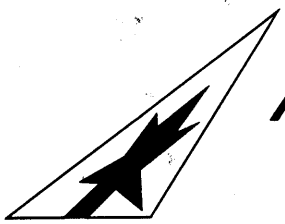


AEROSYSTEMS
INTERNATIONAL
INC.

4000 Steinberg
St-Laurent, Qué.
Canada H4R 2G7
Tél.: (514) 336-9426
Fax.: (514) 336-4383

AUTOMATED CHANNEL OCCUPANCY EVALUATION SYSTEMS

OCCLAN

REGIONAL SPECTRUM SERVICE CENTRE
ACTON, ONTARIO

REV 3

AUTOMATED CHANNEL OCCUPANCY EVALUATION SYSTEMS

OCCLAN

Table of Contents

OCCLAN - CHANNEL OCCUPANCY EVALUATION UTILITY - Ver 3.1

Program Description

OCCLAN allows the evaluation of occupancy data, collected from various sources to be displayed on a CRT or printed. The data base can be accessed using SITE, FREQUENCY and DATE information supplied by the user.

OCCLAN makes two basic assumptions, the operator will know the geographic area and the frequency or approximate frequency for the channel occupancy desired. Knowing this, the operator can quickly obtain a bar chart display of the channel occupancy.

The data files (.OCC) used by OCCLAN are a collection of records of occupancy data for one frequency, for one scanning period (per day). All the records in one data file are for one scanning site, for a specific calender year. This method was selected to prevent the data files from becoming to large and minimize the search time on the slower computers. OCCLAN also produces an index file (.INX) which is a packed 20 byte word containing the frequency, date and record ID # of the file in the data file (.OCC) and is sorted by frequency and then by date. The index file is used to locate the record ID # of the record containing the occupancy data in the data file (.OCC). If the index file is lost or erased OCCLAN will reconstruct a new one, which may take some time on slower computers.

Note: Occlan Ver3.1 data files are not compatible with the data files from earlier versions of Occlan. There is a conversion utility located in the 'utility menu which will convert them to the new format. Old .DAT files are NOT deleted, old .INX files are.

Installation Considerations

The data and frequency list files should be allocated a separate sub-directories on a LAN or on a stand alone PC. The path to the location of these files can be changed using the OPTIONS menu and the default drive/sub-directory may also be preset to a location other than the current drive. If the OCCONFIG file does not exist on the same directory as Occlan, Occlan will look for the data and lists on the current drive/sub-directory.

In a LAN setting the sub-directories that the data, frequency lists and Occlan program reside must be set-up to allow these files to be sharable. This can be done with the SETATTR command on the LAN. If data files are located in the K: drive then the root directory must be made sharable, this is done by executing the command 'SETTATTR +S K:\' and must be executed from the directory you wish to make shareable. This command must also be executed on the drive where Occlan and Occonfig reside. The program and data sub-directories should be read only, except for the LAN administrator.

To check the status of the files execute the command 'SETTATTR *.*' and the file names will be displayed followed by '+S -E'. If they do not, execute the command 'SETATTR +S *.*' to make all the files shareable. (This may be necessary if there are files in the directory that are not presently configured as sharable.)

NOTE - these changes to the LAN set up must only be done by the LAN Administrator.

Frequency Lists

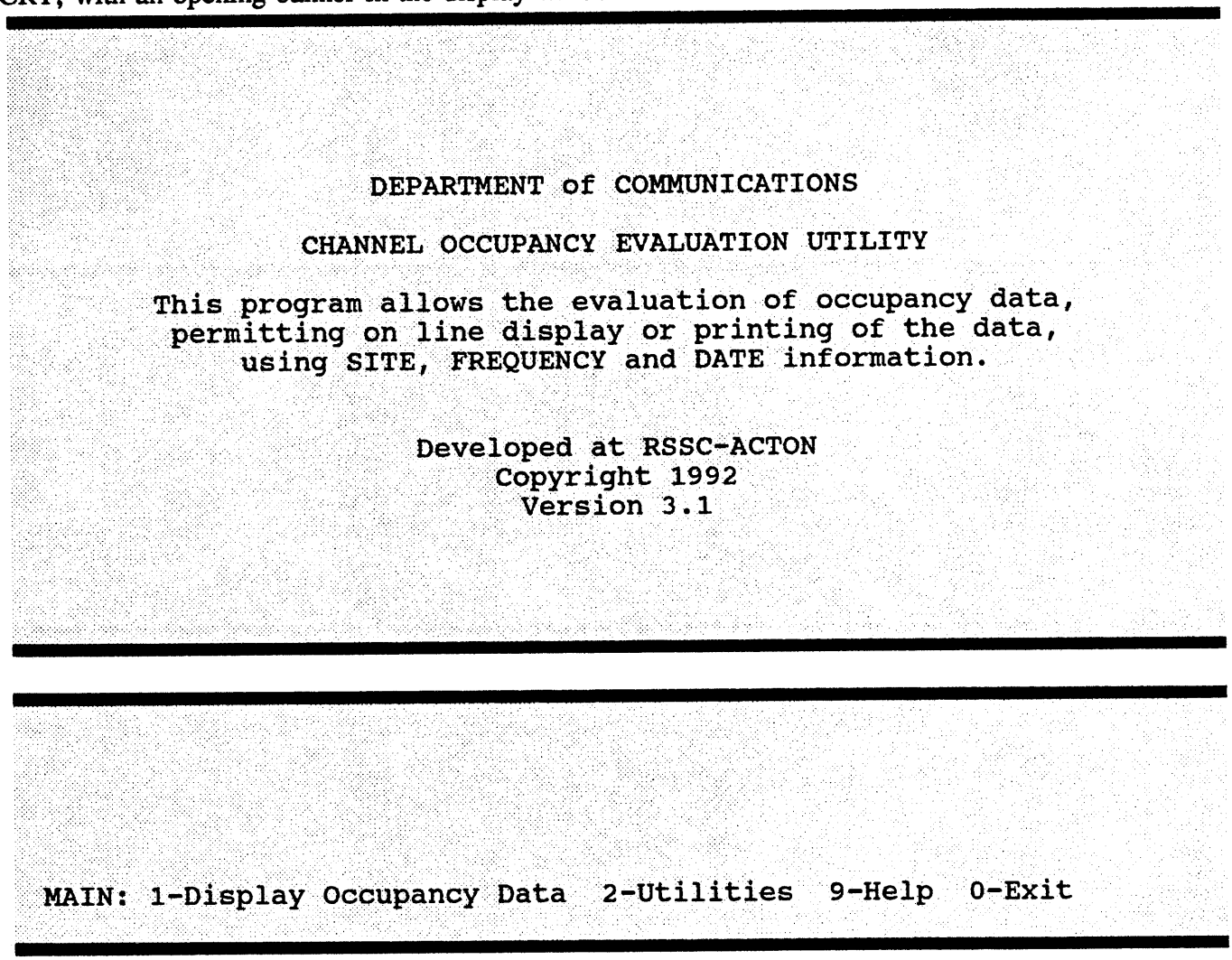
A frequency list consist of a disk file containing a list of frequencies, composed on a text editor or word processor. The list shall have one frequency per line with a carriage return immediately following each entry, and must be saved in the non-document or ASCII text mode. The file must end in a Control Z. The file name shall have the .LST extension to be automatically located by OCCLAN.

