

DRAFT
RHUG APPENDIX B
20 OCTOBER 2010

MARS-ALE SUPPORTED
ANTENNA TUNERS AND ANTENNA SWITCHES

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).

AUTOMATIC ANTENNA TUNERS:

Although antenna types that do not require the use of an ATU are available, MARS-ALE supports direct control of both transceiver manufacturer based internal/external and 3rd party external Antenna Tuner Units (ATU). For a listing of which make/model radios are supported for CAT ATU and ANT SW operation refer to RHUG Appendix A.

However the capabilities of most transceiver manufacturer based integral ATU devices at this time just barely make the grade for ALE operation due to their range of matching and speed in tuning. As such the use of external ATU devices is highly recommended, be they under direct MARS-ALE control or not.

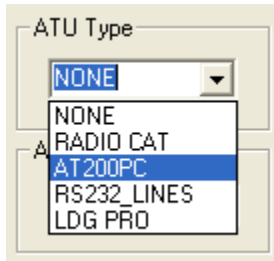
For best receiver sensitivity during ALE scanning operation the ATU selected for use **MUST** be in BYPASS during receive. Most internal ATU units are only in-line when enabled and during transmit, some radios could be modified (e.g. Kenwood TS-850) so that the internal ATU was in-line during transmit and receive. Having the ATU in-line during both transmit and receive provides greater selectivity to the radio receiver when receiving a signal at the frequency for which the ATU is tuned, however this unfortunately is a negative issue during ALE scanning as the received signal on frequencies other than the last one the ATU was tuned on will be attenuated. Many external ATU units are in-line during transmit and in BYPASS during receive by default or selectable for BYPASS during receive where some means is provided for selection of BYPASS via an external signal line. However some external ATU devices provide for no means of selecting BYPASS via signal lines.

In MARS-ALE the RADIO CAT ATU support is handled in one of two ways depending on the make/model transceiver CAT ATU capability, the basic ATU support is either enabled when needed for transmit and disabled for BYPASS during scanning. Those transceivers offering more support allow for the ATU to remain enabled at all times and via CAT is controlled for BYPASS during scanning.

In MARS-ALE the external 3rd party ATU support is handled in one of three ways depending on the category ATU device. Fully computer controlled (e.g. LDG AT200PC) are placed into BYPASS during scanning and for transmit are provided the frequency prior to transmission so that the ATU can be setup per stored memory settings for the given frequency, however the ATU is in AUTO mode so that tuning upon the application of RF can take place should the memory information for the given frequency not be sufficient for the ATU to achieve a match, thus is it also recommended that ATU Tune Words be set to 1. Where External Signal Lines are used for BYPASS or for BYPASS/TUNE directly under MARS-ALE control an additional RS-232 port is required where the External Signal Line support uses the DTR line for BYPASS and the RTS line for TUNE.

ATU TYPE SELECTION:

