TM-V7A Control Protocol

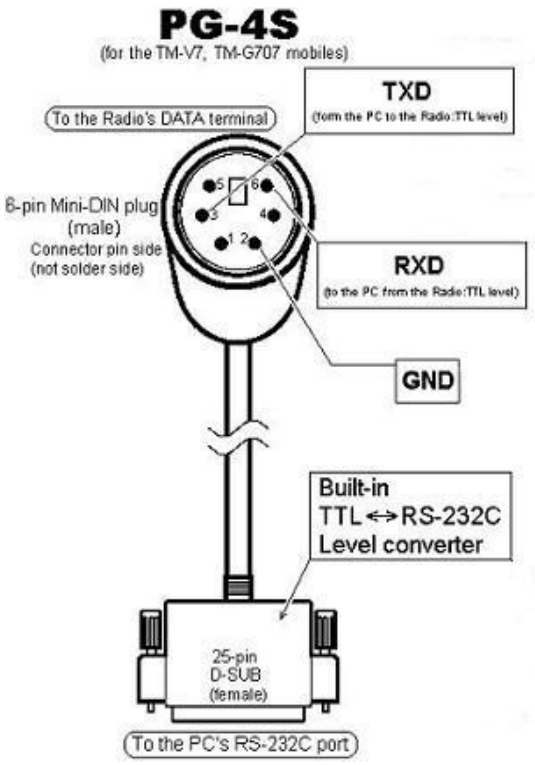
Version 2.0.0

Modified 23 Mar 2011

Hardware Description

The TM-V7A uses an asynchronous, serial interface for communicating with the computer. The cable has a 6-pin DIN plug at the TM-V7A end and a male 25-pin RS-232C COM connector at the computer end. The COM protocol is:

9600 baud
No parity
8 data bits and
1 stop bit.



RXD: Serial data sent from the TM-V7A to the computer.

TXD: Serial data sent from the computer to the TM-V7A.

GND: Signal ground pin.

Note that there are no hardware control signals.

Computer Control Commands

A computer command is composed of an alphabetical command, various parameters, and the terminator that signals the end of the control command.

EXAMPLE: The command to turn on the Auto Information status is:

AI<space>1<CR>, where:

AI is the Alphabetical Command
1 is the Parameter, and
<CR> is the Terminator.

Note that the Command is separated from the first Parameter by a <space> character.

Commands can be classified as :

Set Commands – sets a particular condition;

Read Commands – requests a reply from the TM-V7A; and

Answer Commands – a reply from the TM-V7A in response to a Set or Read Command.

For example, note the following for the AI command (Auto Information):

To set Auto Information OFF, send the command:

AI<space>0<CR>

To read the current Auto Information status, send the command:

AI<CR>

The Answer command from the TM-V7 would be

AI<space>0<CR>.

The Alphabetic Commands consist of 2 or 3 alphabetical characters in upper case. The commands for the TM-V7A are in the fAlphabetic Command table.

Parameters

Parameters are used to specify information necessary to implement the desired command. The parameters to be used for each command are pre-defined, as are the number of digits and characters.

Terminator

To signal the end of a command, it is necessary to insert a Carriage Return character (ASC 13, HEX 0D).

Error Messages

In addition to the Answer Command, the TM-V7A can also send the following error messages:

?<CR> - The TM-V7A does not recognize the command

N<CR> - The command was recognized but the format was invalid

Alphabetical Command Table

Command	Function
AG	Sets or Reads Audio Gain
AI	Sets or reads the Auto Information Status.
BC	Selects the band to be used for both transmit and receive
BUF	Sets or Reads the radio buffer
BY	Reads the Busy status
PC	Power Control
PS	Power Switch
RX	Sets or Reads Receive Mode
SM	Reads Signal Strength or Transmit Power
SQ	Sets or Reads Squelch Level
TS	
TX	Sets or Reads Transmit Mode
VMC	Sets or reads the mode of the selected band
VR	Reads the VFO settings for the specified band
VW	Writes the VFO settings for the specified band

