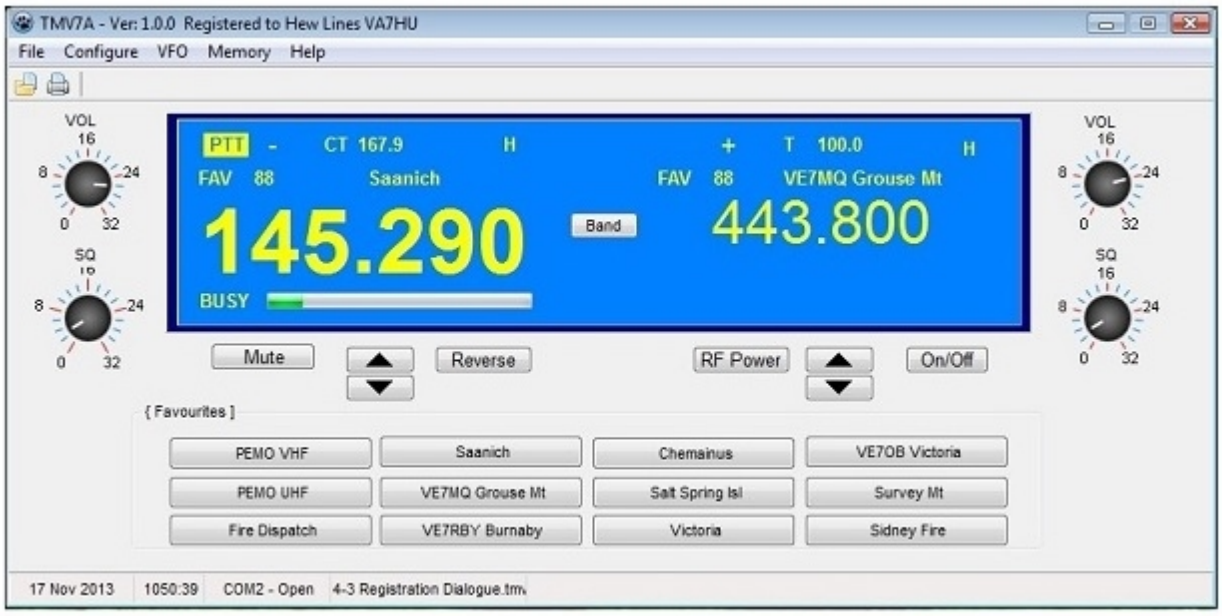
TMV7A

Table of contents

Introduction

Welcome

1.0 GENERAL



W_1

The TMV7A.EXE application has been developed to provide for computer control of the Kenwood TM-V7A VHF/UHF transceiver. In addition. it replicates many of the LCD display capabilities on the computer screen to compensate for LCD displays that have become un-useable on the transceiver.

In developing the software, it was determined that by moving as much of the transceiver functionality as possible, from the TM-V7A to the computer, several enhancements could be made:

- The 100 channel limit of the TM-V7A could be increased;
- The VHF/UHF channel ratio within the 100 channel limit could be removed;
- Additional display items could be provided on the "pseudo" LCD display;
- The 8 character limitation on channel names could be increased;
- The limitation of two colours (Blue/White) could be enhanced by the use of multi-colours on the computer "pseudo" display;
- The limitation of a single "CALL" channel could be enhanced to include the front panel selection of multiple (Favourite) channels using buttonsl; and,
- The provision of Windows Menus, Tool Bar buttons and Status Bar display panels could provide enhanced information display.

Detailed TMV7A.EXE functionality is described in the General Features section.

2.0 DESIGN CONCEPT

It became apparent during early Beta testing that the design concept used in the development of the software was not fully understood, and was obviously not fully explained. Initially the concept was to simply "replace" the transceiver LCD display with a "pseudo" LCD display on the computer. This was to substitute for Kenwood LCD displays that had "deteriorated" and eventually failed.

My display has completely failed and there is nothing intelligible displayed on it at all. However, the LCD display on the TM-V7 transceiver in the truckworks fine. Go figure !

