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# *AMCU*

**Antenna Line Monitor Configuration Utility**

## **User Manual**

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**TASC Systems Inc. • Langley, BC • Canada**

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## PREFACE

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This document describes the configuration of the TASC Antenna Line Monitor (ALM) product and the installation and operation of TASC Systems' *ALM Module Configuration Utility* (AMCU).

Hardware and software described in this document are subject to ongoing development and improvement. Consequently there may be minor discrepancies between the information in this document and the performance and design of the hardware and software.



**Before connecting any equipment to an ALM product, the user is advised to read this document in its entirety. Application of voltages in excess of the rated level could seriously damage the ALM and the equipment it is connected to.**

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## REVISION HISTORY

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<b>Revision</b>	<b>Date</b>	<b>Changes</b>
R01	March 2005	•First Release
R02	October 2009	• Added PTT Input Qualifier to firmware • Updated all software images
R03	April 2010	• Added minimum forward power alarm hold time
R04	June 2010	• Added user configurable PTT Input Qualifier field
R05	March 2011	• Removed fwd power measuring from gui and doc.

# 1. OVERVIEW

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## 1.1. Introduction

The TASC Antenna Line Monitor (ALM) product is a hardware module used to measure Voltage Standing Wave Ratio (VSWR) of an antenna system.

VSWR is an indicator of the impedance match between RF (radio frequency) elements.

AMCU (ALM Module Configuration Utility) is the utility used to program, configure, maintain and monitor the operational characteristics of the TASC ALM product.

Running on a Microsoft Windows based computer, AMCU provides a graphical user interface for the technician, which simplifies the task of configuring the ALM. The technician may set alarm configuration details to report excessive VSWR, for example, via contact closure.

## 1.2. AMCU Requirements

The computer requirements for AMCU are:

- PC: 400MHz or higher Intel Pentium Processor or equivalent
- 64MB RAM
- 10MB free hard disk space
- Video Monitor of minimum resolution of 800 by 600 pixels
- CD-ROM Drive
- At least one free serial (COM) port
- A modem with 'AT-compatible' command set
- Windows 98, ME, Win-2000 or Window XP operating system

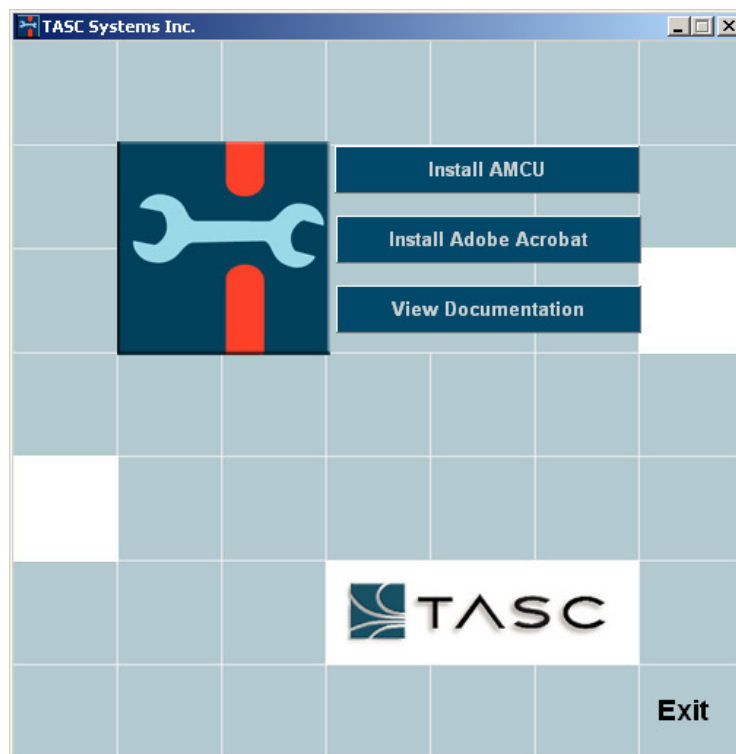
## 2. INSTALLATION

### 2.1. Installing AMCU

AMCU is supplied on CD with the purchase of an ALM product. Future versions of AMCU and updates to the user manual will be available. Please contact TASC or visit our website ([www.tascsystems.com](http://www.tascsystems.com)).