Parameter Table

Format Nr	Name	Nr of Digits	Format
1	SW	1	0: OFF 1: ON
2	MODE	1	0: VFO 2: MEM 3: CALL
3	VFO	1	0: VHF 1: UHF
4	MIC CONTROL	1	0: VHF 1: UHF
5	FREQUENCY	11	Frequency in Hz
6	STEP	1	Frequency Step Size in kHz 0=5, 1=6.25, 2=10, 3=12.5, 4=15, 5=20, 6=25, 7=30, 8=50 9=100
7	SHIFT/OFFSET	1	0=None, 1=Plus (Up), 2=Minus (Down)
8	TONE FREQ	2	CTCSS Tone Frequency in Hz.. NOTE, 02 is NOT used 01=67.0 03=71.9 04=74.4 05=77.0 06=79.7 07=82.5 08=85.4 09=88.5 10=91.5 11=94.8 12=97.4 13=100.0 14=103.5 15=107.2 16=111.9 17=114.8 18=118.8 19=123.0 20=127.3 21=131.8 22=136.5 23=141.3 24=146.2 25=151.4 26=156.7 27=162.2 28=167.9 29=173.8 30=179.9 31=186.2 32=192.8 33=203.5 34=210.7 35-218.1 36=225.7 37=233.6 38=241.8 39=250.3
9	DTSS CODE	3	DTSS Code, 3 digits 000..999
10	VFO OFFSET	9	Repeater Offset in Hz
11	MEM Channel	3	001..999
12	RF Power	1	0 = H 1 = M 2 = L
13	MEM Name	8	0 to 8 Characters
14	BAND	1	2 = VHF 6 = UHF
15	DTMF Channel	2	00..09
16	DTMF Code	16	[0..9, A..D, #, *
17	Busy Status	1	0 = Not Busy, 1 = Busy
18	S Meter Value	1	[0..7]
19	Audio Gain Level	2	2 HEX Digits [00..1F]
20	Squelch Level	2	2 HEX Digits [00..1F]
21	PTT	1	0: VHF 1: UHF

Control Commands

AG

AUDIO GAIN

Read:	AG [P1]
Set:	AG [P1],[P2]
Answer:	AG [P1],[P2]
P1 = Format 3	VFO
P2 = Format 19	Audio Gain Level

AI

AUTO INFORMATION

Sets or reads the Auto Information Status. If on, changes in the TM-V7A are automatically sent to the computer.

Read:	AI
Set:	AI [P1]
Answer:	AI [P1]
P1 = Format 1	AI OFF/ON

BC

BAND CONTROL

Selects the PTT and MIC CONTROL

Read	BC
Set:	BC [P1],[P2]
Answer:	BC [P1],[P2]
P1 = Format 4	MIC CONTROL
P2 = Format 21	PTT

BUF

RADIO BUFFER

Reads and Sets the Buffer for each VFO

Read	BUF [P1]
Set:	BUF [[P1],[P2],[P3],[P4],[P5],[P6],[P7],[P8],[P9],[P10].[P11],[P12]
Ans:	
P1 = Format 3	VFO
P2 = Format 5	FREQUENCY
P3 = Format 6	STEP

P4 = Format 7 SHIFT/OFFSET

P5 = Format 1 REVERSE OFF/ON

P6 = Format 1 TONE OFF/ON

P7 = Format 1 CTCSS OFF/ON

P8 = Format 1 DTSS OFF/ON

P9 = Format 8 TONE FREQ

P10 = Format 9 DTSS CODE

P11 = Format 8 CTCSS FREQ

P12 = Format 10 OFFSET

BY

RADIO BUSY

Reads the “Busy” status that is triggered by the AI command.

Answer: BY [P1],[P2]

P1 = Format 3 VFO

P2 = Format 17 Busy Status

PC

POWER CONTROL

Toggles the RF Power Output of the currently selected VFO. Note this is a “Set” only command and cannot be Read.

Set: PC [P1],[P2]

P1 = Format 3 VFO

P2 = Format 12 RF Power

PS

POWER SWITCH

Turns the radio power on and off.

