ALE INFORMATION FILE

Stitched together and updated by Jim Dunnett (RGA)

This seventh update to the original jottings of 31 December 1999 is no big deal, it simply adds a few additional comments which have come to hand by 7 April 2003.

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Contains:

Chapter 1

The problem with setting up a circuit on HF is that it can be time consuming. Modern technology and computers have now made it possible to automate this function achieving a higher percentage of first time and reliable link-up than can be obtained with an operator.

A number of stations associated with a particular organisation each make use of a single SSB transmitter/receiver (or transceiver) under the control of an ALE Controller. This group of stations will operate on a selection of frequencies thereby coping with the variants of link quality brought about by both distance and time, and of course interference.

The ALE controller of the master and/or the outstations can periodically or irregularly send out a "sounding" burst. There are a number of variants on this theme but I won't go into the complexity at this time. The sounding burst may/may not require a response from other stations but each station can be identified. When any station is not sending it must conversely be receiving. Not only that its ALE controller will be causing its receiver to scan through the designated frequency channels specific to that net's operation (this is normally done on the basis of 2 or 5 channels per second) where the controller software is looking for a data burst containing its unique address or an address for which it is part of multiple station operations.

Whilst normal operations take place there is a continual process of link quality analysis (LQA). The receiving station measures this quality based on a bit error ratio and a signal/noise ratio (to describe in its simplest terms). The result of the analysis is to give a score for that particular burst, the score being stored in memory. Over a period of time the ALE controller knows the current best frequency to employ when wishing to link with an other.

Station ABC wishes to link with station XYZ. It's ALE controller uses XYZ's identity in the call burst having set its transmitter to the computed best frequency as based on the stored data. The receiver at the addressed station is scanning all the frequencies in the set and stops when a burst appears on one of these channels. It then determines that it is being addressed and link-up is established. There is no need for the receiving

operator to continually watch a set of frequencies - he/she can be alerted which required.

ALE is reputed to produce 80-90% first time connections as against the estimated 35% when using traditional/manual procedures. Use of scanning eliminates the need for call scheduling and frequency/time coordination.

The ALE controller in the linkup procedures uses tones (we'll enlarge on this later) to/from the SSB equipment. Once the link is established the controller has the option of passing data in a low speed manner using its internal provisions. Alternatively it may be switched manually or automatically to a second modem which provides high speed FSK/PSK data, or voice, as far as the information transfer is concerned.
So there in simple terms is what ALE is all about.

Chapter 2

What about the ALE waveform? It is designed to pass through the AF passband of standard SSB equipment. It consists of 8 tones (MFSK). They are located 250hz apart from 750hz to 2500hz. The centre of the system is at 1625 khz. Whilst some of my colleagues use the assigned frequency and add the 1.625 khz subcarrier offset I prefer to use the suppressed carrier value for a number of reasons - eg 18003/carrier against 18004.6/assigned - but that's another story. However if one tunes to 18003/usb one should eventually
a. hear a short watery/burbling kind of sound (always difficult to describe sound in the written word), and
b. see the tones in the USB if one has an audio spectrum display starting with the simplest "Spectrogram" as described in this column a couple of months back. Each tone is 8mS in duration. This gives 125 symbols per second. With 8 tones (symbols or elements) we can support 3 data bits per symbol. This results in a transmitted data rate of 375 bits per second.

ALE uses a standard word consisting of a 3-bit preamble and three 7-bit ASCII character fields; a total of 24 bits per word. The function of each ALE word is designated by the code in the preamble and is related to ALE's basic capabilities.

Eight word types are used:
TO THIS IS THIS WAS DATA REPEAT THRU COMMAND FROM.

Depending on the preamble the 7-bit ASCII character fields are used to specify individual address characters, or as ASCII text. Robustness of the system is achieved by the utilisation of a system of triple redundancy in the transmission of ALE data, by interleaving the data, and by use of Golay forward error correction (fec). The ALE system is designated Mil.Std 188-141A and is being taken up by others outside the US military/SHARES network - Danish Mil., Algerian diplo, Romanian diplo, Swedish diplo to name but a few. If you wish to dig deeper into the system I suggest you look at the web site
http://www.its.bldrdoc.gov/pub/oa-rpt/hf-ale/handbook/
My experience of this site is that the zipped report at the end failed to unzip in spite of several downloads and I had to use the .pdf files listed.

Chapter 3

So much for the theory. It is now possible to decode/watch these stations linking up etc. There is a neat program in the form of a 188-141A Ale Controller. It can be used for both Tx/Rx functions but for the UTE monitor the receiver side is fine. It was written for the personal amusement of the author, but is available on his website for others with an interest in the subject. Check out: http://www.chbrain.dircon.co.uk click on the ALE Controller tab. (DW's notes refer to the original version of the program].

The program operates via the PC sound card. There are two files, the first which instals the program, the second which is COPIED into the folder containing the installed files. I find that on starting the program (in W95) an error box appears advising "Cannot load MScomm32.OCX". This lack does not seem to have affected the receive functioning of the program. This is easily fixed, should it cause any problems. See the section on setting up and running the ALE program. As it was written as a personal project and not intended for general distribution there are no help files or documentation; and no implied support.
One can run the program in two receive modes. Single channel [Ch.00] using only the received audio from the receiver. Channel scanning. This requires the addition of an RS232/V24 link between one of the comports of the PC and the remote control port of the receiver. This will allow the ALE controller to manage the receiver and scan the designated channels. A limited number of receivers are catered for.

To date I've left all the CONFIGURATIONS/OPTIONS values as default. In the Enable/Disable section I've set Display sound/Listen calls/Wild. Tune in the channel where one has heard ALE activity. Eg 18003/usb (generally a whole, occasionally a half, kHz point). Click the button with the black triangle (Resume scan) and wait for the next ALE activity to happen. Note that addresses are often limited to three characters. Finally my thanks to the program's author, Charles Brain, for the following additional tips:
"You have the trace mode enabled. This was designed for a low level HEX trace of the protocol and not for general operation. The [E] means the remote ALE stopped sending, and the [R} means the controller was unable to match it to any of its own callsigns and has resumed scanning. I put it in there for my own bug fixing. You want to enable display sounds and listen calls. Most of the other options are needed only when you using it as an ALE controller.

Items like All Calls determine whether the system will respond to an All Call when scanning. DCD threshold sets the threshold when scanning; too low and it will pause on every channel, too large and it will miss calls. In its start directory you will find a file called owlog.txt. That is a text file which contains all the received callsigns. Also if you go into the Other address menus you can see who you have worked."With some systems disappearing or becoming less evident here's something new for investigation.