As I developed the software, it quickly became apparent that the lack of software control commands in the transceiver, coupled with the lack of documentation on any commands that were available was going to be a limiting factor in what could be done. Based on a number of factors, I decided that in able to effectively control the operation of the radio, I would have to maintain all of the data on the computer and simply use the radio as a transmitter and receiver as much as I could. This provided a number of advantages.:

- The physical limitations of the radio memory were no longer an issue. I could maintain as many data tables as necessary, and they would not be limited in size. This removed the limitation of the VHF and UHF channels sharing the same data table. With separate VHF and UHF tables, there is no longer a requirement to set a VHF/UHF Memory Channel Ratio. The limitation of 140 channels total has been increased to 99 for each of the VHF and UHF memories;

- The limitation of only a single "Call" channel" is no longer an issue. A set of 12 configurable buttons has been implemented to allow for the rapid (single button selection) of up to 12 "Favourite" channels; and,

- The display limitations of the radio LCD display have been removed by virtue of using the computer to provide a "pseudo LCD display". This provides for additional display items to be shown, as well as the increased use of colour for various display items.

As a result of these design concepts and considerations, it is important that the user understand that the TMV7A application is not simply a "Replacement Display", but is in fact a "Replacement Control Head". This concept requires that the transceiver LCD display and controls, **NOT BE USED.** The radio display **WILL NOT** accurately display the software configuration, and any changes made to the physical radio **MAY NOT** be reflected back to the software display. Needless to say, things can get very ugly very quickly !!

What's new

Date	Version	Type of Update	Details
	1.0.0	Full Release	Initial Release

General Features

The TMV7A.EXE application provides the following functionality:

- Uses a standard Windows GUI;

- Interfaces through a standard Windows serial interface to the TM-V7A transceiver using the Kenwood PG-4S Programming Cable;
- Works as a "remote control head", replacing the TM-V7A display and controls;
- Emulates the TM-V7A control head as closely as possible with additional enhancements;
- The capability to control the radio using VFO mode;
- Maintains all databases on the computer, not in the radio;
- A detailed Help file;
- Maintains program configuration in a standard Windows ".INI" file;
- Automatically loads the .INI file on startup;
- Automatically saves the .INI file on shutdown;
- The capability to emulate switching the radio "On' and "Off";
- The capability to switch between VHF and UHF bands;
- The capability to display the following items on a "pseudo" LCD display:

  PTT - TX Band;
  H, M, L - RF Power Level;
  T - Tone On/Off and Frequency;
  CT - CTCSS On/Off and Frequency;
  R - Reverse;
  S, -, + - Repeater Offset Direction;
  BUSY Indicator; and,
  ON AIR Indicator.

- The capability to select a repeater offset of Simplex (S), Up (+) or Down (-);
- The capability to select a Tone or CTCSS frequency from a list of standard tones;
- The capability to turn the Tone or CTCSS function "On" or "Off";
- The capability to automatically select a standard repeater offset for VHF (600 kHz) and UHF (5 MHz) repeaters;
- The capability to select "Reverse" functionality for repeaters;
- Display the following data when in Transmit mode:

  Transmit Frequency;
  The text "ONAIR"; and
  RF Power Level.

- Display the following data when in Receive mode

  Receive Frequency;
  The text "BUSY"; and,
  S-Meter reading.

- Display the following data on the Status bar:

  Date;
  Time (changing each second);
  Selected COM port and status (Green = Open, Red = Closed);
  TMV7A data file; and
  Any Comments defined in the TMV7 File for the selected channel.

- A set of 12 User-Configurable "Favourite" buttons to quickly select up to 12 pre-configured channels with a single button-click;

- The capability to Configure and Save Favourite button configurations;

- The capability to Load Favourite button configurations automatically on startup and manually as required;

- Volume and Squelch control for both bands (VHF and UHF);

- The capability to select RF Power output levels;

- Ten user-selectable colour schemes for the LCD display;

- The capability to Import data files created by the Kenwood MCP-V7 software program.

Getting help

The Help file contains a few features that you should know about.