 **If you are upgrading an existing version of AMCU, the older version must be uninstalled before installing the new version.**

Insert the disc into the computer CD-ROM Drive. From the menu, select “Install AMCU” and follow the prompts. If the disc does not auto start, use Windows explorer to locate and activate the setup .exe program on the disc.



Clicking on the *Install AMCU* button will take you to the Program Installation Wizard. The Wizard will guide you through the installation process. Follow the on-screen instructions until the installation is complete.

Clicking on the *Browse Documentation* button will take you to another menu of various relevant documents for reference.



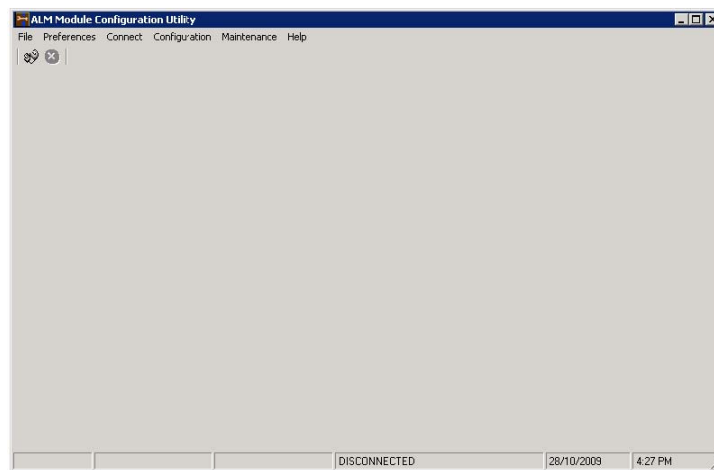
## 3. CONFIGURING

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Launch the AMCU program (version 1.0.41 or later) from the program group folder that was created during the installation process. By default this folder is called "TASC".

### 3.1.1. AMCU Main Window

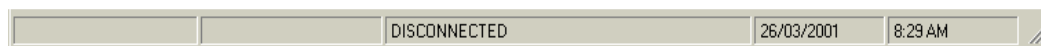
The main window has a conventional tool and menu bar. The main window is shown below:



**Figure 1 - AMCU Main Window**

### 3.1.2. AMCU Status Bar

The AMCU status bar, at the bottom of the AMCU main window, provides informative feedback such as the ALM connection status, operational mode, date and time.



**Figure 2 - AMCU Status Bar**

### 3.1.3. AMCU Version Number

Clicking on the menu item “Help” and then selecting “About AMCU” displays the AMCU version.

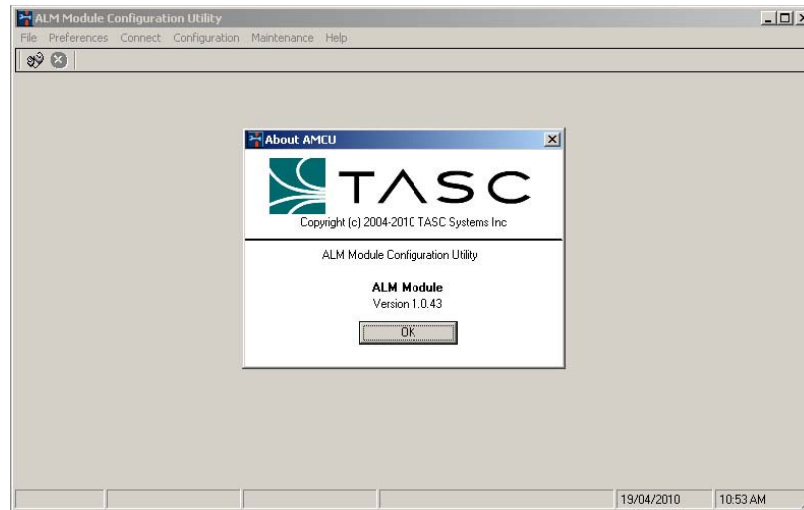


Figure 3 - AMCU Version Number

## 3.2. Connection modes

AMCU provides two basic modes of operation – Local mode and Disconnected mode. AMCU always starts in the Disconnected mode.



