

RHUG APPENDIX C
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DRAFT

MARS-ALE RADIO EMULATION

This document is current as of MARS-ALE SE v2.00 build **B200A5** which supports Windows 2000 Professional, Windows XP, Windows XP Professional, Windows Vista and Windows 7 (where you **MUST** be logged in as Administrator when installing and where it is best to change the properties of the ALE.EXE to run as XP/SP2).

Preface -

The main purpose of MARS-ALE Radio Emulation (REM) is to support seamless ALE follow-on digital communications via 3rd Party Software applications on the MARS-ALE back end after an ALE link state. Any 3rd Party Software that provides for HF SSB radio CAT control will see MARS-ALE via the REM port as being a KENWOOD (TS-480S in detail) or ICOM (IC-746PRO in detail) transceiver for the purposes of 3rd Party Software HF SSB radio command and control.

In addition, the MARS-ALE REM port will additionally support software tools developed to work specifically with MARS-ALE for follow on communications where the REM will be used for signaling, command and control and data exchange in addition to SSB radio CAT control. An example of this class of software application would be a network server application controlling MARS-ALE for forwarding within an HF-ALE radio-to-radio HF e-mail system.

Overview –

All physical radio types supported by MARS-ALE to include the pairing of exciters/transmitters or transceivers are available via Radio Emulation.

MARS-ALE provides Radio Emulation in a manor where MARS-ALE looks like either a KENWOOD or ICOM transceiver to a 3rd Party Software that provides CAT control of KENWOOD or ICOM radios.

MARS-ALE Radio Emulation does not provide for actual support of all KENWOOD or ICOM CAT commands with the radio selected in MARS-ALE. What is supported for all MARS-ALE “Radio Types” at present are Frequency (unless the Radio Type only supports Radio Memory Control), Mode and PTT. At a later date all the features which can be mapped for each supported “Radio Type” to the two models of radios being emulated will be available for command and control when MARS-ALE is placed into CAT Radio Server mode.

KENWOOD and ICOM REM Details -

MARS-ALE will respond when queried for a Radio ID by 3rd Party Software.

The KENWOOD emulation will return address ID020 to appear to be a TS-480SAT.

The ICOM emulation will return radio address 66h to appear to be an IC-746PRO/IC-7400.

It does not matter to MARS-ALE what KENWOOD or ICOM model is actually selected (and for ICOM what radio address is used) in the 3rd Party Software.

Any commands that are not legitimate KENWOOD or ICOM generic CAT commands are ignored. Any command that is specific to any KENWOOD or ICOM model not supported by the TS-480S or IC-746PRO

are ignored. Commands that are treated differently by a real TS-480S or IC-746PRO that supported in more than one KENWOOD or ICOM model will be acted upon the same by MARS-ALE as would a real radio.

PC Sound Device Modem Considerations -

As MARS-ALE utilizes the PC Sound Device as its modem, when the 3rd Party Software also supports using a PC Sound Device for a modem and it is desired to use same PC Sound Device for both applications, best results will be had when a 48Khz sample rate is used for both transmit and receive by both applications.

For unattended ALE operation with 3rd Party Software is not using 48Khz sample rates for TX/RX, a 2nd PC Sound Device in the system is recommended.

For attended operation, a 2nd PC Sound Devices is also recommended. However an option for attended operation using the same PC Sound Device when different sample rates are being is to make use of the capability to release RESOURCES after the ALE link for follow-on 3rd Party Software communications. After releasing resources the 3rd Party Software can be started and then it can open the PC Sound Device as its sample rates, then after use of the 3rd Party Software it must be shut down and RESOURCES reclaimed. The issues with this approach is the need for additional steps by the user.

ALE follow-on REM Operation -

The user can also directly control the parameters of most “Radio Types” via either the Manual Radio Control Panel (MRCP) dialog or the Man Machine Interface (MMI). By use of MMI commands, either entered directly or via MACRO files using RADCMD and HEXRADCMD the user has full direct control of all radio capabilities, thus whatever CAT control feature is not available via Radio Emulation can still be achieved as desired.

MARS-ALE will not respond to any REM commands during scanning in multi-channel operation. Only REM commands that change the state of the Radio Type selected for control when in single channel operation or when in an ALE inlink state, either single or multi-channel operation will be acted upon. When in ALE inlink MARS-ALE will not accept any Frequency or Mode change requests, it will only accept PTT commands.

All 3rd Party software that is used for ALE follow-on communications which support other than CAT PTT must be configured for CAT PTT regardless of what method MARS-ALE is configured to use for radio PTT if the normal ALE time out setting is to be used as CAT PTT resets that time out on each PTT ON state. If the 3rd Party Software being used is controlling an external TNC/Modem for ALE follow on, then the MARS-ALE timer out must be set long enough to maintain the ALE during the duration of all follow-on communications or must be set to 0 to disable automatic time out.