There are hyperlinks throughout the text, in three colours:

- Those in purple jump to a definition in the Abbreviations. You can also get to the Abbreviations by using the Contents tab;

- The hyperlinks in green jump to various sections of the Helpfile that go into more detail about the subject of the link; and,

- The hyperlinks in blue will attempt to link to a World Wide Web site to provide external resources that may help you with hardware and other issues.

In all cases, once you have jumped to a new location, the Forward (**->**) and Back (**<-**) arrows allow you to move sequentially through all topics.

You can use Help in three ways.

- The Table of Contents can be found under the Contents tab at the top of the page. Use the Table of Contents to navigate to a topic; and,

- The Index and Search tabs of the Help window will allow you to search for specific topics or individual words within the Helpfile.

- The Favourite tab allows you to bookmark and then return to your Favourite topics.

Getting Started

System requirements

The TMV7A application has been tested on MS WIndowsXP, MS Vista Business and MS Windows8 and requires a single RS-232 serial port. It has been tested with both on-board serial ports and USB serial cables.

A printer is required in order to print reports from the application.

Installation

The installation and setup of the TMV7A application is descirbed in the document "TMV7A.EXE Software Installation Procedures" included in the Software Release package.

Registration

Configuration

Un-Install

All files required for the TMV7A application are contained in the TMV7A folder and sub-folders. Top uninstall the application, simply delete the TMV7A folder and all sub-folders and remove the shortcut ICON from the desktop.

Forms

Main Form

1.0 GENERAL

MF_1

and The Main Form is he form that provides the user interface to all functionality of the TMV7A application consists of a Title Bar, Menu Bar, Tool Bar, transceiver Control Head and Status Bar.

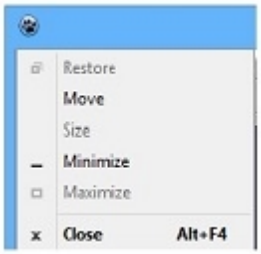
2.0 TITLE BAR

The TMV7A Title Bar contains a standard Windows System Menu, text displaying the application Version Number and Registration Status, and a set of WIndows System Icons.

MF_2

Note that the application can only be Minimized and Maximized. Its screen size cannot be changed when displayed. It has been designed to open in the centre of the display and to be fully visible on an 800x600 size display used by notebooks. The display position may be changed, and the current display position is saved when the applicaition is closed. When re-opened, it will be displayed in the saved position.

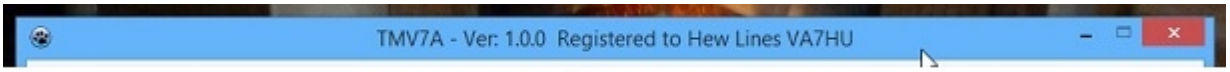
2.1 System Menu



MF_3

The System Menu provides menu items and hot keys to Move, Minimize, Maximize and Close the application. All other functions are disabled.

2.2 Application Version Number and Registration Status

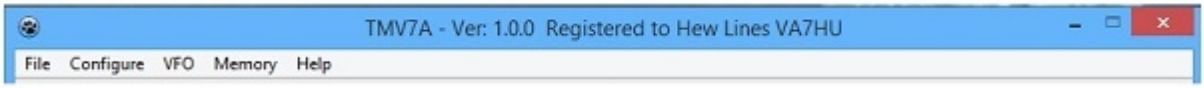


MF_4

2.3 System Icons

MF_5

3.0 MENU BAR

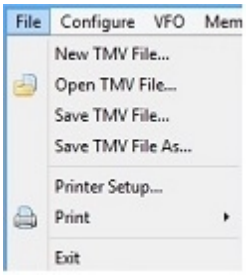


MF_6

The Menu Bar consists of five Main Menu items that provide:

- File Functionality;
- Application Configyration;
- VFO Frequency Selection;
- Memory Channel Configuration and Selection; and,
- Help and Registration Functionality.

3.1 File Menu Item

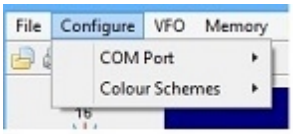


MF_7

The File Menu item consists of seven menu items that allow the user to access the following functionality:

- Create a new TMV data file;
- Open a TMV data file;
- Save the TMV data file currently in use;
- Save the TMV data file currently in use using a different filename;
- Setup the a selected printer;
- Print a TMV data file; and,
- Exit the application.