Set: PS [P1]

Answer: PS [P1]

P1 = Format 1 SW

RX

RADIO RECEIVE MODE

Sets or Reads the Receive mode of the transcveiver

Set: RX

Answer: RX

SM

SMETER

Reads the S-Meter value for each VFO on when in Receive mode or the RF Power Output in Transmit mode

Read: SM [P1]

Answer: SM [P1],[P2]

P1 = Format 3 VFO

P2 = Format 18 S Meter Value

SQ

SQUELCH

Read: SQ [P1]

Set: SQ [P1],[P2]

Answer: SQ [P1],[P2]

P1 = Format 3 VFO

P2 = Format 19 Squelch Level

TS

UNKNOWN

TX

RADIO TRANSMIT MODE

Sets or Reads the Transmit mode of the transcveiver

Set: TX

Answer: TX

VMC

OPERATING MODE

Sets or reads the Operational Mode of the VFO identified by P1.

Read: VMC [P1]

Set: VMC [P1],[P2]

Answer: VMC[P1],[P2]

P1 = Format 3 VFO

P2 = Format 2 MODE

VR

VFO READ

Returns the VFO parameters of the specified VFO.

Read:	VR [P1]
Answer:	VR [P1],[P2],[P3],[P4],[P5],[P6],[P7],[P8],[P9],[P10].[P11],[P12]
P1 = Format 3	VFO
P2 = Format 5	FREQUENCY
P3 = Format 6	STEP
P4 = Format 7	SHIFT/OFFSET
P5 = Format 1	REVERSE OFF/ON
P6 = Format 1	TONE OFF/ON
P7 = Format 1	CTCSS OFF/ON
P8 = Format 1	DTSS OFF/ON
P9 = Format 8	TONE FREQ
P10 = Format 9	DTSS CODE
P11 = Format 8	CTCSS FREQ
P12 = Format 10	OFFSET

VW

VFO WRITE

Sets the VFO parameters of the specified VFO.

Read:	VR [P1]
Answer:	VR [P1],[P2],[P3],[P4],[P5],[P6],[P7],[P8],[P9],[P10].[P11],[P12]
P1 = Format 3	VFO
P2 = Format 5	FREQUENCY
P3 = Format 6	STEP
P4 = Format 7	SHIFT/OFFSET
P5 = Format 1	REVERSE OFF/ON
P6 = Format 1	TONE OFF/ON
P7 = Format 1	CTCSS OFF/ON
P8 = Format 1	DTSS OFF/ON
P9 = Format 8	TONE FREQ
P10 = Format 9	DTSS CODE
P11 = Format 8	CTCSS FREQ
P12 = Format 10	OFFSET

FILE STRUCTURES

RCV7 Data File

The RCV7 data file is an Excel CSV file that contains both data and information records.

The first two records contain the data field descriptions and can be byassed.

The third record contains the keyword “Comment” and is followed by a single line with a free form comment as the first (and only) data field.

The fifth record contains the keywords “MEMORY VHF” and is followed by a variable number of VHF Memory Channel records (000..999) in the format:

Name	Type	Size	Param	Validation	Comments
MEM_CH	C	3	11	[000..999]	Memory Channel Number
RX_Freq	C	9		9 Digits	RX Frequency in Hz
Step	C	1	6	[0..9]	Frequency Step in kHZ
Shift	C	0/1		[Nil, +, -]	Shift Direction
Reverse	C	2/3		No = 0 Yes = 1	Reverse On/Off
Tone	C	2/3		No = 0 Yes = 1	Tone On/Off
CTCSS	C	2/3		No = 0 Yes = 1	CTCSS On/Off
DTSS	C	2/3		No = 0 Yes = 1	DTSS On Off
Tone_Freq	C	2	8	[00, 03..39]	Tone Frequency
DTSS_Code	C	3	9	[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[00, 03..39]	CTCSS Frequency
VFO Offset	C	9	10	9 digits	Repeater Offset in Hz
Scan	C	2/3		No = 0 Yes = 1	Scan On/Off
Lockout	C	2/3		No = 0 Yes = 1	Channel Lockout
N/A					
Spit_Freq	C	11	5	11 Digits	Split TX Frequency
Split_Step	C	1	6	[0..9]	Frequency Step in kHZ
RF_Power	C	1	12	[0..2]	RF Power Level
MEM__Name	C	8	13	0 to 8 Characters	Memory Channel Name

After the VHF Memory Channel records are complete, the next record contains the keywords “MEMORY UHF” and is followed by a variable number of UHF Memory Channel records (000..999) in the same format.