The CAT PTT command from the 3rd Party Software will cause PTT ON/OFF of the selected PTT method in MARS-ALE, either CAT or RTS/DTR. As all KENWOOD models support CAT PTT all 3rd Party software should do so for all models, however the ICOM radio type selected must support CAT PTT as not all ICOM models do. The TS-480S and IC-746PRO which are being emulated for purposes of radio polling feedback should be supported for CAT PTT in all software. Please note that any station using a Harris RF-350K family radio must interface via the J9 connector for proper CAT PTT for DATA, for any use of Voice the MARS-ALE RED PTT button must be used. Any station using a TT550 and the TT550MA selection to interface for data on the AUX port must also use the MARS-ALE RED PTT button for any use of Voice.

Frequency control provided will set both the Receive and Transmit frequency to that of the VFO A Frequency provided by the 3rd Party Software when the MARS-ALE “Radio Type” that is being controlled requires both, thus there is no Split Frequency support provided. Only VFO A frequency information is supported via Radio Emulation, any VFO B information is ignored. For CODAN radios that are not

configured to support free tuning, the memory channel that comes closest to the entered frequency will be selected. The Frequency data reported back from the radio will that of the current ALE channel that radio was last set to by MARS-ALE unless the MMI command ENABLE RADIOSERVER has been issued, in which case the Frequency data reported back will be the last frequency change made by the 3rd Party Software. Once ENABLE RADIOSERVER is issued, the 3rd Party Software will not be able to track ALE scanning channel changes unless DISABLE RADIOSERVER is issued.

Mode control is provided where if both a Receive and Transmit Mode for the MARS-ALE "Radio Type" is required, the Mode sent via Radio Emulation will be used for both, thus there is no Split Mode support provided. For those using a MARS-ALE "Radio Type" that supports a DIG or DATA mode selection, the only way to access it via Radio Emulation is to use an ICOM model selection that supports DATA mode selection. For MICOM radios PILOT (PLT) mode is selected by FM. The Mode data reported back from the radio will that of the current ALE channel that radio was last set to by MARS-ALE unless the MMI command ENABLE RADIOSERVER has been insured, in which case the Mode data reported back will be the last mode change made by the 3rd Party Software. Once ENABLE RADIOSERVER is issued, the 3rd Party Software will not be able to track ALE scanning channel changes unless DISABLE RADIOSERVER is issued.

For any stations that desire running a 3rd Party Software package for communications behind MARS-ALE that is always sending updates of radio frequency and mode for scanning there is a special MMI command of Radio Message Service Block (RMSBLOCK) that will keep the 3rd Party Application happy but yet not actually update the radio and thus interfere with ALE operation. When ENABLE RMSBLOCK is issued no radio frequency or mode REM commands will ever be passed to the selected Radio Type in MARS-ALE until DISABLE RMSBLOCK is issued.

CAT Radio Server Operation -

MARS-ALE via the Radio Emulation (REM) port supports whatever "Radio Type" is selected in MARS-ALE that supports more than just radio Memory Channel operation for Frequency and Mode control.

You can also use Radio Emulation just for stand alone operation where MARS-ALE acts as a CAT Radio Server to allow for 3rd Party Software control of any radio make/models otherwise not supported by the 3rd Party Software, such as the numerous Commercial, Marine and Military transceivers and receivers as well as many Amateur radios that are not commonly supported in HAM software but are found in MARS-ALE.

At present, when in CAT Radio Server mode is selected (MMI command ENABLE RADIOSERVER) the Frequency and Mode data returned to the 3rd Party Software is that as set by the 3rd Party Software rather than the ALE channel information that is otherwise returned.

MARS-ALE has been tested with various popular HAM software, Rig Control applications, Logging applications and Digital Communications applications, to include programs that constantly request radio parameter feedback and check that a TS-480 or IC-746PRO is the radio actually being controlled. All such programs are happy with the MARS-ALE Radio Emulation. However some programs can not keep up on their end when it comes to monitoring actual MARS-ALE channel changes while in scanning mode. When scan rates in excess of 1 ch/sec are used, for example MixW updates its display of frequency and mode about two times a second, thus its rather poor at keeping pace beyond 1 ch/sec, Flrig can be adjusted for updates, but it too will only follow a 1 ch/sec scan rate. HRD regardless of its polling/refresh setup lags behind and at times falls way behind in frequency display and really falls behind on mode display when mixed USB/LSB channels are used. However CI-V Commander seems to have no problems keeping pace through 5 ch/sec when setup for fast enough polling. So when it comes to having a 3rd Party program monitoring MARS-ALE during scanning it will depend on what program is being used and how it is configured.