You can get the program at: http://www.chbrain.dircon.co.uk
Mac users can get Black Cat Systems' 'MultiMode' program which will decode ALE (and many other modes) from: http://www.blackcatsystems.com/software/multimode.html
http://www.cnn.com/TECH/computing/9909/20/radio.email.idg (Air Force tunes in radios for EMail link)

Leif Dehio in Wiesbaden, has made available all sorts of sound samples, including ALE, on his Web site at:
http://rover.wiesbaden.netsurf.de/~signals/WAV/MIL-STD-188-141A.WAV
The following are samples of modems used in conjunction with ALE:
http://rover.wiesbaden.netsurf.de/~signals/WAV/SWE-PSK.WAV
http://rover.wiesbaden.netsurf.de/~signals/WAV/MIL188-110ASHORT.WAV
http://rover.wiesbaden.netsurf.de/~signals/WAV/8021_VOC.WAV

Also see the 'Digital Signals FAQ' Sections 1B and 1D.

There is IRC chat on the #flacom channel dedicated to ALE listening.

Chapter 4

Setting Up & Running the ALE Controller Program.

Connect the receiver's audio output to either the Line-In or Mic-In on the soundcard, and set their software levels by double clicking on the volume icon in the system tray. You should hear the rig's audio in the computer speakers. Run the file ALE.EXE.

It is possible that, on running the program, a 'Cannot create MSCOMM32.OCX' error will occur. Proceed as follows:

- Make sure that MSCOMM32.OCX is already present in C:\WINDOWS\SYSTEM.
- Make sure that REGSVR32.EXE is also present in C:\WINDOWS\SYSTEM.
- Enter the string 'REGSVR32:MSCOMM32.OCX' in a DOS box or at the Start Run dialogue box of Windows. (You may possibly need to make that 'C:\WINDOWS\SYSTEM\REGSVR32:MSCOMM32.OCX') This will solve the problem and PCALE will run.

Use the Configurations Options pull-down-menu (PDM) to get to the basic settings. In the Enable/Disable panel tick 'All Calls', 'Any Calls', 'Display Sounds', 'Listen Calls', 'Wild', and 'Trace'. If you want to see the low-level command strings tick 'Command Trace' as well. If you want to see any operator chatter (opchat) which may accompany the link setup, then tick both 'Trace' and 'Command Trace' - it produces a rather untidy screen, but the value of the opchat as an aid to identification may well make it worthwhile. Clear any other ticks and 'OK' out to the main screen. If you intend to use the program as a scanner with a suitable receiver, then tick the Freq display' box also, otherwise leave it un-ticked. You will also have to select your radio in the 'Radio Type' box and select the correct serial (COM) port in the parameters panel of the Options screen.

Returning to the main screen, set the receiver to a quiet frequency and adjust the gain levels such that the peaks in the spectrum display in the 'Tune' panel on the main screen can only just be seen. The 'Volume' panel does not work in my Windows '95 installation - The slider cannot be moved. It only seems to work when scanning with the NRD545. (In respect of the NRD545 it is important to note that PC-ALE uses the receiver's memories to store the data from the scanfile, overwriting any data that may have been there before. If you use an NRD545 with PC-ALE, and the data stored in the memories is to be retained, then you must save the memories' data to disc before running PC-ALE.)

Find a frequency with ALE activity. In the European evening the easiest ones to try are 2250, 4841 and 5120 kHz. 4841 and 5120 may be audible in the Americas in their evening as well. These frequencies are used by the Danish military for short-term comms and use real callsigns as identifiers, mostly in the 'OW' series. Any appropriate USAF frequency can usually be relied upon to produce copious ALE activity.

ALE activity is unmistakable. As DW says, it's watery. A bubbling interrupted sound usually in bursts with short intervals between them which can go on for quite a few seconds sometimes. The audio files from the sites listed above will help with identification of the ALE noises.

These can be used to test the soundcard and ALE Controller program setup if you record them and then play them back into the soundcard. You can't play them directly as the computer sound system will be needed for the ALE program!

As an aid to tuning, the 'Tune' Panel's spectrum display will show all 8 tones of the ALE signal as vertical bars. These are centred between the black vertical guide bars when the signal is correctly tuned. I know the signal is often all too brief, but very generally the frequency will be on a whole kiloHertz or half (.5) kHz point, mostly USB but sometimes on LSB. If the receiver readout gives a unlikely frequency, while other indications are that the signal is correctly tuned; if the signal produces no output, consider that you may be listening to the wrong sideband.

If you are unable to scan using one of the supported scanning receivers then leave the receiver tuned to a frequency where ALE activity is to be found. Any ALE activity on the frequency will be processed by the program. It is not necessary to use the scan function to monitor and detect single-frequency activity.
It will occasionally happen that good quality ALE signals will not be processed. This is most likely due to the information we are looking for being masked or encrypted. (See the description of the Application Level (AL) box below). This is a rather rare occurrence.

Other difficulties may be due to incorrect configuration of the computer's sound system. First thing to check is that the sound system is taking its input from the soundcard. Some multimedia programs change many of the sound system's parameters. (I have Windows '98SE, if you have ME, XP and so on, setting up the sound system could be slightly different). At Start Settings Control Panel Multimedia check that the Preferred Playback & Recording Devices are those associated with your soundcard. There will probably be several choices. E.g. my soundcard is described there as "SB Live! Wave Out (and In) [DA00]". Select yours. Next, check that the correct outputs from the soundcard are selected in software. Double-click on the speaker/volume symbol on the taskbar. This will bring up a window having various panels related to the sound system's play parameters. You will require as a suggested minimum the Play Control, Line In, Microphone and Wave Direct-SC panels. If these are not in the window, click on Options Properties, tick the facilities required and OK out of there. Having got the required panels, set all sliders to maximum and ensure that there are no ticks in the 'Mute' boxes associated with the panels.

Next, do the same thing for the inputs (record). Double-click on the speaker / volume icon on the taskbar, Options Properties. Select (.) Recording and check that you have at least the Line In, Microphone and Wave panels ticked. [OK] will get you to the Record panels. Set all the sliders to maximum and ensure that Line Input Select box is ticked. If for some reason you have to use the Microphone input to the soundcard, then tick the Microphone Select box instead.

With everything set up in software and the receiver connected to the soundcard, you should see some activity in the 'Tune' box in the PC-ALE program. You can ajust the software sliders so that the noise just produces 'grass' in the 'Tune' box, but it is probably easier to adjust the level with the receiver's gain controls.