for example:
156.235
452.1375
123.4500

The LIST MODE in OCCLAN is used to group frequencies used by one company in an area, a trunking block or blocks or a sub group of frequencies used by a particular service. This list can be used to produce a hourly summary chart of the occupancy or allow sequential display and printing of widely spaced frequencies when in the display mode. These lists are in the same format as the frequency lists used by IRMA, RAMS and ICScan II.

Displaying Channel Occupancy

Upon running the program the MAIN MENU is displayed in the prompt window at the bottom of the CRT, with an opening banner in the display window.



Select option 1-Display occupancy data.

Selecting the Site

OCCLAN will check the default directory for all files with the .OCC extension and display them in the display window, allowing the operator to select the site/year desired. A maximum of 50 site/year files can be displayed and selected by entering the corresponding letter beside the file desired and pressing return. The < and > keys can be used to move forward or backward when more than 10 files are available until the desired file is located.

```
Occupancy data available for the following sites:

     Site Name                 Year    File Name
A    RSSC ACTON                 89     ACTON89
B    RSSC ACTON                 90     90ACTON
C    TORONTO KORTRIGHT          90     KORT
D    KITCHENER EAST             89     KIT1
```

```
Select site (A-D) :
```

Select the desired SITE and press return.

Selecting the Frequency or Frequency List

The prompt window will now ask for the frequency or frequency list of interest. At this point the operator may enter the exact frequency desired if it is known, the approximate frequency of interest, or the full file name of the frequency list desired. An ESC or Null entry at this prompt will exit to the main menu.

```
Enter frequency or frequency list file name:
```

If a numeric value between 20 and 999 is entered and the exact frequency is found in the database the program will continue at the next section. If the frequency entered is not found, five frequencies greater than and five frequencies less than the entered value and available in the database are displayed. For example if 152.3 is entered at the above prompt the following will be displayed.

```
For SITE: RSSC ACTON
These frequencies are close to the one entered.

        A  -         MHz
        B   48.2500 MHz
        C  143.3500 MHz
        D  152.2250 MHz
        E  152.2500 MHz
           152.3000 MHz No Data for this frequency.
        F  152.4250 MHz
        G  452.1375 MHz
        H  456.2500 MHz
        I  456.3375 MHz
        J  460.3500 MHz
```

```
Enter code (A-J) or a new frequency:
```

The desired frequency can be selected by entering the corresponding letter and pressing return. If the desired frequency is not displayed, a new approximate frequency may be entered and above the process will be repeated. An ESC or a null entry will exit back to the enter frequency prompt.

Any none numeric entry will assume that frequency list operation is desired. If the file name entered is a compatible frequency list and is found it is loaded and the program will continue at the next section. If the frequency list file is not found then all the files ending in .LST on the default drive, to a maximum of 50, are displayed and may be selected by entering the corresponding letter beside the desired file name. The < and > keys can be used to move forward or backward until the desired file is located.

```
The list PAGERS was not found.
These files ending in .LST are available.


A    RCCMRS.LST
B    TRUNKING.LST
C    BILLSTOW.LST
D    COURIER.LST
E    SAFETY.LST
F    MARINE.LST
```

```
Select frequency list (A-F) : F
```

Selecting the Date

The display window will indicate all the dates for which occupancy data is available for the previously selected site and frequency or frequency list, to maximum of 76 days. The desired date may be selected by entering the corresponding letter and pressing return. The < and > keys can be used to move forward or backward until the desired file is located. An ESC or a null entry will exit back to the main menu.