3.2 Configure Menu Item

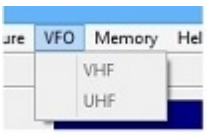


MF_8

The Configure Menu item consists of two menu items that allolw the user to:

- Select and Configure the application RS-232 Serial port; and,
- Select an LCD Colour Scheme from a set of ten pre-defined colour schemes.

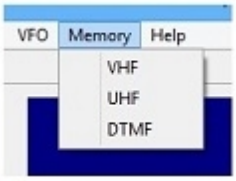
3.3 VFO Menu Item



MF_9

The VFO Menu item allows the user to configure and select a VHF or UHF frequency.

3.4 Memory Menu Item



MF_10

The Memory menu item allows the user to select and configure:

- VHF memory channels;
- UHF memory channels; and,
- DTMF codes.

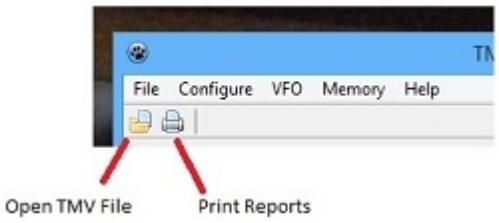
3.4 Help Memory Menu Item

MF_11

The Help menu item allows the user to:

- View the Helpfile;
- Register the application; and,
- View the application Version number and Release date.

4.0 TOOL BAR



MF_12

The Tool Bar consists of two tool buttons:

- Open TMV File; and,
- Print Reports.

5.0 CONTROL HEAD

MF_13

5.1 General

The Control Head is the display of the Main Window of the application. It is designed to emulate the TMV7A front panel and LCD display as closely as possible and to provide additional visual and functional enhancements to the original transceiver functionality in two ways; The LCD Display Area and the Functional Controls.

5.2 LCD Display Area

MF_14

The LCD Display consists of four areas, the:

- Channel Status;
- Channel Information;
- Frequency Display; and,
- RX/TX Status.

5.2.1 Channel Status Area

MF_15

The Channel Status area consists of two sets of status indicators, one for each band channel (VHF & UHF). Some of the indicators replicate the equivalent indicators from the transceiver directly and some replicate the status with a different indication. The following Status Indicators are available for each band:

Transmit Band Indicator (PTT)

The Transmit Band Indicator identifies the band that is currently selected The mnemonic "**PTT**" is displayed in inverted video and is always visible to the left of the status indicators for the selected band only. The non-selected band will display no PTT indicator.

Channel Offset Indicator

The Channel Offset indicator displays the repeater offset configured for the selected channel. The possible indicators are "**S**" (Simplex - no offset), "**+**" (Plus offset) and "**-**" (Minus offset).

Reverse Indicator

The Reverse Indicator ("**R**") indicates that the Repeater Reverse function has been selected with the Reverse button. The displayed Receive and Transmit frequencies for that channel will be displayed in reverse order the normal display.

Tone Indicator

The Tone Indicator has three states, "**T**" (PL Tone), "**CT**" (CTCSS Tone) or Off (nothing displayed), and indicates that either a PL Tone, CTCSS Tone or No Tone has been configured for the selected memory channel.

Tone Frequency

If a Tone has been selected for the current memory channel, then the selected Tone Frequency will also be displayed. If no tone has been configured, then no Tone Frequency will be displayed.

DTSS Indicator

The DTSS Indicator "**DT**" indicates that the DTSS Code functionality and a DTSS Code has been configured for that channel.

DTSS Code

The DTSS Code is a three digit code that can be configured for each memory channel. If the DTSS function is enabled, the three-digit code configured for that channel will be displayed.

RF Power Level

The current Transmit RF Power level for the selected memory channel will be displayed using the mnmonics "**H**" (High), "**M**" (Medium) or "**L**" (Low). The default RF Power Level configured for the selected memory channel will be displayed unless changed by the RF Power button.

5.2.2 Channel Information Area

MF_16

Channel Information is displayed for both selected channels and consists of the memory channel type **"VFO"**, **"FAV"** (Favourite Buttons) or "**MEM**" (Memory channels and the name assigned during channel configuration.

