0	BAND5 TRUNKS: P20
BAND4: 40.0	
BAND5: 50.0	

PRESS RETURN KEY TO USE DEFAULT "P" VALUE OR ENTER YOUR
OWN: 34

FIGURE 3-42

ENTER TOTAL PEAK HOUR OUT WATS TRAFFIC IN MINUTES FOR
EACH BAND:

BAND1:	65.0	BAND1 TRUNKS:	P30
BAND2:	10.0	BAND3 TRUNKS:	P34
BAND3:	15.0	BAND5 TRUNKS:	P20
BAND4:	40.0		
BAND5:	50.0		

PRESS RETURN KEY TO USE DEFAULT "P" VALUE OR ENTER YOUR
OWN: 34

"P" VALUE MUST BE 1 THRU 50. REENTER VALUE.

FIGURE 3-43

ENTER TOTAL PEAK HOUR OUT WATS TRAFFIC IN MINUTES FOR
EACH BAND:

BAND1:	65.0	BAND1 TRUNKS:	P30
BAND2:	10.0	BAND3 TRUNKS:	P34
BAND3:	15.0	BAND5 TRUNKS:	P20
BAND4:	40.0		
BAND5:	50.0		

PRESS RETURN KEY TO USE DEFAULT "P" VALUE OR ENTER YOUR
OWN: 34

"P" VALUE MUST BE 1 THRU 50. REENTER VALUE.

Press any key to continue...

FIGURE 3-44

ENTER ACTUAL MEASURED TRAFFIC IN HOURS PER MONTH:

BAND1:

DAY:	.
EVENING:	.
NIGHT/WEEKEND:	.

FIGURE 3-45

ENTER ACTUAL MEASURED TRAFFIC IN HOURS PER MONTH:

BAND5:

DAY:	69.00
EVENING:	19.00
NIGHT/WEEKEND:	8.00

Press any key to continue...

FIGURE 3-46

COME BACK IN 30 MINUTES.

FIGURE 3-47

ENTER TOTAL PEAK HOUR IN WATS TRAFFIC IN MINUTES FOR EACH
BAND:

BAND1:	5.0	BAND5 TRUNKS:	P40
BAND2:	5.0		
BAND3:	5.0		
BAND4:	5.0		
BAND5:	10.0		

PRESS RETURN KEY TO USE DEFAULT "P" VALUE OR ENTER YOUR
OWN: 40

FIGURE 3-48

ENTER TOTAL PEAK HOUR IN WATS TRAFFIC IN MINUTES FOR EACH
BAND:

BAND1:	5.0	BAND5 TRUNKS:	P40
BAND2:	5.0		
BAND3:	5.0		
BAND4:	5.0		
BAND5:	10.0		

PRESS RETURN KEY TO USE DEFAULT "P" VALUE OR ENTER YOUR
OWN: 40

Press any key to continue...

FIGURE 3-49

ENTER ACTUAL MEASURED TRAFFIC IN HOURS PER MONTH:

BAND5

DAY: 10.00

EVENING: 0.25

NIGHT/WEEKEND: 0.25

Press any key to continue...

FIGURE 3-50

TAKE A 15 MINUTE BREAK WHILE I DO SOME WORK.

FIGURE 3-51

-1- DISPLAY RESULTS ON SCREEN.

-2- PRINT OUT THE RESULTS.

-0- FINISHED.

CHOOSE ONE:

FIGURE 3-52

Suboption 1 - Display Results on Screen

Fig. 3-53 is displayed followed by Figs. 3-55 through 3-59. The grade of service is included in the heading of each report. The data used to optimize the configuration is included in the last reports for outgoing and incoming WATS carriers.

Suboption 2 - Print Out the Results

Fig. 3-54 is displayed followed by the printing of Figs. 3-55 through 3-59.

Suboption 0 - Finished

The program returns to the main menu as in Fig. 3-60.

OPTIMIZED RESULTS

A report summary will be displayed for each carrier. The display will wait between reports. Press <Ctrl><S> to stop the scrolling. Press <Ctrl><S> again to resume.

Press any key to continue...

FIGURE 3-53

OPTIMIZED RESULTS

Align Paper and Turn on Printer

Press any key to continue...

FIGURE 3-54

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OPTIMIZED CONFIGURATION: P20

AT&T OUT WATS
MONTHLY COST SUMMARY

B		DAY		EVE		NIGHT			
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL	
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)	
D									
4	4	119.75	7164.14	37.25	1710.46	23.00	603.52	150.60	9628.72
5	3	23.00	1306.53	6.33	243.07	2.67	54.71	112.95	1717.26
***	Total ***								
	7		8470.67		1953.53		658.23	263.55	11345.98

Access charge is \$ 37.65 per line.

Connection charge is \$222.00 for the first line and
\$123.00 for each successive line.

Total connection charge for this configuration is \$ 960.00.

Figure 3-55

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OPTIMIZED CONFIGURATION: P20

(80% ON-NET/ 20% OFF-NET)

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MCI OUT WATS
MONTHLY COST SUMMARY

B	DAY		EVE		NIGHT		ACCESS	TOTAL	
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	(\$)	(\$)	
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)			
D									
4	4	119.75	5899.16	37.25	1648.07	23.00	590.46	400.00	8537.69
5	3	23.00	1051.15	6.33	238.63	2.67	53.51	300.00	1643.29
***	Total ***								
	7		6950.31		1886.70		643.97	700.00	10180.98

Access charge is \$100.00 per line.

Connection charge is \$120.00 per line.

Total connection charge for this configuration is \$ 840.00.

Minimum usage charge is \$ 75.00 per line exclusive of access charges.

 Figure 3-56

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OPTIMIZED CONFIGURATION: P20
(80% ON-NET/ 20% OFF-NET)

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SPRINT OUT WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT				
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	TOTAL
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)
D							
1	5	18.00	1311.84	4.80	260.21	2.00	63.16
2	5	16.00	1176.48	8.00	436.08	2.00	63.60
3	5	1.80	137.38	1.00	56.80	0.40	13.34
4	5	60.00	4345.40	16.00	938.08	14.00	472.50
5	5	13.80	1110.08	3.80	226.44	1.60	55.37
*** Total ***			8081.18		1917.61		667.97
							10666.76

Access charge is \$ 75.00 per line.

Total monthly access charge for this configuration is \$ 375.00.

Connection charge is \$ 75.00 per line.

Total connection charge for this configuration is \$ 375.00.

Total monthly cost for this configuration is \$ 11041.76.

 Figure 3-57

Page No. 1 OPTIMIZED CONFIGURATION: P20
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SBS SKYLINE OUT WATS
MONTHLY COST SUMMARY

TIER	%	# LINES	DAY HRS/ LINE	DAY (\$)	OTHER HRS/ LINE	OTHER (\$)	TOTAL (\$)
1	65	5	71.24	4430.42	34.84	1149.72	5580.14
2	20	5	21.92	1494.07	10.72	418.08	1912.15
3	10	5	10.96	912.42	5.36	276.74	1189.16
4	5	5	5.48	406.56	2.68	129.20	535.76
*** Total ***							
	100		109.60	7243.47	53.60	1973.74	9217.21

Access charge is \$100.00 per line.

Total monthly access charge for this configuration is \$ 500.00.

Minimum usage charge is \$400.00 if average use is less than 50 hours/line.

Total monthly cost for this configuration is \$ 9717.21.

Connection charges per line are based on the distance between your
exchange carrier wire center and the SBS Skyline WATS access point.

DISTANCE	COST
0-1 mile	85.00
2-15 miles	100.00
16-25 miles	125.00
26-35 miles	150.00
36-50 miles	175.00

OUT WATS BUSY HOUR TRAFFIC (Minutes)		OUT WATS MONTHLY TRAFFIC (Hours)		
		DAY	EVENING	NIGHT/WEEKEND
BAND 1	65.0	90.00	24.00	10.00
BAND 2	10.0	80.00	40.00	10.00
BAND 3	15.0	9.00	5.00	2.00
BAND 4	40.0	300.00	80.00	70.00
BAND 5	50.0	69.00	19.00	8.00

Figure 3-58

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OPTIMIZED CONFIGURATION: P20

AT&T IN WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT					
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D								
5	2 33.50	1142.55	1.00	25.80	1.00	17.06	85.60	1271.01
***	Total ***							
	2	1142.55		25.80		17.06	85.60	1271.01

Access charge is \$ 42.80 per line.

Connection charge is \$222.00 for the first line and
\$123.00 for each successive line.

Total connection charge for this configuration is \$ 468.00.

	IN WATS BUSY HOUR TRAFFIC (Minutes)	DAY	IN WATS MONTHLY TRAFFIC (Hours)	EVENING	NIGHT/WEEKEND
BAND 1	5.0	27.00	1.00	1.00	
BAND 2	5.0	10.00	0.25	0.25	
BAND 3	5.0	10.00	0.25	0.25	
BAND 4	5.0	10.00	0.25	0.25	
BAND 5	10.0	10.00	0.25	0.25	

Figure 3-59

MAIN MENU

- 1 - DETERMINE LEAST COST WATS CARRIER FOR CURRENT NETWORK
- 2 - OPTIMIZE CURRENT NETWORK FOR WATS CARRIER
- 3 - LOAD NEW CARRIER RATE TABLES
- 4 - VIEW EXISTING RESULT FILES
- 5 - DELETE EXISTING FILE

- 0 - FINISHED

CHOOSE ONE:

FIGURE 3-60

Option 3 - Load New Carrier Rate Tables

Screen displays are shown in Figs. 3-61 through 3-64. In Fig. 3-64, the response should be "Y" and press <Return>. This erases the rate tables from the dBASE III disk which was used as a temporary storage place.

LOAD NEW CARRIER RATE TABLES

This option will load new carrier rate tables onto the OPTICOM program as well as any new parameters such as access charges, connection charges, minimum billed, etc. WARNING! OLD TABLES AND PARAMETERS WILL BE ERASED. IF YOU DESIRE TO SAVE THE OLD TABLES OR RUN DATA USING THE OLD TABLES, BE SURE TO MAKE A COPY OF THIS DISK BEFORE PROCEEDING.

DO YOU WISH TO CONTINUE WITH THIS OPTION (Y/N)? N

FIGURE 3-61

WHICH DRIVE IS OPTICOM PROGRAM ON (A/B/C/D)?
WHICH DRIVE IS DBASE III ON (A/B/C/D)?

FIGURE 3-62

WHICH DRIVE IS OPTICOM PROGRAM ON (A/B/C/D)? B

WHICH DRIVE IS DBASE III ON (A/B/C/D)? A

REMOVE OPTICOM FLOPPY FROM DRIVE B AND INSERT FLOPPY
WITH UPDATED TABLES.

Press any key to continue...

B: TABLES AT&TOUT.DBF
B: TABLES AT&TIN.DBF
B: TABLES SPRNTOUT.DBF
B: TABLES SBSOUT.DBF
B: TABLES MCIOUT.DBF
B: TABLES SBSIN.DBF
B: TABLES SBSCONEC.DBF
7 File(s) copied
B: TABLES CONSTANT.MEM
B: TABLES DATE.MEM
2 File(s) copied

FIGURE 3-63

INSERT FLOPPY WITH OPTICOM PROGRAM IN DRIVE B.

Press any key to continue...

A: TABLES AT&TOUT.DBF
A: TABLES AT&TIN.DBF
A: TABLES SPRNTOUT.DBF
A: TABLES SBSOUT.DBF
A: TABLES MCIOUT.DBF
A: TABLES SBSIN.DBF
A: TABLES SBSCONEC.DBF
A: TABLES CONSTANT.MEM
A: TABLES DATE.MEM
9 File(s) copied

Are you sure (Y/N)?

FIGURE 3-64

Option 4 - View Existing Results Files

Fig. 3-65 shows the screen display which includes the selection made. Again, press the <Return> key rather than make an entry and you will return to the main menu. Fig. 3-52 will appear in order to choose the appropriate output.

Suboption 1 - Display Results on Screen

Figs. 3-16 through 3-23 apply. If the configuration has previously been optimized, Figs. 3-53 and 3-55 through 3-59 will follow. After completion, Fig. 3-52 will appear.

Suboption 2 - Print Out the Results

Figs. 3-25 and 3-27 through 3-32 apply. If previously optimized, Figs. 3-54 through 3-59 will follow. Fig. 3-52 completes this choice.

Suboption 0 - Finished

The screen returns to the main menu as in Fig. 3-60.

EXISTING RESULT FILES ARE:
ONE.DBF TWO.DBF THREE.DBF FOUR.DBF
FIVE.DBF

20480 bytes in 5 files.
101376 bytes remaining on drive.

DO YOU WISH TO SEE ANY OF THESE FILES (Y/N)? Y
CHOOSE ONE:FIVE

FIGURE 3-65

Option 5 - Delete Existing File

Figure 3-66 shows the screen display along with the responses. When complete, the program returns to the main menu.

Option 0 - Finished

This exits the OPTICOM program and returns to the dBASE III dot (.) prompt as in Fig. 3-1.

EXISTING RESULT FILES ARE:
ONE.DBF TWO.DBF THREE.DBF FOUR.DBF
FIVE.DBF

20480 bytes in 5 files.
101376 bytes remaining on drive.

DO YOU WISH TO DELETE ANY OF THESE FILES (Y/N)? Y
CHOOSE ONE: FIVE

FIGURE 3-66

CHAPTER IV

DECISION MAKING WITH THE PROGRAM

Figures 4-1 through 4-6 show the results from actual data obtained for Lowry Air Force Base, Colorado for its WATS lines during the period of July 1985. Detail call recording devices are not used on the lines so an optimization could not be performed; however, looking at the current network output gives valuable information. Traffic patterns do not fluctuate radically from month to month so this can be used as a representative.

As can be seen in Fig. 4-5, approximately \$1500 per month could be saved just by switching from AT&T to SPRINT as the long distance carrier. The connection charge of \$1125 would be saved in less than one month. First year savings would be \$16,875. If detail traffic information were available, the network could be optimized for further possible savings. For example, Fig. 4-1 shows five band 5 lines with low usage of 19.06 hours/line. It may be more cost effective to eliminate these and pass the traffic over the band 6 lines. Only an optimization will show this. There are also possible

savings in Fig. 4-6 on the nine high usage band 5 lines through adding lower band lines.

OPTICOM can be especially valuable for "what if" situations. The cost of projected requirements are immediately available along with the least expensive carrier and configuration. As Chapter 3 showed, the grade of service of the current network is determined to help the user ensure his service is adequate. If the user is dissatisfied with his grade of service, the optimization will tell him the cost of changing it.

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AT&T DUT WATS
MONTHLY COST SUMMARY

B		DAY		EVE		NIGHT			
A	#	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N	LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D									
5	1	79.50	1339.67	5.90	75.52	13.30	90.84	37.65	1543.68
5	2	77.30	2611.81	8.50	217.60	11.00	150.26	75.30	3054.97
5	3	78.44	6617.02	9.82	628.48	10.18	347.65	188.25	7781.40
5	5	19.06	1832.41	0.00	0.00	1.80	61.47	188.25	2082.13
6	2	6.20	296.36	0.05	1.55	0.30	5.02	75.30	378.23
*** Total ***									
	15		12697.27		923.15		655.24	564.75	14840.41

Access charge is \$ 37.65 per line.

Connection charge is \$222.00 for the first line and
\$123.00 for each successive line.

Total connection charge for this configuration is \$1944.00.

Figure 4-1

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80% ON-NET/ 20% OFF-NET

NCI OUT WATS
MONTHLY COST SUMMARY

B	DAY	EVE	NIGHT						
A #	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL	
N LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)	
D									
5	1	79.50	1101.37	5.90	74.14	13.30	88.84	100.00	1364.35
5	2	77.30	2144.70	8.50	213.62	11.00	146.96	200.00	2705.28
5	5	78.44	5436.95	9.82	616.99	10.18	340.02	500.00	6893.96
5	5	19.06	1485.49	0.00	0.00	1.80	60.12	500.00	2045.61
6	2	6.20	200.22	0.05	1.25	0.30	4.01	200.00	405.48
***	Total ***								
	15		10368.73		906.00		639.95	1500.00	13414.68

Access charge is \$100.00 per line.

Connection charge is \$120.00 per line.

Total connection charge for this configuration is \$1800.00.

Minimum usage charge is \$ 75.00 per line exclusive of access charges.

Figure 4-2

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80% ON-NET/ 20% OFF-NET

SPRINT OUT WATS
MONTHLY COST SUMMARY

B		DAY		EVE		NIGHT			
A	#	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	ACCESS	TOTAL
N	LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)	(\$)	(\$)
D									
5	1	79.50	1123.75	5.90	70.32	13.30	92.06	75.00	1361.13
5	2	77.30	2194.49	8.50	202.61	11.00	152.29	150.00	2699.39
5	5	78.44	5554.91	9.82	585.17	10.18	352.33	375.00	6867.41
5	5	19.06	1533.19	0.00	0.00	1.80	62.30	375.00	1970.49
6	2	6.20	234.58	0.05	1.31	0.30	4.26	150.00	390.15
*** Total ***									
	15		10640.92		859.41		663.24	1125.00	13288.57

Access charge is \$ 75.00 per line.

Connection charge is \$ 75.00 per line.

Total connection charge for this configuration is \$1125.00.

Figure 4-3

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SBS SKYLINE OUT WATS
MONTHLY COST SUMMARY

TIER	#	% LINES	DAY HRS/ LINE	DAY (\$)	OTHER HRS/ LINE	OTHER (\$)	TOTAL (\$)
1	65	15	31.81	6781.50	7.28	720.29	7501.79
2	20	15	9.79	2279.51	2.24	261.92	2541.43
3	10	15	4.89	1370.52	1.12	194.43	1564.95
4	5	15	2.45	616.56	0.56	91.67	708.23
*** Total ***							
	100		48.93	11048.09	11.19	1268.31	12316.40

Access charge is \$100.00 per line.

Total monthly access charge for this configuration is \$1500.00.

Minimum usage charge is \$400.00 if average use is less than 50 hours/line.

Total monthly cost for this configuration is \$ 13816.40.

Connection charges per line are based on the distance between your exchange carrier wire center and the SBS Skyline WATS access point.

DISTANCE	COST
0-1 mile	85.00
2-15 miles	100.00
16-25 miles	125.00
26-35 miles	150.00
36-50 miles	175.00

Figure 4-4

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OUT WATS
MONTHLY COST COMPARISON
BY BAND

BAND	# LINES	DAY HRS/ LINE	EVE HRS/ LINE	NIGHT HRS/ LINE	AT&T TOTAL (\$)	MCI TOTAL (\$)	SPRINT TOTAL (\$)
5	1	79.50	5.90	13.30	1543.68	1364.35	1361.13
5	2	77.30	8.50	11.00	3054.97	2705.28	2699.39
5	5	78.44	9.82	10.18	7781.40	6893.96	6867.41
5	5	19.06	0.00	1.80	2082.13	2045.61	1970.49
6	2	6.20	0.05	0.30	378.23	405.48	390.15
*** Total ***							
	15				14840.41	13414.68	13288.57

SBS Skyline total monthly cost is \$ 13816.40.

Figure 4-5

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AT&T IN WATS
MONTHLY COST SUMMARY

B		DAY		EVE		NIGHT		ACCESS		TOTAL
A	#	HRS/	DAY	HRS/	EVE	HRS/	NIGHT	(\$)	(\$)	(\$)
N	LNS	LINE	(\$)	LINE	(\$)	LINE	(\$)			
D										
5	6	104.22	9527.25	0.97	75.08	14.67	750.81	256.80		10609.94
5	9	150.47	19747.91	0.07	8.13	12.51	960.39	385.20		21101.63
6	2	3.15	135.45	0.00	0.00	0.10	2.07	85.60		223.12
***	Total ***									
	17		29410.61		83.21		1713.27	727.60		31934.69

Access charge is \$ 42.80 per line.

Connection charge is \$222.00 for the first line and
\$123.00 for each successive line.

Total connection charge for this configuration is \$2313.00.

Figure 4-6

CHAPTER V

CONCLUSION

OPTICOM is a valuable tool to be used by a business or government agency to optimize its long distance WATS service for least cost. The program as originally written uses the rate tables for Colorado. Using the program elsewhere requires loading the rate tables for the appropriate state. For a small organization in a few states, this can be done manually using the format of files in Appendix C. If the organization has multiple locations in the state, the tables can be put on a single floppy disk, duplicated, and distributed to each location for updating the program.

This would not be cost effective for an organization that had many locations but only one or two in each state. Manual loading of 50 different tables each time there was an update would be too time consuming. In this case the OPTICOM program could be modified to include the full nation-wide rate table and a configuration option to choose the state. For example, the program would ask "Which state do you want the program configured for?" The response would be a two

letter abbreviation for the state. The program would then select the subset of the nation-wide rate table which applied to that state.

As currently written, OPTICOM requires the user to already own dBASE III software. dBASE III cannot be duplicated so each location would be required to own a copy at approximately \$370 through mail order sources. If dBASE III is not required at those locations for any other uses, there is a cheaper alternative. dBASE III compilers are now available for \$500 to \$750 through mail order. The OPTICOM program could be compiled, then copied and distributed to locations. The only maintenance required would be periodic (every six months) distribution of new rate table floppies at a cost of \$5. The original manual load of the new tables would take a person about 1/2 day. Sources for dBASE III software and compilers are provided in Table 5-1.