Multimedia applications will almost certainly alter any or all of these settings, so if things in ALE look less than encouraging, then re-check the validity of the settings needed for PC-ALE. If the receiver is scanning properly and you hear ALE bursts which PC-ALE does not recognise, then one of two things is wrong. Either the ALE burst you are listening to is link-protected (the Swiss diplomatic service uses this facility) to which there is no solution, the burst is in the other sideband or is off frequency. If you can identify the frequency concerned in the scanfile, then modify the sideband or produce a special 'search' scanfile with entries from a couple of kilohertz above and below the suspect frequency, using both USB and LSB. Provided the frequency is not link-protected, this strategy will eventually reveal the correct frequency and sideband for the errant scanfile entry.

When an ALE signal is detected the information box at the bottom left of the window will change from 'STOPPED' to 'SYNCHED' and when the ALE burst is finished, the processed information will appear in the bottom pane of the program screen, after which the info box will revert to 'STOPPED'. ('STOPPED' refers to the scanning function, it does not mean that the program has stopped listening!) An addition in v1.03j was a facility to record audio to a .WAV file on hard disc. I have found that it tends to record any activity which comes up following an ALE burst, including modem activity. You may find it useful. Its parameters can be accessed via the PDM Configuration Recorder and allows the facility to be disabled, the maximum recording period for one session and the directory path to be set. Play back the saved data using one of Windows' audio players: Sound Recorder, Windows Media Player, Real Player, RecAll, Total Recorder etc.

In respect of this facility, Sandy Abel pointed out that: In addition to setting The Maximum Recording Period for the amount of audio recorded to your drive in one session. Parameters/Listen Time also needs to be set for the length of time recorded for each contact/patch ie:- 100 = 100 seconds, if the contact/patch

finishes before 100 secs are reached the program automatically resumes scanning, the same also happens when 100 secs have passed.

On one of my computers, this facility seems to record any activity it feels like, and in the root directory of the hard disc too, despite my having set aside a dedicated folder for these recordings!

Interpreting What You Receive.

(The following OWLOG.TXT file entries are squashed horizontally to fit the page. They are otherwise quite genuine intercepts from 3/4 May 2000).
('Trace' ticked)
[11:37:09][FRQ 17487000][SND][HHS][TIS][ ][AL0] BER 13 SN 03 [RX][CH 18][TIS HHS][TIS HHS][TIS HHS][R]

[11:39:15][FRQ 27870000][SND][HAW [RX][CH 25][TWS HAW][TWS HAW][R]	][TWS][	][AL0] BER 21 SN 07

('Trace' off)
[12:16:12][FRQ 10238000][TO][CH11][TIS][KAI1][AL0] BER 28 SN 19
Each of the items of the program's output is enclosed in square brackets. (Boxes).

[11:37:09]	The time the ALE activity was detected, taken from your computer's time, but note: If the time is one hour ahead of UTC, then there is an environment variable somewhere which is causing
Time Box	

the program to add an hour. Usually this is caused by the SET TZ environment setting in AUTOEXEC.BAT. REM it out or delete it.

{FRQ 1748700]

Frequency	If you are scanning and have ticked the 'Freq
Box	display' box in Config Options, this box will

indicate the frequency on which the activity was detected rather than the channel number (CH) (in Hz). WARNING: if you are unable to scan, then please untick the 'Freq display' box, otherwise the boxes probably won't display properly. If you are scanning and have not ticked the 'Freq display' box in Config Options, then the Channel Number only will be displayed. (Channel Numbers are assigned to successive frequencies in a scan file commencing with CH 00). To convert the channel number to frequency you will have to look it up in Channels List.

[RX][CH 18][TIS HHS][TIS HHS][TIS HHS][R]

Trace Derived Info	If 'Trace' is ticked, then this information will
Box	be output, otherwise it is suppressed. It is

probably here that any 'opchat' will be seen. It includes the channel number. Can contain {TIS] and [TWS] (Significance of [R] is not unknown). Note: I cannot say much more about the Trace and Command Trace facilities as I don't fully understand them. Perhaps someone else....? See also the note on Trace under 'additional tips', by the program's author earlier on in this discussion.

[CHN 18]

Channel No	The channel number. In single frequency
Box	operation this will be 00.

[SND][HHS]

Type of	Can be [SND] or [TO	]
Transmission/Address SND = the station is 'sounding', i.e. announcing		
Boxes	its presence and transmitting a signal for link quality assessment by other stations in the net.	

TO = the designation of the intended recipient of the ALE burst which will appear in the next box.
[TO][CH11][TIS][KAI1]
With [SOUND] the ident of the SENDING station.
With [TO] the ident of the individual station to which the ALE activity is being addressed.
Here KAI1 is sending to CH11.

TIS/TWS Box: [TIS] = 'tis - i.e. 'it is', 'this is'.
The identity of the sending station, which will be found in the next box. This is blank on sounding transmissions, when the sender is found in the address box.

[TWS] = 'twas - i.e 'this was'.
This seems to be a sort of termination signal, present with sounding transmissions and seen on termination of Danish Military data transmissions.

[AL0] BER 28 SN 19
AL Box: Application Level indicator. Some users obviously need to protect their ALE setup information from prying eyes, so the setup information is encrypted.
AL0 = No Encryption.
AL1 = Unclassified, 24-bit lattice encryption with a 1-minute protection interval.
AL2 = Unclassified.
AL3 = Unclassified but sensitive.
AL4 = Classified

Each ALE word is encrypted by XORing it with an enciphered seed. The seed is a function of the time of day, the frequency and an incrementing counter. Not much to be exploited here, and you'll only ever see AL0, but it probably explains those very occasional good quality ALE bursts which just won't synch - they're encrypted.

BER Box: This is your monitoring system's ratings of the signals it has recorded. SN being a signal-to noise ratio. The higher the value the better the signal.

The OWLOG.TXT File.
All ALE activity monitored and shown on the screen is saved in this file, so that even if you clear the receive screen (first icon on the ALE taskbar) the data isn't lost. It's an ASCII file, so it can be read with a text editor such as Notepad and printed for later analysis if required. The system doesn't start a new file with each listening session, new data is appended to the previous data along with the date. Be aware of that extra hour that may possibly be added to the times by the program. Note: this may well be a Windows function related to the time-zone which Windows is using and may only be a problem where daylight saving is in force. UK ders ho want to keep their computer on UTC should set their country as: '(GMT) Casablanca,

Monrovia' in Control Panel Date/Time. This prevents Windows from messing about with the computer's time when BST comes into force.