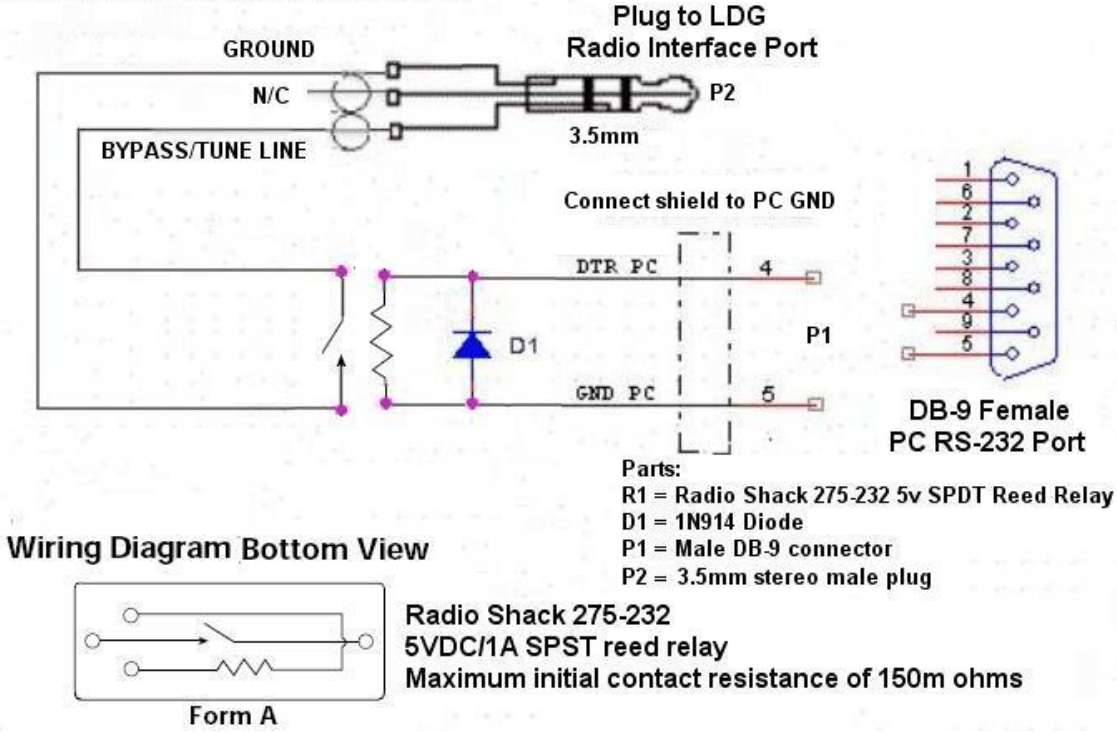
An “ATU Type” selection pull down box on the MIL-STD-188-141 options dialog provides for the selection of the MARS-ALE directly supported ATU type or NONE. If an ATU is used with MARS-ALE and NONE is selected then MARS-ALE has no direct control of ATU operation.



ATU MODEL	CATEGORY	COMMENTS
NONE	N/A	No direct MARS-ALE antenna tuner support.
RADIO CAT	CAT Port	Internal radio antenna tuner under CAT control. Refer to make/model radio listing in RHUG Appendix A to determine CAT ATU support. NOTE: ATU com port configuration is not required.
AT200PC	RS-232	The AT200PC ATU was developed with ALE in mind and is highly recommend if an ATU is required as part of your ALE system. In addition 2 internal antenna ports are provided where each use is embedded in the ATU memories. Once the AT200PC is trained, tuning is accomplished via MARS-ALE sending the ATU the frequency of transmission prior to the application of RF. Should the previously stored parameters not achieve a tuned state within the ATU VSWR threshold setting range, AUTO tuning upon the application of RF will take place. NOTE: Due to the AT200PC characteristic of re-entering tuning after being tuned with common mode currents or with unstable antenna systems, if it is desired, the AT200PC may be placed into MANUAL mode to eliminate the re-tuning after a LINKED state is achieved. To activate the LDG MANUAL command line in the LINKED.DAT file just remove the pound sign (#) in front of LDG MANUAL. Alternately to retain AUTO operation during the linked state the VSWR Threshold setting of the AT200PC can be increased using the LINKED.DAT file and then set back to a lower level using the UNLINKED.DAT file or set to a higher general level using the MMI command LDG VSWRxx via the STARTUP.DAT file. NOTE: ATU comm port selection is required.
RS232 LINES	RS-232	Supports external ATU where user supplied external interface logic as required, provides for the selection of BYPASS, TUNE or ACTIVE. The DTR line (BYPASS) and RTS line (TUNE) of the selected serial port are used to select BYPASS and optionally ACTIVE ATU modes of an external ATU via user provided interfacing circuitry. The default hang times for the DTR and RTS lines are set to 100ms. which can be user selected via the MIL-STD-188-141 options dialog to the right of the ATU Comm Port (a range