TABLE 5-1
dBASE III Software and Compiler Sources

<u>SOFTWARE</u>	<u>MANUFACTURED BY</u>	<u>RETAIL</u>
dBASE III	Ashton-Tate 10150 West Jefferson Blvd. Culver City, CA 90230 Phone: 213-329-8000	\$695
<u>COMPILERS</u>		
Clipper	Nantucket, Inc. 5995 South Sepulveda Blvd. Culver City, CA 90230 Phone: 213-390-7923	\$695
dB III Compiler	Wordtech Systems, Inc. 21 Altarinda Road Orinda, CA 94563 Phone: 415-254-0900	\$750

BIBLIOGRAPHY

1. Beckmann, Petr, Introduction to Elementary Queuing Theory and Telephone Traffic, Boulder, CO., Golem Press, 1968.
2. Finefrock, Jerry W., "Poisson Traffic Tables Designed for Practical Use." Business Communications Review. Vol. 4, No. 2, March-April 1974, pp. 3-12.
3. Lewin, Leonard, Telecommunications: An Interdisciplinary Text, Dedham, MA; Artech House, Inc., 1984.
4. Rabb, Michael T., "A Design Algorithm and Computer Program for Optimizing Single-Node, Long Distance Networks," Boulder, CO: University of Colorado College of Engineering, 1983.

APPENDIX A

OPTICOM PROGRAM FLOWCHARTS

This appendix contains a hierarchical representation of program module dependencies along with a description of each module.

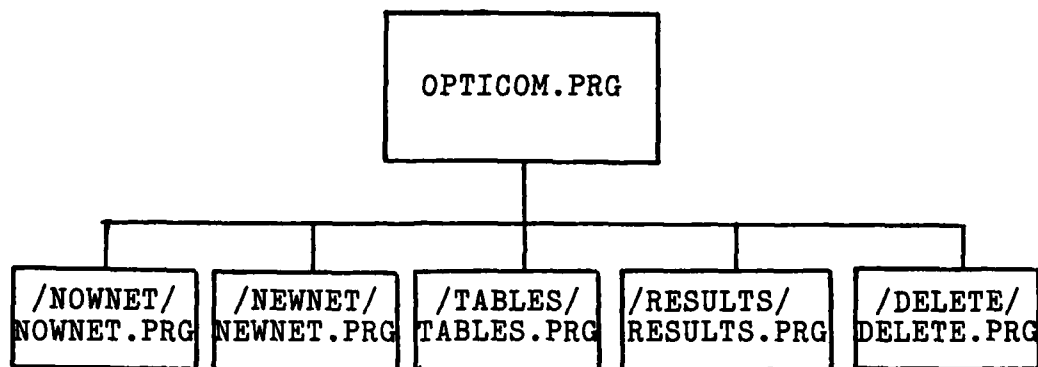


FIGURE A-1. Program Heirarchy Level 1.

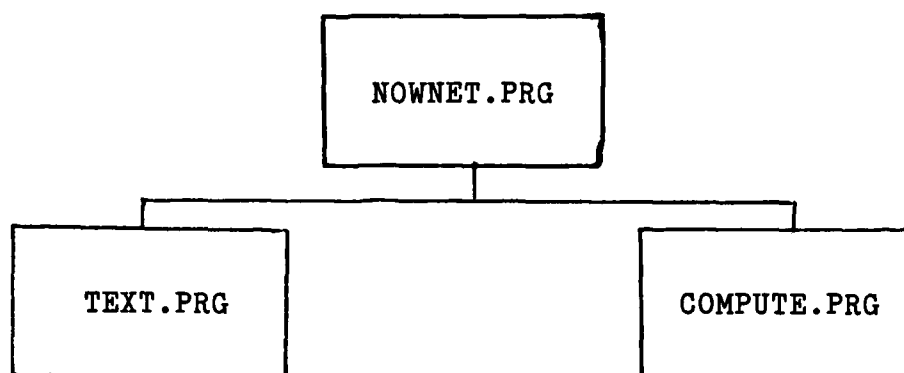


FIGURE A-2. Program Hierarchy Level 2, NOWNET.

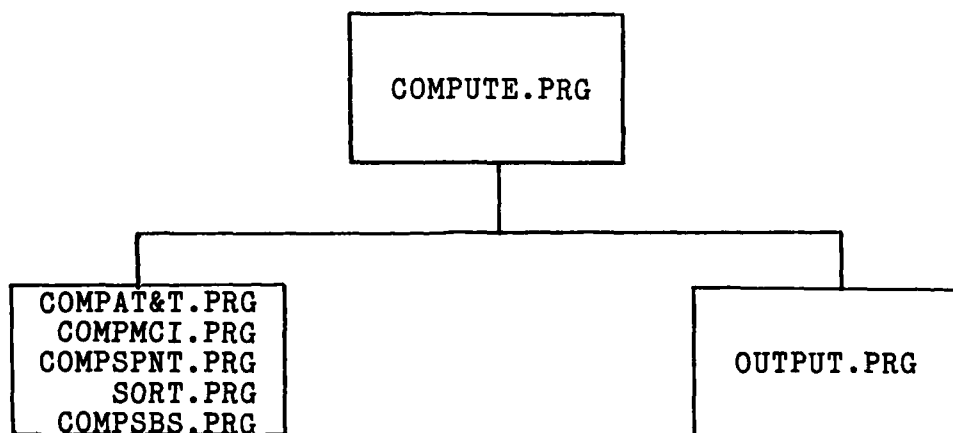


FIGURE A-3. Program Hierarchy Level 3, NOWNET.

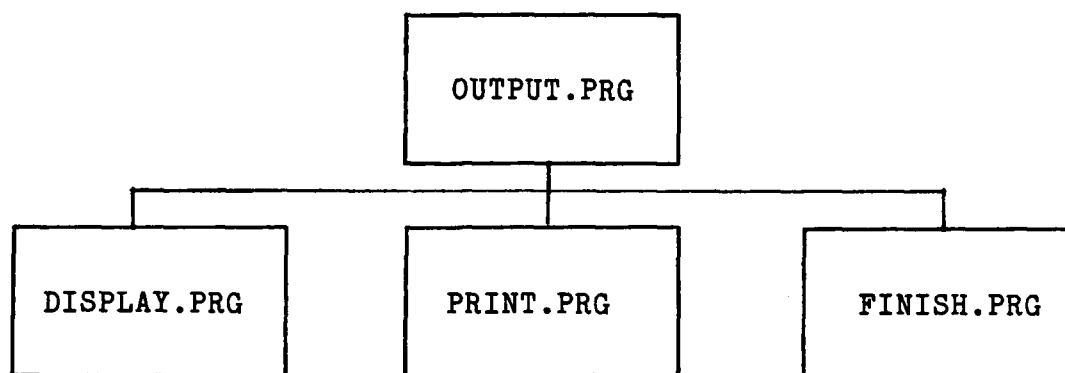


FIGURE A-4. Program Hierarchy Level 4, NOWNET.

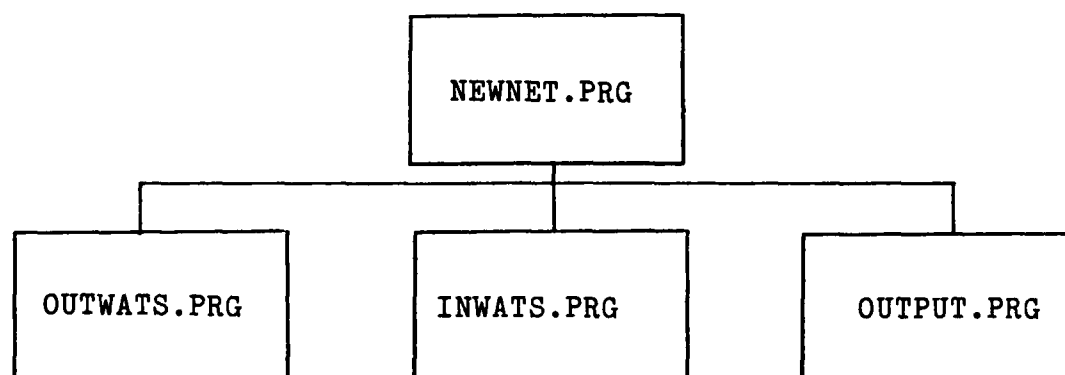


FIGURE A-5. Program Heirarchy Level 2, NEWNET.

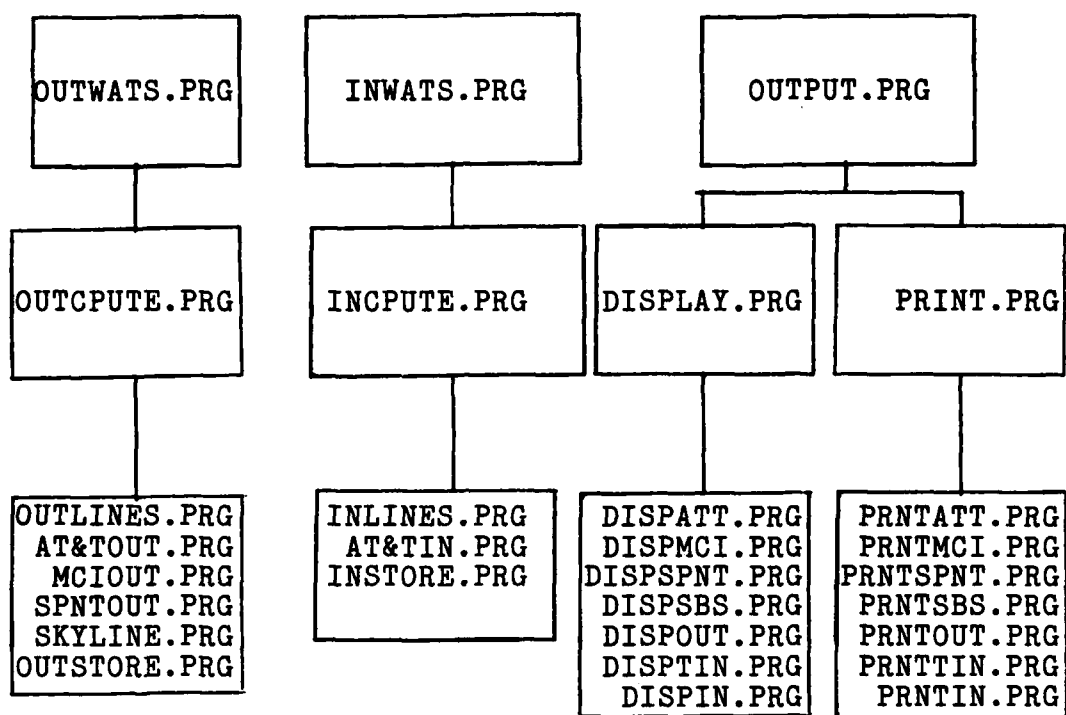


FIGURE A-6. Program Hierarchy Levels 3 and 4, NEWNET.

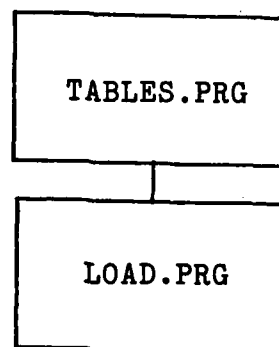


FIGURE A-7. Program Hierarchy Level 2, TABLES.

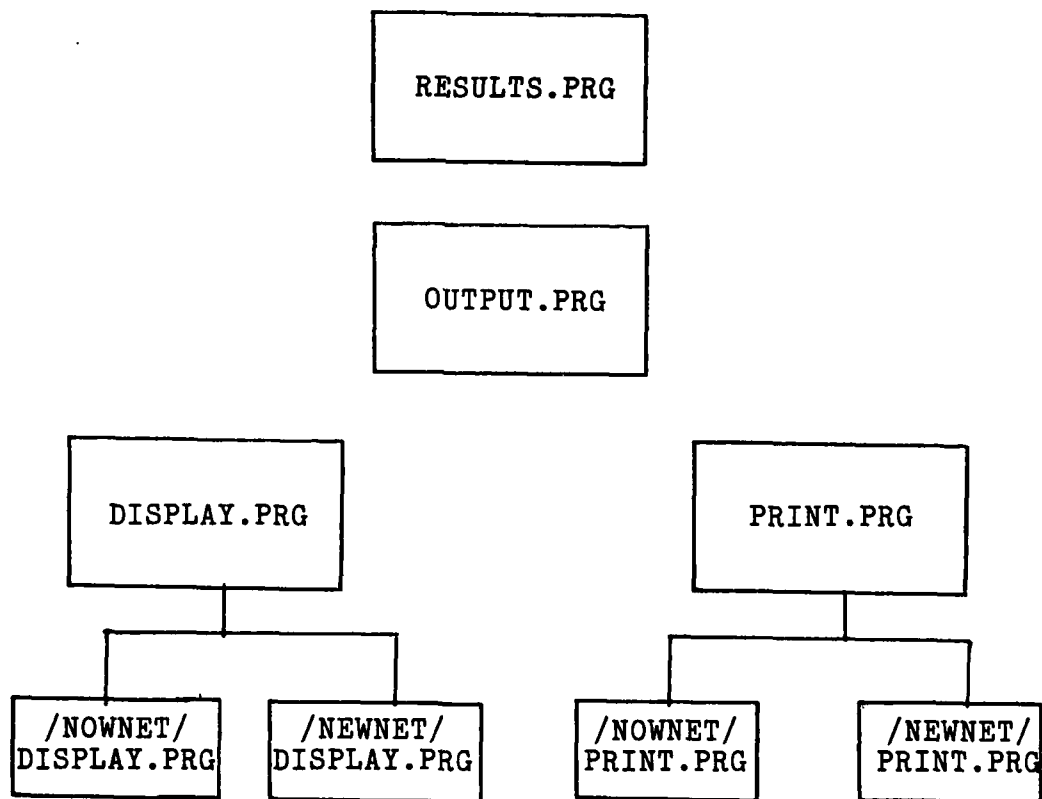


FIGURE A-8. Program Hierarchy Levels 3 and 4, RESULTS.

Module Descriptions/DELETE/ Directory Modules

1. DELETE.PRG - Controls removal of files containing results of network configuration costs and optimizations.

/NEWNET/ Directory Modules

1. AT&TIN.PRG - Calculates the cost of each configuration possible for the incoming WATS traffic in order to find the optimum AT&T solution.
2. AT&TOUT.PRG - Calculates the cost of each configuration possible for the outgoing WATS traffic in order to find the optimum AT&T solution.
3. DISPATT.PRG - Displays the optimum AT&T solution for outgoing WATS traffic.
4. DISPIN.PRG - Displays data which was input and used to optimize the incoming WATS traffic.
5. DISPLAY.PRG - Controls screen displays of optimum configurations for all carriers.
6. DISPMCI.PRG - Displays the optimum MCI solution for outgoing traffic.
7. DISPOUT.PRG - Displays data which was input and used to optimize the outgoing WATS traffic.
8. DISPSBS.PRG - Displays the optimum SBS Skyline solution for outgoing traffic.

9. DISPSPNT.PRG - Displays the optimum GTE SPRINT solution for outgoing traffic.
10. DISPTIN.PRG - Displays the optimum AT&T solution for incoming WATS traffic.
11. INCPUTE.PRG - Controls selection of possible configurations and computations in order to find optimum solution for AT&T incoming WATS traffic.
12. INLINES.PRG - Computes the number of incoming lines of each band required for each configuration in order to meet the customer's service requirement.
13. INSTORE.PRG - Stores the optimal solution for the AT&T incoming WATS traffic in the /RESULTS/ directory.
14. MCIOUT.PRG - Same as #2 for MCI.
15. NEWNET.PRG - Controls all functions to optimize the current network based on data provided by the user.
16. OUTLINES.PRG - Computes the number of outgoing lines of each band required for each configuration in order to meet the customer's service requirement.
17. OUTPUT.PRG - Controls all output of optimized solutions.
18. OUTSTORE.PRG - Stores the optimal solution for outgoing WATS traffic for each carrier in the /RESULTS/ directory.

19. PRINT.PRG - Controls the printing of optimum solutions for all carriers.
20. PRNTATT.PRG - Same as #3 to the printer.
21. PRNTIN.PRG - Same as #4 to the printer.
22. PRNTMCI.PRG - Same as #6 to the printer.
23. PRNTOUT.PRG - Same as #7 to the printer.
24. PRNTSBS.PRG - Same as #8 to the printer.
25. PRNTSPNT.PRG - Same as #9 to the printer.
26. PRNTTIN.PRG - Same as #10 to the printer.

/NOWNET/ Directory Modules

1. COMPAT&T.PRG - Computes the AT&T cost of the present network.
2. COMPMCI.PRG - Computes the MCI cost of the present outgoing WATS configuration.
3. COMPSBS.PRG - Same as #2 for SBS Skyline.
4. COMSPNT.PRG - Same as #2 for GTE SPRINT.
5. COMPUTE.PRG - Controls all computations of cost for the current network.
6. DISPLAY.PRG - Controls all screen displays of current network costs for each carrier.
7. FINISH.PRG - Stores the current network costs for all carriers in a /RESULTS/ directory file specified by the user, then returns to the main menu.
8. NOWNET.PRG - Controls all functions to determine current network costs.

9. OUTPUT.PRG - Controls all output for the current network.
10. PRINT.PRG - Controls the printing of current network costs for each carrier.

/RESULTS/ Directory Modules

1. DISPLAY.PRG - Controls screen displays of all results.
2. PRINT.PRG - Controls printing of all results.
3. OUTPUT.PRG - Controls all output.
4. RESULTS.PRG - Retrieves a file specified by the user in order to look at the results of a configuration previously run through the program.

/TABLES/ Directory Modules

1. LOAD.PRG - Loads new carrier rate tables into the OPTICOM program.
2. TABLES.PRG - Provides explanatory information to the user and controls the loading of new tables.

APPENDIX B

OPTICOM PROGRAM CODE

TYPE OPTICON.PR6

```

CLEAR ALL
SET TALK OFF
SET DEFAULT TO B:
SET MENU ON
STORE 'N' TO CHOICE
CLEAR
@ 10,20 SAY 'ARE YOU USING A COLOR MONITOR (Y/N)?' GET CHOICE      PICTURE '! '
READ

IF CHOICE = 'Y'
    SET COLOR TO 7/1,1/7,4
ELSE
    SET COLOR TO 7/0,0/7,0
ENDIF

CLEAR
RESTORE FROM \TABLES\DATE
? '      OPTICOM VERSION 1.00      ' + 'RATE TABLES AS OF: ' + DATE
? '      DECEMBER 2, 1985'
? '      STEPHEN A. DRAPER'
?
?
?
?
? '      OPTICOM is a software package designed to aid you, the'
? '      communications manager in making decisions to optimize your'
? '      long haul communications network. This program is currently'
? '      limited to telephone traffic; however, future versions may'
? '      be expanded to include data traffic as well. The program is'
? '      menu driven so you needn't worry if you are uncomfortable'
? '      with computers or programming. Each option, when selected,'
? '      will provide a description along with the information you'
? '      are required to provide. If you need a different selection,'
? '      you can return to any level of the menu to make a different'
? '      selection. Press the <Esc> key any time you wish to terminate'
? '      the OPTICOM program.'
?
?
WAIT

DO WHILE .T.
    CLEAR
    @ 5,10 SAY "MAIN MENU"
    @ 8,15 SAY "1 - DETERMINE LEAST COST WATS CARRIER FOR CURRENT NETWORK."

```

AD-A166 744

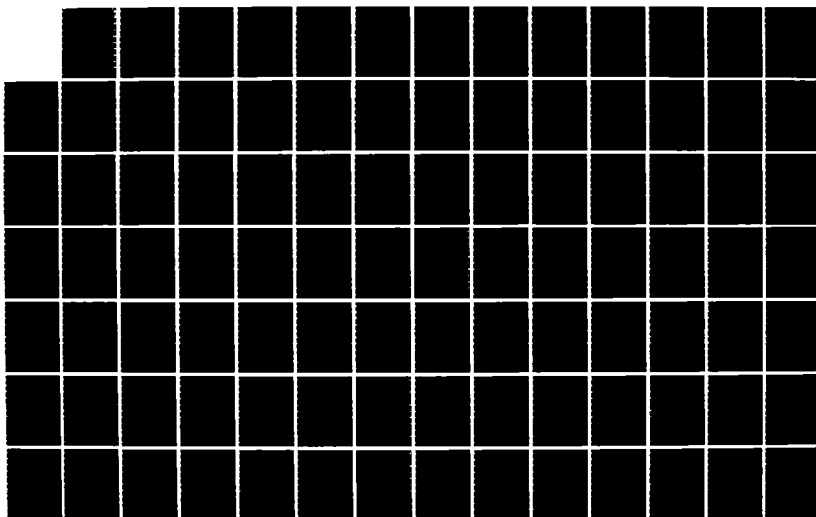
A COMPUTER PROGRAM FOR OPTIMIZING LONG HAUL TELEPHONE
NETWORKS FOR LEAST.. (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH 5 A DRAPER 1986
AFIT/CI/NR-86-48T

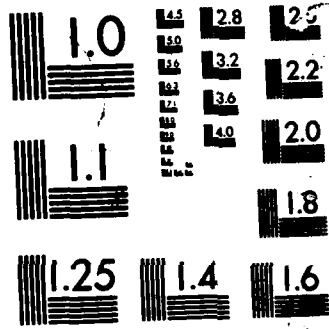
2/3

UNCLASSIFIED

F/G 17/2

NL





MICROCOPY

CHART

@ 9,15 SAY "2 - OPTIMIZE CURRENT NETWORK FOR WATS CARRIER"
@ 10,15 SAY "3 - LOAD NEW CARRIER RATE TABLES."
@ 11,15 SAY "4 - VIEW EXISTING RESULT FILES."
@ 12,15 SAY "5 - DELETE EXISTING FILE."

@ 15,15 SAY "0 - FINISHED."

STORE " " TO CHOICE

@ 10,15 SAY "CHOOSE ONE:" GET CHOICE PICTURE "9"
READ

DO CASE

CASE CHOICE = "0"

CANCEL

CASE CHOICE = "1"

SET PATH TO B:\NOWNET

DO NOWNET

CASE CHOICE = "2"

SET PATH TO B:\NEWNET

DO NEWNET

CASE CHOICE = "3"

SET PATH TO B:\TABLES

DO TABLES

CASE CHOICE = "4"

SET PATH TO B:\RESULTS

DO RESULTS

CASE CHOICE = "5"

SET PATH TO B:\DELETE

DO DELETE

ENDCASE

SET PATH TO B:

ENDDO

SET ECHO OFF

TYPE \NOWNET\NOWNET.PRG

DO TEXT

CLEAR

RESTORE FROM \TABLES\CONSTANT

FLAG = .T.