Scanning.
The program is designed to scan a list of up to 100 frequencies with a suitable receiver and control system. The receivers now supported directly by the program are: EK890 FRG100, FT1000MP, FT757GX, FT847, GENERIC, HF1000, IC706, IC707, IC726, IC735, IC746, NRD535, NRD545, IC-R75, IC-R8500, RX320, SKANTI-825, TS850, TT550 and WJ8711.
Indirectly, additional receivers are supported where their serial control parameters and internal microprocessor systems correspond to a receiver type supported by the program. For example, the IC735 and IC736 have identical serial control mechanisms so that the IC736 can be used with the IC735 settings; the IC-R75 can be used with the IC706 selected. (Although there would be no point, as the R75 is catered for).

Receiver Compatibilities & Parameters.

Your Receiver: Select Radio Type: Speed	Serial Port Address	Machine Hex	
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IC736 IC-R75 IC-R8500 TS870 NRD545	IC735	1200	04 Set on Rx
R75	19200 (HI) 5A Set on Rx		
R8500	19200 ?	4A Set on Rx ?	
TS850 NRD545	4800 4800	??	
-- Automatic			

Perhaps others can add to this list.

These notes, from Alan Doherty, may help those who do not have a supported or compatible receiver:

"Hi All,
If your receiver is not yet supported in ALE V1.03d, and you want to try scanning several ALE channels, read on. I tried a little messing around with separate scan programs. First I loaded several ALE frequencies into Scancat for Windows, and set it up to stop on a station, had about 70% success on the stronger signals. Then I programmed my Kenwood TS-870 memories with the same channels, the success rate was not as good this time as the squelch had to be set quite high to enable the scan. One problem with this method, you won't get a log of the active frequencies, but all in all it still proved to be better than sitting for hours and hours monitoring a single channel ! This setup should work for any computer controlled receiver and compatible software.

BTW, for any TS-870 users if you set the baud rate to 4800 and choose the TS-850 setting, it works more or less as it should do from within the ALE software, (though the mode changeover does not work). Have fun...73 de Alan Doherty, GI0OTC" There is a method whereby unsupported receivers can be used to scan via the 'GENERIC' receiver setting. This seems to involve an additional runtime file. I can get some details of this, but be warned : it just isn't for the faint-hearted!

No additional connections are required to scan other than your usual rig-control interface e.g. CI-V for Icom. A squelch detect line is not necessary as the ALE program doesn't rely on squelch: it will hold up the scan when it detects a genuine ALE signal, process it and then restart the scan.
As an aside: if you don't have the (expensive) CI-V for Icom, I have some economy homebrew designs which will do the same job. You will also require to connect your receiver's audio output to the soundcard and ensure that the soundcard can pass the audio to the ALE program.

The audio is usually input via the LineIn jack socket on the sound card, although I did have one soundcard which would only accept input on the MicIn socket. I connect the receiver output to both right and left channels on the soundcard. (Connect audio 'hot' to both tip and ring, and ground/earth/0V to sleeve on the plug which goes into the soundcard LineIn socket).

To make sure the sound system's inputs are correctly configured:
• Double click on the speaker icon on the taskbar.
• Ensure that in the Line In panel the box 'Mute' is not ticked and that the volume slider is around 75% of the way up.
• Whilst you are there, Using the PDM Options Properties, press the 'Recording' button, followed by [OK].
• Ensure that the 'Select' box is ticked in the Line In panel.
• Close the Volume Control applet and ensure that there is some response in the ALE program's 'Tune' window to noise or to a signal from the receiver. If not, adjust the volume settings in software and/or in hardware.

If you use the Mic socket on the soundcard, then substitute 'Mic' for 'Line In' in the instructions above. (This is covered in more detail below).

Program Settings
In PDM Configuration Options, select the appropriate radio in 'Radio Type' (top right) and the appropriate 'Radio Com Port' in the Parameters panel at bottom right. There may be scope for playing with the 'RX Audio Level' setting, but I haven't tried this. Mine's set to 50. If you find that the program lingers too long on a frequency after detecting and processing ALE, adjust the 'Listen Time' box. Mine is set to 10.

Making a Scan File
Use the PDM Channels Add:
• In the dialog box, in 'RX/Frequency' enter the frequency in Hz. (Eight digits for frequencies above 10 MHz, seven digits for frequencies below 10 MHz). i.e. 10581 kHz is entered as 10581000, 2250 Khz is entered as 2250000.
• 'Mode': enter either USB or LSB. Most ALE seems to be on USB.
• 'Usage': doesn't seem to matter - Set them all to DATA. This way you will be able to see any [AMD] (chat and other text material embedded in the ALE burst) - practically essential when monitoring USAF ALE, as it reveals opchat and auto 'phone-patch setup info.
• 'Permission': set to RX. You don't need to enter a TX frequency. Apart from the 'Groups' tick box, which I'll deal with later, ignore all the other boxes.

The PDM 'Channels' allows you to Add, Delete, Modify and List channels, all of which are self-explanatory. 'Goto' will set the receiver to the selected channel.

Organising Scan Files.
100 frequencies is a lot to scan through if all the activity is in a subset of those!
The ALE Controller program has a built-in means of grouping its channels, which allows frequencies to be assigned to a particular group. This will permit, for example separate lists of day and night frequencies within the same scan file. (E.g. day frequencies are marked Group 'A' and night ones Group 'B'.) A scan file

could be split into, for example, a list with the higher (day) frequencies designated Group A and the lower (night) frequencies as Group B. Frequencies of an 'intermediate' nature (appropriate to day and night groups) can both be ticked and will be scanned in both groups. A single frequency can belong to up to eight groups, A-H. When creating a scan file, indicate the group to which the frequency belongs by ticking one or more of the 'Groups' boxes A to H in Channels Add/Delete/Modify. If you are modifying the scanfile with a text editor, the group parameter is at column 37. Note: you can only have a maximum of 100 frequencies in any one scan file.

To scan a particular group: before starting the scanner, use the PDM Configuration Options and tick the group you wish to scan (one group only allowed), OK out of the box and hit the scan button. This is the 5th button on the toolbar - a triangle. To pause (stop) the scan hit the 4th button - the double bar. The first button - the white oblong clears the receive screen. The processed data is still available, however, in the file OWLOG.TXT.