REM Configuration -

In MARS-ALE there is no selection of KENWOOD or ICOM required for REM support as they are both automatically supported. The selection of the REM serial port within the range of COM 1 thru COM 16 via the MIL-STD-188-141 Options Dialog is all that is required.

The serial port selected for REM can either be a paired VCP port or a real serial port using a null modem cable to a second computer that is running the 3rd Party Software application. For VCP ports the serial port parameters selected do not matter. When using a real serial port the port parameters that must be used in the 3rd Party Software are 19,200 baud 8N1.

The use of RTS/CTS should not be selected as they are not supported in MARS-ALE for REM and will likely cause issues with the 3rd Party Software.

VCP Port Pairing -

By design MARS-ALE requires a pair of VCP ports for REM support, I recommend the use of N8VM Vcom or other (e.g. MixW ComEmulDrv3) such utility is used to bridge the MARS-ALE and 3rd Party Software. To enable Radio Emulation in MARS-ALE a valid REM Comm Port that is not already in use must be entered. In MARS-ALE the REM Port can be COM 1 thru COM 16 where whatever port is used must be entered into the N8VBvCOM.inf file as one half of the pairing and whatever port is desired for the 3rd Party Software CAT radio port needs to be entered as the other half of the pairing. For example in MARS-ALE we use COM12 and in the given 3rd Party Software we used COM13 and we only wanted one set of pairs in our use of Vcom then the Number of pairs section of N8VBvCOM.inf would need to be un-remarked to read:

```
;Number Of Pairs
;*****
PAIRS=0x01
;PAIRS=0x02
;PAIRS=0x03
;PAIRS=0x04
;PAIRS=0x05
;PAIRS=0x06
;PAIRS=0x07
;PAIRS=0x08
;PAIRS=0x09
;PAIRS=0x0A
;NOTE: MAX is 10 pairs
```

Also the Pair 1 section of N8VBvCOM.inf would need to look like:

```
;Pair 1
;*****
PORT1="COM12"
PORT2="COM13"
```

As VCP ports are being used, the serial port parameters for Radio Emulation in MARS-ALE and the 3rd Party software do not have to match, however should someone desire to run the program on two different PC's due to CPU loading or for whatever reason, then a Null Modem cable will be required and the 3rd Party software will need to be setup for 19,200 baud, No Parity, 8 data bits and 1 stop bit regardless of KENWOOD or ICOM being selected.

Using REM with RMS Express or RMS Server -

RMS Express or RMS Server software can be used for automatic follow-on to an ALE link. Either KENWOOD or ICOM can be selected in the RMS software as the CAT radio type. However ICOM should only be selected if a dedicated digital port or USB-D mode selections are being used on the actual radio type selected in MARS-ALE.

When MARS-ALE is being used with these programs for follow-on to ALE the MMI command ENABLE RMSBLOCK must have already been used as we do not want RMS programs to have radio Frequency and Mode control of the radio. If you are just using MARS-ALE as a CAT Radio Server to make use of a CAT radio not supported by the RMS program, then be sure to use DISABLE RMSBLOCK if it has ever been enabled.

At present only CAT PTT can be used to signal MARS-ALE to maintain the ALE link time out timer to reset, maintaining the ALE link state. As such, only RMS Express and RMS Server programs using Winmor can be supported in fully automatic operation where the ALE link time out timer is reset to maintain the ALE link state. However a future update of MARS-ALE will add an RS-232 signal line monitoring capability on the REM port that will, when tied to the GND and PTT lines from a hardware TNC/Modem or other interface will reset the ALE time out timer. The actual radio PTT under MARS-ALE will be whatever form of PTT is selected via the MIL-STD-188-141 Options Dialog.

In the use of WL2K client tools such as RMS Express or other programs, the use of the RESOURCES button to release RESOURCES will allow for any type of follow-on where the ALE link timer is held at bay until the RESOURCES are reclaimed.

If the user is making use of a Signalink or similar interface device that is wired to a radio port where CAT PTT will not work, then the interface must either be modified for RS-232 signal line (RTS or DTR) PTT or the interface configuration must be changed. Below are details from Ed, AG1M on the modification of the Signalink USB interface to support RS-232 signal line PTT he detailed in his use of PC-ALE.

If the Signalink or similar interface is the only interface being used for both ALE and RMS Express, CAT PTT or RS-232 signal must be used as these VOX based interfaces PTT delays can not be addressed for ALE and meet the ALE standards timing requirements as can be done for Winmor.