After the UHF Memory Channel records are complete, the next record contains the keywords “CALL” and is followed by two Call Channel records in the format:

Name	Type	Size	Param	Validation	Comments
VFO	C	3		[0, 1]	VFO (VHF or UHF)
RX_Freq	C	9		9 Digits	RX Frequency in Hz
Step	C	1	6	[0..9]	Frequency Step in kHZ

Name	Type	Size	Param	Validation	Comments
Shift	C	0/1		[Nil, +, -]	Shift Direction
Reverse	C	2/3	1	[0, 1]	Reverse On/Off
Tone	C	2/3	1	[0, 1]	Tone On/Off
CTCSS	C	2/3	1	[0, 1]	CTCSS On/Off
Tone_Freq	C	2	8	[00, 03..39]	Tone Frequency
DTSS_Code	C	3	9	[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[00, 03..39]	CTCSS Frequency

After both Call Channel records are complete, the next record contains the keywords “VFO” and is followed by two VFO records in the format:

Name	Type	Size	Param	Validation	Comments
VFO	C	3		[0, 1]	VFO (VHF or UHF)
RX_Freq	C	9		9 Digits	RX Frequency in Hz
Step	C	1	6	[0..9]	Frequency Step in kHZ
Shift	C	0/1		[Nil, +, -]	Shift Direction
Reverse	C	1	1	[0, 1]	Reverse On/Off
Tone	C	1	1	[0, 1]	Tone On/Off
CTCSS	C	1	1	[0, 1]	CTCSS On/Off
Tone_Freq	C	2	8	[00, 03..39]	Tone Frequency
DTSS_Code	C	3	9	[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[00, 03..39]	CTCSS Frequency
VFO OFFSET	C	9	10	9 Digits	VFO Offset in Hz
N/A					
N/A					
N/A					
N/A					
RF Power	C	1	12	[0..2]	Output Power

After both VFO records are complete, the next record contains the keywords “DTMF” and is followed by up to ten DTMF records in the format:

Name	Type	Size	Param	Validation	Comments
DTMF Channel	C	2	15	[0..9]	DTMF Channel Number
DTMF Code	C	10	16	10 Characters	DTMF Code

After the DTMFrecords are complete, the next record contains the keywords “Ch Ratio” and is followed by one record in the format:

Name	Type	Size	Param	Validation	Comments
Ch Ratio	C	2/3		3 Digits	VHF to UHF Channel Ratio

MCP_V7 Data File

The MCP_V7 data file is a TAB delimited file that contains both data and information records.

The first record contains the keyword “Comment” and is followed by a single line with a free form comment.

The second record contains the keywords “MEMORY VHF” and is followed by a variable number of VHF Memory Channel records (000..999) in the format:

Name	Type	Size	Param	Validation	Comments
MEM_CH	C	3	11	[000..999]	Memory Channel Number
RX_Freq	C	11	5	11 Digits	RX Frequency in Hz
Step	C	1	6	[0..9]	Fredquency Step in kHZ
Shift	C	1	7	[0..2]	Shift Direction
Reverse	C	1	1	[0,1]	Reverse On/Off
Tone	C	1	1	[0,1]	Tone On/Off
CTCSS	C	1	1	[0,1]	CTCSS On/Off
DTSS	C	1	1	[0,1]	DTSS On Off
Tone_Freq	C	2	8	[00, 03..39]	Tone Frequency
DTSS_Code	C	3	9	[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[00, 03..39]	CTCSS Frequency
N/A					
Lockout	C	1	1	[0,1]	Channel Lockout
N/A					
Spit_Freq	C	11	5	11 Digits	Split TX Frequency
N/A					
MEM__Name	C	8	13	0 to 8 Characters	Memory Channel Name

After the VHF Memory Channel records are complete, the next record contains the keywords “MEMORY UHF” and is followed by a variable number of UHF Memory Channel records (000..999) in the same format.