You may find, with some older, slower receivers, particularly Icoms, that if you mix USB and LSB channels, the receiver will be unable to go back to USB immediately after scanning through an LSB channel. As explained below by the program's author, this is a fault of the Icom system. It isn't a problem with the IC706 and the IC-R75 which uses the same control system.
It sometimes happens that pressing the 'Scan' button does not start the receiver scanning. The info box at bottom left of the screen is giving every indication that the scan has started, but the receiver is not scanning. This will happen sometime when changes are made to some items in Configurations Options. If you are satisfied that the receiver control hardware is correctly set up, close the ALE Controller program and restart it. The 'Scan' button will now work. If not, then you will have to check the hardware installation and check also that the receiver's serial speed and address are correct. Check also that all the frequencies in the scanfile are not all set to a group other than that which you have selected to scan. I.e all the frequencies in the scanfile are set to group A and you have selected to scan group B in Configuration Options.

There are three scan rates, 1, 2 and 5, which can be selected from the PDM Configuration Options. 5 is fastest. I seem to catch more activity with it set to 2 rather than 5. The 5 rate is a bit too fast as the receiver's AGC recovery time plus the latency in the Windows operating system means the receiver is taking too long to recover its sensitivity and so bursts are often missed. However, with modern receivers this will not be a problem. Charles explained this and pointed out that he has not yet perfected the scan stop routine. The ALE word takes 392 mS to send, so you will notice that some good bursts get lost. Having said that, he may well now have incorporated these enhancements to v1.03j. Note: changing the scan group or scan speed in Configuration Options does not require a program restart.

Inputing a long scan file via Channels Add can be a fairly long-winded process. After having built a scan file by this method, you can export it via the PDM Fill Dump. This will save the scan file information to disc, via a standard file dialogue box, as an ASCII file with whatever name you may wish to give it, in a directory of your choice. It will have a '.QRG extension by default).

With care you can add, modify, delete and rearrange the frequency information stored in a .QRG file. Use a text editor such as Notepad to make changes, but be very careful to change only the frequency and scan group information. To add a frequency I usually copy a line and then overtype it with the frequency to be added. Watch the shorter line lengths for frequencies below 10 MHz. With a little imagination, you can construct completely new scan files from scratch this way. But no more than 100 frequencies, please. When you've done your modifications, save the file and go back into the ALE program. If you now select PDM Fill Load, the modified scan file can be loaded back in from disc and used by the scanner.
If you get a 'SYNTAX ERROR' during the load process, this probably means no more than a surplus line feed at the very end of the scan file. This is harmless and you can use the file without any problems. This process can be used to generate a selection of scan files. You could have, for example, USAF, DIPLO and UNIDS scan files, all different and separate from each other, loaded as and when required.

Long scanfiles can be split up into ranges such as DIP5-9.QRG; DIP16UP.QRG etc.

Note: DUMP.TXT files from earlier versions of the program can be used simply by changing their extensions to .QRG.

Load in scanfiles via Fill Load which offers a standard Windows file dialogue. To save a scanfile modified with Channels Add, Channels Delete or Channels Modify, use the PDM Fill Dump.

To get Fill to look for scanfiles in the directory of your choice rather than a directory of Windows' choosing, right click on the ALE icon on your desktop, select Properties and enter the directory of your choice in the 'Start In' box, then hit OK. You do of course have this icon on your desktop??!

I have available a DOS program which will generate an ALE scan file which takes its input from the keyboard or from a list of frequencies in an ASCII text file. As it is a DOS program, it seems that it will have only limited application in versions of Windows above 98SE, which don't permit easy access to DOS. If you want it, please ask. I also built into it a facility to generate 'search' files, where start and end frequencies as well as a frequency step can be input. However.... as the ALE program's scan files are limited to 100 entries, this facility is of questionable utility. If you set the step size to 1 kHz, the usual allocation step size, you'll only be able to search 100 kHz at a time, which isn't particularly useful.

This idea was first implemented by DW some time in 2001. He produced working programs, but wasn't then able to compile them into stand-alone .EXE files which would run in a DOS box without needing runtime support libraries. The ones I have will run without any additional support and I am struggling (and how!) with programming a Windows version, but cannot at this time promise anything. DW has now completed a simple but adequate Windows progette to allow a series of frequencies to be input to an ALE .QRG file. It requires a couple of extra runtime support files, but it does the job. I dare say that, if you ask him nicely, he would supply a copy.

Chapter 5

From the author of the program:
Reply-To: Charles Brain
Hello Folks,
Frequencies are entered in Hz
You can add up to 100 frequencies then put them into different scan groups so you can scan different groups at different times. Membership of a scan group is done from the channel dialog box and the current scan group is selected from the options dialog. When adding a freq you only need to input the RX frequency. The software was not originally written for the SWL community hence the reason for channels rather than frequencies in the display, to a non technical user frequencies mean nothing.
[***** This has been fixed from V1.03d on. Frequency display is now *****]
[***** an available option. Thanks Charles. *****]
The problem with the USB/LSB switching is due to older Icom radios not being able to process more than one command at a time, if you send two commands in quick succession only the second one will be processed. I added timing/queing mechanism to get round this but obviously the timeout period
is too short, its fine on my IC706. [**** and on the R75 ****]
The reason so few radios are supported is that I only have 3 different SW radios here so I have to rely on other people to supply information / test the software. Also the ALE S/W comes last in priority, well behind stuff that makes me money, sorry.
I do listen to people's comments and will make changes when I am able to.
- Thanks
- Charles G4GUO

Since the above was written, Charles has indicated that there are unlikely to be any further development of the ALE Controller program. He has other thing to do - like earning a living. Nonetheless, thank you again, Charles.

However, in the event that Charles tires of earning a living and decides to apply himself once more to PC-ALE, there are one or two enhancements which I personally would love to see, like:
- longer scanfiles;
- an indication of the sideband on which activity has been detected - both on the screen and in the OWLOG.TXT file; and
- an indication of the name of the scanfile being run, preferrably on the screen, but in the OWLOG.TXT file as well if possible.

PCAle Controller - PC-ALE Project
Introduction to PCALE v 1.03 g
A few years ago I started on the development of an ALE system for the P.C. which started as a training exercise in DSP and grew from there. The links below provide some light bedtime reading, for those insomniacs amongst you.

ALE SOUND taken from NTIA test disk) [http://www.chbrain.dircon.co.uk/ale.wav]
Final Version of MIL-STD 188-141B (1.5 M zipped) ITS ALE Users Handbook (Offsite Link)
The controllers database can be saved to floppy disk in man readable form and then distributed to all users of the net, this allows centralised net management.