DO WHILE FLAG

STORE 80 TO METRO

STORE 65 TO SBS1

STORE 20 TO SBS2

STORE 10 TO SBS3

@ 5,10 SAY "PRESS RETURN KEY TO USE DEFAULT VALUES OR ENTER YOUR OWN."

@ 8,10 SAY "MCI & SPRINT METROPOLITAN PERCENTAGE:" GET METRO

@ 10,10 SAY "SBS SKYLINE TIER 1:" GET SBS1

@ 12,10 SAY "SBS SKYLINE TIER 2:" GET SBS2

@ 14,10 SAY "SBS SKYLINE TIER 3:" GET SBS3

READ

IF SBS1 + SBS2 + SBS3 <= 100 .AND. METRO <= 100

FLAG = .F.

SBS4 = 100 - SBS1 - SBS2 - SBS3

@ 16,10

@ 16,10 SAY "SBS SKYLINE TIER 4:" GET SBS4

?

WAIT

ELSE

@ 16,10 SAY "INVALID ENTRIES. TOTALS EXCEED 100%. REENTER VALUES."

ENDIF

ENDDO

SET SAFETY OFF

SAVE TO \TABLES\CONSTANT

SET SAFETY ON

CLEAR

USE NOWNET

SET SAFETY OFF

ZAP

SET SAFETY ON

FINISHED = .F.

DO WHILE .NOT. FINISHED

GOTO BOTTOM

APPEND BLANK

REPLACE USE_DAY WITH 0

REPLACE USE_EVE WITH 0

REPLACE USE_NIGHT WITH 0

```

@ 5,10 SAY "ENTER INFORMATION FOR EACH WATS BAND YOU CURRENTLY HAVE."
VALID = .F.
@ 11,10 CLEAR

```

```

DO WHILE .NOT. VALID
  DELETE
  PACK
  APPEND BLANK
  REPLACE USE_DAY WITH 0
  REPLACE USE_EVE WITH 0
  REPLACE USE_NIGHT WITH 0
  REPLACE OUT WITH .T.
  REPLACE QUANTITY WITH 0
  @ 9,10 SAY "          WATS BAND (1 THRU 6):" GET BAND
  READ
  IF BAND >= 1 .AND. BAND <= 6
    VALID = .T.
    @ 11,10
  ELSE
    @ 11,10 SAY "INVALID ENTRY. REENTER BAND."
  ENDIF
ENDDO

```

```

@ 11,10 SAY "          IS THIS AN OUT WATS (Y/N)?" GET OUT
@ 13,10 SAY "          NUMBER OF LINES:" GET QUANTITY
@ 15,10 SAY "AVERAGE HOURS BILLED PER LINE PER MONTH:"
@ 16,10 SAY "          DAY:" GET USE_DAY
@ 17,10 SAY "          EVENING:" GET USE_EVE
@ 18,10 SAY "          NIGHT/WEKEND:" GET USE_NIGHT

```

```

@ 20,10 SAY "IS THIS YOUR LAST ENTRY (Y/N)?" GET FINISHED
READ

```

```

IF FINISHED
  @ 22,10 SAY "DOUBLE CHECK YOUR ENTRIES AND MAKE CORRECTIONS ON NEXT SCR
EEN."
  @ 23,10 SAY "PRESS <Ctrl><End> WHEN FINISHED."
  WAIT
  CLEAR
  GOTO TOP
  BROWSE
  GOTO TOP
  DO WHILE .NOT. EOF()
    IF BAND > 6 .OR. BAND < 1
      CLEAR
      @ 12,1 SAY "INVALID ENTRIES. BAND MUST BE 1 THRU 6. PLEASE MAK
E CORRECTIONS ON NEXT SCREEN."
      @ 13,10 SAY "PRESS <Ctrl><End> WHEN FINISHED."
    ENDIF
  ENDWHILE

```

```
      WAIT  
      BROWSE  
      GOTO TOP  
    ELSE  
      SKIP  
    ENDIF  
  ENDDO
```

```
    PACK  
  ELSE  
  ENDIF
```

```
ENDDO
```

```
DO COMPUTE  
RETURN
```

```
SET ECHO OFF
```

TYPE \DOWNET\TEXT.PR6

CLEAR

@ 5,15 SAY "DETERMINE THE LEAST COST WATS CARRIER"

?

?

?

? " This option will determine which carrier is the least"
 ? " costly for your existing network. The carriers used are"
 ? " MCI, SPRINT, SBS Skyline, and AT&T. You must provide information"
 ? " on your current configuration for each line as follows:"

?

? " (1) Average hours billed each month."
 ? " (2) WATS band."
 ? " (3) WATS in or out."
 ? " (4) Percentage of calls to metropolitan areas."

?

STORE "N" TO CHOICE

@ 23,15 SAY "DO YOU WISH TO CONTINUE WITH THIS OPTION (Y/N)?"

GET C

CHOICE PICTURE "!"

READ

IF CHOICE <> "Y"

RETURN

ENDIF

CLEAR

?

?

?

?

?

? " MCI and SPRINT have two rate tables:"
 ? " one for calls that utilize only their facilities, such as"
 ? " large cities, and one for calls that must also utilize AT&T"
 ? " facilities, such as rural areas. The default values"
 ? " for MCI and SPRINT are 80% ON-NET (metropolitan) and"
 ? " 20% OFF-NET (rural)."

?

?

WAIT

CLEAR

?
 ?
 ? " SBS Skyline has all WATS band calls over a single"
 ? " access channel rather than a separate line for different"
 ? " bands of service. Consequently, their rate tables take"
 ? " into account where the destination of the call is"
 ? " for billing purposes. SBS rates are based on a four"
 ? " tier structure as follows:"
 ?
 ? " TIER 1 - Major metropolitan areas."
 ? " TIER 2 - Includes additional frequently called cities."
 ? " TIER 3 - Includes remainder of contiguous US, Puerto Rico,"
 ? " and the Virgin Islands."
 ? " TIER 4 - Equivalent WATS band 1 coverage of bordering states."
 ?
 ? " Default values for SBS Skyline are 65%/20%/10%/5% for"
 ? " TIERs 1 through 4 respectively. If your calling patterns"
 ? " are unusual, then enter different values. For example, a"
 ? " stock brokerage would have close to 100% of its calls to "
 ? " metropolitan areas and a farm implement company mostly to"
 ? " rural areas."
 ?
 ?

WAIT
 RETURN

SET ECHO OFF

TYPE \NONNET\COMPUTE.PRG

```
CLEAR
@ 12,18 SAY "WAIT A MINUTE WHILE I DO SOME FIGURING."
@ 13,18 SAY "COMPUTING AT&T COST."
DO COMPAT&T
@ 14,18 SAY "COMPUTING NCI COST."
DO COMPMCI
@ 15,18 SAY "COMPUTING STE SPRINT COST."
DO COMSPNT
USE RESULTS
COUNT TO COUNT

IF COUNT > 1
    DO SORT
ELSE
ENDIF

@ 16,18 SAY "COMPUTING SBS SKYLINE COST."
DO COMPSBS
DO STORE
DO OUTPUT
RETURN

SET ECHO OFF
```

TYPE \MOMNET\COMPAT&T.PRG

CLEAR ALL
 USE RESULTS
 SET SAFETY OFF
 ZAP
 SET SAFETY ON
 APPEND FROM MOMNET
 GOTO TOP
 RESTORE FROM \TABLES\CONSTANT

SELECT 1
 DO WHILE .NOT. EOF()
 IF OUT
 SELECT 2
 USE \TABLES\AT&TOUT
 ELSE
 SELECT 2
 USE \TABLES\AT&TIN
 ENDIF
 LOCATE FOR BAND = A->BAND
 SELECT 1
 DO CASE
 CASE USE_DAY >= 80
 REPLACE DAY_ATT WITH (B->DAY15*15 + B->DAY25*25 + B->DAY40*40 +
 (USE_DAY-80)*B->DAY80) * QUANTITY
 CASE 40 < USE_DAY .AND. USE_DAY < 80
 REPLACE DAY_ATT WITH (B->DAY15*15 + B->DAY25*25 +
 (USE_DAY-40)*B->DAY40) * QUANTITY
 CASE 15 < USE_DAY .AND. USE_DAY <= 40
 REPLACE DAY_ATT WITH (B->DAY15*15 + (USE_DAY-15)*B->DAY25)
 * QUANTITY
 CASE USE_DAY <= 15
 REPLACE DAY_ATT WITH USE_DAY*B->DAY15 * QUANTITY
 ENDCASE

 DO CASE
 CASE USE_EVE >= 80
 REPLACE EVE_ATT WITH (B->EVE15*15 + B->EVE25*25 +
 B->EVE40*40 + (USE_EVE-80)*B->EVE80) * QUANTITY
 CASE 40 < USE_EVE .AND. USE_EVE < 80
 REPLACE EVE_ATT WITH (B->EVE15*15 + B->EVE25*25 +
 (USE_EVE-40)*B->EVE40) * QUANTITY
 CASE 15 < USE_EVE .AND. USE_EVE <= 40

```
REPLACE EVE_ATT WITH (B->EVE15*15 +  
SE_EVE-15)*B->EVE25) * QUANTITY      (U  
CASE USE_EVE <= 15  
  REPLACE EVE_ATT WITH USE_EVE*B->EVE15 * QUANTITY  
ENDCASE  
  
REPLACE NIGHT_ATT WITH (USE_NIGHT * B->WEEKEND * QUANTITY)  
REPLACE ACCES_ATT WITH B->ACCESS * QUANTITY  
  
IF DAY_ATT + EVE_ATT + NIGHT_ATT >= QUANTITY*ATT_MIN  
  REPLACE ATT_TOTAL WITH DAY_ATT+EVE_ATT+NIGHT_ATT+ACCES_ATT  
ELSE  
  REPLACE ATT_TOTAL WITH QUANTITY*ATT_MIN + ACCES_ATT  
ENDIF  
  
SKIP  
ENDDO  
RETURN
```

```
SET ECHO OFF
```

TYPE \NONNET\COMPNCI.PRG

```

CLEAR ALL
RESTORE FROM \TABLES\CONSTANT
USE RESULTS
GOTO TOP
SELECT 1
DO WHILE .NOT. EOF()
  IF OUT
    SELECT 2
    USE \TABLES\NCIOUT
    LOCATE FOR BAND = A->BAND
    SELECT 1
    DO CASE
      CASE USE_DAY >= 80
        REPLACE DAY_MCI WITH (B->DAY15*15 + B->DAY25*25 +
          B->DAY40*40 + (USE_DAY-80)*B->DAY80) * QUANTITY
          *
        METRO/100
        SELECT 2
        SKIP
        SELECT 1
        REPLACE DAY_MCI WITH (B->DAY15*15 + B->DAY25*25 +
          B->DAY40*40 + (USE_DAY-80)*B->DAY80) * QUANTITY
          * (1
        00-METRO)/100 + DAY_MCI
        CASE 40 < USE_DAY .AND. USE_DAY < 80
          REPLACE DAY_MCI WITH (B->DAY15*15 + B->DAY25*25 +
            (USE_DAY-40)*B->DAY40) * QUANTITY * METRO/100
          SELECT 2
          SKIP
          SELECT 1
          REPLACE DAY_MCI WITH (B->DAY15*15 + B->DAY25*25 +
            (USE_DAY-40)*B->DAY40) * QUANTITY * (100-METRO)/100 +
            DAY_MCI
          CASE 15 < USE_DAY .AND. USE_DAY <= 40
            REPLACE DAY_MCI WITH (B->DAY15*15 + (USE_DAY-15)*B->DAY25)
              * QUANTITY * METRO/100
            SELECT 2
            SKIP
            SELECT 1
            REPLACE DAY_MCI WITH (B->DAY15*15 + (USE_DAY-15)*B->DAY25)
              * QUANTITY * (100-METRO)/100 + DAY_MCI
            CASE USE_DAY <= 15
              REPLACE DAY_MCI WITH USE_DAY*B->DAY15 * QUANTITY * METRO/100
              SELECT 2
              SKIP

```

```

        SELECT 1
        REPLACE DAY_MCI WITH USE_DAY*B->DAY15 * QUANTITY
* (100-METRO)/100 + DAY_MCI
    ENDCASE
    SELECT 2
    SKIP -1
    SELECT 1

    DO CASE
        CASE USE_EVE >= 80
            REPLACE EVE_MCI WITH (B->EVE15*15 + B->EVE25*25 +
            B->EVE40*40 + (USE_EVE-80)*B->EVE80) * QUANTITY * ME
            TRD/100
            SELECT 2
            SKIP
            SELECT 1
            REPLACE EVE_MCI WITH (B->EVE15*15 + B->EVE25*25 +
            B->EVE40*40 + (USE_EVE-80)*B->EVE80) * QUANTITY *
            (100-METRO)/100 + EVE_MCI
            CASE 40 < USE_EVE .AND. USE_EVE < 80
                REPLACE EVE_MCI WITH (B->EVE15*15 + B->EVE25*25 +
                (USE_EVE-40)*B->EVE40) * QUANTITY * METRO/100
                SELECT 2
                SKIP
                SELECT 1
                REPLACE EVE_MCI WITH (B->EVE15*15 + B->EVE25*25 +
                (USE_EVE-40)*B->EVE40) * QUANTITY * (100-METRO)/100 +
                EVE_MCI
                CASE 15 < USE_EVE .AND. USE_EVE <= 40
                    REPLACE EVE_MCI WITH (B->EVE15*15 + (USE_EVE-15)*B->EVE25)
                    * QUANTITY * METRO/100
                    SELECT 2
                    SKIP
                    SELECT 1
                    REPLACE EVE_MCI WITH (B->EVE15*15 + (USE_EVE-15)*B->EVE25)
                    * QUANTITY * (100-METRO)/100 + EVE_MCI
                CASE USE_EVE <= 15
                    REPLACE EVE_MCI WITH USE_EVE*B->EVE15 * QUANTITY * METRO/100
                    SELECT 2
                    SKIP
                    SELECT 1
                    REPLACE EVE_MCI WITH USE_EVE*B->EVE15 * QUANTITY
                    * (100-METRO)/100 + EVE_MCI
            ENDCASE

    SELECT 2
    SKIP -1
    SELECT 1

    REPLACE NIGHT_MCI WITH (USE_NIGHT * B->WEEKEND * QUANTITY) * METRO/100
    SELECT 2
    SKIP

```

```
SELECT 1
  REPLACE NIGHT_MCI WITH (USE_NIGHT * B->WEEKEND * QUANTITY)
  * (100-METRO)/100 + NIGHT_MCI

  REPLACE ACCES_MCI WITH MCI_ACCESS * QUANTITY

  IF DAY_MCI + EVE_MCI + NIGHT_MCI >= QUANTITY*MCI_MIN
    REPLACE MCI_TOTAL WITH DAY_MCI+EVE_MCI+NIGHT_MCI+ACCES_MCI
  ELSE
    REPLACE MCI_TOTAL WITH QUANTITY*MCI_MIN + ACCES_MCI
  ENDIF

ELSE
ENDIF
SKIP
ENDDO
RETURN

SET ECHO OFF
```

TYPE \NOWNET\COMPSPNT.PRG

```

CLEAR ALL
RESTORE FROM \TABLES\CONSTANT
USE RESULTS
BOTO TOP
SELECT 1
DO WHILE .NOT. EOF()
  IF OUT
    SELECT 2
    USE \TABLES\SPRNTOUT
    LOCATE FOR BAND = A->BAND
    SELECT 1
    DO CASE
      CASE USE_DAY >= 100
        REPLACE DAY_SPNT WITH (B->DAY0_40*40 + B->DAY40_70*30 +
          B->DAY70_100*30 + (USE_DAY-100)*B->DAY100PLUS) * QUANTITY
          * METRO/100
        SELECT 2
        SKIP
        SELECT 1
        REPLACE DAY_SPNT WITH (B->DAY0_40*40 + B->DAY40_70*30 +
          B->DAY70_100*30 + (USE_DAY-100)*B->DAY100PLUS) * QUANTITY
          * (100-METRO)/100 + DAY_SPNT
      CASE 70 < USE_DAY .AND. USE_DAY < 100
        REPLACE DAY_SPNT WITH (B->DAY0_40*40 + B->DAY40_70*30 +
          (USE_DAY-70)*B->DAY70_100) * QUANTITY * METRO/100
        SELECT 2
        SKIP
        SELECT 1
        REPLACE DAY_SPNT WITH (B->DAY0_40*40 + B->DAY40_70*30 +
          (USE_DAY-70)*B->DAY70_100) * QUANTITY * (100-METRO)/100 +
          DAY_SPNT
      CASE 40 < USE_DAY .AND. USE_DAY <= 70
        REPLACE DAY_SPNT WITH (B->DAY0_40*40 + (USE_DAY-40)*B->DAY40_70
          * QUANTITY * METRO/100
        )
        SELECT 2
        SKIP
        SELECT 1
        REPLACE DAY_SPNT WITH (B->DAY0_40*40 + (USE_DAY-40)*B->DAY40_70
          * QUANTITY * (100-METRO)/100 + DAY_SPNT
        )
      CASE USE_DAY <= 40
        REPLACE DAY_SPNT WITH USE_DAY*B->DAY0_40 * QUANTITY * METRO/100
        SELECT 2
        SKIP

```

```

        SELECT 1
        REPLACE DAY_SPNT WITH USE_DAY*B->DAY0_40 * QUANTITY
        * (100-METRO)/100 + DAY_SPNT
    ENDCASE
    SELECT 2
    SKIP -1
    SELECT 1

DO CASE
    CASE USE_EVE >= 100
        REPLACE EVE_SPNT WITH (B->EVE0_40*40 + B->EVE40_70*30 +
        B->EVE70_100*30 + (USE_EVE-100)*B->EVE100PLUS) * QUANTITY
        * METRO/100
        SELECT 2
        SKIP
        SELECT 1
        REPLACE EVE_SPNT WITH (B->EVE0_40*40 + B->EVE40_70*30 +
        B->EVE70_100*30 + (USE_EVE-100)*B->EVE100PLUS) * QUANTITY
        * (100-METRO)/100 + EVE_SPNT
        CASE 70 < USE_EVE .AND. USE_EVE < 100
            REPLACE EVE_SPNT WITH (B->EVE0_40*40 + B->EVE40_70*30 +
            (USE_EVE-70)*B->EVE70_100) * QUANTITY * METRO/100
            SELECT 2
            SKIP
            SELECT 1
            REPLACE EVE_SPNT WITH (B->EVE0_40*40 + B->EVE40_70*30 +
            (USE_EVE-70)*B->EVE70_100) * QUANTITY * (100-METRO)/100 +
            EVE_SPNT
        CASE 40 < USE_EVE .AND. USE_EVE <= 70
            REPLACE EVE_SPNT WITH (B->EVE0_40*40 + (USE_EVE-40)*B->EVE40_70
            * QUANTITY * METRO/100
        )
        SELECT 2
        SKIP
        SELECT 1
        REPLACE EVE_SPNT WITH (B->EVE0_40*40 + (USE
        _EVE-40)*B->EVE40_70) * QUANTITY * (100-METRO)/100
        + EVE_SP
    NT
    CASE USE_EVE <= 40
        REPLACE EVE_SPNT WITH USE_EVE*B->EVE0_40 * QUANTITY * METRO/100
        SELECT 2
        SKIP
        SELECT 1
        REPLACE EVE_SPNT WITH USE_EVE*B->EVE0_40 * QUANTITY
        * (100-METRO)/100 + EVE_SPNT
    ENDCASE

    SELECT 2
    SKIP -1
    SELECT 1

    REPLACE NIGHT_SPNT WITH (USE_NIGHT * B->WEEKEND * QUANTITY) * METRO/100
    SELECT 2

```

```
SKIP
SELECT 1
REPLACE NIGHT_SPNT WITH (USE_NIGHT * B->WEEKEND * QUANTITY)
* (100-METRO)/100 + NIGHT_SPNT

REPLACE ACCES_SPNT WITH SPNTACCESS * QUANTITY

IF DAY_SPNT + EVE_SPNT + NIGHT_SPNT >= QUANTITY*SPRNT_MIN
  REPLACE SPNT_TOTAL WITH DAY_SPNT+EVE_SPNT+NIGHT_SPNT+ACCES_SPNT
ELSE
  REPLACE SPNT_TOTAL WITH QUANTITY*SPRNT_MIN + ACCES_SPNT
ENDIF

ELSE
ENDIF
SKIP
ENDDO
RETURN

SET ECHO OFF
```

TYPE \NOWNET\SORT.PRG

CLEAR ALL
USE RESULTS
SET SAFETY OFF
SORT ON BAND, QUANTITY TO TEMP
ZAP
APPEND FROM TEMP FOR OUT
APPEND FROM TEMP FOR .NOT. OUT
DELETE FILE TEMP.DBF
SET SAFETY ON
RETURN