When AMCU is first launched, the terminate connection menu item is disabled (greyed out). These items and tools do not become available until AMCU is in Local mode.



Figure 4 - Mode Toolbar

The AMCU toolbar provides ‘one click’ access to any of the four modes (see Figure 4 - Mode Toolbar). From left to right: Local mode and Disconnected mode.

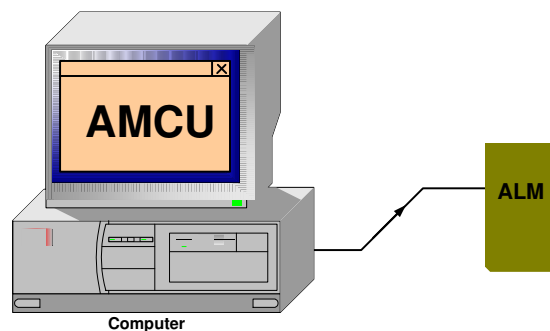
### 3.2.1. Disconnected Mode

When AMCU is first launched it is in the Disconnected Mode (not connected to the ALM device). The Disconnected mode allows limited access to certain menu functions. These are:

- Ability to start any other mode
- Preferences

### 3.2.2. Local Connection Mode

The Local Connection mode is used to connect directly to an ALM module using the computer COM Port. Local Connection mode allows configuration of the product, viewing event logs, monitoring current system status and acknowledging alarms.



**Figure 5 – Local Connection Mode**

Local Connection mode may be accessed via the main menu bar by clicking on “Connect”, then selecting “Local Connection” or by choosing the appropriate toolbar button.

AMCU incorporates an automatic log out feature, which disconnects the link to the ALM product if AMCU senses no keyboard or mouse activity after a preset time.

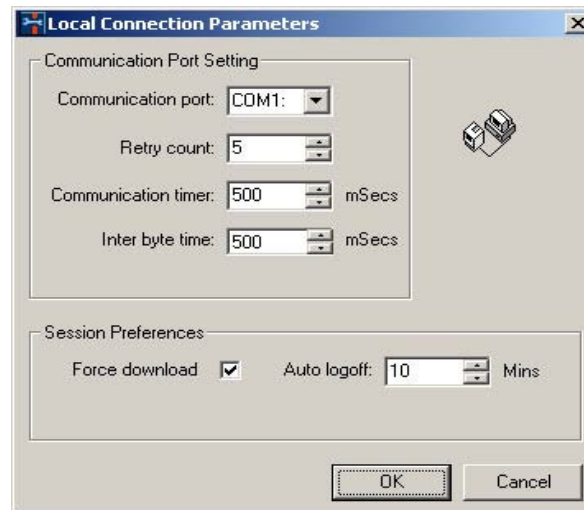
In Local Connection mode all menu items are enabled.

## 3.3. Preferences

The Preferences menu allows access to the settings, which affect the Local Connection Mode. These menu provides individual settings allowing a technician to tailor their particular connection method locally.