Since writing the above I have now restarted work on this because I am using it to provide a backup orderwire for my digital voice experiments. The software has become quite popular in the Utility listening community. I am gradually adding new radios but this has to take second place to my more commercial work. I have recently entirely re-written all the signal processing modules and those of you used to previous versions of the software hopefully will find from version G onwards a significant improvement in performance. The software is now totally free of any Intel DSP code.

If you would like to try this software it may be downloaded using the link below. You will need at least a 133 Mhz Pentium and a soundcard. Also this software is highly experimental so may not work on your machine. Limited technical support will be provided via Email. It is best to download both files, install the first file then copy the second file to the sub directory that contains the executable. If you have any problems I would appreciate knowing about them, so I can correct them in a latter release.

Software for Win95 Floppy Version (G) 1.8 MB [http://www.chbrain.dircon.co.uk/pcaled.zip]
Latest executable Ver 1.03k (only for upgrading current version) [http://www.chbrain.dircon.co.uk/ale.exe]

Additional Information.
Here are some frequencies, with users where known. Start with the USAF frequencies as the USAF is a prolific ALE user. In Europe, look at 2250, 4841 and 5120 kHz (Danish Military) initially to get a feel for the system. It's also useful to build up some sort of database or list of ALE frequencies from the logs submitted to the YDXF server by stalwarts such as JM, SA, DW, and others. I will be happy to provide such files as I have available by EMail to whoever may require them. Please ask.

Bear in mind that ALE itself is only a setup system for some other system, which may be either data or voice. So what you are looking at is often merely the setup, not the link itself. The link it sets up will not necessarily turn up on the frequency you get the ALE data on, although sometimes it does. The Danish Military for example often send data bursts on 2250/4841/5120 kHz following ALE activity. Mike Chace maintains a useful database of frequencies and ALE identifiers. Mike sees many ALE loggings marked 'UNID' which can be readily identified from the ALE-IDs database located at his Utility Monitoring Central site at: http://www.mindspring.com/~mike.chace/identa.html

Chapter 6

Frequency USB / User
2250 Danish Mil 10190 ALGERIAN
4721 USAF 10581 Swedish Diplo
4841 Danish Mil 11073.5 USAF
5120 Danish Mil 13215 USAF
5784 Unid Diplo 13375 UNID
6481 Unid Diplo 13390 Unid Diplo
6689 Unid Diplo 15016 USAF
6715 USAF 15043 USAF
6721 USAF 15860 Swed Diplo
6863 Romanian Diplo 16105 Swed Diplo
6889 Romanian Diplo 16105 USAF
6980 Swedish Diplo 18003 USAF
6981 Unid Diplo 19060 UNID
7375 ALGERIAN 19340 Austrian UN
7375 USAF 20031 USAF
7672 USAF 20958 Swed Diplo
7972 Swedish Diplo 23337 USAF
8965 USAF 24268 Unid Diplo
27870 USAF
(Some of these may be inactive now : keep an eye on the UDXF logs for up-to-date loggings).

Addresses
The addresses used in ALE activity can vary from the obvious to the obscure.
USAF ground stations are usually identified by the last three letters of the station's ICAO location indicator;
Swedish diplomatic entities are identified by 'S' followed by two figures, amost all of which are common
knowledge to dxers. Others such as Chinese diplomats are identified by such as 'Z1234' which tells us little.
On the other hand, Danish military stations often use callsigns from the International series, such as OWD,
many of which have been identified.

USAF aircraft using ALE employ a string of numbers as ALE identifiers which can easily be converted to tail
numbers and thence to aircraft type. This information, provided by Sandy Abel, is appended to this
document.

I also have a database of frequencies. You can't have the database, but you can EMail me for possible
identification of a frequency. Or ask via the UDXF Listserver - someone may know. (Actually you can have
the database, but interpreting/making use of it would be another matter - and it would be out-of-date in 24
hours!)

Finally a plea. Please submit your logs in the UDXF format if you wish them to go into the monthly
Newsletter. This example shows how you should do it:

Raw data from the screen or OWLOG.TXT:
[16:42:13][FRQ 12101000][TO][S00][TIS][S51]
is logged in the form Freq Call: ID Time Mode Traffic/Remarks Date Sig
as something like:
12101 S51: Swedish Embassy Teheran 1642 ALE/USB Calls S00/MFA Stockholm (25/02/01) (ABC)
or:

[19:01:05][FRQ 7966000][SOUND][5556][TIS][ ]
as, for example:
07966 5556: Unid 1901 ALE/LSB Sounds. (15/Feb/01) (AW)

An Interpretation Exercise
This came via my IC736 ALE scan program while I was writing a previous version of these notes. The activity record comes from the OWLOG.TXT file.
I've cut off rightmost [AL] and [BER] data to keep the line length reasonable - it's irrelevant to this discussion anyway.
1....Some Swedish Diplo:
[20:07:17][FRQ 6980000][TO][S17][TIS][S00]
[20:10:06][FRQ 7972000][TO][S17][TIS][S00]
At 2007 UTC, MFA Stockholm [S00] calls its embassy in Kiev, Ukraine, [S17] twice. Once on 6980 kHz and three minutes later on 7972 kHz.

[16:42:13][FRQ 12101000][TO][S00][TIS][S51]
[16:45:13][FRQ 18686000][TO][S51][TIS][S00]
In this item the Swedish embassy in Teheran, Iran [S51] calls MFA Stockholm on 12101 kHz at 1642UTC. MFA Stockholm returns the call three minutes later on 18686 kHz.

2....Sounding.
[19:01:05][FRQ 7966000][SOUND][5556][TIS][ ]
At 1901 UTC the unidentified Algerian(?) station 5556 makes its presence known on 7966 kHz.

3....Odds & Ends.
[19:48:51][FRQ 8130000][TO][KARIM3][TIS][O13]
At 1948 on the same day, an unidentified outstation [O13] calls the Ministry of Information [KARIM3] in Algiers, on 8130 kHz. (The actual identification of KARIM3 has yet to be confirmed).

[19:54:29][FRQ 8130000][TO][C13][TIS][O13]
Later, our unidentified friend [O13] calls another unknown outstation [C13] on 8130 kHz.

[19:26:47][FRQ 7620000][TO][VKZ][TIS][VKF]
At 1926UTC on another day, unidentified user VKF calls another unidentified user VKZ on 7620 kHz. These are suspected to be Australian military or air force stations using their international callsigns.