After the UHF Memory Channel records are complete, the next record contains the keywords “CALL” and is followed by two Call Channel records in the format:

Name	Type	Size	Param	Validation	Comments
VFO	C	1		[0, 1]	VFO (VHF or UHF)
RX_Freq	C	11		11 Digits	RX Frequency in Hz
Step	C	1	6	[0..9]	Frequency Step in kHZ

Name	Type	Size	Param	Validation	Comments
Shift	C	1	1	[0..2]	Shift Direction
Reverse	C	1	1	[0, 1]	Reverse On/Off
Tone	C	1	1	[0, 1]	Tone On/Off
CTCSS	C	1	1	[0, 1]	CTCSS On/Off
DTSS	C	1	1	[0,1]	DTSS On/Off
Tone_Freq	C	2	8	[00, 03..39]	Tone Frequency
DTSS_Code	C	3	9	[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[00, 03..39]	CTCSS Frequency

After both Call Channel records are complete, the next record contains the keywords “VFO” and is followed by two VFO records in the format:

Name	Type	Size	Param	Validation	Comments
VFO	C	1		[0, 1]	VFO (VHF or UHF)
RX_Freq	C	11		11 Digits	RX Frequency in Hz
Step	C	1	6	[0..9]	Frequency Step in kHz
Shift	C	1		[0..2]	Shift Direction
Reverse	C	1	1	[0, 1]	Reverse On/Off
Tone	C	1	1	[0, 1]	Tone On/Off
CTCSS	C	1	1	[0, 1]	CTCSS On/Off
DTSS	C	1	1	[0, 1]	TDSS On/Off
Tone_Freq	C	2	8	[00, 03..39]	Tone Frequency
DTSS_Code	C	3	9	[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[00, 03..39]	CTCSS Frequency
VFO OFFSET	C	9	10	9 Digits	VFO Offset in Hz

After both VFO records are complete, the next record contains the keywords “DTMF” and is followed by up to ten DTMF records in the format:

Name	Type	Size	Param	Validation	Comments
DTMF Channel	C	2	15	[0..9]	DTMF Channel Number
DTMF Code	C	10	16	10 Characters	DTMF Code

After the DTMF records are complete, the next record contains the keywords “Ch Ratio” and is followed by one record in the format:

Name	Type	Size	Param	Validation	Comments
Ch Ratio	C	2/3		2 or 3 Digits	VHF to UHF Channel Ratio

TM-V7A Data File (.TMV)

The TM-V7A data file is a Comma delimited file that contains both data and information records.

The first record contains the keyword “Comment” and is followed by a single line with a free form comment. This comment is displayed on the Status bar of the Main form.

The second record contains the keywords “MEMORY VHF” and is followed by a variable number of VHF Memory Channel records (000..999) in the format:

Name	Type	Size	Param	Validation	Comments
MEM_CH	C	3	11	[000..999]	Memory Channel Number
RX_Freq	C	7		7 characters nnn.nnn	RX Frequency in mHz
Step	C	1	6	[0..9]	Frequency Step
Shift	C	1		[s, +, -]	Shift Direction
Reverse	C	3		[ON, OFF]	Reverse On/Off
Tone	C	3		[ON, OFF]	Tone On/Off
CTCSS	C	3		[ON, OFF]	CTCSS On/Off
DTSS	C	3		[ON, OFF]	DTSS On Off
Tone_Freq	C	2	8	[00, 03..39]	Tone Frequency
DTSS_Code	C	3		[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[01, 03..39]	CTCSS Frequency
VFO Offset	C	5		5 Characters nn.nn	Repeater Offset in mHz
Scan	C	3	3	[ON, OFF]	Scan On/Off
RF_Power	C	1		[H,M,L]	RF Output Level
MEM_Name	C	15	13	0 to 15 Characters	Memory Channel Name
Comments	C	32		0 to 32 Characters	Free form comments

After the VHF Memory Channel records are complete, the next record contains the keywords “MEMORY UHF” and is followed by a variable number of UHF Memory Channel records (000..999) in the same format.