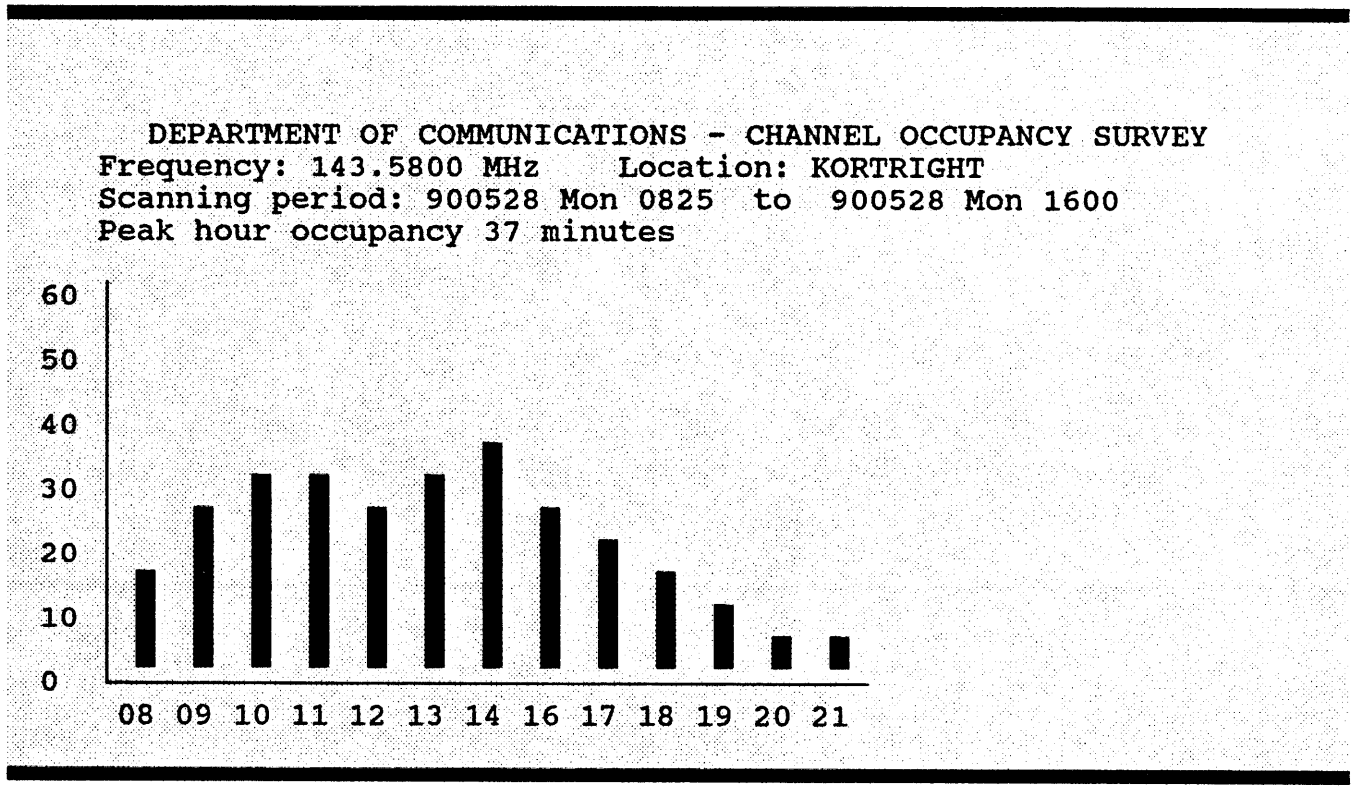
```
For the SITE: ACTON and FREQUENCY: 143.500 MHz,
Loading information is available for the following dates:

    A - 90/05/28
    B - 90/05/29
    C - 90/05/30
    D - 90/07/01
    E - 90/07/02
```

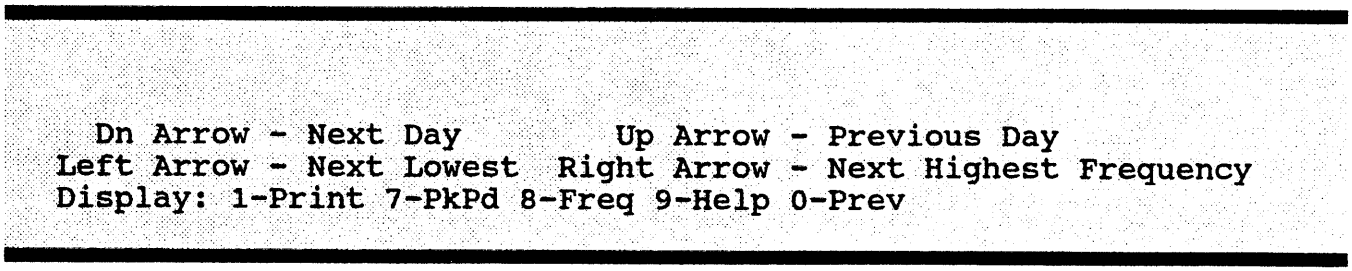
```
Select date : E
```

Select a date and press return.

Displaying the Occupancy Bar Charts

The bar chart in the display window displays the occupancy chart for a specific frequency for a single time period (max one day). The cursor keys may be used to move about in the database, the up/down keys change the date while the left/right keys change the frequency. In the normal mode the left/right keys will change the display to the next less than or greater than available frequency in the data base. When in the frequency list mode the left/right keys will step down/up in the frequency list. It is also possible from this menu to select a new frequency/frequency list by selecting option '8', this in turn will prompt for the date, as described above.