SET ECHO OFF

TYPE \NOWNET\COMPSBS.PRG

```
CLEAR ALL
SELECT 1
USE RESULTS
RESTORE FROM \TABLES\CONSTANT
SUM USE_DAY * QUANTITY TO DAYTOTAL FOR OUT
SUM (USE_EVE + USE_NIGHT) * QUANTITY TO NIGHTTOTAL FOR OUT
USETOTAL = DAYTOTAL + NIGHTTOTAL
SUM QUANTITY TO LINETOTAL FOR OUT
DAYAVG = DAYTOTAL/LINETOTAL
NIGHTAVG = NIGHTTOTAL/LINETOTAL
USEAVG = USETOTAL/LINETOTAL
SUM USE_DAY*QUANTITY TO BAND1DAY FOR OUT .AND. BAND = 1
SUM (USE_EVE+USE_NIGHT)*QUANTITY TO BAND1NIGHT FOR OUT .AND. BAND = 1
COUNT TO COUNT
```

```
IF COUNT < 4
    APPEND BLANK
    APPEND BLANK
    APPEND BLANK
    APPEND BLANK
```

```
ELSE
ENDIF
```

```
GOTO TOP
SELECT 2
USE \TABLES\SBSOUT
LOCATE FOR USAGE_HRS > USEAVG .OR. EOF()
SKIP -1
SELECT 1
```

```
REPLACE TIER WITH 1
REPLACE PERCENT WITH SBS1
REPLACE SBSHRS_DAY WITH SBS1*DAYTOTAL/100
REPLACE SBSHRS_EVE WITH SBS1 *NIGHTTOTAL/100
REPLACE DAY_SBS WITH SBS1*B->TIER1_DAY * 0.6 * DAYTOTAL/100
REPLACE NIGHT_SBS WITH SBS1*B->TIER1_OTH * 0.6 * NIGHTTOTAL/100
REPLACE ACCES_SBS WITH SBS_ACCESS*LINETOTAL
REPLACE SBS_LINES WITH LINETOTAL
SKIP
```

```
REPLACE TIER WITH 2
REPLACE PERCENT WITH SBS2
```

```
REPLACE SBSHRS_DAY WITH SBS2*DAYTOTAL/100
REPLACE SBSHRS_EVE WITH SBS2*NIGHTTOTAL/100
REPLACE DAY_SBS WITH SBS2 * B->TIER2_DAY * 0.6 * DAYTOTAL/100
REPLACE NIGHT_SBS WITH SBS2 * B->TIER2_OTH * 0.6 * NIGHTTOTAL/100
REPLACE SBS_LINES WITH LINETOTAL
SKIP
```

```
REPLACE TIER WITH 3
REPLACE PERCENT WITH SBS3
REPLACE SBSHRS_DAY WITH SBS3*DAYTOTAL/100
REPLACE SBSHRS_EVE WITH SBS3*NIGHTTOTAL/100
REPLACE DAY_SBS WITH SBS3 * B->TIER3_DAY * 0.6 * DAYTOTAL/100
REPLACE NIGHT_SBS WITH SBS3 * B->TIER3_OTH * 0.6 * NIGHTTOTAL/100
REPLACE SBS_LINES WITH LINETOTAL
SKIP
```

```
REPLACE TIER WITH 4
REPLACE PERCENT WITH SBS4
REPLACE SBSHRS_DAY WITH SBS4*DAYTOTAL/100
REPLACE SBSHRS_EVE WITH SBS4 *NIGHTTOTAL/100
REPLACE DAY_SBS WITH SBS4 * B->TIER4_DAY * 0.6 * DAYTOTAL/100
REPLACE NIGHT_SBS WITH SBS4 * B->TIER4_OTH * 0.6 * NIGHTTOTAL/100
REPLACE SBS_LINES WITH LINETOTAL
```

```
SUM DAY_SBS TO SUNDAY
SUM NIGHT_SBS TO SUMNIGHT
GOTO TOP
```

```
IF USEAVG < SBS_HRSMIN .AND. SUNDAY + SUMNIGHT < SBS_MIN*LINETOTAL
  REPLACE SBS_TOTAL WITH SBS_MIN*LINETOTAL + ACCES_SBS
ELSE
  REPLACE SBS_TOTAL WITH SUNDAY + SUMNIGHT + ACCES_SBS
ENDIF
```

```
RETURN
```

```
SET ECHO OFF
```

TYPE \NONNET\OUTPUT.PRG

CLEAR ALL

DO WHILE .T.

 CLEAR

 STORE ' ' TO CHOICE

 @ 8,25 SAY "-1- DISPLAY RESULTS ON SCREEN."

 @ 10,25 SAY "-2- PRINT OUT THE RESULTS."

 @ 13,25 SAY "-0- FINISHED."

 @ 17,25 SAY "CHOOSE ONE:" GET CHOICE PICTURE "9"

 READ

DO CASE

 CASE CHOICE = "1"

 DO DISPLAY

 CASE CHOICE = "2"

 DO PRINT

 CASE CHOICE = "0"

 DO FINISH

 RETURN

ENDCASE

ENDDO

SET ECHO OFF

TYPE \NOWNET\DISPLAY.PRG

CLEAR
TEXT

CURRENT CONFIGURATION

A report summary will be displayed for each carrier plus a comparison report of all the carriers. The display will wait between reports. Press <Ctrl><S> to stop the scrolling. Press <Ctrl><S> again to resume.

```
ENDTEXT
WAIT
CLEAR
USE RESULTS
IF OUT
  RESTORE FROM \TABLES\CONSTANT
  SUM QUANTITY TO NUMLINES FOR OUT
  SELECT 2
  USE \TABLES\AT&TOUT

  IF NUMLINES = 0
    CONECTOTAL = 0
  ELSE
    CONECTOTAL = CONNECT1 + (NUMLINES-1)*CONNECT2
  ENDIF
  SELECT 1
  LINE1 = "    Access charge is $" + STR(B->ACCESS,6,2) + " per line."
  LINE2 = "    Connection charge is $" + STR(B->CONNECT1,6,2) + " for the fi
rst line and "
  LINE3 = "    $" + STR(B->CONNECT2,6,2) + " for each successive line."
  LINE4 = "    Total connection charge for this configuration is $" + STR(CO
NECTOTAL,7,2) + "."
  LINE5 = "    Minimum usage charge is $" + STR(ATT_MIN,6,2) + " per line ex
clusive of access charges."
```

REPORT FORM AT&TOUT FOR OUT

```

WAIT
?
?
?
? LINE1
? LINE2
? LINE3
? LINE4

IF ATT_MIN > 0
    ? LINE5
ELSE
ENDIF
WAIT

CLEAR

IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = MCICONNECT * NUMLINES
ENDIF

LINE1 = "    Access charge is $" + STR(MCI_ACCESS,6,2) + " per line."
LINE2 = "    Connection charge is $" + STR(MCICONNECT,6,2) + " per line."
LINE3 = "    Total connection charge for this configuration is $" + STR(CO
NECTOTAL,7,2) + "."
LINE4 = "    Minimum usage charge is $" + STR(MCI_MIN,6,2) + " per line ex
clusive of access charges."

REPORT FORM MCIOUT FOR OUT HEADING STR(METRO,3,0) + "% ON-NET/" + STR(100-M
ETRO,3,0) + "% OFF-NET"
WAIT
?
?
?
? LINE1
? LINE2
? LINE3

IF MCI_MIN > 0
    ? LINE4
ELSE
ENDIF
WAIT

CLEAR

IF NUMLINES = 0

```

```

      CONECTOTAL = 0
    ELSE
      CONECTOTAL = SPNTCONECT * NUMLINES
    ENDIF

```

```

      LINE1 = "      Access charge is $" + STR(SPNTACCESS,6,2) + " per line."
      LINE2 = "      Connection charge is $" + STR(SPNTCONECT,6,2) + " per line."
      LINE3 = "      Total connection charge for this configuration is $" + STR(CONECTOTAL,7,2) + "."
      LINE4 = "      Minimum usage charge is $" + STR(SPRNT_MIN,6,2) + " per line exclusive of access charges."

```

```

      REPORT FORM SPRNTOUT FOR OUT HEADING STR(METRO,3,0) + "% ON-NET/" +
      STR(100-METRO,3,0) + "% OFF-NET"

```

```

      WAIT
      ?
      ?
      ?
      ? LINE1
      ? LINE2
      ? LINE3

```

```

      IF SPRNT_MIN > 0
        ? LINE4

```

```

      ELSE
      ENDIF
      WAIT

```

```

      CLEAR

```

```

      GOTO TOP

```

```

      LINE1 = "      Access charge is $" + STR(SBS_ACCESS,6,2) + " per line."
      LINE2 = "      Total monthly access charge for this configuration is $" + STR(R(ACCES_SBS,7,2) + "."
      LINE3 = "      Minimum usage charge is $" + STR(SBS_MIN,6,2) + " "if
      average use is less than " + STR(SBS_HRSMIN,3,0) + " hours/line."
      LINE4 = "      Total monthly cost for this configuration is $" + STR(SBS_TOTAL,11,2) + "."
      LINE5 = "      Connection charges per line are based on the distance between
      your"
      LINE6 = "      exchange carrier wire center and the SBS Skyline WATS access
      point."

```

```

      REPORT FORM SBSOUT FOR TIER >= 1 .AND. TIER <= 4

```

```

      WAIT
      ?
      ?
      ?
      ? LINE1
      ? LINE2
      IF SBS_MIN > 0
        ? LINE3

```

```

ELSE
ENDIF

? LINE4
? LINE5
? LINE6
USE \TABLES\SBSCONEC
SET MARGIN TO 30
?
?
?
DISPLAY OFF ALL
?
SET MARGIN TO 0
WAIT

CLEAR

USE RESULTS
LINE1 = "      SBS Skyline total monthly cost is $" + STR(SBS_TOTAL,11,2) +
". "
REPORT FORM COMPARE FOR OUT
?
? LINE1
WAIT
ENDIF

LOCATE FOR .NOT. OUT

IF BAND > 0
CLEAR
RESTORE FROM \TABLES\CONSTANT
SUM QUANTITY TO NUMLINES FOR .NOT. OUT
SELECT 2
USE \TABLES\AT&TIN

IF NUMLINES = 0
CONNECTTOTAL = 0
ELSE
CONNECTTOTAL = CONNECT1 + (NUMLINES) *CONNECT2
ENDIF

SELECT 1
LINE1 = "      Access charge is $" + STR(B->ACCESS,6,2) + " per line."
LINE2 = "      Connection charge is $" + STR(B->CONNECT1,6,2) + " for the fi
rst line and "
LINE3 = "      $" + STR(B->CONNECT2,6,2) + " for each successive line."
LINE4 = "      Total connection charge for this configuration is $" + STR(C
ONNECTTOTAL,7,2) + "."
LINE5 = "      Minimum usage charge is $" + STR(ATT_MININ,6,2) + " per line
exclusive of access charges."

```

```
REPORT FORM AT&TIN FOR .NOT. OUT .AND. ATT_TOTAL > 0
WAIT
?
?
?
? LINE1
? LINE2
? LINE3
? LINE4

IF ATT_MININ > 0
  ? LINE5
ELSE
ENDIF

WAIT
CLEAR
ENDIF

RETURN

SET ECHO OFF
```

TYPE \NOWNET\PRINT.PR6

CLEAR

@ B,10 SAY "ALIGN PAPER AND TURN ON PRINTER"

WAIT

USE RESULTS

IF OUT

RESTORE FROM \TABLES\CONSTANT

SUM QUANTITY TO NUMLINES FOR OUT

SELECT 2

USE \TABLES\AT&TOUT

IF NUMLINES = 0

CONNECTOTAL = 0

ELSE

CONNECTOTAL = CONNECT1 + (NUMLINES-1)*CONNECT2

ENDIF

SELECT 1

LINE1 = " Access charge is \$" + STR(B->ACCESS,6,2) + " per line."

LINE2 = " Connection charge is \$" + STR(B->CONNECT1,6,2) + " for the fi
rst line and "

LINE3 = " \$" + STR(B->CONNECT2,6,2) + " for each successive line."

LINE4 = " Total connection charge for this configuration is \$" + STR(CON
NECTOTAL,7,2) + "."

LINE5 = " Minimum usage charge is \$" + STR(ATT_MIN,6,2) + " per line ex
clusive of access charges."

REPORT FORM AT&TOUT FOR OUT NOEJECT TO PRINT

SET PRINT ON

?

?

?

? LINE1

?

? LINE2

? LINE3

?

? LINE4

?

IF ATT_MIN > 0

```

        ? LINE5
        ?
ELSE
ENDIF

SET PRINT OFF
CLEAR

IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = MCICONNECT * NUMLINES
ENDIF

LINE1 = "    Access charge is $" + STR(MCI_ACCESS,6,2) + " per line."
LINE2 = "    Connection charge is $" + STR(MCICONNECT,6,2) + " per line."
LINE3 = "    Total connection charge for this configuration is $" + STR(CONECTOTAL,7,2) + "."
LINE4 = "    Minimum usage charge is $" + STR(MCI_MIN,6,2) + " per line exclusive of access charges."

REPORT FORM MCIDOUT FOR OUT HEADING STR(METRO,3,0) + "% ON-NET/" +      S
TR(100-METRO,3,0) + "% OFF-NET" TO PRINT
SET PRINT ON
?
?
?
? LINE1
?
? LINE2
?
? LINE3
?

IF MCI_MIN > 0
    ? LINE4
    ?
ELSE
ENDIF

SET PRINT OFF
CLEAR

IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = SPNTCONNECT * NUMLINES
ENDIF

```

```

LINE1 = "      Access charge is $" + STR(SPMTACCESS,6,2) + " per line."
LINE2 = "      Connection charge is $" + STR(SPNTCONNECT,6,2) + " per line."
LINE3 = "      Total connection charge for this configuration is $" + STR(CO
NECTOTAL,7,2) + "."
LINE4 = "      Minimum usage charge is $" + STR(SPRNT_MIN,6,2) + " per line
exclusive of access charges."
REPORT FORM SPRNTOUT FOR OUT HEADING STR(METRO,3,0) + "% ON-NET/" + STR(100
-METRO,3,0) + "% OFF-NET" TO PRINT
SET PRINT ON
?
?
?
? LINE1
?
? LINE2
?
? LINE3
?

IF SPRNT_MIN > 0
  ? LINE4
  ?
ELSE
ENDIF
SET PRINT OFF
CLEAR
GOTO TOP
LINE1 = "      Access charge is $" + STR(SBS_ACCESS,6,2) + " per line."
LINE2 = "      Total monthly access charge for this configuration is $" + ST
R(ACCES_SBS,7,2) + "."
LINE3 = "      Minimum usage charge is $" + STR(SBS_MIN,6,2) + " if average
use is less than " + STR(SBS_HRSMIN,3,0) + " hours/line."
LINE4 = "      Total monthly cost for this configuration is $" + STR(SBS_TOT
AL,11,2) + "."
LINE5 = "      Connection charges per line are based on the distance between
your"
LINE6 = "      exchange carrier wire center and the SBS Skyline WATS access
point."
REPORT FORM SBSOUT FOR TIER >= 1 .AND. TIER <= 4 TO PRINT
SET PRINT ON
?
?
?
? LINE1
? LINE2
?
IF SBS_MIN > 0
  ? LINE3
ELSE
ENDIF
? LINE4

```

```

?
? LINE5
? LINE6
USE \TABLES\SBSCONEC
SET MARGIN TO 30
?
?
?
DISPLAY OFF ALL
?
SET MARGIN TO 0
SET PRINT OFF
CLEAR
USE RESULTS
LINE1 = "      SBS Skyline total monthly cost is $" + STR(SBS_TOTAL,11,2) +
".
REPORT FORM COMPARE FOR OUT TO PRINT
SET PRINT ON
?
? LINE1
?
SET PRINT OFF
ENDIF

LOCATE FOR .NOT. OUT

IF BAND > 0
  CLEAR
  RESTORE FROM \TABLES\CONSTANT
  SUM QUANTITY TO NUMLINES FOR .NOT. OUT
  SELECT 2
  USE \TABLES\AT&TIN

  IF NUMLINES = 0
    CONECTOTAL = 0
  ELSE
    CONECTOTAL = CONNECT1 + (NUMLINES) *CONNECT2
  ENDIF

  SELECT 1
  LINE1 = "      Access charge is $" + STR(B->ACCESS,6,2) + " per line."
  LINE2 = "      Connection charge is $" + STR(B->CONNECT1,6,2) + " for the fi
rst line and "
  LINE3 = "      $" + STR(B->CONNECT2,6,2) + " for each successive line."
  LINE4 = "      Total connection charge for this configuration is $" + STR(C
ONECTOTAL,7,2) + "."
  LINE5 = "      Minimum usage charge is $" + STR(ATT_MININ,6,2) + " per line
exclusive of access charges."

```

```
REPORT FORM AT&TIN FOR .NOT. OUT .AND. ATT_TOTAL > 0 TO PRINT
```

```
SET PRINT ON
?
?
?
? LINE1
?
? LINE2
? LINE3
?
? LINE4
?
IF ATT_MININ > 0
  ? LINES
  ?
ELSE
ENDIF
SET PRINT OFF
ENDIF

CLEAR
RETURN

SET ECHO OFF
```

TYPE \NOWNET\FINISH.PRG

```
CLEAR ALL
RESTORE FROM \TABLES\CONSTANT
RELEASE ALL EXCEPT METRO
CLEAR
DO WHILE .T.
    STORE "Y" TO CHOICE
    @ 20,10 SAY "DO YOU WISH TO SAVE THESE RESULTS FOR LATER USE" (Y/N)?
    * GET CHOICE PICTURE "!"
    READ

    DO CASE
        CASE CHOICE = "N"
            RETURN
        CASE CHOICE = "Y"
            CLEAR
            STORE " " TO FILENAME
            TEXT
                Filenames can have up to eight letters and/or numbers, must begin with a
                letter, and can have no imbedded blanks. (XXXXXXX.DBF).
            TEXT
            EXISTING FILENAMES ARE:
            ENDTXT
            DIR \RESULTS\*.DBF

            @ 23,10 SAY "ENTER FILENAME WHERE RESULTS ARE TO BE STORED:"
            GET FILENAME PICTURE "!!!!!!!"
            READ
            FILENAME = TRIM(FILENAME)
            OPTIMIZE = .F.
            RELEASE CHOICE
            CONSTANT = FILENAME + ".MEN"
            SAVE TO \RESULTS\&CONSTANT
            FILENAME = FILENAME + ".DBF"
            SET TALK ON
            COPY FILE RESULTS.DBF TO \RESULTS\&FILENAME
            SET TALK OFF
            RETURN
    ENDCASE

ENDDO

SET ECHO OFF
```

TYPE \NEWNET\NEWNET.PRG

CLEAR ALL
CLEAR
TEXT

OPTIMIZE CURRENT NETWORK

This option will determine the number of trunks you need for each band in your network optimized for least cost for each carrier. Information is utilized from the present network which was entered in option <1> DETERMINE LEAST COST WATS CARRIER. To optimize your network requires a call recording device on each of your WATS lines to determine your actual calling patterns. You must provide the busy hour traffic for each WATS band.

Also, you must provide the "P" value required for your lines. A value of "P10" means that during the busy hour, 10 percent of the calls attempted will receive a busy signal on the first attempt. The lower the "P" value, the better the availability of lines; however, it requires more trunks at a higher expense. The default value is the highest "P" value of your present network.

ENDTEXT

SET SAFETY OFF

STORE "N" TO CHOICE

@ 23,15 SAY "DO YOU WISH TO CONTINUE WITH THIS OPTION (Y/N)?"

GET CHOICE

E PICTURE "!"

READ

IF CHOICE <> "Y"

RETURN

ENDIF

CLEAR

@ 5,10 SAY "EXISTING RESULT FILES ARE:"

?

?

DIR \RESULTS*.DBF

?

?

STORE " " TO FILENAME

@ 24,50 SAY "CHOOSE ONE:" GET FILENAME PICTURE "!!!!!!!"

READ

IF FILENAME = " " *
RETURN
ENDIF

?
FILENAME = TRIM(FILENAME)

FILE = FILENAME + ".DBF"
USE NENNET
ZAP
USE \RESULTS\FILE
COPY TO \NENNET\NENNET FIELDS BAND, OUT, QUANTITY, USE_DAY, USE_EVE, USE_NIGHT

CLEAR
SAVE TO \NENNET\TEMP
GOTO TOP

IF OUT
DO OUTWATS
ENDIF

CLEAR ALL
CLEAR
RESTORE FROM TEMP
USE \RESULTS\FILE

LOCATE FOR .NOT. OUT .AND. BAND > 0

IF .NOT. EOF()
DO INWATS
ENDIF

DO OUTPUT

RETURN

SET ECHO OFF

TYPE \NEWNET\OUTWATS.PRG

```

RESTORE FROM TEMP
USE NEWNET
LOCATE FOR .NOT. OUT .OR. EOF()
SKIP -1
MAX = BAND
ROW = 5
PEAKHR1 = 0.0
PEAKHR2 = 0.0
PEAKHR3 = 0.0
PEAKHR4 = 0.0
PEAKHR5 = 0.0
PEAKHR6 = 0.0
NUMBER = 1
CLEAR
@ 2,5 SAY "ENTER TOTAL PEAK HOUR OUT WATS TRAFFIC IN MINUTES FOR EACH BAND:"

DO WHILE NUMBER <= MAX
    TEMP = "PEAKHR" + STR(NUMBER,1,0)
    @ ROW,10 SAY "BAND" + STR(NUMBER,1,0) + ": " GET &TEMP PICTURE "999.9"
    NUMBER = NUMBER + 1
    ROW = ROW + 2
ENDDO

READ

USE NEWNET
ROW = 4
HIGH_P = 0
TEMP = 0
PEAKNUM = 1
LOCATE FOR BAND > TEMP

DO WHILE OUT .AND. .NOT. EOF()
    TEMP = BAND
    PEAKTOTAL = 0

    DO WHILE PEAKNUM <= TEMP
        NAMEPK = "PEAKHR" + STR(PEAKNUM,1,0)
        PEAKTOTAL = PEAKTOTAL + &NAMEPK
        PEAKNUM = PEAKNUM + 1
    ENDDO

```

```

SUM QUANTITY TO LINES FOR BAND = TEMP .AND. OUT
SELECT 2
USE POISSON
LOCATE FOR TRUNKS = LINES
NUMBER = 1
FLAG = .T.

DO WHILE NUMBER <= 50 .AND. FLAG
  IF NUMBER > 9
    FIELD = "P" + STR(NUMBER,2,0)
  ELSE
    FIELD = "P" + STR(NUMBER,1,0)
  ENDIF

  IF &FIELD >= PEAKTOTAL
    FLAG = .F.
  ENDIF

  NUMBER = NUMBER + 1
ENDDO
@ ROW,40 SAY "BAND" + STR(TEMP,1,0) + " TRUNKS: " GET FIELD

IF NUMBER -1 > HIGH_P
  HIGH_P = NUMBER -1
ENDIF

ROW = ROW + 2
SELECT 1
LOCATE FOR BAND > TEMP
ENDDO

CLEAR GETS

FLAG = .T.
DO WHILE FLAG
  TEMP2 = HIGH_P
  @ 20,5 SAY 'PRESS RETURN KEY TO USE DEFAULT "P" VALUE OR ENTER YOUR OWN: '
  GET HIGH_P PICTURE "99"
  READ
  IF HIGH_P <= 50 .AND. HIGH_P >= 1
    FLAG = .F.
  ELSE
    HIGH_P = TEMP2
    @ 22,5 SAY '"P" VALUE MUST BE 1 THRU 50. REENTER VALUE.'
  ENDIF
ENDDO

WAIT

```

USE WENNET
ZAP
NUMBER = 1

DO WHILE NUMBER <= MAX
 APPEND BLANK
 REPLACE BAND WITH NUMBER
 REPLACE OUT WITH .T.
 NUMBER = NUMBER + 1
ENDDO

CLEAR
GOTO TOP
@ 5,10 SAY "ENTER ACTUAL MEASURED TRAFFIC IN HOURS PER MONTH:"

DO WHILE .NOT. EOF()
 @ 11,10 SAY "BAND" + STR(BAND,1,0)
 @ 13,10 SAY " DAY:" GET USE_DAY
 @ 15,10 SAY " EVENING:" GET USE_EVE
 @ 17,10 SAY "NIGHT/WEEKEND:" GET USE_NIGHT
 READ
 SKIP
ENDDO

WAIT
SAVE TO \WENNET\TEMP
DO OUTCPUT
RETURN

SET ECHO OFF

TYPE \NEWNET\OUTCPUTE.PRG

RESTORE FROM TEMP
CLEAR
USE POSSIBLE

DO CASE
CASE MAX = 1
LOCATE FOR ONE .AND. .NOT. TWO .AND. .NOT. THREE .AND. .NOT
. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
@ 23,5 SAY 'TAKE A 5 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 2
LOCATE FOR TWO .AND. .NOT. THREE .AND. .NOT. FOUR .AND. .NO
T. FIVE .AND. .NOT. SIX
@ 23,5 SAY 'TAKE A 5 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 3
LOCATE FOR THREE .AND. .NOT. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
@ 23,5 SAY 'TAKE A 10 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 4
LOCATE FOR FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
@ 23,5 SAY 'TAKE A 15 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 5
LOCATE FOR FIVE .AND. .NOT. SIX
@ 23,5 SAY 'COME BACK IN 30 MINUTES.'
CASE MAX = 6
LOCATE FOR SIX
@ 23,5 SAY 'COME BACK IN 1 HOUR.'