4....And Finally...
[14:10:06][FRQ 13370][SOUND][PLA][TWS][ ]
[14:10:14][FRQ 18003][SOUND][PLA][TWS][ ]
[14:11:00][FRQ 27870][SOUND][JNR][TWS][ ]
At 1410, PLA (Lajes Field, Azores (USAF)) sounds on 23370 and 18003 kHz, and a minute later, on 27870 kHz, Salinas/Roosevelt Roads AFB, Puerto Rico sounds for link quality assessment.

That's it.

Thanks are due to Charles Brain, who did the really difficult work, DW, JM, SA, MCo, LDO and AD. Apologies to anyone I may have overlooked.

Enjoy your ALE.
(Jim Dunnett, 23 January 2002).
Updated 7 April 2003)

Appendix

This appendix is tacked on here because the USAF is the most prolific user of ALE, and as such is an excellent introduction to monitoring the system. There follows a compilation of the most important information. This section is almost entirely due to the efforts of Sandy Abel, a prolific USAF logger.

Below is a list of USAF aircraft:- C-5 GALAXY, C-17 GLOBEMASTER, C-141 STARLIFTER, KC-10 EXTENDER, KC-135 (ALL TYPES), C-9 NIGHTINGALE (I have never copied one), HC/MC-130 (only ever copied two)
I have not included the C-9 or the HC/MC-130 in the list.

Tail Numbers ALE ID Series

C-5 GALAXY:-
66-8303 TO 66-8307   168303-168307
67-0167 TO 67-0174   170167-170174
68-0211 TO 68-0228   180211-180228
69-0001 TO 69-0027   190001-190027
70-0445 TO 70-0467   100445-100467
83-1285 131285
84-0059 TO 84-0062   140059-140062
85-0001 TO 85-0010   150001-150010
86-0011 TO 86-0026   160011-160026
87-0027 TO 87-0045   170027-170045

C-17 GLOBEMASTER:-
87-0025 270025
88-0265 TO 88-0266   280265-280266
89-1189 TO 89-1192   291189-291192
90-0532 TO 90-0535   200532-200535
92-3291 TO 92-3294   223291-223294
93-0599 TO 93-0604   230599-230604
94-0065 TO 94-0070   240065-240070
95-0102 TO 95-0107   250102-250107
96-0001 TO 96-0008   260001-260008
97-0041 TO 97-0048   270041-270048
98-0049 TO 98-0057   280049-280057
99-0058 TO 99-0064   290058-290064
99-0165 TO 99-0170   290165-290170
00-0171 TO 00-0185   200171-200185

E-3 SENTRY :-
71-1407 TO 71-1408   E31407-E31408
73-1674 TO 73-1675   E31674-E31675
75-0556 TO 75-0560   E30556-E30560
76-1604 TO 76-1607   E31604-E31607
77-0351 TO 77-0356   E30351-E30356
78-0576 TO 78-0578   E30576-E30578
79-0001 TO 79-0003   E30001-E30003
80-0137 TO 80-0139   E30137-E30139
81-0004 TO 81-0005   E30004-E30005
82-0006 TO 82-0007   E30006-E30007
83-0008 TO 83-0009   E30008-E30009

C-141 STARLIFTER:-
61-2778 312778
63-8076 TO 63-8088   338076-338088
64-0611 TO 64-0645   340611-340645
65-0216 TO 65-0279   350216-350279
65-9401 TO 65-9414   359401-359414
66-0130 TO 66-0206   360130-360206
66-7944 TO 66-7959   367944-367959
67-0002 TO 67-0031   370002-370031
67-0165 TO 67-0166   370165-370166

KC-10 EXTENDER:-
79-0433 TO 79-0434   490433-490434
79-1710 TO 79-1713   491710-491713
79-1946 TO 79-1950   491946-491950
82-0191 TO 82-0193   420191-420193
83-0075 TO 83-0082   430075-430082
84-0185 TO 84-0192   440185-440192
85-0027 TO 85-0032   450027-450032
86-0027 TO 86-0038   460027-460038
87-0117 TO 87-0124   470117-470124

KC-135 ALL TYPES :-
55-3132 TO 55-3146   553132-553146
56-3593 TO 56-3658   563593-563658
57-1418 TO 57-1514   571418-571514
57-2589 TO 57-2608   572589-572608
58-0001 TO 58-0130   580001-580130
59-1444 TO 59-1523   591444-591523
60-0313 TO 60-0376   500313-500376
61-0264 TO 61-0330   510264-510330
61-2662 TO 61-2672   512662-512672
62-3498 TO 62-3582   523498-523582
62-4125 TO 62-4139   524125-524139
63-7976 TO 63-8061   537976-538061
63-8871 TO 63-8888   538871-538888
63-9792   539792
64-14828 TO 64-14849   544828-544849

These are only intended to be a guide. I have available a database of USAF ALE IDs, mostly derived from Sandy's loggings, which is available for the asking. It's in ASCII with one entry per line. Some other ALE addresses of aircraft worth noting:-

ALE Aircraft
512669 S-99(C-135C 61-26690). Usual voice callsign TROUT-99

AF5	C-20C 85-0049
AF6	C-20C 85-0050
AF7	C-20C 86-0403
AF8	VC-25A 82-8000
AF9	VC-25A 82-9000
NW1/4	E-4B (NW = Night Watch)

Some Further Special Exceptions. (Not guaranteed to be current)

ALE Aircraft Voice Call
512669 C-135 'Speckled Trout' Trout 99

599	C-135 'Speckled Trout' Trout 99		
AF2	Air Force Two	Air Force 2 (Presidential a/c)	
AF5	85-0049	SAM 049	(Secret Service a/c)
AF6	85-0050	SAM 050	(Secret Service a/c)
AF7	86-0403	SAM 403	(Secret Service a/c)
AF8	82-8000	Air Force 1	(Presidential a/c)
AF9	82-9000	SAM 29000	(Presidential a/c)
CO1	KC135 57-2589	Casey 01	
HMX263 VH60N 163263 Marine 1	(Presidential helo)		
NW1-NW4 E-48 NAOC Aircraft	Nightwatch 01-04		

352 352 SOG Mildenhall
353 353 SOG Kadena AFB

459	459 AS Andrews AFB
16F	16 SOW Hulburt AFB
16T	16 OSS Hulburt AFB
23A	23 CCS Charleston AFB
51T	51 CCS Robins AFB
52T	52 CCS Robins AFB
53T	53 CCS Robins AFB
66A	66 CCS McChord AFB

Sandy also mentions that, recently, some aircraft have been seen using their SELCAL IDs as ALE IDs, as in this log extract:
"11226 DPCS: unid 1647 ALE/USB Wkg PLA (13Jan02) (SA)"
He says "DPCS matches the SELCAL for C-5 87-0040. Before I can be certain I will have to check through all my logs to find more matches."