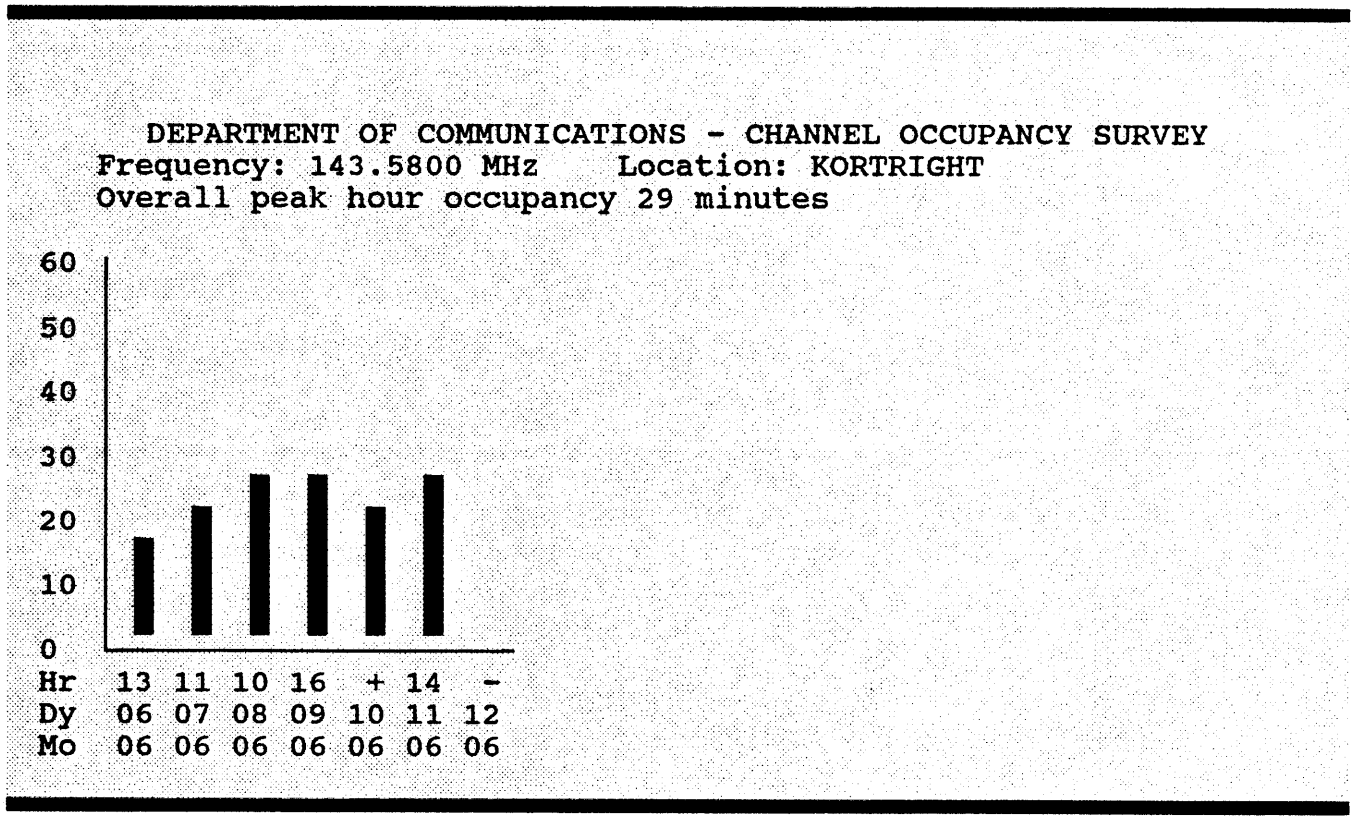


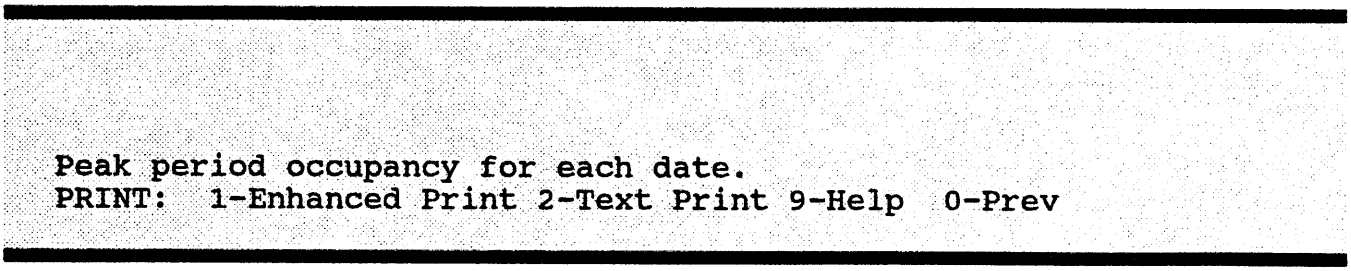
If LIST MODE has be selected the prompt display will have '(LIST MODE)' in the upper right corner, and the frequency list in use can be displayed by entering '4' (LIST) at the prompt.

```
  Dn Arrow - Next Day          Up Arrow - Previous Day (LIST MODE)
Left Arrow - Next Lowest  Right Arrow - Next Highest Frequency
Display: 1-Print 3-Summary 4-List 7-PkPd 8-Freq 9-Help 0-Prev
```

Peak Period

The PEAK PERIOD option will display the peak occupancy for the selected frequency, for each date for which there is data available. Below each bar, representing the peak airtime, the hour/day/month when the peak occurred is displayed. If there was no activity during that day a '-' is displayed and if the same peak value is reached during more than one hour a '+' is displayed in place of the hour. All the dates for which there is data are displayed, 24 days per display, to a maximum of 76 dates.





System Summary (only available in LIST MODE)

The SUMMARY option will display the hourly average occupancy for all the frequencies in the list, therefore providing a system summary and can be used in the evaluation of trunking systems or groups of frequencies which are somehow related. The peak period option is also available when in this menu and provides the peak period of the system averaged occupancy.