ENDCASE

SELECT 2
USE \RESULTS\FILE
STORE 999999999 TO ATTLOWCOS, MCILOWCOS

SELECT 3
USE RESULTS

SELECT 1
LASTCOUNT = 0

DO WHILE .NOT. EOF()
DO CASE
CASE MAX = 1
LOCATE FOR ONE .AND. .NOT. TWO .AND. .NOT. THREE .AND.
.NOT. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX

```

CASE MAX = 2
  LOCATE FOR TWO .AND. .NOT. THREE .AND. .NOT. FOUR .AND.
.NOT. FIVE .AND. .NOT. SIX
CASE MAX = 3
  LOCATE FOR THREE .AND. .NOT. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
CASE MAX = 4
  LOCATE FOR FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
CASE MAX = 5
  LOCATE FOR FIVE .AND. .NOT. SIX
CASE MAX = 6
  LOCATE FOR SIX
ENDCASE

COUNTER = 0
DO WHILE COUNTER < LASTCOUNT .AND. .NOT. EOF()
  CONTINUE
  COUNTER = COUNTER + 1
ENDDO

LASTCOUNT = LASTCOUNT + 1

@ 23,5 SAY "CALCULATING AT&T AND MCI COST FOR CONFIGURATION " + STR
(LASTCOUNT,2,0) + "."

IF .NOT. EOF()
  SELECT 3
  ZAP

  IF A->ONE
    APPEND BLANK
    REPLACE BAND WITH 1
  ENDIF

  IF A->TWO
    APPEND BLANK
    REPLACE BAND WITH 2
  ENDIF

  IF A->THREE
    APPEND BLANK
    REPLACE BAND WITH 3
  ENDIF

  IF A->FOUR
    APPEND BLANK
    REPLACE BAND WITH 4
  ENDIF

  IF A->FIVE
    APPEND BLANK
    REPLACE BAND WITH 5
  ENDIF

```

```
IF A->SIX  
  APPEND BLANK  
  REPLACE BAND WITH 6  
ENDIF  
SAVE TO \NEWNET\TEMP
```

```
DO OUTLINES
```

```
SELECT 3  
DO AT&TOUT  
DO MCIOUT  
RESTORE FROM TEMP ADDITIVE  
SELECT 1
```

```
ENDIF  
ENDDO
```

```
@ 23,5 SAY "CALCULATING COST FOR SBS SKYLINE."  
DO SKYLINE  
@ 23,5 SAY "CALCULATING COST FOR GTE SPRINT."  
DO SPRNTOUT  
@ 23,5 CLEAR  
@ 23,5 SAY "STORING THE RESULTS."  
DO OUTSTORE  
RETURN
```

```
SET ECHO OFF
```

TYPE \NEWNET\OUTLINES.PRG

```

RESTORE FROM TEMP
LASTBAND = 0
SELECT 4
USE NEWNET
SUM USE_DAY + USE_EVE + USE_NIGHT TO SUMEASURED
GOTO TOP
SELECT 2
SUM (USE_DAY + USE_EVE + USE_NIGHT) * QUANTITY TO SUMBILLED FOR OUT
FACTOR = SUMBILLED/SUMEASURED

```

```

SELECT 3
GOTO TOP

```

```

DO WHILE .NOT. EOF()
  NUMBER = LASTBAND + 1
  STORE 0 TO PEAKSUM, DAYSUM, EVESUM, NIGHTSUM

```

```

  DO WHILE NUMBER <= BAND
    NAME = "PEAKHR" + STR(NUMBER,1,0)
    PEAKSUM = PEAKSUM + &NAME
    NUMBER = NUMBER + 1
  ENDDO

```

```

  SELECT 4
  DO WHILE BAND <= C->BAND .AND. .NOT. EOF()
    DAYSUM = DAYSUM + USE_DAY
    EVESUM = EVESUM + USE_EVE
    NIGHTSUM = NIGHTSUM + USE_NIGHT
    SKIP
  ENDDO

```

```

  SELECT 5
  USE POISSON

```

```

  IF HIGH_P <= 9
    P = "P" + STR(HIGH_P,1,0)
  ELSE
    P = "P" + STR(HIGH_P,2,0)
  ENDIF

```

```
LOCATE FOR &P >= PEAKSUM
SELECT 3
REPLACE QUANTITY WITH E->TRUNKS
REPLACE USE_DAY WITH DAYSUM/QUANTITY * FACTOR
REPLACE USE_EVE WITH EVESUM/QUANTITY * FACTOR
REPLACE USE_NIGHT WITH NIGHTSUM/QUANTITY * FACTOR
LASTBAND = BAND
SKIP
ENDDO

SAVE TO \NEWNET\TEMP

RETURN

SET ECHO OFF
```

TYPE \NEWNET\AT&TOUT.PRG

RESTORE FROM TEMP
RESTORE FROM \TABLES\CONSTANT ADDITIVE

SELECT 6
USE \TABLES\AT&TOUT

```

SELECT 3
GOTO TOP
DO WHILE .NOT. EOF()
  SELECT 6
  LOCATE FOR BAND = C->BAND
  SELECT 3
  DO CASE
    CASE USE_DAY >= 80
      REPLACE DAY_ATT WITH (F->DAY15*15 + F->DAY25*25 + F->DAY40*40 +
        (USE_DAY-80)*F->DAY80) * QUANTITY
    CASE 40 < USE_DAY .AND. USE_DAY < 80
      REPLACE DAY_ATT WITH (F->DAY15*15 + F->DAY25*25 +
        (USE_DAY-40)*F->DAY40) * QUANTITY
    CASE 15 < USE_DAY .AND. USE_DAY <= 40
      REPLACE DAY_ATT WITH (F->DAY15*15 + (USE_DAY-15)*F->DAY25)
        * QUANTITY
    CASE USE_DAY <= 15
      REPLACE DAY_ATT WITH USE_DAY*F->DAY15 * QUANTITY
  ENDCASE

  DO CASE
    CASE USE_EVE >= 80
      REPLACE EVE_ATT WITH (F->EVE15*15 + F->EVE25*25 +
        F->EVE40*40 + (USE_EVE-80)*F->EVE80) * QUANTITY
    CASE 40 < USE_EVE .AND. USE_EVE < 80
      REPLACE EVE_ATT WITH (F->EVE15*15 + F->EVE25*25 +
        (USE_EVE-40)*F->EVE40) * QUANTITY
    CASE 15 < USE_EVE .AND. USE_EVE <= 40
      REPLACE EVE_ATT WITH (F->EVE15*15 +
        SE_EVE-15)*F->EVE25) * QUANTITY
    CASE USE_EVE <= 15
      REPLACE EVE_ATT WITH USE_EVE*F->EVE15 * QUANTITY
  ENDCASE

  REPLACE NIGHT_ATT WITH (USE_NIGHT * F->WEEKEND * QUANTITY)
  REPLACE ACCES_ATT WITH F->ACCESS * QUANTITY

```

(U

```
IF DAY_ATT + EVE_ATT + NIGHT_ATT >= QUANTITY*ATT_MIN  
  REPLACE ATT_TOTAL WITH DAY_ATT+EVE_ATT+NIGHT_ATT+ACCES_ATT  
ELSE  
  REPLACE ATT_TOTAL WITH QUANTITY*ATT_MIN + ACCES_ATT  
ENDIF
```

```
SKIP  
ENDDO
```

```
SUM ATT_TOTAL TO ATT_TOTE
```

```
IF ATT_TOTE < ATTLOWCOS  
  ATTLOWCOS = ATT_TOTE  
  SELECT 3  
  USE  
  SELECT 6  
  USE AT&TOUT  
  ZAP  
  APPEND FROM \NEWNET\RESULTS  
  SELECT 3  
  USE RESULTS  
ENDIF  
SAVE ALL EXCEPT METRO TO \NEWNET\TEMP  
RETURN
```

```
SET ECHO OFF
```

TYPE \NEWNET\MCIOUT.PRG

```

RESTORE FROM TEMP
RESTORE FROM \RESULTS\&FILENAME ADDITIVE
SELECT 3
GOTO TOP
DO WHILE .NOT. EOF()
    SELECT 6
    USE \TABLES\MCIOUT
    LOCATE FOR BAND = C->BAND
    SELECT 3
    DO CASE
        CASE USE_DAY >= 80
            REPLACE DAY_MCI WITH (F->DAY15*15 + F->DAY25*25 +
            F->DAY40*40 + (USE_DAY-80)*F->DAY80) * QUANTITY *
            METRO/100
            SELECT 6
            SKIP
            SELECT 3
            REPLACE DAY_MCI WITH (F->DAY15*15 + F->DAY25*25 +
            F->DAY40*40 + (USE_DAY-80)*F->DAY80) * QUANTITY * (1
            00-METRO)/100 + DAY_MCI
            CASE 40 < USE_DAY .AND. USE_DAY < 80
                REPLACE DAY_MCI WITH (F->DAY15*15 + F->DAY25*25 +
                (USE_DAY-40)*F->DAY40) * QUANTITY * METRO/100
                SELECT 6
                SKIP
                SELECT 3
                REPLACE DAY_MCI WITH (F->DAY15*15 + F->DAY25*25 +
                (USE_DAY-40)*F->DAY40) * QUANTITY * (100-METRO)/100 +
                DAY_MCI
                CASE 15 < USE_DAY .AND. USE_DAY <= 40
                    REPLACE DAY_MCI WITH (F->DAY15*15 + (USE_DA
                    Y-15)*F->DAY25) * QUANTITY * METRO/100
                    SELECT 6
                    SKIP
                    SELECT 3
                    REPLACE DAY_MCI WITH (F->DAY15*15 + (USE_DA
                    Y-15)*F->DAY25) * QUANTITY * (100-METRO)/100 + DAY_MCI
                    CASE USE_DAY <= 15
                        REPLACE DAY_MCI WITH USE_DAY*F->DAY15 * QUANTITY * METRO/100
                        SELECT 6
                        SKIP
                        SELECT 3
                        REPLACE DAY_MCI WITH USE_DAY*F->DAY15 * QUANTITY

```

```

* (100-METRO)/100 + DAY_MCI
ENDCASE
SELECT 6
SKIP -1
SELECT 3

DO CASE
CASE USE_EVE >= 80
REPLACE EVE_MCI WITH (F->EVE15*15 + F->EVE25*25 +
F->EVE40*40 + (USE_EVE-80)*F->EVE80) * QUANTITY * ME
TRO/100
SELECT 6
SKIP
SELECT 3
REPLACE EVE_MCI WITH (F->EVE15*15 + F->EVE25*25 +
F->EVE40*40 + (USE_EVE-80)*F->EVE80) * QUANTITY *
(100-METRO)/100 + EVE_MCI
CASE 40 < USE_EVE .AND. USE_EVE < 80
REPLACE EVE_MCI WITH (F->EVE15*15 + F->EVE25*25 +
(USE_EVE-40)*F->EVE40) * QUANTITY * METRO/100
SELECT 6
SKIP
SELECT 3
REPLACE EVE_MCI WITH (F->EVE15*15 + F->EVE25*25 +
(USE_EVE-40)*F->EVE40) * QUANTITY * (100-METRO)/100 +
EVE_MCI
CASE 15 < USE_EVE .AND. USE_EVE <= 40
REPLACE EVE_MCI WITH (F->EVE15*15 + (USE_EVE-15)*F->EVE25)
* QUANTITY * METRO/100
SELECT 6
SKIP
SELECT 3
REPLACE EVE_MCI WITH (F->EVE15*15 + (USE_EVE-15)*F->EVE25)
* QUANTITY * (100-METRO)/100 + EVE_MCI
CASE USE_EVE <= 15
REPLACE EVE_MCI WITH USE_EVE*F->EVE15 * QUANTITY * METRO/100
SELECT 6
SKIP
SELECT 3
REPLACE EVE_MCI WITH USE_EVE*F->EVE15 * QUANTITY
* (100-METRO)/100 + EVE_MCI
ENDCASE

SELECT 6
SKIP -1
SELECT 3

REPLACE NIGHT_MCI WITH (USE_NIGHT * F->WEEKEND * QUANTITY) * METRO/100
SELECT 6
SKIP
SELECT 3
REPLACE NIGHT_MCI WITH (USE_NIGHT * F->WEEKEND * QUANTITY)

```

```
* (100-METRO)/100 + NIGHT_MCI

      REPLACE ACCES_MCI WITH MCI_ACCESS * QUANTITY

      IF DAY_MCI + EVE_MCI + NIGHT_MCI >= QUANTITY*MCI_MIN
        REPLACE MCI_TOTAL WITH DAY_MCI+EVE_MCI+NIGHT_MCI+ACCES_MCI
      ELSE
        REPLACE MCI_TOTAL WITH QUANTITY*MCI_MIN + ACCES_MCI
      ENDIF

      SKIP
    ENDDO

    SUM MCI_TOTAL TO MCI_TOTE

    IF MCI_TOTE < MCILOWCOS
      MCILOWCOS = MCI_TOTE
      SELECT 3
      USE
      SELECT 6
      USE MCIDUT
      ZAP
      APPEND FROM \NEWNET\RESULTS
      SELECT 3
      USE RESULTS
    ENDIF

    SAVE TO \NEWNET\TEMP
    RETURN

    SET ECHO OFF
```

TYPE \NEWNET\SKYLINE.PRG

CLEAR ALL
 RESTORE FROM TEMP
 SELECT 2
 USE \RESULTS\&FILE
 SELECT 5
 USE POISSON
 SELECT 6
 USE SKYLINE
 SELECT 7
 USE \TABLES\SBSOUT

PEAKTOTAL = PEAKHR1 + PEAKHR2 + PEAKHR3 + PEAKHR4 + PEAKHR5 + PEAKHR6

SELECT 2
 SUM USE_DAY * QUANTITY TO DAYTOTAL FOR OUT
 SUM (USE_EVE + USE_NIGHT) * QUANTITY TO NIGHTTOTAL FOR OUT
 GOTO TOP

SELECT 5
 LOCATE FOR &P >= PEAKTOTAL

SELECT 6
 ZAP
 USEAVG = (DAYTOTAL + NIGHTTOTAL)/E->TRUNKS
 RESTORE FROM \TABLES\CONSTANT ADDITIVE

TIERNUM = 1

DO WHILE TIERNUM <= 4
 APPEND BLANK
 REPLACE SBS_LINES WITH E->TRUNKS
 REPLACE ACCES_SBS WITH SBS_ACCESS * SBS_LINES
 REPLACE TIER WITH B->TIER
 REPLACE PERCENT WITH B->PERCENT
 REPLACE SBSHRS_DAY WITH DAYTOTAL * PERCENT/100
 REPLACE SBSHRS_EVE WITH NIGHTTOTAL * PERCENT/100
 SELECT 7
 LOCATE FOR USAGE_HRS > USEAVG .OR. EOF()
 SKIP -1
 SELECT 6
 NAME = 'TIER' + STR(TIER,1,0) + '_DAY'
 REPLACE DAY_SBS WITH SBSHRS_DAY * 6->&NAME * 0.6
 NAME = 'TIER' + STR(TIER,1,0) + '_OTHR'

```
REPLACE NIGHT_SBS WITH SBSHRS_EVE * 6->&NAME * 0.6

TIERNUM = TIERNUM + 1
SELECT 2
SKIP
SELECT 6
ENDDO

SUM DAY_SBS + NIGHT_SBS TO TOTAL_SBS
GOTO TOP

IF USEAVG < SBS_HRSMIN .AND. TOTAL_SBS < SBS_MIN* SBS_LINES
  REPLACE SBS_TOTAL WITH SBS_MIN * SBS_LINES + ACCES_SBS
ELSE
  REPLACE SBS_TOTAL WITH TOTAL_SBS + ACCES_SBS

RETURN

SET ECHO OFF
```

TYPE \NEWNET\SPRNTOUT.PRG

```
RESTORE FROM TEMP
SELECT 4
USE
SELECT 1
USE SPRNTOUT ALIAS SPRNT
ZAP
APPEND FROM NEWNET
GOTO TOP
```

```
DO WHILE .NOT. EOF()
  REPLACE QUANTITY WITH E->TRUNKS
  REPLACE USE_DAY WITH USE_DAY/QUANTITY * FACTOR
  REPLACE USE_EVE WITH USE_EVE/QUANTITY * FACTOR
  REPLACE USE_NIGHT WITH USE_NIGHT/QUANTITY * FACTOR
  SKIP
ENDDO
```

```
GOTO TOP
DO WHILE .NOT. EOF()
  SELECT 6 ALIAS SPRNT
  USE \TABLES\SPRNTOUT
  LOCATE FOR BAND = A->BAND
  SELECT 1
  DO CASE
    CASE USE_DAY >= 100
      REPLACE DAY_SPNT WITH (F->DAY0_40*40 + F->DAY40_70*30 +
        F->DAY70_100*30 + (USE_DAY-100)*F->DAY100PLUS) * QUANTITY
        * METRO/100
      SELECT 6
      SKIP
      SELECT 1
      REPLACE DAY_SPNT WITH (F->DAY0_40*40 + F->DAY40_70*30 +
        F->DAY70_100*30 + (USE_DAY-100)*F->DAY100PLUS) * QUANTITY
        * (100-METRO)/100 + DAY_SPNT
    CASE 70 < USE_DAY .AND. USE_DAY < 100
      REPLACE DAY_SPNT WITH (F->DAY0_40*40 + F->DAY40_70*30 +
        (USE_DAY-70)*F->DAY70_100) * QUANTITY * METRO/100
      SELECT 6
      SKIP
      SELECT 1
      REPLACE DAY_SPNT WITH (F->DAY0_40*40 + F->DAY40_70*30 +
        (USE_DAY-70)*F->DAY70_100) * QUANTITY * (100-METRO)/100 +
        DAY_SPNT
```

```

CASE 40 < USE_DAY .AND. USE_DAY <= 70
  REPLACE DAY_SPNT WITH (F->DAY0_40*40 +          (USE
_DAY-40)*F->DAY40_70)          * QUANTITY * METRO/100
  SELECT 6
  SKIP
  SELECT 1
  REPLACE DAY_SPNT WITH (F->DAY0_40*40 +          (USE
_DAY-40)*F->DAY40_70)          * QUANTITY * (100-METRO)/100 + DAY_SP
NT

```

```

CASE USE_DAY <= 40
  REPLACE DAY_SPNT WITH USE_DAY*F->DAY0_40 * QUANTITY * METRO/100
  SELECT 6
  SKIP
  SELECT 1
  REPLACE DAY_SPNT WITH USE_DAY*F->DAY0_40 * QUANTITY
* (100-METRO)/100 + DAY_SPNT
ENDCASE
SELECT 6
SKIP -1
SELECT 1

```

DO CASE

```

CASE USE_EVE >= 100
  REPLACE EVE_SPNT WITH (F->EVE0_40*40 + F->EVE40_70*30 +
F->EVE70_100*30 + (USE_EVE-100)*F->EVE100PLUS) * QUANTITY
* METRO/100
  SELECT 6
  SKIP
  SELECT 1
  REPLACE EVE_SPNT WITH (F->EVE0_40*40 + F->EVE40_70*30 +
F->EVE70_100*30 + (USE_EVE-100)*F->EVE100PLUS) * QUANTITY
* (100-METRO)/100 + EVE_SPNT