5.2.3 Frequency Display Area

MF_17

The Frequency Display displays the Receive and Transmit Frequencies exactly the same as the TMV7A does. The selected frequency, is displayed in large, bold digits and the non-selected frequency is displayed normally. In Receive Mode the Receive Frequency is displayed and when in Transit Mode the Transmit Frequency is displayed.

5.2.4 RX/TX Status Line Area

MF_18

The RX/TX Status Line displays the transciever Receive and Transmit status of each band exactly as the TMV7A does.

If the channel is in Receive Mode, the RX/TX Status Line is blank unless a signal is being received, in which case the word "**BUSY**" is displayed along with a horizontal S-Meter bar displaying the current S-Meter reading. The length of this bar will vary depending on received signal strength (S-Meter reading).

if the channel is in Transmit Mode, the words "**ON AIR**" is displayed along with a horizontal RF Power bar displaying the current RF Power level selected for that channel (H, M or L).

5.3 Functional Controls

MF_19

The Functional Controls consist of four analogue controls (two Volume Controls and two Squelch controls) and 19 mouse-selectable buttons.

5.3.1 Analogue Controls

The Analogue Controls consist of two sets of Volume and Squelch controls, one on either side of the LCD Display (VHF controls on the left and UHF controls on the right).

5.3.2 Buttons

The buttons are divided into two operational catagories:

Buttons not related to either channel. There are two buttons that are not either radio channel:

- **ON/Off Power Button** - This button provides the same functionality as the TMV7 "PWR" button. The important thing to note is that the TMV7 MUST be powered on first in order for the software to detect the initial power state of the radio. Once that has been done, ONLY the On/Off power button of the software should be used to turn the TMV7 On and Off.

MF_20

- **Mute Button** - This button is a toggle that turns the received audio of **BOTH** channels On and Off. If the Mute fubction has been toggled On, then the text "**Mute**" on the button is displayed in bold Red letters, and the backgrouns of both Volume controls is displayed in red as a reminder. The Volume and Squelch control indicators also display a value of zero. When Mute is toggled off, the red display indications disappear and the Volume and Squelch controls return to their set values before Mute was turned on.

Buttons related to a specific channel. These buttons provide functionality to the selected channel or are used to select a different band or channel.

- **Channel Select Buttons** (Up/Down Arrows) - These buttons are not yet implemented.

- **Reverse Button** - This button is a toggle button only enabled if the selected channel is a repeater channel and if a simplex channel is active, an error message will be displayed. The Reverse functionality is different than that in the TMV7 and will Reverse the Transmit and Receive frequencies of the selected channel as well as turn off any tone functionality enabled. The LCD Reverse indicator will change to reflect the reversed offset, any tone indicators will disappear and the text "Reverse" on the button will be displayed in red. When the Reverse function is toggled Off, the LCD Display will return to it's previous state displaying the Shift and Tones status correctly.

- **RF Power Button** - This is a toggle button that toggles thru the three possible states for Transmit RF Power level (L, M and H) of the selected channel.The LCD Display RF Power indicator will change as the different levels are selected.

- **Favourite Channel Buttons** - There are 12 user-confiogurable Favourite Channel buttons that provide the capability to configure and select a specific channel.

  Placing the mouse cursor over a Favourite Channel; button and pressing the left mouse button will select the channel (either VHF or UHF) configured for that button.

  Placing the mouse cursor over a Favourite Channel button and pressing the right mouse button will open the Data Entry form and allow the user to configure the channel assignment for that biutton.