Data Conversion

This option permits the conversion of occupancy data collected by ICScan I, ICScan II, IRMA, RAMS and the MSMS (threshold mode) to be used by OCCLAN.

ICScan I and ICScan II/IRMA, RAMS

At the main menu select '2-Utilities', '2-Convert', and the appropriate new data format.

The first prompt is for the file name of the file to be converted. The option 4 on the UTILITIES menu will directory any drive/subdirectory if the exact file name is unknown, and remain in the display window while prompting for the new file name.

```
Enter path/file name to ICScan I data file :
```

The program will then prompt for the file the new data is to be added to. If this data is to be new file, enter '?' and you will be prompted for a SITE FILE NAME and a SITE LOCATION. If the data is to be added to an existing file the new data must be of the same year as the old or existing data or an error will result.

```
Occupancy data available for the following sites:

     Site Name                Year     File Name
A    RSSC ACTON                 89     ACTON89
B    RSSC ACTON                 90     90ACTON
C    TORONTO KORTRIGHT          90     KORT
D    KITCHENER EAST             89     KIT1
```

```
Select site (A-D) ('?' for new site ) : D
```

The program will display the following in the prompt window.

```
Opening data and index files ...
```

```
Converting ICScan I data files ...
```

```
Sorting index file ...
```

```
Conversion complete press any key to continue ...
```

Converting OCCLAN ver 2.4 Data to ver 3.1 Data

This option is used to convert the old data format to the new format resulting in a data file size reduction of 50%. The old .DAT files will remain untouched but the .INX files will be reformated for the new .OCC files. All .DAT files on the data sub-directory will be converted. ConfIRMA, RAMStion (Y/N) will be required before each file is converted.

Appending or Merging Data Files

This option is used to merge two Occlan data files. The second file is appended to the first file and overwrites occupancy data for the same frequency/date with the new data. Occlan will not support more than one occupancy record for a frequency, for the same date.

The two data files must be from the same calender year and should have the same site name.

Search Options

This facility will permit the operator to search a database file to determine the data that is available for a specific frequency (or frequency range), a specific date or both.

After the selection of a SITE/YEAR file, the search parameters are entered at the SEARCH menu. A DATE or FREQUENCY range can be entered. A directory of a drive or sub-directory is also available from this menu.

```
Search parameters Date: 900612  Site: KORTRIGHT
Frequency range: 152.100 to 153.000 MHz
PARM I/P: 1-Date 2-Freq 3-Direc 4-Search 9-Help 0-Prev
```

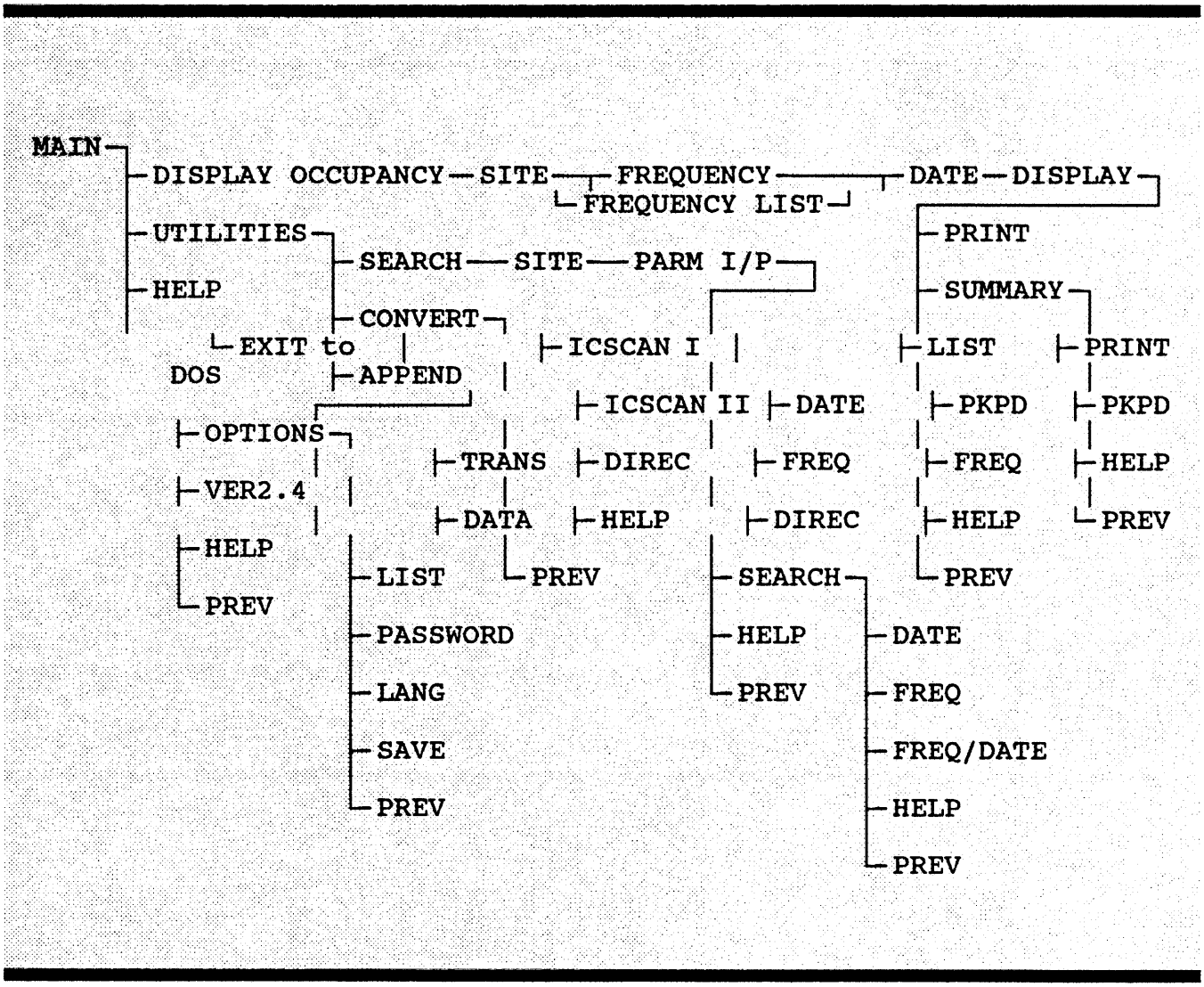
Option 4-Search will now determine how the database file will be searched for matching occupancy records. The data can be searched by DATE, FREQUENCY or DATE/FREQUENCY.

```
Search parameters Date: 900612  Site: KORTRIGHT
Frequency range: 152.100 to 153.000 MHz
SEARCH by: 1-Date 2-Freq 3-Date/Freq 9-Help 0-Prev
```