```

```

CASE 70 < USE_EVE .AND. USE_EVE < 100
  REPLACE EVE_SPNT WITH (F->EVE0_40*40 + F->EVE40_70*30 +
(USE_EVE-70)*F->EVE70_100) * QUANTITY * METRO/100
  SELECT 6
  SKIP
  SELECT 1
  REPLACE EVE_SPNT WITH (F->EVE0_40*40 + F->EVE40_70*30 +
(USE_EVE-70)*F->EVE70_100) * QUANTITY * (100-METRO)/100 +
EVE_SPNT

```

```

CASE 40 < USE_EVE .AND. USE_EVE <= 70
  REPLACE EVE_SPNT WITH (F->EVE0_40*40 +          (USE
_EVE-40)*F->EVE40_70)          * QUANTITY * METRO/100
  SELECT 6
  SKIP
  SELECT 1
  REPLACE EVE_SPNT WITH (F->EVE0_40*40 +          (USE
_EVE-40)*F->EVE40_70) * QUANTITY * (100-METRO)/100          + EVE_SP
NT

```

```

CASE USE_EVE <= 40
  REPLACE EVE_SPNT WITH USE_EVE*F->EVE0_40 * QUANTITY * METRO/100

```

```

        SELECT 6
        SKIP
        SELECT 1
        REPLACE EVE_SPNT WITH USE_EVE * F -> EVE0_40 * QUANTITY
        * (100-METRO)/100 + EVE_SPNT
    ENDCASE

    SELECT 6
    SKIP -1
    SELECT 1

    REPLACE NIGHT_SPNT WITH (USE_NIGHT * F -> WEEKEND * QUANTITY) * METRO/100
    SELECT 6
    SKIP
    SELECT 1
    REPLACE NIGHT_SPNT WITH (USE_NIGHT * F -> WEEKEND * QUANTITY)
    * (100-METRO)/100 + NIGHT_SPNT

    SKIP
    ENDDO

    SELECT 1
    SUM DAY_SPNT + EVE_SPNT + NIGHT_SPNT TO TOTAL_SPNT
    GOTO TOP
    REPLACE ACCES_SPNT WITH SPNTACCESS * QUANTITY

    IF TOTAL_SPNT/QUANTITY < SPRNT_MIN
        REPLACE SPNT_TOTAL WITH SPRNT_MIN * QUANTITY + ACCES_SPNT
    ELSE
        REPLACE SPNT_TOTAL WITH TOTAL_SPNT + ACCES_SPNT
    ENDIF
    SAVE TO \NEWNET\TEMP
    RETURN

    SET ECHO OFF

```

TYPE \NEWNET\OUTSTORE.PR6

CLEAR ALL
RESTORE FROM TEMP
RESTORE FROM \RESULTS\&FILENAME ADDITIVE
RESTORE FROM TEMP ADDITIVE
SAVE ALL LIKE PEAKHR? TO \NEWNET\TEMP2
RELEASE ALL EXCEPT ?I*
RELEASE NIGHTSUM, LINES
RESTORE FROM TEMP2 ADDITIVE
SAVE TO \NEWNET\TEMP2
RESTORE FROM TEMP
RELEASE ALL EXCEPT MAX
RESTORE FROM TEMP2 ADDITIVE
SAVE TO \NEWNET\TEMP2
RESTORE FROM TEMP
RELEASE ALL EXCEPT METRO
RESTORE FROM TEMP2 ADDITIVE
OPTIMIZE = .T.
P_OUT = HIGH_P

IF HIGH_P < 10
 FIELDOUT = "P" + STR(HIGH_P,1,0)
ELSE
 FIELDOUT = "P" + STR(HIGH_P,2,0)
ENDIF

MAXOUT = MAX
PEAKHR1OUT = PEAKHR1
PEAKHR2OUT = PEAKHR2
PEAKHR3OUT = PEAKHR3
PEAKHR4OUT = PEAKHR4
PEAKHR5OUT = PEAKHR5
PEAKHR6OUT = PEAKHR6
RELEASE HIGH_P, FIELD, MAX
RELEASE ALL LIKE PEAKHR?
SAVE TO \RESULTS\&FILENAME

NAME = FILENAME + '.ATT'
COPY FILE AT&TOUT.DBF TO \RESULTS\&NAME
NAME = FILENAME + '.MCI'
COPY FILE MCIOUT.DBF TO \RESULTS\&NAME
NAME = FILENAME + '.SPT'
COPY FILE SPRNTOUT.DBF TO \RESULTS\&NAME

```
NAME = FILENAME + '.SBS'  
COPY FILE SKYLINE.DBF TO \RESULTS\&NAME  
NAME = FILENAME + '.NEW'  
COPY FILE NEWNET.DBF TO \RESULTS\&NAME
```

```
RETURN
```

```
SET ECHO OFF
```

TYPE \NEWNET\INWATS.PRG

```

CLEAR ALL
RESTORE FROM TEMP
RELEASE ALL EXCEPT FILE*
USE \RESULTS\&FILE
COPY TO \NEWNET\NEWNET FIELDS BAND, OUT, QUANTITY, USE_DAY,    USE_EVE, USE_MI
GHT FOR .NOT. OUT
LOCATE FOR .NOT. OUT .AND. BAND > 0

DO WHILE BAND > 0 .AND. .NOT. EOF()
    SKIP
ENDDO

SKIP -1
MAX = BAND
ROW = 5
PEAKHR1 = 0.0
PEAKHR2 = 0.0
PEAKHR3 = 0.0
PEAKHR4 = 0.0
PEAKHR5 = 0.0
PEAKHR6 = 0.0
NUMBER = 1
CLEAR
@ 2,5 SAY "ENTER TOTAL PEAK HOUR IN WATS TRAFFIC IN MINUTES FOR EACH BAND:"

DO WHILE NUMBER <= MAX
    TEMP = "PEAKHR" + STR(NUMBER,1,0)
    @ ROW,10 SAY "BAND" + STR(NUMBER,1,0) + ": " GET &TEMP PICTURE "999.9"
    NUMBER = NUMBER + 1
    ROW = ROW + 2
ENDDO

READ

USE NEWNET
ROW = 4
HIGH_P = 0
TEMP = 0
PEAKNUM = 1
LOCATE FOR BAND > TEMP

```

```
DO WHILE .NOT. OUT .AND. .NOT. EOF()
  TEMP = BAND
  PEAKTOTAL = 0
```

```
DO WHILE PEAKNUM <= TEMP
  NAMEPK = "PEAKR" + STR(PEAKNUM,1,0)
  PEAKTOTAL = PEAKTOTAL + &NAMEPK
  PEAKNUM = PEAKNUM + 1
ENDDO
```

```
SUM QUANTITY TO LINES FOR BAND = TEMP .AND. .NOT. OUT
SELECT 2
USE POISSON
LOCATE FOR TRUNKS = LINES
NUMBER = 1
FLAG = .T.
```

```
DO WHILE NUMBER <= 50 .AND. FLAG
  IF NUMBER > 9
    FIELD = "P" + STR(NUMBER,2,0)
  ELSE
    FIELD = "P" + STR(NUMBER,1,0)
  ENDIF
```

```
  IF &FIELD >= PEAKTOTAL
    FLAG = .F.
  ENDIF
```

```
  NUMBER = NUMBER + 1
ENDDO
@ ROW,40 SAY "BAND" + STR(TEMP,1,0) + " TRUNKS: " GET FIELD
```

```
IF NUMBER -1 > HIGH_P
  HIGH_P = NUMBER -1
ENDIF
```

```
ROW = ROW + 2
SELECT 1
LOCATE FOR BAND > TEMP
ENDDO
```

```
CLEAR GETS
```

```
FLAG = .T.
DO WHILE FLAG
  TEMP2 = HIGH_P
  @ 20,5 SAY "PRESS RETURN KEY TO USE DEFAULT "P" VALUE OR ENTER YOUR OWN: "
  GET HIGH_P PICTURE "99"
  READ
```

```

IF HIGH_P <= 50 .AND. HIGH_P >= 1
  FLAG = .F.
ELSE
  HIGH_P = TEMP2
  @ 22,5 SAY '"P" VALUE MUST BE 1 THRU 50. REENTER VALUE.'
ENDIF
ENDDO

WAIT

USE NEWNET
ZAP
NUMBER = 1

DO WHILE NUMBER <= MAX
  APPEND BLANK
  REPLACE BAND WITH NUMBER
  REPLACE OUT WITH .F.
  NUMBER = NUMBER + 1
ENDDO

CLEAR
GOTO TOP
@ 5,10 SAY "ENTER ACTUAL MEASURED TRAFFIC IN HOURS PER MONTH:"

DO WHILE .NOT. EOF()
  @ 11,10 SAY "BAND" + STR(BAND,1,0)
  @ 13,10 SAY "      DAY:" GET USE_DAY
  @ 15,10 SAY "      EVENING:" GET USE_EVE
  @ 17,10 SAY "NIGHT/WEEKEND:" GET USE_NIGHT
  READ
  SKIP
ENDDO

WAIT
SAVE TO \NEWNET\TEMP
DO INCPUTE
RETURN

SET ECHO OFF

```

TYPE \NEWNET\INCPUTE.PRG

RESTORE FROM TEMP
CLEAR
USE POSSIBLE

DO CASE

```

CASE MAX = 1
  LOCATE FOR ONE .AND. .NOT. TWO .AND. .NOT. THREE .AND. .NOT
. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
  @ 23,5 SAY 'TAKE A 5 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 2
  LOCATE FOR TWO .AND. .NOT. THREE .AND. .NOT. FOUR .AND. .NO
T. FIVE .AND. .NOT. SIX
  @ 23,5 SAY 'TAKE A 5 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 3
  LOCATE FOR THREE .AND. .NOT. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
  @ 23,5 SAY 'TAKE A 5 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 4
  LOCATE FOR FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
  @ 23,5 SAY 'TAKE A 10 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 5
  LOCATE FOR FIVE .AND. .NOT. SIX
  @ 23,5 SAY 'TAKE A 15 MINUTE BREAK WHILE I DO SOME WORK.'
CASE MAX = 6
  LOCATE FOR SIX
  @ 23,5 SAY 'COME BACK IN 30 MINUTES.'

```

ENDCASE

SELECT 2
USE \RESULTS\%FILE
STORE 9999999999 TO ATTLOWCOS

SELECT 3
USE RESULTS

SELECT 1
LASTCOUNT = 0

DO WHILE .NOT. EOF()

DO CASE

```

CASE MAX = 1
  LOCATE FOR ONE .AND. .NOT. TWO .AND. .NOT. THREE .AND.
.NOT. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
CASE MAX = 2

```

```

        LOCATE FOR TWO .AND. .NOT. THREE .AND. .NOT. FOUR .AND.
.NOT. FIVE .AND. .NOT. SIX
        CASE MAX = 3
        LOCATE FOR THREE .AND. .NOT. FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
        CASE MAX = 4
        LOCATE FOR FOUR .AND. .NOT. FIVE .AND. .NOT. SIX
        CASE MAX = 5
        LOCATE FOR FIVE .AND. .NOT. SIX
        CASE MAX = 6
        LOCATE FOR SIX
    ENDCASE

    COUNTER = 0
    DO WHILE COUNTER < LASTCOUNT .AND. .NOT. EOF()
        CONTINUE
        COUNTER = COUNTER + 1
    ENDDO

    LASTCOUNT = LASTCOUNT + 1

    @ 23,5 SAY "CALCULATING AT&T COST FOR CONFIGURATION " +      STR(LASTCOU
NT,2,0) + "."

    IF .NOT. EOF()
        SELECT 3
        ZAP

        IF A->ONE
            APPEND BLANK
            REPLACE BAND WITH 1
        ENDIF

        IF A->TWO
            APPEND BLANK
            REPLACE BAND WITH 2
        ENDIF

        IF A->THREE
            APPEND BLANK
            REPLACE BAND WITH 3
        ENDIF

        IF A->FOUR
            APPEND BLANK
            REPLACE BAND WITH 4
        ENDIF

        IF A->FIVE
            APPEND BLANK
            REPLACE BAND WITH 5
        ENDIF

```

```
IF A->SIX  
  APPEND BLANK  
  REPLACE BAND WITH 6  
ENDIF  
SAVE TO \NEWNET\TEMP
```

```
DO INLINES
```

```
SELECT 3  
DO AT&TIN  
RESTORE FROM TEMP ADDITIVE  
SELECT 1
```

```
ENDIF  
ENDDO
```

```
@ 23,5 SAY "STORING THE RESULTS."  
DO INSTORE  
RETURN
```

```
SET ECHO OFF
```

```
TYPE \NEWNET\INLINES.PRG
```

```
RESTORE FROM TEMP
LASTBAND = 0
SELECT 4
USE NEWNET
SUM USE_DAY + USE_EVE + USE_NIGHT TO SUMEASURED
GOTO TOP
SELECT 2
SUM (USE_DAY + USE_EVE + USE_NIGHT) * QUANTITY TO SUMBILLED FOR .NOT. OUT
FACTOR = SUMBILLED/SUMEASURED
```

```
SELECT 3
GOTO TOP
```

```
DO WHILE .NOT. EOF()
  NUMBER = LASTBAND + 1
  STORE 0 TO PEAKSUM, DAYSUM, EVESUM, NIGHTSUM
```

```
  DO WHILE NUMBER <= BAND
    NAME = "PEAKHR" + STR(NUMBER,1,0)
    PEAKSUM = PEAKSUM + &NAME
    NUMBER = NUMBER + 1
  ENDDO
```

```
  SELECT 4
  DO WHILE BAND <= C->BAND .AND. .NOT. EOF()
    DAYSUM = DAYSUM + USE_DAY
    EVESUM = EVESUM + USE_EVE
    NIGHTSUM = NIGHTSUM + USE_NIGHT
  SKIP
  ENDDO
```

```
  SELECT 5
  USE POISSON
```

```
  IF HIGH_P <= 9
    P = "P" + STR(HIGH_P,1,0)
  ELSE
    P = "P" + STR(HIGH_P,2,0)
  ENDIF
```

```
LOCATE FOR &P >= PEAKSUM
SELECT 3
REPLACE QUANTITY WITH E->TRUNKS
REPLACE USE_DAY WITH DAYSUM/QUANTITY * FACTOR
REPLACE USE_EVE WITH EVESUM/QUANTITY * FACTOR
REPLACE USE_NIGHT WITH NIGHTSUM/QUANTITY * FACTOR
LASTBAND = BAND
SKIP
ENDDO

SAVE TO \NEWNET\TEMP

RETURN

SET ECHO OFF
```

TYPE \NEWNET\AT&TIN.PRG

RESTORE FROM TEMP
RESTORE FROM \TABLES\CONSTANT ADDITIVE

SELECT 6
USE \TABLES\AT&TIN

SELECT 3
GOTO TOP
DO WHILE .NOT. EOF()
 SELECT 6
 LOCATE FOR BAND = C->BAND
 SELECT 3
 DO CASE
 CASE USE_DAY >= 80
 REPLACE DAY_ATT WITH (F->DAY15*15 + F->DAY25*25 + F->DAY40*40 +
 (USE_DAY-80)*F->DAY80) * QUANTITY
 CASE 40 < USE_DAY .AND. USE_DAY < 80
 REPLACE DAY_ATT WITH (F->DAY15*15 + F->DAY25*25 +
 (USE_DAY-40)*F->DAY40) * QUANTITY
 CASE 15 < USE_DAY .AND. USE_DAY <= 40
 REPLACE DAY_ATT WITH (F->DAY15*15 + (USE_DAY-15)*F->DAY25)
 * QUANTITY
 CASE USE_DAY <= 15
 REPLACE DAY_ATT WITH USE_DAY*F->DAY15 * QUANTITY
 ENDCASE

DO CASE
 CASE USE_EVE >= 80
 REPLACE EVE_ATT WITH (F->EVE15*15 + F->EVE25*25 +
 F->EVE40*40 + (USE_EVE-80)*F->EVE80) * QUANTITY
 CASE 40 < USE_EVE .AND. USE_EVE < 80
 REPLACE EVE_ATT WITH (F->EVE15*15 + F->EVE25*25 +
 (USE_EVE-40)*F->EVE40) * QUANTITY
 CASE 15 < USE_EVE .AND. USE_EVE <= 40
 REPLACE EVE_ATT WITH (F->EVE15*15 +
SE_EVE-15)*F->EVE25) * QUANTITY (U
 CASE USE_EVE <= 15
 REPLACE EVE_ATT WITH USE_EVE*F->EVE15 * QUANTITY
 ENDCASE

REPLACE NIGHT_ATT WITH (USE_NIGHT * F->WEEKEND * QUANTITY)
REPLACE ACCES_ATT WITH F->ACCESS * QUANTITY

```
IF DAY_ATT + EVE_ATT + NIGHT_ATT >= QUANTITY*ATT_MININ
  REPLACE ATT_TOTAL WITH DAY_ATT+EVE_ATT+NIGHT_ATT+ACCES_ATT
ELSE
  REPLACE ATT_TOTAL WITH QUANTITY*ATT_MININ + ACCES_ATT
ENDIF

SKIP
ENDDO

SUM ATT_TOTAL TO ATT_TOTE

IF ATT_TOTE < ATTLOWCOS
  ATTLOWCOS = ATT_TOTE
  SELECT 3
  USE
  SELECT 6
  USE AT&TIN
  ZAP
  APPEND FROM \NEWNET\RESULTS
  SELECT 3
  USE RESULTS
ENDIF
SAVE ALL EXCEPT METRO TO \NEWNET\TEMP
RETURN

SET ECHO OFF
```

TYPE \NEWNET\INSTORE.PRG

CLEAR ALL
RESTORE FROM TEMP
RESTORE FROM \RESULTS\&FILENAME ADDITIVE
RESTORE FROM TEMP ADDITIVE
SAVE ALL LIKE PEAKHR? TO \NEWNET\TEMP2
RESTORE FROM TEMP
RELEASE ALL EXCEPT ?!*
RELEASE NIGHTSUM, LINES
RESTORE FROM TEMP2 ADDITIVE
SAVE TO \NEWNET\TEMP2
RESTORE FROM TEMP
RELEASE ALL EXCEPT MAX
RESTORE FROM TEMP2 ADDITIVE
OPTIMIZE = .T.
P_IN = HIGH_P

IF HIGH_P < 10
FIELDIN = "P" + STR(HIGH_P,1,0)
ELSE
FIELDIN = "P" + STR(HIGH_P,2,0)
ENDIF

MAXIN = MAX
PEAKHR1IN = PEAKHR1
PEAKHR2IN = PEAKHR2
PEAKHR3IN = PEAKHR3
PEAKHR4IN = PEAKHR4
PEAKHR5IN = PEAKHR5
PEAKHR6IN = PEAKHR6
RELEASE HIGH_P, FIELD, MAX
RELEASE ALL LIKE PEAKHR?
SAVE TO \NEWNET\TEMP2
RESTORE FROM TEMP2
RESTORE FROM \RESULTS\&FILENAME
RESTORE FROM TEMP2 ADDITIVE
SAVE TO \RESULTS\&FILENAME

NAME = FILENAME + '.TIN'
COPY FILE AT&TIN.DBF TO \RESULTS\NAME
NAME = FILENAME + '.NEW'
USE \RESULTS\&FILENAME

IF OUT

```
      USE \RESULTS\&NAME  
      APPEND FROM NENNET  
ELSE  
      USE NENNET  
      COPY TO \RESULTS\&NAME  
ENDIF  
  
RETURN  
  
SET ECHO OFF
```

TYPE \MENNET\OUTPUT.PR6

DO WHILE .T.

CLEAR

STORE " " TO CHOICE

@ 8,25 SAY "-1- DISPLAY RESULTS ON SCREEN."

@ 10,25 SAY "-2- PRINT OUT THE RESULTS."

@ 13,25 SAY "-0- FINISHED."

@ 17,25 SAY "CHOOSE ONE:" GET CHOICE PICTURE "9"

READ

DO CASE

CASE CHOICE = "1"

RESTORE FROM TEMP

DO DISPLAY

CASE CHOICE = "2"

RESTORE FROM TEMP

DO PRINT

CASE CHOICE = "0"

RETURN

ENDCASE

ENDDO

SET ECHO OFF

TYPE \NEWNET\DISPLAY.PRG

CLEAR
TEXT

OPTIMIZED RESULTS

A report summary will be displayed for each carrier.
The display will wait between reports. Press <Ctrl><S>
to stop the scrolling. Press <Ctrl><S> again to resume.