### 3.3.1. Local Connection

The following are the settings and their definitions from the Local Connection sub-menu:



**Figure 6 – Local Connection Window**

- Communication Port – Field containing the modem initialization string for the modem attached to the local PC, typically user supplied

*Range COM1 – COM12 / Default COM1*

- Retry Count – Specifies the number of times AMCU will retry a transmission to a ALM module after a communication timeout

*Range 2 – 10 / Default 5*

- Communication Timer – Defines the amount of time to wait for a buffer flush and re-transmission when a packet is not received. This is useful when dealing with systems which may be subject to higher latencies

*Range 500ms – 50000ms / Default 500ms*

- Inter byte time – Defines the amount of time to wait for a buffer flush and re-transmission when a packet is not received. This is useful when dealing with systems which may be subject to higher latencies

*Range 500ms – 10000ms / Default 500ms*

- Force Download – Enable/Disable the auto downloading of all the ALM module configuration information after establishing a connection

*Range Enabled or Disabled / Default Enabled*

- Auto Logoff – The maximum time the AMCU software can be idle before the user is logged out.

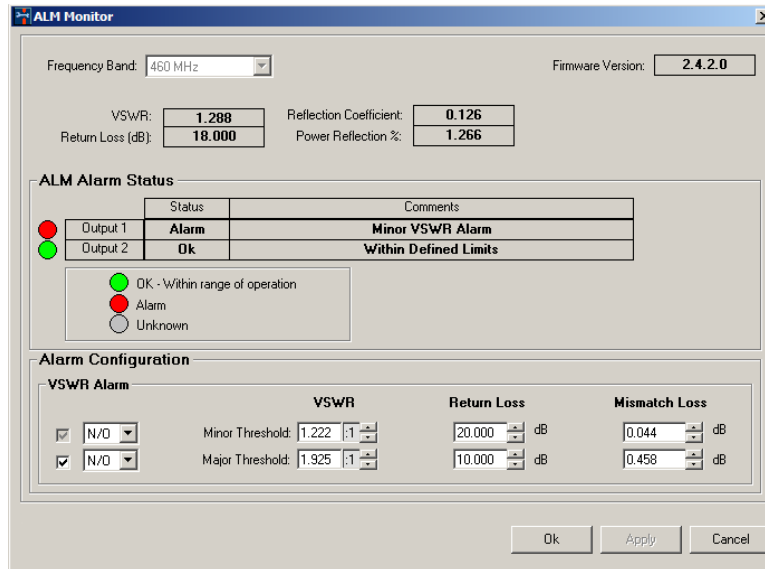
*Range 5min – 30min / Default 10min*

## 3.4. Configuration

### 3.4.1. ALM Module Configuration

The following are the settings and their definitions on the ALM Configuration Form (see Figure 7 -View ALM Status Main Window):

- Firmware Version – this is the firmware version of the ALM. Firmware is displayed as **w.x.y.z**, where *w* is the major version, *x* is the minor version, *y* is the maintenance version and *z* is the patch version.
- Frequency Band – the ALM's tuned frequency band from factory. Not user configurable.
- VSWR – stands for Voltage Standing Wave Ratio, and is displayed as a ratio.
- Return Loss – is the difference between forward power and reflected power, and is displayed in dB.
- Reflection Coefficient – is equal to  $(VSWR - 1) / (VSWR + 1)$
- Power Reflection % – is equal to  $(\text{reflected power Watts} / \text{forward power Watts}) \times 100 \%$



**Figure 7 - View ALM Status Main Window**

ALM alarms can be output via closed contacts to an external alarm monitoring system.

- ALM Alarm Status – displays the status of configured alarms
  - Output 1 and 2 -Shows the alarming status of outputs 1 and 2. Each output is mapped to an enabled alarm configuration. The possible alarm configurations include:
    - 1) VSWR Minor Threshold Alarm
    - 2) VSWR Major Threshold Alarm
  - If only one alarm configuration is enabled, it is mapped to output 1.
  - For Example: If the VSWR Minor Threshold Alarm and VSWR Major Threshold Alarm configurations are selected, the VSWR Minor Threshold configuration is mapped to output 1 and the VSWR Major Threshold Alarm configuration is mapped to output 2.
  - Status – displays the current alarm status. Possible values can be OK, Alarm, or Unknown. An unknown status is reported if the ALM has not yet determined the alarm status. This should only occur briefly in normal operation or while the ALM is off-line.
  - Comments – displays a description about the alarm status.