		of 10..1000ms is accepted).
		NOTE: ATU comm port selection is required.
LDG PRO	RS-232	<p>This selection specifically supports LDG PRO models via the Radio Interface port on the rear of the ATU for placing the ATU into BYPASS during scanning. The ATU re-enters ACTIVE mode by the application of RF. It is recommended that an “ATU Tune Words” setting of 1 be used to generate the required RF tuning signal to re-enter ACTIVE mode for ATU memory operation. This approach may not work for other LDG models or LDG OEM models such as the Alpha Delta PathFinder that have a Radio Interface port.</p> <p>The DTR line of the selected serial port is used to select BYPASS via user provided interfacing circuitry (see the example below) where the DTR line is held high for 100ms. to achieve BYPASS. The 100ms. is the default value which can be user entered via the MIL-STD-188-141 options dialog to the right of the ATU Comm Port selection (a range of 10..1000ms is accepted).</p> <p>NOTE: ATU comm.. port selection is required.</p>

MARS-ALE Bypass/Tune Control to LDG ATU Radio Interface



ATU COMMUNICATION PORT PARAMETERS:

On the MIL-STD-188-141 options dialog the selection “ATU Comm Port” (COM ports 1..16 are supported) provides for serial port selection for external an ATU that requires serial port interfacing.

10 ATU Comm Port DLYs> 100 ms DTR BYPASS 100 ms RTS TUNE

ANTENNA PORT SWITCHES:

and Antenna Port switches.

ANT SW TYPE SELECTION:

ANT Switch Type

NONE
RADIO CAT
LDG_DTS4
LDG_DTS6
ACOM_2000S
AT200PC
RS232_LINES

ANT SW MODEL	CATEGORY	COMMENTS
NONE	N/A	No MARS-ALE antenna switch support.
RADIO CAT	CAT Port	Internal radio antenna port under CAT control. Refer make/model radio in RHUG Appendix A for the number of antenna ports supported by each make/model radio. NOTE: ANT SW com port configuration is not required.
LDG_DTS4	RS-232	External antenna switch supports 4 antenna ports. NOTE: ANT SW comm port selection is required.
LDG-DTS6	RS-232	External antenna switch supports 6 antenna ports. NOTE: ANT SW comm port selection is required.
ACOM_2000S	RS-232	External antenna switch supports 10 antenna ports. NOTE: ANT SW comm port selection is required.
AT200PC	RS-232	External ATU which supports 2 antenna ports. NOTE: ANT SW comm port selection is required.
RS232_LINES	RS-232	DTR is held high for ANT PORT 1 and RTS is held high for ANT PORT 2.
RS232_LINES4	TBD	The DTR and RTS lines of the selected comm. port for use can be used to select between 2, 3 or 4 antenna ports using

		<p>off the shelf or custom antenna switch systems. To select greater than 3 ports a logic matrix circuit is required where the truth table is:</p> <table border="1"> <thead> <tr> <th>DTR LINE</th><th>RTS LINE</th><th>ANT PORT</th></tr> </thead> <tbody> <tr> <td>0</td><td>0</td><td>1</td></tr> <tr> <td>0</td><td>1</td><td>2</td></tr> <tr> <td>1</td><td>0</td><td>3</td></tr> <tr> <td>1</td><td>1</td><td>4</td></tr> </tbody> </table> <p>NOTE: ANT SW comm port selection is required.</p>	DTR LINE	RTS LINE	ANT PORT	0	0	1	0	1	2	1	0	3	1	1	4
DTR LINE	RTS LINE	ANT PORT															
0	0	1															
0	1	2															
1	0	3															
1	1	4															

ANT SW COMMUNICATION PORT PARAMETERS:

On the MIL-STD-188-141 options dialog the selection “ANT SW Comm Port” (COM ports 1..16 are supported) provides for serial port selection for external an ANT SW that requires serial port interfacing.

12 ANT SW Comm Port