Print Options

Occlan will permit the printing of the occupancy, peak period and summary charts in an enhanced mode, using standard IBM graphics characters or in a text mode using standard IBM text characters. In list mode the operator has the option of printing the displayed single frequency occupancy chart or the occupancy charts for all frequencies in the list. Examples of the occupancy chart printouts can be found in Appendix A,B and C.

Menu Flow Chart



Help Screens

Main Menu

```
MAIN MENU

1 - Display     This option displays the occupancy data based on
                SITE, FREQUENCY or FREQUENCY LIST and DATE
                information provided at the prompts.

2 - Utilities   This option allows operation of various utility
                functions, such as directory a disk, search for
                data, conversion of data from other sources and
                set up default values.

9 - Help        This menu.

0 - Exit        Exit program to DOS.
```

```
MAIN: 1-Display Loading Data  2-Utilities  9-Help  0-Exit
```

Utility Menu

```
UTILITY MENU

1 - Search      Search the data base to determine the data avail.
2 - Convert     Convert data formats of ICScan I & IRMA/ICScan II
                to data format used by this program.
3 - Append      Append new Site/Index data files to existing data
                files, duplicate data will be ignored.
4 - Opt         Set up default values for the program.
5 - Ver2.4      Convert data filesfrom ver 2.4 or earlier
                to .OCC data files for ver 3.1. Old .DAT files
                not deleted, .inx files over written.
9 - Help        This menu.
0 - Prev        Return to 'MAIN' menu.
```

```
UTILITY: 1-Search 2-Convert 3-Append 4-Opt 5-Ver2.4 9-Help 0-Prev
```

Display Menu

```
DISPLAY MENU

1 - Print       Print the displayed loading chart.
7 - PkPd        Display peak period occupancy for each date.
8 - Freq        Select a new frequency (or list) and date.
9 - Menu        This menu.
0 - Prev        Return to the 'MAIN' menu.
Dn Arrow        Display data for next following day.
Up Arrow        Display data for next previous day.
Left Arrow      Display data for next lowest frequency.
Right Arrow     Display data for next highest frequency.
```

```
  Dn Arrow - Next Day          Up Arrow - Previous Day
Left Arrow - Next Lowest  Right Arrow - Next Highest Frequency
Display: 1-Print 7-PkPd 8-Freq 9-Help 0-Prev
```

or if in LIST MODE ....

```
DISPLAY MENU

1 - Print       Print the displayed loading chart or the
                charts for all the frequencies in the list.
3 - Summary     Display loading summary of all frequencies
                in the list file.
4 - List        Display all frequencies in list file.
7 - PkPd        Display peak period occupancy for each date.
8 - Freq        Select a new frequency (or list) and date.
9 - Menu        This menu.
0 - Prev        Return to the 'MAIN' menu.
Dn Arrow        Display data for next following day.
Up Arrow        Display data for next previous day.
Left Arrow      Display data for next lowest frequency in list.
Right Arrow     Display data for next highest frequency in list.
```

```
  Dn Arrow - Next Day          Up Arrow - Previous Day (LIST MODE)
Left Arrow - Next Lowest  Right Arrow - Next Highest Frequency
Display: 1-Print 2-Summary 3-List 7-PkPd 8-Freq 9-Help 0-Prev
```

Summary Menu

```
SUMMARY MENU

1 - Print       This option will print the summary chart
                in text or enhanced mode.

2 - PkPd        This option will display the peak period
                occupancy of the averaged, daily data chart.

9 - Help        This menu.

0 - Prev        Previous menu.
```

```
Average hourly occupancy for the frequencies in the list.
SUMMARY: 1-Print 2-PkPd 9-Help 0-Prev
```

Data Conversion Menu

```
DATA CONVERSION MENU

1 - ICScan I          Converts data collected by ICScan I
                      to the format used by this program.

2 - IRMA/ICScan II    Converts data collected by IRMA/ICScan II
                      controllers and ASCII downloaded by a
                      communications program to a format
                      used by this program.

3 - Direc.            Directories a disk or sub-directory.
```

```
CONVERT: 1-ICScanI 2-IRMA/ICScanII 3-Direc 9-Help 0-Prev
```