## Alarm Configuration – use these options to configure the alarm conditions

- VSWR Alarm – The alarm output is activated if the VSWR is above a specific threshold. Two thresholds are available. Each threshold can be specified in terms of VSWR, return loss or mismatch loss. Mismatch loss is the loss of power that occurs due to a mismatch between the transmitter and the antenna. Mismatch loss is measured in decibels.

Formulae:

$$\text{VSWR} = (1 + 10^{((-1 * \text{ReturnLoss})/20)}) / (1 - (10^{((-1 * \text{ReturnLoss})/20)}))$$

$$\text{Mismatch Loss} = (-10 * \text{Log}_{10}(1 - (10^{((-1 * \text{ReturnLoss})/20)})^2)$$

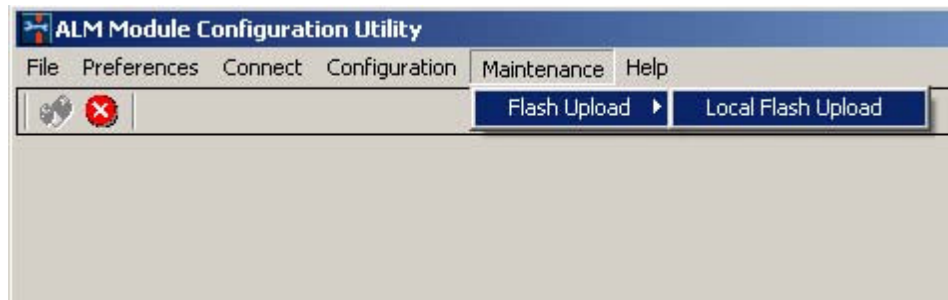
- Alarm Enabled – select the check box(s) on the left to enable the VSWR alarm(s)
  - Output State – determines if the default output state is normally open, or normally closed
  - Minor Threshold – minor VSWR threshold alarm.
  - Major Threshold – major VSWR threshold alarm.
- Copy to Clipboard – copies forward power, reflected power, ALM, return loss, reflection coefficient, and power reflection % to the MS Windows clipboard. Once copied to the clipboard, this data can then be pasted into word processing documents.



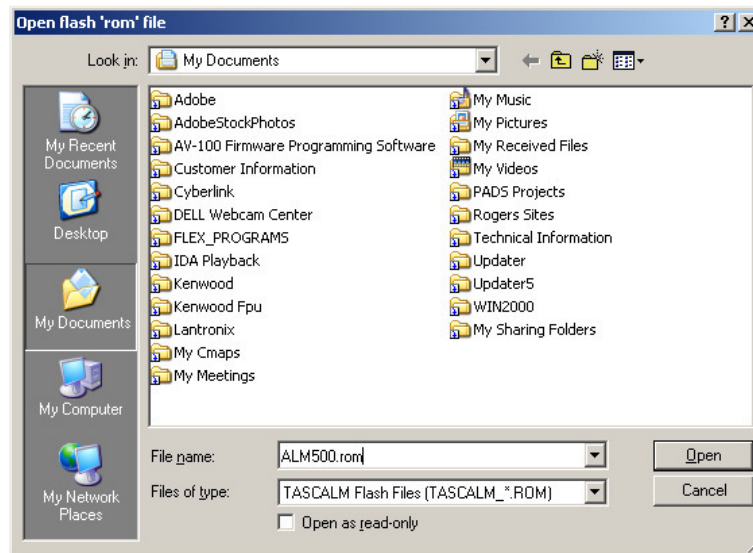
**Note: Variables are not written into the ALM configuration memory until the Apply button is clicked.**

### 3.5. Flash Upload of New Firmware

The “Flash Upload” main menu option allows new firmware to be uploaded to the ALM locally.



Local Flash Upload: The “Local Flash Upload” menu allows new firmware to be uploaded to the ALM using the local connection between the ALM and a COM port on the PC.



Select the .ROM file provided to you by TASC Systems Inc and click “Open”.