After the UHF Memory Channel records are complete, the next record contains the keywords “FAVOURITES” and is followed by up to 12 records in the same format.

TM-V7A Registry

The Registry entries shall be automatically loaded or created on startup.

The Registry entries shall be automatically saved on shutdown.

The Registry format shall be:

Section	Value	Default	Data
SECTION_Setup	VALUE_Com Port	0	Last configured COM Port
SECTION_Setup	VALUE_Call sign	''	Registered Callsign
SECTION_Setup	VALUE_Debug	0	Debug Selected
SECTION_Setup	VALUE_Colour Scheme	1	Currently selected Colour Scheme
SECTION_Files	VALUE_TMVFile	''	Path to last used Data file
SECTION_VHF	VALUE_VHF_MEM_Ch	VFO	Current VHF Memory Channel
SECTION_VHF	VALUE_VHF_RX_Freq	'146.490'	Current VFO RX Frequency
SECTION_VHF	VALUE_VHF_TX_Freq	'146.490'	Current VHF TX Frequency
SECTION_VHF	VALUE_VHF_Step	6	Current VHF Step value
SECTION_VHF	VALUE_VHF_Shift	0	Current VHF Shift value
SECTION_VHF	VALUE_VHF_Reverse	0	Current VHF Reverse Setting
SECTION_VHF	VALUE_VHF_VFO_Tone	0	Current VHF Tone Setting
SECTION_VHF	VALUE_VHF_CTSS	0	Current VHF CTCSS Setting
SECTION_VHF	VALUE_DTSS	0	Current VHF DTSS Setting
SECTION_VHF	VALUE_VHF_Tone_Freq	'01'	Current VHF Tone Frequency
SECTION_VHF	VALUE_VHF_DTSS_Code	'000'	Current VHF DTSS Code
SECTION_VHF	VALUE_VHF_CTCSS_Freq	'01'	Current VHF CTCSS Frequency
SECTION_VHF	VALUE_VHF_VFO Offset	'00.00'	Current VHF Offset
SECTION_VHF	VALUE_VHF_Scan	0	Current VHF Scan Setting
SECTION_VHF	VALUE_VHF_Lockout	0	Current VHF Lockout Setting
SECTION_VHF	VALUE_VHF_NA	''	Not used
SECTION_VHF	VALUE_VHF_Spit_Freq	'000.000'	Current VHF Split TX Frequency
SECTION_VHF	VALUE_VHF_Split_Step	0	Current VHF Split Step Setting
SECTION_VHF	VALUE_VHF_MEM_Name	Simplex	Current VHF Memory Name
SECTION_VHF	VALUE_VHF_Comments	Default Simplex	Free form comments
SECTION_VHF	VALUE_VHF_Volume	10	Volume Level
SECTION_VHF	VALUE_VHF_Volume	4	Squelch Level
SECTION_UHF	VALUE_UHF_MEM_Ch	VFO	Current UHF Memory Channel
SECTION_UHF	VALUE_ UHF_RX_Freq	'443.800'	Current UHF RX Frequency
SECTION_UHF	VALUE_ UHF_TX_Freq	'448.800'	Current UHF TX Frequency
SECTION_UHF	VALUE_UHF_Step	6	Current UHF Step value
SECTION_UHF	VALUE_UHF_Shift	0	Current UHF Shift value
SECTION_UHF	VALUE_UHF_Reverse	0	Current UHF Reverse Setting
SECTION_UHF	VALUE_UHF_Tone	1	Current UHF Tone Setting