Search Mode Parameter Input Menu

```
PARAMETER INPUT MENU

Options 1+2 allow the entry of parameters used when performing
a selective search of the available data files ( Opt.4 ).
1 - Date       Enter the DATE of interest.
2 - Freq       Enter the FREQUENCY RANGE of interest.
3 - Direc      DIRECTORY a disk or drive/sub-directory.
4 - Search     Selective search of the available data using
               search parameters specified in options 1+2.
9 - Menu       This menu.
0 - Prev       Return to 'UTILITY' menu.

Decoded File Name Format 'FFF.FFFF  YY/MM/DD'
F = Frequency  YY/MM/DD = Year/Month/Day
```

```
Search parameters Date: 900612  Site: KORTRIGHT
Frequency range: 152.100 to 153.000 MHz
PARM I/P: 1-Date 2-Freq 3-Direc 4-Search 9-Help 0-Prev
```

Search Mode Selective Search Menu

```
SELECTIVE SEARCH MENU

1 - Date       Search by DATE.
2 - Freq       Search by FREQUENCY RANGE.
3 - Date/Freq  Search by DATE and FREQUENCY RANGE.
9 - Menu       This menu.
0 - Prev       Return to 'PARM I/P' menu.

NOTE - SEARCH DEFAULTS TO WILDCARD FOR UNSPECIFIED PARAMETERS.

Display format 'FFF.FFFF  YY/MM/DD'
F = Frequency,  YY/MM/DD = Year/Month/Day
```

```
Search parameters Date: 900612  Site: KORTRIGHT
Frequency range: 152.100 to 153.000 MHz
SEARCH by: 1-Date 2-Freq 3-Date/Freq  9-Help 0-Prev
```

Options Menu

```
OPTIONS MENU

1 - Printing of transmission counts DISABLED.
2 - The default directory for the data files is
    A:\
3 - The default directory for the list files is
    A:\
4 - Change Password.
5 - Changer au Francais.
6 - Save default settings.
0 - Return to 'UTILITY' menu.
```

```
OPTIONS: 1-Trans 2-Data 3-List 4-Password 5-Lang 6-Save 0-Prev
```

** or ****

```
OPTIONS MENU

1 - Printing of transmission counts ENABLED.
    A = MSMS, B = ICScan I, C = IRMA/ICScan II
    # indicates the # of channels in the scanned list.
2 - The default directory for the data files is
    A:\
3 - The default directory for the data files is
    A:\
4 - Change password.
5 - Changer au Francais.
6 - Save default settings.
0 - Return to 'UTILITY' menu.
```

```
OPTIONS: 1-Trans 2-Data 3-List 4-Password 5-Lang. 6-Save 0-Prev
```

OCCUPANCY DATA EVALUATION

When evaluating occupancy data charts there are many factors which will affect the conclusions drawn and should be considered each time occupancy charts are evaluated.

Factors Affecting Occupancy Data

- Monitoring location relative to the station of interest and the range of the monitoring site.
- Monitoring site characteristics (i.e. city/rural, hilly/flat terrain, antenna type and height).
- Type of equipment used to perform the monitoring (ICSCAN II, IRMA, RAMS, SSS van).
- Time of day, month or year when the monitoring was performed. For example snowplough operations and school buses do not operate during the summer, etc. Often the last Friday in the month is the busiest for many types of operation, especially for couriers and delivery firms.
- Weather conditions may also affect the results, although the weather may not always be known. It is for this reason the occupancy data taken over many days will render a truer picture of the occupancy on a frequency.
- Propagation and atmospheric conditions (i.e. inversions, heat of the day, etc) can result in unexpected activity. For example , considerable activity during the early morning period and little during the rest of the day may indicate the reception of stations just beyond the normal reception range of the monitoring location. Long range skip is also possible from many hundreds or thousands of miles depending on frequency and conditions.
- Type of system being monitored, i.e. in an simplex system only the base and a few or none of the mobiles may be observed while on a repeater system all the traffic will register as occupancy. Therefore the simplex traffic will have to be factored up to account for the mobile traffic not received.
- Multiple users on a frequency may all contribute to the occupancy recorded. Therefore care must be taken to determine the range of the monitoring site and all the stations which may be received.
- Trunked systems should generally be handled as a system (in list mode in Occlan). Individual channel occupancy displays will identify such characteristics as control data, dispatch traffic or interconnect traffic channels.

DATA FILE FORMAT - ICSCAN II/IRMA, RAMS

Line #	Data file	Details
1	215	Day / Month (Monday 15th).
2	1091	Month / Year (October 1991).
3	0905	Start time of scanning.
4	1300	Stop time of scanning.
5	4	# hour (or part hours) scanned.
6	05	Number of channels scanned.
7	151.5800	1st frequency in list.
8	159.5250	2nd frequency in list.
9	159.7500	.
10	173.0400	.
11	451.1500	Last frequency in list.
12	0069 0356 0257 0566 0245	Occupancy data
13	0055 0200 0170 0287 0058	
14	0102 0433 0909 0546 0716	
15	0078 0214 0271 0279 0243	
16	0134 0912 0612 0570 0640	
17	0103 0321 0240 0327 0196	
18	0178 0908 1087 0333 0377	
19	0158 0340 0377 0234 0111	