ENDTEXT
WAIT
CLEAR
USE \RESULTS\&FILENAME
RESTORE FROM \RESULTS\&FILENAME

IF OUT
DO DISPATT
DO DISPMCI
DO DISPPNT
DO DISPSBS
DO DISPOUT
ENDIF

USE \RESULTS\&FILENAME
LOCATE FOR .NOT. OUT

IF BAND > 0
CLEAR
DO DISPTIN
DO DISPIN
ENDIF

RETURN

SET ECHO OFF

```
TYPE \NEWNET\DISPATT.PR6
```

```
CLEAR
```

```
NAME = FILENAME + ".ATT"
```

```
USE \RESULTS\&NAME
```

```
RESTORE FROM \TABLES\CONSTANT ADDITIVE
```

```
SUM QUANTITY TO NUMLINES
```

```
SELECT 2
```

```
USE \TABLES\AT&TOUT
```

```
IF NUMLINES = 0
```

```
    CONECTOTAL = 0
```

```
ELSE
```

```
    CONECTOTAL = CONNECT1 + (NUMLINES-1)*CONNECT2
```

```
ENDIF
```

```
SELECT 1
```

```
LINE1 = "    Access charge is $" + STR(B->ACCESS,6,2) + " per line."
```

```
LINE2 = "    Connection charge is $" + STR(B->CONNECT1,6,2) + " for the first  
line and "
```

```
LINE3 = "    $" + STR(B->CONNECT2,6,2) + " for each successive line."
```

```
LINE4 = "    Total connection charge for this configuration is $" + STR(CONECT  
OTAL,7,2) + "."
```

```
LINES = "    Minimum usage charge is $" + STR(ATT_MIN,6,2) + " per line exclus  
ive of access charges."
```

```
REPORT FORM \NOWNET\AT&TOUT HEADING "OPTIMIZED CONFIGURATION: " + FIELDOUT
```

```
WAIT
```

```
?
```

```
?
```

```
?
```

```
? LINE1
```

```
? LINE2
```

```
? LINE3
```

```
? LINE4
```

```
IF ATT_MIN > 0
```

```
    ? LINES
```

```
ELSE
```

```
ENDIF
```

```
WAIT
```

```
RETURN
```

```

TYPE \NEWNET\DISPMCI.PRG
CLEAR
NAME = FILENAME + ".MCI"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
SUM QUANTITY TO NUMLINES
IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = MCICONNECT * NUMLINES
ENDIF

LINE1 = "    Access charge is $" + STR(MCI_ACCESS,6,2) + " per line."
LINE2 = "    Connection charge is $" + STR(MCICONNECT,6,2) + " per line."
LINE3 = "    Total connection charge for this configuration is $" + STR(CONECTOTAL,7,2) + "."
LINE4 = "    Minimum usage charge is $" + STR(MCI_MIN,6,2) + " per line exclusive of access charges."

REPORT FORM \NOWNET\MCIOUT HEADING "          OPTIMIZED CONFIGURATION: "
+ FIELDOUT + "          " + "(" + STR(METRO,3,0) + "% ON-NET/" +
  STR(100-METRO,3,0) + "% OFF-NET" + ")"
WAIT
?
?
?
? LINE1
? LINE2
? LINE3
IF MCI_MIN > 0
    ? LINE4
ELSE
ENDIF
WAIT

RETURN

SET ECHO OFF

```

TYPE \NEWNET\DISPSPNT.PR6

```

CLEAR
NAME = FILENAME + ".SPT"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
IF QUANTITY = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = SPNTCONECT * QUANTITY
ENDIF

LINE1 = "    Access charge is $" + STR(SPNTACCESS,6,2) + " per line."
LINE2 = "    Total monthly access charge for this configuration is $" + STR(
R(SPNTACCESS * QUANTITY,7,2) + ".")
LINE3 = "    Connection charge is $" + STR(SPNTCONECT,6,2) + " per line."
LINE4 = "    Total connection charge for this configuration is $" + STR(CO
NECTOTAL,7,2) + ".")
LINE5 = "    Minimum usage charge is $" + STR(SPRNT_MIN,6,2) + " per line
exclusive of access charges."
LINE6 = "    Total monthly cost for this configuration is $" + STR(SPNT_TOTAL,
12,2) + ".")

REPORT FORM SPRNTOUT HEADING "          OPTIMIZED CONFIGURATION: " + FIELD
OUT + "          " + "(" + STR(METRO,3,0) + "% ON-NET/" + STR(100-METRO,3
,0) + "% OFF-NET" + ")"
WAIT
?
?
?
? LINE1
? LINE2
?
? LINE3
? LINE4
?
IF SPRNT_MIN > 0
    ? LINE5
    ?
ELSE
ENDIF
? LINE6
?
WAIT
RETURN

```

TYPE \NEWNET\DISPSBS.PRG

```

CLEAR
NAME = FILENAME + ".SBS"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
LINE1 = "    Access charge is $" + STR(SBS_ACCESS,6,2) + " per line."
LINE2 = "    Total monthly access charge for this configuration is $" + STR(AC
CES_SBS,7,2) + "."
LINE3 = "    Minimum usage charge is $" + STR(SBS_MIN,6,2) + "    if average
use is less than " + STR(SBS_HRSMIN,3,0) + " hours/line."
LINE4 = "    Total monthly cost for this configuration is $" + STR(SBS_TOT
AL,11,2) + "."
LINE5 = "    Connection charges per line are based on the distance between you
r"
LINE6 = "    exchange carrier wire center and the SBS Skyline WATS access poin
t."
REPORT FORM \NEWNET\SBSOUT HEADING "OPTIMIZED CONFIGURATION: " + FIELDOUT
WAIT
?
?
?
? LINE1
? LINE2
IF SBS_MIN > 0
?
? LINE3
ELSE
ENDIF
? LINE4
?
? LINE5
? LINE6
USE \TABLES\SBSCONEC
SET MARGIN TO 30
?
?
?
DISPLAY OFF ALL
?
SET MARGIN TO 0
WAIT

RETURN

```

TYPE \NEWNET\DISPOUT.PRG

CLEAR

NAME = FILENAME + ".NEW"

USE \RESULTS\&NAME

LINE0 = 'OUT WATS	OUT WATS'
LINE1 = 'BUSY HOUR TRAFFIC	MONTHLY TRAFFIC'
LINE2 = '(Minutes)	(Hours)'
LINE3 = 'DAY EVENING NIGHT/WEEKE	
ND'	
NUMBER = 1	

DO WHILE NUMBER <= MAXOUT

PEAKNAME = 'PEAKHR' + STR(BAND,1,0) + 'OUT'

LINENAME = 'LINE' + STR(BAND + 3,1,0)

&LINENAME = 'BAND' + STR(BAND,1,0) + 'STR(&PEAKNAME
,6,1) + 'STR(USE_DAY,6,2) + 'STR(USE_EVE,6,2
) + 'STR(USE_NIGHT,6,2)

SKIP

NUMBER = NUMBER + 1

ENDDO

GOTO TOP

?

?

? LINE0

? LINE1

? LINE2

? LINE3

?

NUMBER = 1

DO WHILE NUMBER <= MAXOUT

LINENAME = 'LINE' + STR(BAND + 3,1,0)

? &LINENAME

SKIP

NUMBER = NUMBER + 1

ENDDO

WAIT

RETURN

```
TYPE \NOWNET\DISPTIN.PRG
```

```
CLEAR
NAME = FILENAME + ".TIN"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
SUM QUANTITY TO NUMLINES
SELECT 2
USE \TABLES\AT&TIN

IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = CONNECT1 + (NUMLINES) *CONNECT2
ENDIF
```

```
SELECT 1
LINE1 = "    Access charge is $" + STR(B->ACCESS,6,2) + " per line."
LINE2 = "    Connection charge is $" + STR(B->CONNECT1,6,2) + " for the first
line and "
LINE3 = "    $" + STR(B->CONNECT2,6,2) + " for each successive line."
LINE4 = "    Total connection charge for this configuration is $" + STR(CONEC
TOTAL,7,2) + "."
LINE5 = "    Minimum usage charge is $" + STR(ATT_MININ,6,2) + " per line excl
usive of access charges."
```

```
REPORT FORM \NOWNET\AT&TIN HEADING "OPTIMIZED CONFIGURATION: " + FIELDIN
WAIT
?
?
?
? LINE1
? LINE2
? LINE3
? LINE4
```

```
IF ATT_MININ > 0
    ? LINE5
ELSE
ENDIF
WAIT
```

```
RETURN
```

TYPE \NEWNET\DISPIN.PRG

```

CLEAR
NAME = FILENAME + ".NEW"
USE \RESULTS\&NAME
LINE0 = '                IN WATS                IN WATS'
LINE1 = '                BUSY HOUR TRAFFIC        MONTHLY TRAFFIC'
LINE2 = '                (Minutes)              (Hours)'
LINE3 = '                DAY          EVENING    NIGHT/WEEKE
ND'
NUMBER = 1
LOCATE FOR .NOT. OUT

DO WHILE NUMBER <= MAXIN
    PEAKNAME = 'PEAKHR' + STR(BAND,1,0) + 'IN'
    LINENAME = 'LINE' + STR(BAND + 3,1,0)
    &LINENAME = '    BAND ' + STR(BAND,1,0) + '    ' + STR(&PEAKNAME
,6,1) + '    ' + STR(USE_DAY,6,2) + '    ' + STR(USE_EVE,6,2
) + '    ' + STR(USE_NIGHT,6,2)

    SKIP
    NUMBER = NUMBER + 1
ENDDO

LOCATE FOR .NOT. OUT

?
?
? LINE0
? LINE1
? LINE2
? LINE3
?

NUMBER = 1

DO WHILE NUMBER <= MAXIN
    LINENAME = 'LINE' + STR(BAND + 3,1,0)
    ? &LINENAME
    SKIP
    NUMBER = NUMBER + 1
ENDDO

WAIT
RETURN

```

TYPE \NEWNET\PRINT.PRG

CLEAR
TEXT

OPTIMIZED RESULTS

Align Paper and Turn on Printer

ENDTEXT
WAIT
CLEAR
USE \RESULTS\&FILENAME
RESTORE FROM \RESULTS\&FILENAME

IF OUT
DO PRNTATT
DO PRNTHCI
DO PRNTSPNT
DO PRNTSBS
DO PRNTOUT
ENDIF

USE \RESULTS\&FILENAME
LOCATE FOR .NOT. OUT

IF BAND > 0
CLEAR
DO PRNTTIN
DO PRNTIN
ENDIF

RETURN

SET ECHO OFF

TYPE \NOWNET\PRINTATT.PR6

```

CLEAR
NAME = FILENAME + ".ATT"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
SUM QUANTITY TO NUMLINES
SELECT 2
USE \TABLES\AT&TOUT

IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = CONNECT1 + (NUMLINES-1)*CONNECT2
ENDIF

SELECT 1
LINE1 = "    Access charge is $" + STR(B->ACCESS,6,2) + " per line."
LINE2 = "    Connection charge is $" + STR(B->CONNECT1,6,2) + " for the first
line and "
LINE3 = "    $" + STR(B->CONNECT2,6,2) + " for each successive line."
LINE4 = "    Total connection charge for this configuration is $" + STR(CONECT
OTAL,7,2) + "."
LINE5 = "    Minimum usage charge is $" + STR(ATT_MIN,6,2) + " per line exclus
ive of access charges."

REPORT FORM \NOWNET\AT&TOUT HEADING "OPTIMIZED CONFIGURATION: " + FIELDOUT
NOJECT TO PRINT
SET PRINT ON
?
?
?
? LINE1
?
? LINE2
? LINE3
?
? LINE4
IF ATT_MIN > 0
    ? LINE5
ELSE
ENDIF
?
SET PRINT OFF
RETURN

```

```
TYPE \NEWNET\PRNTMCI.PRG
```

```
CLEAR
NAME = FILENAME + ".MCI"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
SUM QUANTITY TO NUMLINES
IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = MCICONNECT * NUMLINES
ENDIF
```

```
LINE1 = "    Access charge is $" + STR(MCI_ACCESS,6,2) + " per line."
LINE2 = "    Connection charge is $" + STR(MCICONNECT,6,2) + " per line."
LINE3 = "    Total connection charge for this configuration is $" + STR(CO
NECTOTAL,7,2) + "."
LINE4 = "    Minimum usage charge is $" + STR(MCI_MIN,6,2) + " per line e
xclusive of access charges."
```

```
REPORT FORM \NEWNET\MCIOUT HEADING "          OPTIMIZED CONFIGURATION: "
+ FIELDOUT + "          " + "(" + STR(METRO,3,0) + "% ON-NET/" +
STR(100-METRO,3,0) + "% OFF-NET" + ")" TO PRINT
```

```
SET PRINT ON
```

```
?
```

```
?
```

```
?
```

```
? LINE1
```

```
?
```

```
? LINE2
```

```
?
```

```
? LINE3
```

```
?
```

```
IF MCI_MIN > 0
```

```
    ? LINE4
```

```
ELSE
```

```
ENDIF
```

```
?
```

```
SET PRINT OFF
```

```
RETURN
```

```
SET ECHO OFF
```

TYPE \NEWNET\PRINTSPNT.PR6

CLEAR

NAME = FILENAME + ".SPT"

USE \RESULTS\&NAME

RESTORE FROM \TABLES\CONSTANT ADDITIVE

IF QUANTITY = 0

CONECTOTAL = 0

ELSE

CONECTOTAL = SPNTCONNECT * QUANTITY

ENDIF

LINE1 = " Access charge is \$" + STR(SPNTACCESS,6,2) + " per line."

LINE2 = " Total monthly access charge for this configuration is \$" + STR(SPNTACCESS * QUANTITY,7,2) + "."

LINE3 = " Connection charge is \$" + STR(SPNTCONNECT,6,2) + " per line."

LINE4 = " Total connection charge for this configuration is \$" + STR(CONNECTOTAL,7,2) + "."

LINE5 = " Minimum usage charge is \$" + STR(SPRNT_MIN,6,2) + " per line exclusive of access charges."

LINE6 = " Total monthly cost for this configuration is \$" + STR(SPNT_TOTAL,12,2) + "."

REPORT FORM SPNTOUT HEADING " OPTIMIZED CONFIGURATION: " + FIELD
OUT + " " + "(" + STR(METRO,3,0) + "% ON-NET/" + STR(100-METRO,3,0) + "% OFF-NET" + ")" TO PRINT

SET PRINT ON

?

?

?

? LINE1

? LINE2

?

? LINE3

? LINE4

?

IF SPRNT_MIN > 0

? LINE5

?

ELSE

ENDIF

? LINE6

?

SET PRINT OFF

RETURN

TYPE \NEWNET\PRINTSBS.PR6

```

CLEAR
NAME = FILENAME + ".SBS"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
LINE1 = "    Access charge is $" + STR(SBS_ACCESS,6,2) + " per line."
LINE2 = "    Total monthly access charge for this configuration is $" + STR(AC
CES_SBS,7,2) + "."
LINE3 = "    Minimum usage charge is $" + STR(SBS_MIN,6,2) + " if average
    use is less than " + STR(SBS_HRSMIN,3,0) + " hours/line."
LINE4 = "    Total monthly cost for this configuration is $" + STR(SBS_TOT
AL,11,2) + "."
LINE5 = "    Connection charges per line are based on the distance between you
r"
LINE6 = "    exchange carrier wire center and the SBS Skyline WATS access poin
t."
REPORT FORM \NEWNET\SBSOUT HEADING "OPTIMIZED CONFIGURATION: " + FIELDOUT    T
D PRINT
SET PRINT ON
?
?
?
? LINE1
? LINE2
IF SBS_MIN > 0
    ?
    ? LINE3
ELSE
ENDIF
? LINE4
?
? LINE5
? LINE6
USE \TABLES\SBSCONEC
SET MARGIN TO 30
?
?
?
DISPLAY OFF ALL
?
SET MARGIN TO 0
SET PRINT OFF

RETURN

```

TYPE \NEWNET\PRNTOUT.PRG

```

CLEAR
NAME = FILENAME + ".NEW"
USE \RESULTS\&NAME
LINE0 = '          OUT WATS          OUT WATS'
LINE1 = '          BUSY HOUR TRAFFIC    MONTHLY TRAFFIC'
LINE2 = '          (Minutes)          (Hours)'
LINE3 = '          DAY          EVENING    NIGHT/WEEKE
ND'
NUMBER = 1

DO WHILE NUMBER <= MAXOUT
    PEAKNAME = 'PEAKHR' + STR(BAND,1,0) + 'OUT'
    LINENAME = 'LINE' + STR(BAND + 3,1,0)
    &LINENAME = '    BAND ' + STR(BAND,1,0) + '    ' + STR(&PEAKNAME
,6,1) + '    ' + STR(USE_DAY,6,2) + '    ' + STR(USE_EVE,6,2
) + '    ' + STR(USE_NIGHT,6,2)

    SKIP
    NUMBER = NUMBER + 1
ENDDO

GOTO TOP

SET PRINT ON
?
?
? LINE0
? LINE1
? LINE2
? LINE3
?

NUMBER = 1

DO WHILE NUMBER <= MAXOUT
    LINENAME = 'LINE' + STR(BAND + 3,1,0)
    ? &LINENAME
    SKIP
    NUMBER = NUMBER + 1
ENDDO
?
SET PRINT OFF
RETURN

```

TYPE \NEWNET\PRNTTIN.PRG

```

CLEAR
NAME = FILENAME + ".TIN"
USE \RESULTS\&NAME
RESTORE FROM \TABLES\CONSTANT ADDITIVE
SUM QUANTITY TO NUMLINES
SELECT 2
USE \TABLES\AT&TIN

IF NUMLINES = 0
    CONECTOTAL = 0
ELSE
    CONECTOTAL = CONNECT1 + (NUMLINES) *CONNECT2
ENDIF

SELECT 1
LINE1 = "    Access charge is $" + STR(B->ACCESS,6,2) + " per line."
LINE2 = "    Connection charge is $" + STR(B->CONNECT1,6,2) + " for the first
line and "
LINE3 = "    $" + STR(B->CONNECT2,6,2) + " for each successive line."
LINE4 = "    Total connection charge for this configuration is $" + STR(CONEC
TOTAL,7,2) + "."
LINE5 = "    Minimum usage charge is $" + STR(ATT_MININ,6,2) + " per line excl
usive of access charges."

REPORT FORM \NEWNET\AT&TIN HEADING "OPTIMIZED CONFIGURATION: " + FIELDIN    TO
PRINT
SET PRINT ON
?
?
?
? LINE1
?
? LINE2
? LINE3
?
? LINE4
IF ATT_MININ > 0
    ? LINE5
ELSE
ENDIF
?
SET PRINT OFF
RETURN

```

TYPE \NEWNET\PRNTIN.PR6

```

CLEAR
NAME = FILENAME + ".NEW"
USE \RESULTS\&NAME
LINE0 = '                IN WATS                IN WATS'
LINE1 = '                BUSY HOUR TRAFFIC        MONTHLY TRAFFIC'
LINE2 = '                (Minutes)              (Hours)'
LINE3 = '                DAY          EVENING    NIGHT/WEEKE
ND'
NUMBER = 1
LOCATE FOR .NOT. OUT

DO WHILE NUMBER <= MAXIN
    PEAKNAME = 'PEAKHR' + STR(BAND,1,0) + 'IN'
    LINENAME = 'LINE' + STR(BAND + 3,1,0)
    &LINENAME = '    BAND ' + STR(BAND,1,0) + '    ' + STR(&PEAKNAME
,6,1) + '    ' + STR(USE_DAY,6,2) + '    ' + STR(USE_EVE,6,2
) + '    ' + STR(USE_NIGHT,6,2)
    SKIP
    NUMBER = NUMBER + 1
ENDDO

LOCATE FOR .NOT. OUT
SET PRINT ON
?
?
? LINE0
? LINE1
? LINE2
? LINE3
?

NUMBER = 1

DO WHILE NUMBER <= MAXIN
    LINENAME = 'LINE' + STR(BAND + 3,1,0)
    ? &LINENAME
    SKIP
    NUMBER = NUMBER + 1
ENDDO

?
SET PRINT OFF
RETURN

```

TYPE \TABLES\TABLES.PR6

CLEAR ALL
CLEAR
TEXT

LOAD NEW CARRIER RATE TABLES

This option will load new carrier rate tables onto the OPTICOM program as well as any new parameters such as access charges, connection charges, minimum amount billed, etc. WARNING! OLD TABLES AND PARAMETERS WILL BE ERASED. IF YOU DESIRE TO SAVE THE OLD TABLES OR RUN DATA USING THE OLD TABLES, BE SURE TO MAKE A COPY OF THIS DISK BEFORE PROCEEDING.

ENDTEXT

CHOICE = "N"

DO WHILE .T.

 @ 20,10 SAY "DO YOU WISH TO CONTINUE WITH THIS OPTION (Y/N)?"

SET CH

 OICE PICTURE "!"