Section	Value	Default	Data
SECTION_UHF	VALUE_UHF_CTCSS	0	Current UHF CTCSS Setting
SECTION_UHF	VALUE_UHF_DTSS	0	Current UHF DTSS Setting
SECTION_UHF	VALUE_UHF_Tone_Freq	13	Current UHF Tone Frequency
SECTION_UHF	VALUE_UHF_DTSS_Code	'000'	Current UHF DTSS Code
SECTION_UHF	VALUE_UHF_CTCSS_Freq	'01'	Current UHF CTCSS Frequency
SECTION_UHF	VALUE_UHF_VFO Offset	'05.00'	Current UHF Offset
SECTION_UHF	VALUE_UHF_Scan	0	Current UHF Scan Setting
SECTION_UHF	VALUE_UHF_Lockout	0	Current UHF Lockout Setting
SECTION_UHF	VALUE_UHF_NA	''	Not used
SECTION_UHF	VALUE_UHF_Spit_Freq	'000.000'	Current UHF Split TX Frequency
SECTION_UHF	VALUE_UHF_Split_Step	0	Current UHF Split Step Setting
SECTION_UHF	VALUE_UHF_MEM_Name	Simplex	Current UHF Memory Name
SECTION_UHF	VALUE_UHF_Comments	Default Simplex	Free form comments
SECTION_UHF	VALUE_UHF_Volume	10	Volume Level
SECTION_UHF	VALUE_UHF_Volume	4	Squelch Level
SECTION_POWER	VALUE_UHF_Power	H	Current UHF Power Setting

TM-V7A Debug File (.DBG)

The TM-V7A debug file is a Comma delimited file that contains Debug information.

A new file is created each day.

The file is created or opened each time the program is executed and closed on each program termination. If there is more than one program execution within a 24 hour period, the “daily” file is re-opened and the new data appended to the old.

The debug file name format is TMV7Addmmyyyy.DBG and is stored in the TMV7A program folder by default.

The Record Format is:

Field	Content
Time	Current Time in the format hh:mm:ss
Message Number	Cccnnn ccc = Debug Header nnn = Sequence Number
Module Name	Name of the module within the Source file

Field	Content
Debug Message	string
Data	string

TABLE STRUCTURES

VHF, UHF and Favourites Tables

The VHF, UHF and Favourites VFO tables are identical except for the maximum number of records in each table.

The VHF and UHF tables shall contain a maximum of 999 records [001..999].

The Favourites table shall contain a maximum of 12 records [01..12].

Name	Type	Size	Param	Validation	Comments
MEM_CH	C	3	11	[001..999]	Memory Channel Number
RX_Freq	C	7		7 Characters nnn.nnn	RX Frequency in mHz
TX_Freq	C	7		7 Characters nnn.nnn	TX Frequency in mHz
Step	C	1	6	[0..9]	Fredquency Step
Shift	C	1		[s,+,-]	Shift Direction
Reverse	C	1		[ON,OFF]	Reverse Off/On
Tone	C	1	1	[ON,OFF]	Tone Off/On
CTCSS	C	1	1	[ON,OFF]	CTCSS Off/On
DTSS	C	1	1	[ON,OFF]	DTSS Off/On
Tone_Freq	C	2	8	[01, 03..39]	Tone Frequency
DTSS_Code	C	3	9	[000..999]	DTSS Code
CTCSS_Freq	C	2	8	[01, 03..39]	CTCSS Frequency
VFO Offset	C	5		5 Characters nn.nn	Repeater Offset in mHz
Scan	C	1		[ON,OFF]	Scan Off/On
Lockout	C	1	1	[ON,OFF]	Channel Lockout Off/On
Spit_Freq	C	7			Split TX Frequency
Split_Step	C	1	6	[0..9]	Frequency Step
RF_Power	C	1	12	[H,M,L]	RF Power Level
MEM_Name	C	15	13	0 to 8 Characters	Memory Channel Name
Comments	C	32		0 to 32 Characters	Free form comments

DTMF Table

The DTMF table shall hold up to 99 records in the format:

Name	Type	Size	Param	Validation	Comments
DTMF Channel	C	2	15	[0..99]	DTMF Channel Number
DTMF Code	C	16	16	Up to 16 Characters	DTMF Code
Comments	C	32		0 to 32 Characters	Free form comments