Some Base addresses:
AED = Elmendorf AFB AK
ADW = Andrews AFB MD
CEF = Westover AFB NY
CHS = Charleston AFB SC
CRO = Croughton UK (Remote station answered by Andrews)
DDF = Frankfurt Germany
DOV = Dover AFB DE
DVL = Devils Lake Municipal ND (?)
GTL = Thule Greenland
GUA = Anderson AB Guam
HAW = Ascension Island
HIK = Hickam AFB HI
ICZ = Sigonella AB Italy

JDG = NAS Diego Garcia Indian Ocean
JNR = Salinas/Roosevelt Roads Peurto Rico (Remote Station)
JTY = Yokota Japan
MCC = McLellan AFB CA
MET = Weather Shop Scott AFB IL (Hilda Metro)
OFF = Offutt AFB NE
PLA = Lajes Field Azores
RIC = CAP Richmond VA
RSC = Rockwell Centre Cedar Rapids IA
TAE = East Cell Scott AFB IL (Hilda East)
TAG = Incirlik Turkey
TAR = Ramstein Germany
TAW = West Cell Scott AFB IL (Hilda West)

ALE Network Frequencies (in kHz USB)
3059 3137 4721 5708 6715 6721 7632 8965 9025 9057 11226 11250 13215 15043 18003 20631 23337 27870 Also 11175.

USAF [AMD] Auto 'Phone-Patch Strings
USAF DSN numbers are regularly seen with ALE-initiated 'phone-patch traffic. They are designed to connect an ALE-equipped facility to the required DSN number automatically by direct dialling. The DSN is the world-wide US military telephone network. It also permits connection to the commercial telephone network.

The direct dial strings take the form:
[AMD]CCCCPTAENNNN
[AMD]CCCCD83146763286NNNN

In the first instance, the CCCC is the header string and the NNNN a trailer string. These mark the beginning and end of a direct-dial instruction. The D indicates direct-dialling from the number following. A number commencing with 8 indicates that the number following is a DSN number, a 9 indicates a commercial (toll) number.
In the instruction [AMD]CCCCPTAENNNN, ignoring the CCCC and NNNN, the letter P indicates a pre-programmed telephone number. In this case the designator TAE, (Hilda East).

Ignoring the CCCCD8 header and the NNNN trailer in the second example leaves us with the DSN number 314-676-3286 (Incirlik AMCC). 314 is the Area Code (Europe), 676 the Base Code (Incirlik) and 3286 is an extension at Incerlik assigned to the AMCC. The area codes are: 312 - Continental US 314 - Europe 315 – Pacific 317 - Alaska 318 - Central (Bahrain, Kuwait, Mid-East) 319 – Canada

CCCCD9943143308635NNNN would indicate a commercial telephone number was being dialled.
From Sandy Abel, a list of the known DSN numbers in Europe and the USA.

Lajes as with some other GHFS Stations appears to have two Base codes 245/535. " [Possibly, like the ConUS ones - one for access from within the ConUS and one for access from without??]

314 Europe Mildenhall
314-238-2247 AMCC?
238-2552 Metro
238-2121 Banter Control

Frankfurt/Rhein-Main
314-330-8742 AMCC
330-7801 Command Post
330-7471 Base Ops

Ramstein
314-480-2049 AMCC
480-5922 AMCC
480-2488 Metro
480-5713 Base Ops

Sembach
314-496-6145 Usafe Metro
314-496-6146 Usafe Metro

Sigonella
314-624-5371 Command Post
624-5285 Metro
624-8237 Base Ops

Souda Bay (Crete)
314-636-xxxx

Incirlik
314-676-3286 AMCC
676-6837 Command Post (ATOC?)

Rota
314-727-3766 AMCC
727-2407 Base Ops
727-2404 Metro

Moron
314-772-8221 Command Post
772-9084 Metro
772-8237 Base Ops

Lajes
314-245-3514 Metro
314-535-4200 Command Post
314-535-4123 Command Post

There is a slight problem with the Base Codes for the ConUS. A few bases have two codes ie:-
779/576 for Hilda, I believe one is for dialling within ConUS and the other is for the rest of the world. With Hilda 779 is the RoW and 576 is from within ConUS.

Scott AFB (HILDA) :-
312-779/576-1748 Hilda East
779/576-1749 Hilda West
779/576-0301 Flight Manager/Dispatch
779/576-4795 Metro

Andrews:-
312-858-3052 Command Post
858-5826 Metro
858-3411 Airforce Base Ops

Bangor:-
312-698-7788 Maniac Control
698-7238 101St ARS (Ang)

Charleston:-
312-673-2531 Command Post
673-3016 Metro

Dover:-
312-445-4201 Command Post
445-4175 Metro
445-2861 Ops

Grand Forks:-
312-362-6711 Nordic Control
362-4396 Metro

McChord:-
312-382/984-2635 Command Post
382/984-3434 Metro
382/984-5611 Base Ops

McConnell:-
312-743-3251 Shocker Control
743-4424 Scheduling

McGuire:-
312-440/650-3935 Command Post
440/650-3992 Metro
440/650-2712 Base Ops

Offutt:- (Raymond-21)
312-271-8478 Command Centre
271-3459 Metro
271-2398 Snoop Ops

Tinker (Raymond-24):-
312-884-7317 Command Post
884-5714 Metro
884-7239 Ops

Warner-Robins:-
312-468/497-2612 Command Post
468/497-5052 Metro
468/497-2114 Base Ops

Westover:-
312-589-3571 Command Post (Casino Royalle)
589-2879 Metro
589-2581 Base Ops

Credits

- Many thanks to Sandy for taking the time to compile the information above.
- Apart from Sandy, the compilation of the material above has been made possible thanks to the efforts of Ary Boender, Autovon, Graham Tanner and Mike Chace-Ortiz.
- The official DSN directory is available for download on the WWW from various sources. Do a Google search for "dsn directory" and download your personal copy.
- And finally, this unusual situation is sometimes seen on the USAF ALE channels: [LINKED] and [CLEARED] indicates an 'AllCall' situation, where the calling station calls all stations on the frequency and holds them linked until cleared. Purpose of this isn't quite clear.