Due to REM port PTT support with ACK/NAK cycles if you want to keep the PTT messages in the Engineering Window down, do NOT check "PTT Status Display" on the MARS-ALE MIL-STD-188-141 Options Dialog.

The TUNE window will not display TRANSMITTING when RESOURCES are released if the PC Sound Device is a selected resource for being released

The recommended radio setup for RMS Express is for either KENWOOD or ICOM radios are:

KENWOOD:

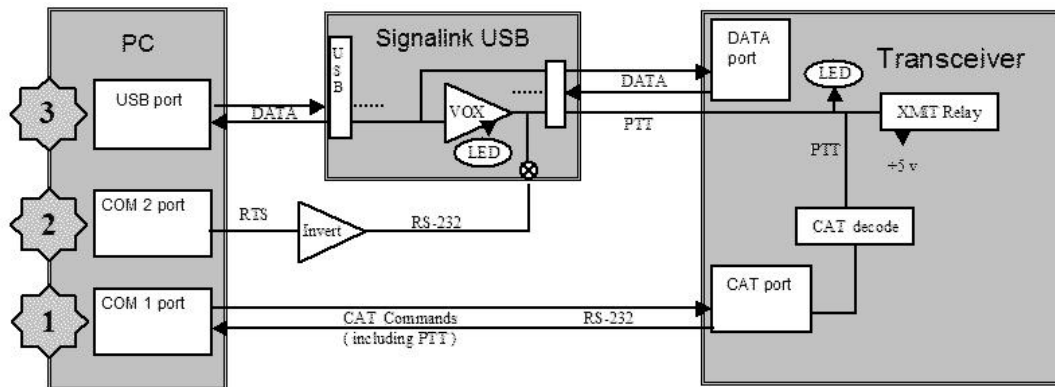
1. 'Select Radio Model: Kenwood Radios
2. Antenna Selection: Default (At this time no ANT port support has been coded for REM)
3. USB radio button selected
4. Use Internal Tuner: Not Checked (At this time no ATU support is coded for REM)
5. Serial Port to Use: What ever pair VCP port that mates with the REM port in MARS-ALE or real ports being used with two PC's.
6. Baud: 9600 or any baud rate will work
7. Enable RTS: NOT CHECKED
8. Enable DTR: NOT CHECKED
9. PTT Port - Serial Port to Use: K450

ICOM:

* The use of ICOM is only recommended if you need to make use of any radios Digital port and USB-D or DIG rather than just normal USB.

1. 'Select Radio Model: Icom Amateur Radios
2. Antenna Selection: Default (At this time no ANT port support has been coded for REM)
3. Icom Address: 66 or anything you like
4. USB Digital radio button selected when needing USB-D support otherwise USB
5. Use Internal Tuner: Not Checked (At this time no ATU support is coded for REM)
6. Serial Port to Use: What ever pair VCP port that mates with the REM port in MARS-ALE or real ports being used with two PC's.
7. Baud: 9600 or any baud rate will work
8. Enable RTS: NOT CHECKED
9. Enable DTR: NOT CHECKED
10. PTT Port - Serial Port to Use: CI-V

SIGNALINK USB RS-232 SIGNAL LINE PTT MODIFICATION



Here is my view of using the Signalink USB for PCALE ...

Using the Signalink USB with PCALE provides you with 3 independent methods of operating the PTT in your transceiver.

1. Using the CAT PTT command.

This command bypasses the Signalink USB and travels on the Com Port from up your PC to the Transceiver. Your Transceiver will show a red PTT LED but the Signalink USB PTT LED will NOT illuminate.

2. Using an RTS signal from a separate PC COM Port.

The RTS now must be inverted and connected to the PTT lead of the Transceiver. Bringing the inverted RTS back into the Signalink USB to pick up the PTT lead to the Transceiver is a good way to do this.

As in method 1, your Transceiver will show a red PTT LED but the Signalink USB will NOT light up.

3. Use the VOX/PTT circuit in the Signalink USB.

This will likely produce a delayed PTT based on the timing of the VOX operation in the Signalink USB (not good). You also need to insure that your volume levels are high enough from your PC to drive the VOX ckt. And, watch for PCALE to periodically MUTE your PC audio, killing the signal needed to drive the VOX.

When this method is working, you will see BOTH the Signalink USB and the Transceiver with their PTT LEDs turned on.

Each of these methods requires specific options to be set in your PCALE configuration (RTS/PTT, CAT/PTT, CAT port, RTS port). If you change the method for operating the Transceiver PTT, you must change the options and possibly the RTS cabling.

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