6.0 STATUS BAR

MF_nn

The Status Bar consists of five "panels", the:

- **Date Panel** - Displays the System Date;

- **Time Panel** - Displays the System Time. The displayed time is updated every two seconds;

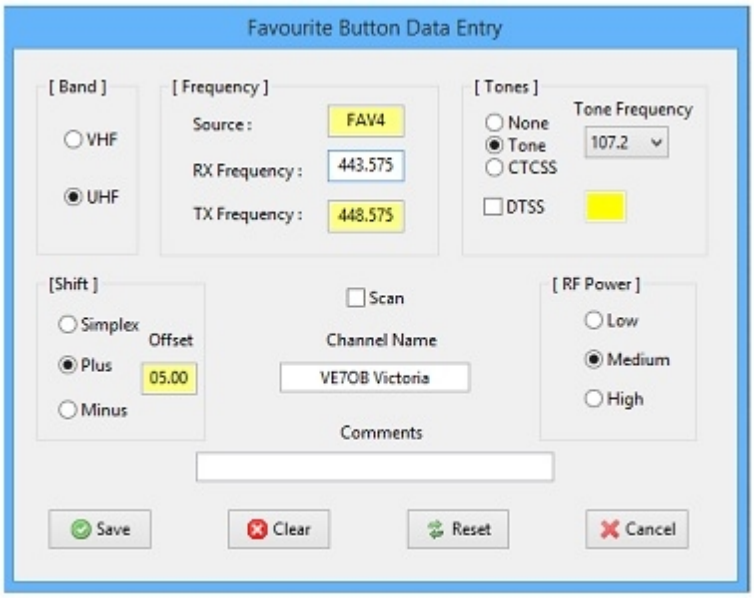
- **COM Port Panel** -Displays the currently selecedt Windows COM port. If not port is selected (initial installation), the text "None" is displayed. If a port has been selected, the COM port number is displayed along with the current status of that port. If the port is "Open", the text "Open" is displayed in green. If the port is closed, the text "Closed" is displayed in red.

- **TMV FIlename Panel** - If a TMV data file has been selected, the Filenamer is displayed in this panel. If no TMV file is open, this panel will be blank.

- **Channel Comments Panel** - Any comments configured for the currently selected channel will be displayed in this panel. If there are no comments configured, this panel will be blank.

Data Entry Form

1.0 General



DEF_1

The Data Entry Form is a common form used to configure all channel data regardless of source (VFO or Memory) or band (VHF or UHF) and consists of a Title Bar, Main Data Entry Area and four Command Buttons. When the Data Entry form is initially displayed, the data from the channel last selected for the data source will be used as default data to populate the Data Entry form fields.

2.0 TITLE BAR

The Title Bar displays the data source or Channel Type (VFO, UHF Memory, VHF Memory or Favourite Button).

3.0 MAIN DATA ENTRY AREA

The Main Data Entry Area consists of a small data entry area and five functional Data Entry Panels that contain standard Windows Textboxes, Drop-Down Lists, Radio Buttons and Checkboxes. These controls are enabled and disabled depending on the data being entered at any specific time. Within each panel, only one of the set of Radio Buttons available can be selected. There are three Textboxes that are read only and cannot be changed (Source, TX Frequency and Offset). These boxes contain static or calculated data. A fourth Textbox (DTSS Code) is only enabled if the DTSS Checkbox has been selected.

It is imprtant to understand that the Band, Frequency and Shift panels are all related and work together. The Band radio buttons define the frequency limits for entry and the Shift Offset value. The Shift Offset value is used in the calculatiuon of the Transmit Frequency.

Extensive error checking and data validation are done on the data entered into this form. When the Save button is selected, all data is checked to ensure that the frequency entered is valid for the band selected, the DTSS Code if entered) is three digits and, a valid Channel Name is entered. The data entered into each text box is validated on entry and only valid digits or alpha-numeric characters are allowed as required. A channel entry will not be saved with invalid data and an error message will be displayed indicating the error.

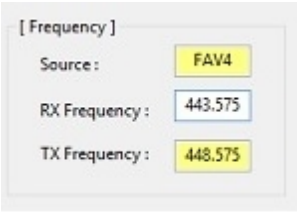
3.1 Band Panel

DEF_2

The Band Panel contains two radio buttons that are used to configure the band to be used for this channel and as a direct result define the frequency limits that are valid for the entry of the Receive Frequency and calculation of the Transmit Frequency as well as the Frequency Offset value to be used (600 kHz for VHF or 5 MHz for UHF). Frequency limits are those limits defined in the Kenwood TMV7A manual and are VHF - 118.0 MHz to 173.995 MHz and UHF - 410.0 MHz and 469.975 MHz.