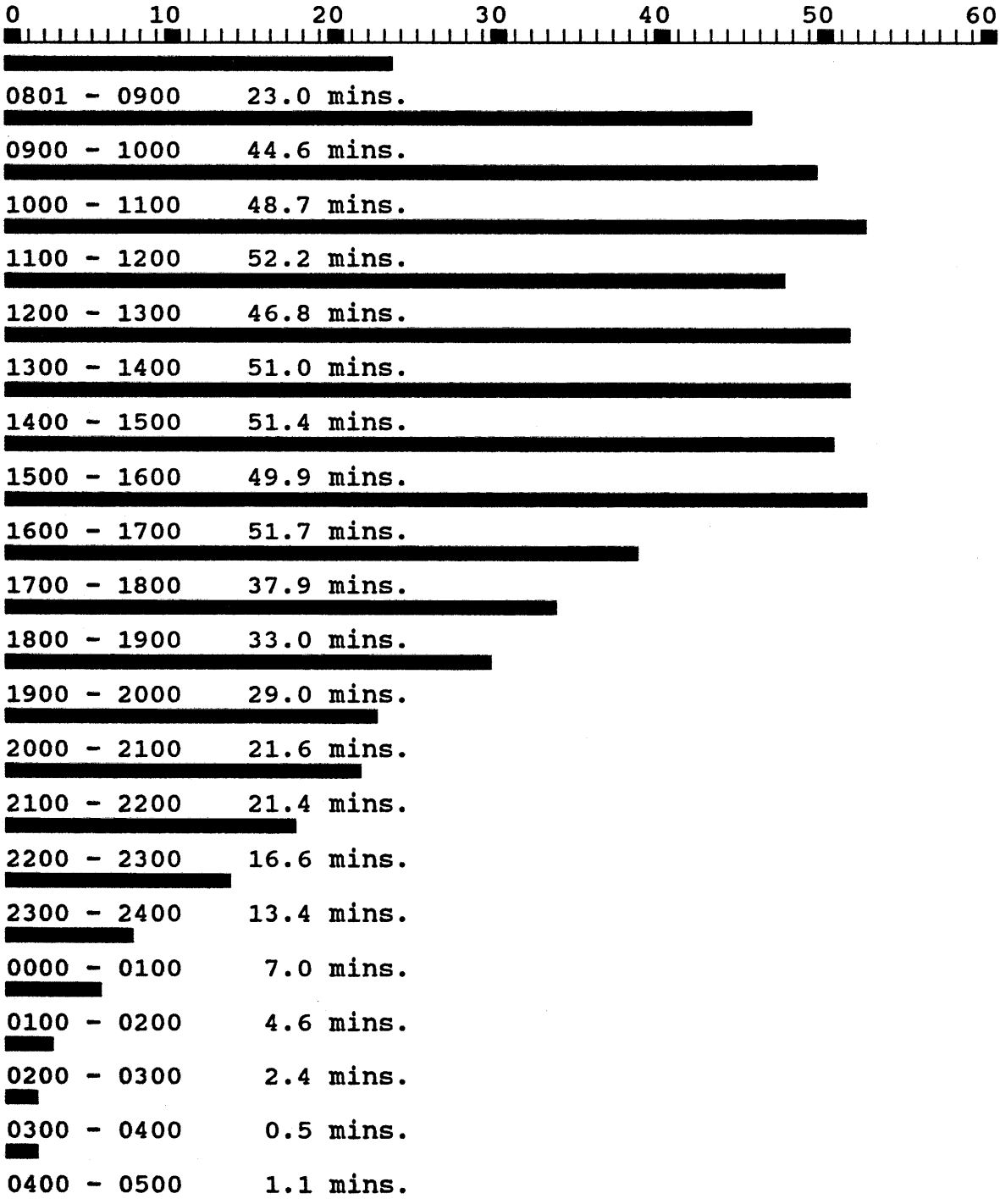
The occupancy data block starting at line 11 contains the hourly recorded elapsed time and number of transitions for each channel scanned. The data is arranged by channel horizontally (columns) and vertically (rows) by the number of hours (or part hour), with two lines of data for each hour. The first line contains the measured elapsed time in seconds and the second line contains the transition data.

Line 1 of the data file should be the first line in the data file. Text or blank lines before line one will cause conversion errors. Extraneous text etc. following the occupancy data should not be a problem.

OCCUPANCY CHART PRINTOUT - SINGLE FREQUENCY APPENDIX A

DEPARTMENT OF COMMUNICATIONS
CHANNEL OCCUPANCY SURVEY

FREQUENCY : 151.475 MHz
MONITORING SITE : KORTRIGHT
SURVEY PERIOD : 890620 TUE 0801 to 890621 WED 0500



OCCUPANCY CHART PRINTOUT - SYSTEM SUMMARY APPENDIX B

DEPARTMENT OF COMMUNICATIONS
CHANNEL OCCUPANCY SYSTEM SUMMARY

LIST FILE NAME : MOT1.LST
MONITORING SITE : KORTRIGHT
SURVEY PERIOD : 890620 TUE 0801 to 890621 WED 0500

0801 - 0900 15.0 mins.

0900 - 1000 31.2 mins.

1000 - 1100 35.4 mins.

1100 - 1200 40.1 mins.

1200 - 1300 41.3 mins.

1300 - 1400 41.0 mins.

1400 - 1500 42.4 mins.

1500 - 1600 35.9 mins.

1600 - 1700 35.7 mins.

1700 - 1800 33.9 mins.

1800 - 1900 33.0 mins.

1900 - 2000 24.0 mins.

2000 - 2100 21.6 mins.

2100 - 2200 21.4 mins.

2200 - 2300 16.6 mins.

2300 - 2400 13.4 mins.

0000 - 0100 7.0 mins.

0100 - 0200 4.6 mins.

0200 - 0300 2.4 mins.

0300 - 0400 0.5 mins.

0400 - 0500 1.1 mins.

OCCUPANCY CHART PRINTOUT - PEAK PERIOD APPENDIX C

DEPARTMENT OF COMMUNICATIONS
CHANNEL OCCUPANCY - PEAK PERIOD

LIST FILE NAME : MOT1.LST
MONITORING SITE : KORTRIGHT
OVERALL PEAK HOUR OCCUPANCY : 42 MINUTES