 READ

 DO CASE

 CASE CHOICE = "Y"

 DO LOAD

 RETURN

 CASE CHOICE = "N"

 RETURN

 ENDCASE

ENDDO

SET ECHO OFF

TYPE \TABLES\LOAD.PRG

```

CLEAR ALL
CLEAR
OPTICOMFIL = " "
DBASEFIL = " "
DO WHILE .NOT. ((DBASEFIL >= "C" .AND. DBASEFIL <= "D" .AND. OPTICOMFIL >=
"A" .AND. OPTICOMFIL <= "D") .OR. (DBASEFIL = "A" .AND. OPTICOMFIL >= "B" .
AND. OPTICOMFIL <= "D"))

    OPTICOMFIL = " "
    DBASEFIL = " "
    @ 8,10 SAY "WHICH DRIVE IS OPTICOM PROGRAM ON (A/B/C/D)?" GET OPTIC
ONFIL PICTURE "!"
    @ 10,10 SAY "WHICH DRIVE IS DBASE III ON (A/B/C/D)?" GET DBASEFIL P
ICTURE "!"
    READ
ENDDO

@ 15,10 SAY "INSERT FLOPPY WITH UPDATED TABLES IN DRIVE B."
WAIT

DO CASE
CASE OPTICOMFIL = "C"
    ! COPY B:\TABLES\*.DBF C:\TABLES\*.DBF
    ! COPY B:\TABLES\*.MEM C:\TABLES\*.MEM
    RETURN
CASE OPTICOMFIL = "D"
    ! COPY B:\TABLES\*.DBF D:\TABLES\*.DBF
    ! COPY B:\TABLES\*.MEM D:\TABLES\*.MEM
    RETURN
CASE DBASEFIL = "A"
    ! MD A:\TABLES
    ! COPY B:\TABLES\*.DBF A:\TABLES\*.DBF
    ! COPY B:\TABLES\*.MEM A:\TABLES\*.MEM
CASE DBASEFIL = "C"
    ! MD C:\TABLES
    ! COPY B:\TABLES\*.DBF C:\TABLES\*.DBF
    ! COPY B:\TABLES\*.MEM C:\TABLES\*.MEM
CASE DBASEFIL = "D"
    ! MD D:\TABLES
    ! COPY B:\TABLES\*.DBF D:\TABLES\*.DBF
    ! COPY B:\TABLES\*.MEM D:\TABLES\*.MEM
ENDCASE

```

```
CLEAR
@ 15,10 SAY "INSERT FLOPPY WITH OPTICOM PROGRAM IN DRIVE B."
WAIT
```

```
DO CASE
  CASE DBASEFIL = "A"
    ! COPY A:\TABLES\*.DBF B:\TABLES\*.DBF
    ! COPY A:\TABLES\*.MEM B:\TABLES\*.MEM
    ! ERASE A:\TABLES\*.*
    ! RD A:\TABLES
  CASE DBASEFIL = "C"
    ! COPY C:\TABLES\*.DBF B:\TABLES\*.DBF
    ! COPY C:\TABLES\*.MEM B:\TABLES\*.MEM
    ! ERASE C:\TABLES\*.*
    ! RD C:\TABLES
  CASE DBASEFIL = "D"
    ! COPY D:\TABLES\*.DBF B:\TABLES\*.DBF
    ! COPY D:\TABLES\*.MEM B:\TABLES\*.MEM
    ! ERASE D:\TABLES\*.*
    ! RD D:\TABLES
```

```
ENDCASE
```

```
RETURN
```

```
SET ECHO OFF
```

TYPE \RESULTS\RESULTS.PR6

```

CLEAR ALL
CLEAR
@ 5,10 SAY "EXISTING RESULT FILES ARE:"
?
?
DIR \RESULTS\*.DBF
?
?
STORE "N" TO CHOICE
STORE " " TO FILENAME
DO WHILE .T.
    @ 24,0 SAY "DO YOU WISH TO SEE ANY OF THESE FILES (Y/N)?" GET CHOICE PICTUR
E "!"
    READ
    DO CASE
        CASE CHOICE = "Y"
            SET SAFETY OFF
            @ 24,50 SAY "CHOOSE ONE:" GET FILENAME PICTURE "!!!!!!!"
            READ

            IF FILENAME = " "
                RETURN
            ENDIF

            FILENAME = TRIM(FILENAME)
            SAVE TO \RESULTS\TEMP
            DO OUTPUT
            SET SAFETY ON
            RETURN
        CASE CHOICE = "N"
            RETURN
    ENDCASE
ENDDO

SET ECHO OFF

```

TYPE \RESULTS\OUTPUT.PR6

```
CLEAR
FILENAME = TRIM(FILENAME)
USE &FILENAME
COPY TO \NOWNET\RESULTS
RESTORE FROM \RESULTS\&FILENAME
RELEASE ALL EXCEPT METRO
SAVE TO \RESULTS\METRO
RESTORE FROM \TABLES\CONSTANT
RESTORE FROM METRO ADDITIVE
SAVE TO \TABLES\CONSTANT
DO WHILE .T.
    CLEAR
    STORE " " TO CHOICE
    @ 8,25 SAY "-1- DISPLAY RESULTS ON SCREEN."
    @ 10,25 SAY "-2- PRINT OUT THE RESULTS."
    @ 13,25 SAY "-0- FINISHED."
    @ 17,25 SAY "CHOOSE ONE:" GET CHOICE PICTURE "9"
    READ

    DO CASE
        CASE CHOICE = "1"
            DO DISPLAY
        CASE CHOICE = "2"
            DO PRINT
        CASE CHOICE = "0"
            RETURN
    ENDCASE

ENDDO

SET ECHO OFF
```

TYPE \RESULTS\DISPLAY.PRG

CLEAR
SET PATH TO B:\NOWNET
DO DISPLAY
RESTORE FROM \RESULTS\TEMP
RESTORE FROM \RESULTS\FILENAME ADDITIVE

IF OPTIMIZE
 SET PATH TO B:\NEWNET
 DO DISPLAY
 SET PATH TO B:\RESULTS
ENDIF

RETURN

SET ECHO OFF

TYPE \RESULTS\PRINT.PRG

CLEAR
SET PATH TO B:\NOWNET
DO PRINT
RESTORE FROM \RESULTS\TEMP
RESTORE FROM \RESULTS\FILENAME ADDITIVE

IF OPTIMIZE
 SET PATH TO B:\NOWNET
 DO PRINT
 SET PATH TO B:\RESULTS
ENDIF

RETURN

SET ECHO OFF

TYPE \DELETE\DELETE.PRG

```

CLEAR ALL
CLEAR
@ 5,10 SAY "EXISTING RESULT FILES ARE:"
?
?
DIR \RESULTS\*.DBF
?
?
STORE "N" TO CHOICE
STORE " " TO FILENAME
@ 23,0 SAY "DO YOU WISH TO DELETE ANY OF THESE FILES (Y/N)?" GET CHOICE PICTURE
"! "
READ
IF CHOICE = 'Y'
    @ 23,50 SAY "CHOOSE ONE:" GET FILENAME PICTURE "!!!!!!!"
    READ

    IF FILENAME = " "
        RETURN
    ENDIF

    FILENAME = TRIM(FILENAME)
    RESTORE FROM \RESULTS\&FILENAME

    ! ERASE B:\DELETE\*.ATT
    ! ERASE B:\DELETE\*.MCI
    ! ERASE B:\DELETE\*.SPT
    ! ERASE B:\DELETE\*.SBS
    ! ERASE B:\DELETE\*.DBF
    ! ERASE B:\DELETE\*.MEM
    ! ERASE B:\DELETE\*.NEW
    ! ERASE B:\DELETE\*.TIN

    NAME = FILENAME + '.MEM'
    COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
    DELETE FILE \RESULTS\&NAME

    NAME = FILENAME + '.DBF'
    COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
    DELETE FILE \RESULTS\&NAME

    IF OPTIMIZE

```

USE \DELETE\&NAME

NAME = FILENAME + '.NEW'
COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
DELETE FILE \RESULTS\&NAME

IF OUT

NAME = FILENAME + '.ATT'
COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
DELETE FILE \RESULTS\&NAME

NAME = FILENAME + '.MCI'
COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
DELETE FILE \RESULTS\&NAME

NAME = FILENAME + '.SPT'
COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
DELETE FILE \RESULTS\&NAME

NAME = FILENAME + '.SBS'
COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
DELETE FILE \RESULTS\&NAME

ENDIF

LOCATE FOR .NOT. OUT

IF BAND > 0

NAME = FILENAME + '.TIN'
COPY FILE \RESULTS\&NAME TO \DELETE\&NAME
DELETE FILE \RESULTS\&NAME

ENDIF

ENDIF

ENDIF

RETURN

SET ECHO OFF

APPENDIX C

OPTICOM PROGRAM FILE STRUCTURES

Structure for database : B:\NOWNET\NOWNET.dbf

Number of data records : 2

Date of last update : 12/20/85

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
** Total **			23	

Structure for database : B:\NOWNET\RESULTS.dbf

Number of data records : 4

Date of last update : 12/03/85

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
7	DAY_ATT	Numeric	8	2
8	EVE_ATT	Numeric	8	2
9	NIGHT_ATT	Numeric	8	2
10	ACCES_ATT	Numeric	7	2
11	ATT_TOTAL	Numeric	9	2
12	DAY_MCI	Numeric	8	2
13	EVE_MCI	Numeric	8	2
14	NIGHT_MCI	Numeric	8	2
15	ACCES_MCI	Numeric	7	2
16	MCI_TOTAL	Numeric	9	2
17	DAY_SPNT	Numeric	8	2
18	EVE_SPNT	Numeric	8	2
19	NIGHT_SPNT	Numeric	8	2
20	ACCES_SPNT	Numeric	7	2
21	SPNT_TOTAL	Numeric	9	2
22	SBS_LINES	Numeric	3	
23	TIER	Numeric	1	
24	PERCENT	Numeric	2	
25	SBSHRS_DAY	Numeric	6	2
26	DAY_SBS	Numeric	8	2
27	SBSHRS_EVE	Numeric	6	2
28	NIGHT_SBS	Numeric	8	2
29	ACCES_SBS	Numeric	8	2
30	SBS_TOTAL	Numeric	11	2
** Total **			196	

Structure for database : B:\NEWNET\POISSON.dbf

Number of data records : 20

Date of last update : 12/12/85

Field	Field name	Type	Width	Dec
1	TRUNKS	Numeric	2	
2	P1	Numeric	6	1
3	P2	Numeric	6	1
4	P3	Numeric	6	1
5	P4	Numeric	6	1
6	P5	Numeric	6	1
7	P6	Numeric	6	1
8	P7	Numeric	6	1
9	P8	Numeric	6	1
10	P9	Numeric	6	1
11	P10	Numeric	6	1
12	P11	Numeric	6	1
13	P12	Numeric	6	1
14	P13	Numeric	6	1
15	P14	Numeric	6	1
16	P15	Numeric	6	1
17	P16	Numeric	6	1
18	P17	Numeric	6	1
19	P18	Numeric	6	1
20	P19	Numeric	6	1
21	P20	Numeric	6	1
22	P21	Numeric	6	1
23	P22	Numeric	6	1
24	P23	Numeric	6	1
25	P24	Numeric	6	1
26	P25	Numeric	6	1
27	P26	Numeric	6	1
28	P27	Numeric	6	1
29	P28	Numeric	6	1
30	P29	Numeric	6	1
31	P30	Numeric	6	1
32	P31	Numeric	6	1
33	P32	Numeric	6	1
34	P33	Numeric	6	1
35	P34	Numeric	6	1
36	P35	Numeric	6	1
37	P36	Numeric	6	1
38	P37	Numeric	6	1
39	P38	Numeric	6	1
40	P39	Numeric	6	1
41	P40	Numeric	6	1
42	P41	Numeric	6	1
43	P42	Numeric	6	1
44	P43	Numeric	6	1
45	P44	Numeric	6	1
46	P45	Numeric	6	1
47	P46	Numeric	6	1
48	P47	Numeric	6	1
49	P48	Numeric	6	1
50	P49	Numeric	6	1
51	P50	Numeric	6	1

Total

303

Structure for database : B:\NEWNET\POSSIBLE.dbf

Number of data records : 64

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	SIX	Logical	1	
2	FIVE	Logical	1	
3	FOUR	Logical	1	
4	THREE	Logical	1	
5	TWO	Logical	1	
6	ONE	Logical	1	
** Total **			7	

Structure for database : B:\NEWNET\NEWNET.dbf

Number of data records : 5

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
** Total **			23	

Structure for database : B:\NEWNET\PEAKHR.dbf

Number of data records : 6

Date of last update : 10/25/85

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	PEAKHR1	Numeric	6	1
3	PEAKHR2	Numeric	6	1
4	PEAKHR3	Numeric	6	1
5	PEAKHR4	Numeric	6	1
6	PEAKHR5	Numeric	6	1
7	PEAKHR6	Numeric	6	1
** Total **			38	

Structure for database : B:\NEWNET\RESULTS.dbf

Number of data records : 1

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
7	DAY_ATT	Numeric	8	2
8	EVE_ATT	Numeric	8	2
9	NIGHT_ATT	Numeric	8	2
10	ACCES_ATT	Numeric	7	2
11	ATT_TOTAL	Numeric	9	2
12	DAY_MCI	Numeric	8	2
13	EVE_MCI	Numeric	8	2
14	NIGHT_MCI	Numeric	8	2
15	ACCES_MCI	Numeric	7	2
16	MCI_TOTAL	Numeric	9	2
17	DAY_SPNT	Numeric	8	2
18	EVE_SPNT	Numeric	8	2
19	NIGHT_SPNT	Numeric	8	2
20	ACCES_SPNT	Numeric	7	2
21	SPNT_TOTAL	Numeric	9	2
22	SBS_LINES	Numeric	3	
23	TIER	Numeric	1	
24	PERCENT	Numeric	2	
25	SBSHRS_DAY	Numeric	6	2
26	DAY_SBS	Numeric	8	2
27	SBSHRS_EVE	Numeric	6	2
28	NIGHT_SBS	Numeric	8	2
29	ACCES_SBS	Numeric	8	2
30	SBS_TOTAL	Numeric	11	2
** Total **			196	

Structure for database : B:\NEWNET\AT&TOUT.dbf

Number of data records : 2

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
7	DAY_ATT	Numeric	8	2
8	EVE_ATT	Numeric	8	2
9	NIGHT_ATT	Numeric	8	2
10	ACCES_ATT	Numeric	7	2
11	ATT_TOTAL	Numeric	9	2
** Total **			63	

Structure for database : B:\NEWNET\MCIOUT.dbf

Number of data records : 2

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
7	DAY_MCI	Numeric	8	2
8	EVE_MCI	Numeric	8	2
9	NIGHT_MCI	Numeric	8	2
10	ACCES_MCI	Numeric	7	2
11	MCI_TOTAL	Numeric	9	2
** Total **			63	

Structure for database : B:\NEWNET\SPRNTOUT.dbf

Number of data records : 5

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
7	DAY_SPNT	Numeric	8	2
8	EVE_SPNT	Numeric	8	2
9	NIGHT_SPNT	Numeric	8	2
10	ACCES_SPNT	Numeric	7	2
11	SPNT_TOTAL	Numeric	9	2
** Total **			63	

Structure for database : B:\NEWNET\SKYLINE.dbf

Number of data records : 4

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	SBS_LINES	Numeric	3	
2	TIER	Numeric	1	
3	PERCENT	Numeric	2	
4	SBSHRS_DAY	Numeric	6	2
5	DAY_SBS	Numeric	8	2
6	SBSHRS_EVE	Numeric	6	2
7	NIGHT_SBS	Numeric	8	2
8	ACCES_SBS	Numeric	8	2
9	SBS_TOTAL	Numeric	11	2
** Total **			54	

AD-A166 744

A COMPUTER PROGRAM FOR OPTIMIZING LONG HAUL TELEPHONE
NETWORKS FOR LEAST. (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH S A DRAPER 1986
AFIT/CI/NR-86-48T

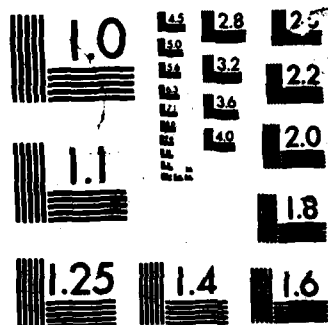
3/3

UNCLASSIFIED

F/G 17/2

NL





MICROCOPY

CHART

Structure for database : B:±NEWNET±AT&TIN.dbf

Number of data records : 1

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	OUT	Logical	1	
3	QUANTITY	Numeric	2	
4	USE_DAY	Numeric	6	2
5	USE_EVE	Numeric	6	2
6	USE_NIGHT	Numeric	6	2
7	DAY_ATT	Numeric	8	2
8	EVE_ATT	Numeric	8	2
9	NIGHT_ATT	Numeric	8	2
10	ACCES_ATT	Numeric	7	2
11	ATT_TOTAL	Numeric	9	2
** Total **			63	

Structure for database : B:\TABLES\AT&TOUT.dbf

Number of data records : 6

Date of last update : 10/07/85

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	DAY15	Numeric	5	2
3	EVE15	Numeric	5	2
4	DAY25	Numeric	5	2
5	EVE25	Numeric	5	2
6	DAY40	Numeric	5	2
7	EVE40	Numeric	5	2
8	DAY80	Numeric	5	2
9	EVE80	Numeric	5	2
10	WEEKEND	Numeric	5	2
11	ACCESS	Numeric	5	2
12	CONNECT1	Numeric	6	2
13	CONNECT2	Numeric	6	2
** Total **			64	

Structure for database : B:\TABLES\AT&TIN.dbf

Number of data records : 6

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	DAY15	Numeric	5	2
3	EVE15	Numeric	5	2
4	DAY25	Numeric	5	2
5	EVE25	Numeric	5	2
6	DAY40	Numeric	5	2
7	EVE40	Numeric	5	2
8	DAY80	Numeric	5	2
9	EVE80	Numeric	5	2
10	WEEKEND	Numeric	5	2
11	ACCESS	Numeric	5	2
12	CONNECT1	Numeric	6	2
13	CONNECT2	Numeric	6	2
** Total **			64	

Structure for database : B:\TABLES\SPRNTOUT.dbf

Number of data records : 12

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	ON NET	Logical	1	
3	DAY0_40	Numeric	5	2
4	EVE0_40	Numeric	5	2
5	DAY40_70	Numeric	5	2
6	EVE40_70	Numeric	5	2
7	DAY70_100	Numeric	5	2
8	EVE70_100	Numeric	5	2
9	DAY100PLUS	Numeric	5	2
10	EVE100PLUS	Numeric	5	2
11	WEEKEND	Numeric	5	2
** Total **			48	

Structure for database : B:\TABLES\SBSOUT.dbf

Number of data records : 44

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	USAGE_HRS	Numeric	3	
2	TIER1_DAY	Numeric	5	2
3	TIER1_OTHR	Numeric	5	2
4	TIER2_DAY	Numeric	5	2
5	TIER2_OTHR	Numeric	5	2
6	TIER3_DAY	Numeric	5	2
7	TIER3_OTHR	Numeric	5	2
8	TIER4_DAY	Numeric	5	2
9	TIER4_OTHR	Numeric	5	2
** Total **			44	

Structure for database : B:\TABLES\SBSIN.dbf

Number of data records : 42

Date of last update : 01/01/80

Field	Field name	Type	Width	Dec
1	USAGE_HRS	Numeric	3	
2	TIER1_DAY	Numeric	5	2
3	TIER1_OTHR	Numeric	5	2
4	TIER2_DAY	Numeric	5	2
5	TIER2_OTHR	Numeric	5	2
6	TIER3_DAY	Numeric	5	2
7	TIER3_OTHR	Numeric	5	2
** Total **			34	

Structure for database : B:\TABLES\MCIOUT.dbf

Number of data records : 12

Date of last update : 10/11/85

Field	Field name	Type	Width	Dec
1	BAND	Numeric	1	
2	ON NET	Logical	1	
3	DAY15	Numeric	5	2
4	EVE15	Numeric	5	2
5	DAY25	Numeric	5	2
6	EVE25	Numeric	5	2
7	DAY40	Numeric	5	2
8	EVE40	Numeric	5	2
9	DAY80	Numeric	5	2
10	EVE80	Numeric	5	2
11	WEEKEND	Numeric	5	2
** Total **			48	

Structure for database : B:\TABLES\SBSCONEC.dbf

Number of data records : 5

Date of last update : 10/18/85

Field	Field name	Type	Width	Dec
1	DISTANCE	Character	15	
2	COST	Numeric	6	2
** Total **			22	

RESTORE FROM ±TABLES±CONSTANT

. LIST MEMORY TO PRINT

CHOICE	pub	C	"Y"		
FLAG	pub	L	.F.		
METRO	pub	N		80	(80.00000000)
SBS1	pub	N		66	(66.00000000)
SBS2	pub	N		22	(22.00000000)
SBS3	pub	N		11	(11.00000000)
SBS4	pub	N		1	(1.00000000)
MCI_MIN	pub	N		75.00	(75.00000000)
MCI_ACCESS	pub	N		100.00	(100.00000000)
MCICONNECT	pub	N		120.00	(120.00000000)
SPNTCONNECT	pub	N		75.00	(75.00000000)
SPNTACCESS	pub	N		75.00	(75.00000000)
SBS_ACCESS	pub	N		100.00	(100.00000000)
SBS_MIN	pub	N		400.00	(400.00000000)
SBS_HRSMIN	pub	N		50	(50.00000000)
ATT_MIN	pub	N		0	(0.00000000)
SPRNT_MIN	pub	N		0	(0.00000000)
ATT_MININ	pub	N		0	(0.00000000)

18 variables defined, 149 bytes used
 238 variables available, 5851 bytes available

RESTORE FROM ±TABLES±DATE

. LIST MEMORY TO PRINT

DATE pub C " 1 JULY 1985"
 1 variables defined, 14 bytes used
 255 variables available, 5986 bytes available

APPENDIX D

TRAFFIC MODELS

Poisson

The probability of a call being blocked when there are N trunks carrying a total of T erlangs of traffic is given by the formula:

$$P_p(N, T) = 1 - \frac{N-1}{E} \frac{T^i e^{-T}}{i!}$$

This formula does not take into account whether blocked calls are diverted from the system or delayed as in Erlang B and Erlang C.³ An erlang of traffic is defined as 60 minutes of circuit usage; i.e., one call of 60 minutes duration and six calls of ten minutes duration both equal one erlang of traffic.

Another unit often used to express traffic is the CCS which stands for hundreds of call-seconds per hour. In this case $T = \text{CCS}/36$ or $\text{CCS} = 36T$. Jerry Finefrock² indicates that both the erlang and CCS are difficult terms to use. Consequently, his tables are expressed in total minutes of usage for easier use and understanding.

The "P" number generally indicates the percentage of calls reaching a busy signal on the first attempt.

P.01 means one percent of the calls reach a busy signal. As the "P" number or level of traffic increases, the actual percentage of blocked calls exceeds the "P" number so it is then only an approximation. For example, at P.25 with 20 circuits, the actual percentage of blocked calls is 35%.²

Erlang B

This formula was derived by A.K. Erlang of Denmark in the early 20th century for systems where blocked calls are diverted from the system and sent via alternate facilities. The formula is expressed as:¹

$$P_b(N, T) = \frac{\frac{T^N e^{-T}}{N!}}{\sum_{i=0}^N \frac{T^i e^{-T}}{i!}}$$

Extended Erlang B

This model was developed by James E. Jewett for situations when immediate overflow is not available and blocked calls do not exit from the system. It applies a factor to the Erlang B formula to calculate reattempt traffic.⁴

Erlang C

This applies to systems which have an infinite queue and blocked calls are merely delayed until a trunk is available. The formula is:³

$$P_c(N,T) = \frac{\sum_{i=0}^N \frac{T^i e^{-T}}{i!} + \frac{T^N e^{-T}}{N!} * \frac{T}{N-T}}{\frac{T^N e^{-T}}{N!} * \frac{N}{N-T}}$$

Table Values

Values used in the traffic tables for this program are in minutes. The AT&T, MCI, and SPRINT rate tables are expressed in cost/hour. The SBS Skyline rate table is expressed in cost/minute.

END
FILMED

5-86

DTIC