Only one radio button may be selected.

3.2 Frequency Panel



DEF_3

The Frequency Panel contains three Textboxes. The user can only enter data into the RX Frequency textbox. the other two textboxes are read-only.

3.2.1 Source Textbox

The Source textbox is a read-only textbox that is used by the application to identify both the source or channel type.

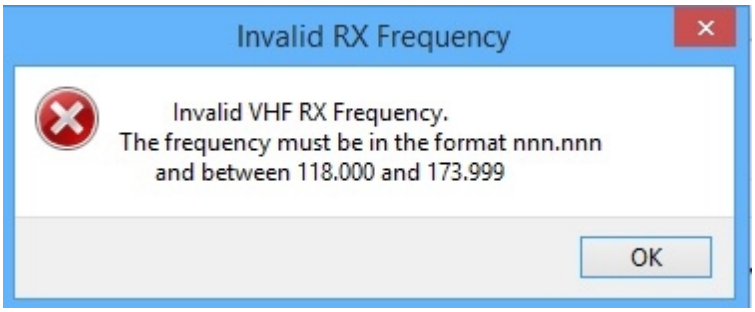
If the source is the VFO the text will display the band and text "VFO" (VHFVFO or UHFVFO) depending on which menu item was selected.

If the source is one of the Memory dialogue boxes then the text will display the band and channel number (VHF001 or UHF001).

If the source is one of the Favourite buttons then the text will display "FAV" and the button number (FAV1).

3.2.2 RX Frequency Textbox

The RX Frequency textbox will display the current frequency of the source. In the case of a blank (non-configured) Memory channel or Favourite button then it will be blank. This is the textbox used to enter the desired frequency. The data entered in this textbox is validated on entry and must be in the format "nnn.nnn". Only the digits 0 to 9 and the decimal point may be entered and the decimal point may only be in the fourth character position. The frequency must be a full six-digit value. It is important to note that only a valid frequency can be entered depending on the setting of the Band radio buttons (UHF or VHF). Any invalid frequency will result in an error message.

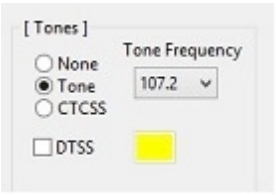


DEF_4

3.2.3 TX Frequency Textbox

The TX Frequency is automatically calculated by the application depending on the band selected and is displayed in this textbox. It is not editable by the user.

3.3 Tones Panel



DEF_5

The Tones panel is used to configure PL or CTCSS tone and DTSS Code functionality and consists of three radio buttons and a drop-down list for tones and a checkbox and edit box for DTSS Codes.

3.3.1 Tone Functionality

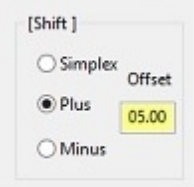
There are three radio buttons used to define tone functionality. Only one of the buttons may be selected:

- **None** - This is the default value and if selected then no tome functionality will be available for this channel entry and the Tone drop-down list will be disabled.
- **Tone** - If selected, this button will enable PL Tone functionality for this channel entry. The Tone Frequency drop-down list will be enabled and a tone must be selected from the list. If no tone is selected, an error message will be displayed.
- **CTCSS** - If selected, this button will enable CTCSS Tone functionality for this channel entry. The Tone Frequency drop-down list will be enabled and a tone must be selected from the list. If no tome is selected, an error message will be displayed

3.3.2 DTSS Code Functionality

DTSS Code functionality is enabled by selecting the DTSS checkbox. If this checkbox is selected, the DTSS Code edit box is enabled and the DTSS default code "000" will be displayed. This default can be changed but the change must be a three-digit code between 000 and 999.

3.4 Shift Panel



DEF_6

The Shift panel consists of three Shift radio buttons and an offset Textbox and is used to select either Simplex or Repeater operation for the channel entry. The Repeater Offset value is fixed and is a function of the band selected in the Band panel (600 kHz for VHF or 5 MHz for UHF). The offset value is displayed in the Offset textbox automatically.

Only one of the radio buttons can be selected.

- **Simplex Radio Button** - No offset is applied.
- **Plus Radio Button** - The offset displayed in the offset textbox is applied and the Transmit frequency is shifted up by the offset value.
- **Minus Radio Button** - The offset displayed in the offset textbox is applied and the Transmit frequency is shifted down by the offset value.

3.5 RF Power Panel

DEF_7

The RF Power panel conatins three radio buttons that are used to select the default RF power setting for the channel entry. Only on of the three buttons may be selected.

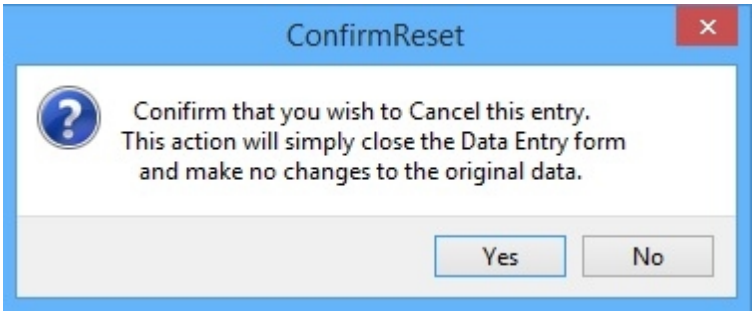
4.0 COMMAND BUTTONS

There are four command buttons at the bottom of the Data Entry form that allow the user to complete the DataEntry process.

4.1 Cancel Button

The Cancel button is used to cancel the Data Entry process and exit the Data Entry form without changing or saving any channel data. If the Cancel button is selected, a confirmation message is

displayed requireing the user to confirm the cancellation with no changes.



DEF_8

If the user selects the <Yes> button the DataEntry form will be closed. If the user selects <No> the form will remain open and no changes will be made.

4.2 Reset Button

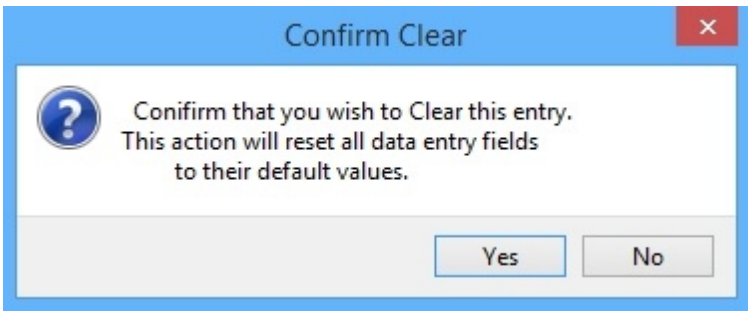
The Reset button is used to cancel any changes made to the data fields will be reset to the initial default data. If the Reset button is selected, a confirmation message is displayed requiring the user to confirm that any changed data will be reset to its original default state.

DEF_9

If the user selects the <Yes> button any changes made to the data fields will be reset to the initial default data and the form will remain open. If the user selects <No> the form will remain open and no changes will be made.

4.3 Clear Button

The Clear button is used to Clear all data fields. If the Clear button is selected, a confirmation message is displayed requiring the user to confirm that all data fields will be cleared and previous data will be lost..



If the user selects the <Yes> button all data fields will be cleared and the form will remain open. If the user selects <No> the form will remain open and no changes will be made.

4.4 Save Button

The Save button is used to save the channel data and close the form. If the source is VFO, then selecting the Save button will also set the TMV7A to the saved channel.

Memory Form

Dialogues

About

Not Registered

Registration

Functionality

Maintaining TMV Data

Appendices

Abbreviations

CTCSS	Continuous Tone-Coded Squelch System
DTSS	Dual-Tone Signaling System
GUI	Graphical User Interface
H	High
kHz	Kilohertz
L	Low
LCD	Liquid Crytsal Display
M	Medium
MHz	Megahertz
PL	Private Line Tone Squelch System
PTT	Push to Talk
RF	Radio Frequency
RX	Receive
TX	Transmit
UHF	Ultra-High radio frequencies, normally defined as those frequencies 300 mHz and above.
VFO	Variable Frequency Oscillator
VHF	Very-high radio frequencies, normally defined as those frequencies above 100 mHz.