Computer Aided Transceiver Operations at W1TR

This document describes the CAT transceiver control and audio / digital interface for amateur radio contest and casual computer aided operations. Three transceivers are described in this document: the TS-2000x station, the IC-756pro3 station, and the IC-7000 station. Most of the details given are for the TS-2000x station using an advanced 4 core / 8 thread high performance computer running the Microsoft Windows 7 Ultimate operating system. The information also applies for an IC-756pro3 and an ordinary 2 core desktop running WinXP SP3, and an IC-7000 and an HP Mini NetBook computer running WinXP SP3 with limited memory and display screen. In all cases, a RigBlaster unit is used as the audio / digital interface, and USB to Serial converters are used for CAT control and CW/PTT/FSK using the EXTFSK driver.

TS-2000x System

IC-756pro3 System

IC-7000 System

N1MM Phone / CW

N1MM Digital

    MMTTY
    MMVARI
    FLDIGI
    EXTFSK

Ham Radio Deluxe

Ham Radio Deluxe Logger

Ham Radio Deluxe DM780

M110A
**TS-2000x Station**

This section describes how to configure the upstairs station for CAT control using N1MM, HRD, DXlog, and other related software. The hardware configuration is a Dell XPS-8300 Pentium I-7-2600 4 core / 8 thread processor 3.4 GHz, 12 GB RAM, 1.5 TB HDD. The Operating System is Windows 7 Ultimate 64-bit with Virtual PC / WinXP Mode. The WinXP Mode is available but NOT used for this configuration.

**Port Usage TS-2000x**

COM2 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS

COM1 = CAT Control (USB to Serial RS-232), 57600 baud

![TS-2000 RigBlasterPro CAT Diagram](TS-2000 RigBlasterPro CAT Diagram.vsd Revised 12-24-2011 10:26 AM)
IC-756pro3 Station (also IC-765)
This section describes how to configure the downstairs contest station for CAT control using N1MM, HRD, DXLAB, and other related software. The hardware configuration is a Gateway AMD 2 core 2.2 GHz, 4 GB RAM, 300 GB HDD. The Operating System is Windows XP SP3.

Port Usage IC-756pro3
COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM7 =CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 baud, Address 7E (check RIG menu)

Port Usage IC-765
COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM7 =CAT Control (USB to Serial RS-232 to CT-17 CI-V), 1200 baud Address 2C

IC-756P3 RigBlasterPro CAT Diagram

![IC-756P3 RigBlasterPro CAT Diagram](image-url)
IC-7000 Station
This section describes how to configure the portable (Field Day) contest station for CAT control using N1MM, HRD, DXlog, and other related software. The hardware configuration is an HP Mini NetBook, 1 GB RAM, 120 GB HDD. The Operating System is Windows XP SP3.

Port Usage IC-7000
COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM5 = CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 Address 6E baud
Note that the PTT for both COM5 and COM6 must be activated so that the RigBlaster PnP will pass the audio.

Note: configure Rigblaster COM port RTS for PTT when using Phone, AFSK, or Sound Card Modes since RigBlaster PnP will NOT pass computer audio unless PTT is activated!

Note: Set IC-7000 KEY to Straight Key. Item is in Menu S-1 in CW mode not SET menus.
N1MM Stand-Alone Setup for Phone / CW

This configuration is for CW, SSB, AM, FM operations using N1MM stand-alone without an accessory software module such as MMTTY, MMVAR1, FLDIG1. MMSSTV and EZPAL work independently of N1MM. A separate setup is required for digital modes using these accessory modules and is discussed at N1MM Digital Mode Setup.

Port Usage TS-2000x
COM2 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM1 = CAT Control (USB to Serial RS-232), 57600 baud

Port Usage IC-756pro3
COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM7 = CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 Address 6E baud

Port Usage IC-7000
COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM5 = CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 Address 6E baud

N1MM Config Menu Item
Click on Config Menu Item to access the Configurer Dialog.
N1MM Configurer Dialog for Phone / CW

This dialog allows configuration of a number of items (see the TABs). The WinKey and Antennas Tabs are NOT used for this configuration since no supporting hardware exists. The Digital Modes is discussed under Digital Mode Setup.

Hardware Tab

The Hardware Tab is used to configure the serial and parallel ports for rig control (CAT) and Key/PTT/FSK. Click on the SET buttons to configure detailed settings for the appropriate COM ports. Be sure to check both the Digital and CW check boxes for the KEY/PTT/FSK port, and set the DTR=CW, RTS=PTT. Checking the Digital checkbox will automatically switch control of this port from N1MM to MMTTY / MMVARI / FLDIGI.
COM1 is used for the CAT control port.

Baud Rate (Speed) is 57600.
Parity = N
Data Bits = 8
Stop Bits = 2
DTR (Pin 4) = Always ON
RTS (Pin 7) = Always ON
Radio Nr = 1 (only SO1R operations here).

Note: Other boxes are not activated since hardware control is used instead of CAT command software control.
Note: NOT using hardware or software DTR/RTS handshake for the TS-2000 even though hardware handshake is recommended by N1MM documentation (perhaps I will try it in the future).
COM2 is used for the CW, PTT, and FSK port.
CW keying is DTR (Pin 4)
PTT is RTS (Pin 7)
PTT delay is 30 msec
NO footswitch
NO WinKey.
FSK is configured in MMTTY and MMVARI.
**Files Tab**

The Files Tab is used to establish the location (path) for contest logger files. Contest Log Files are all located at

\texttt{C:\AMATEUR\Radio\Logs\Contests...}

![Configurer Interface]

- **Callsign database path**: \texttt{C:\AMATEUR\Radio\Logs\Contests\}
- **Record QSO wav file path**: \texttt{C:\AMATEUR\Radio\Logs\Contests\Record\QSO\}
- **Letters file path**: \texttt{C:\AMATEUR\Radio\Logs\Contests\N1MM\Letters\}
Function Keys Tab

The Function Keys tab is used to setup the general behavior of the function keys. Specific behavior per function key is determined by the macro files (*.mc) which are located at

C:\AmateurRadio\Logs\Contests\N1MM Macros\
**Audio Tab**

The Audio tab is used to setup the sound card parameters.
Other Tab

The **Other** tab is used for a number of miscellaneous settings.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packet Spot Timeout (min)</td>
<td>60</td>
</tr>
<tr>
<td>SSB Tuning Tolerance (Hz)</td>
<td>300</td>
</tr>
<tr>
<td>SSB Up/Down Arrow Incr (kHz)</td>
<td>0.10</td>
</tr>
<tr>
<td>CW Tuning Tolerance (Hz)</td>
<td>300</td>
</tr>
<tr>
<td>CW Up/Down Arrow Incr (kHz)</td>
<td>0.02</td>
</tr>
<tr>
<td>RTTY Tuning Tolerance (Hz)</td>
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</tr>
<tr>
<td>PgUp/PgDn Incr (kHz)</td>
<td>10.00</td>
</tr>
<tr>
<td>Default # Spots in SH/DX/4</td>
<td>30</td>
</tr>
<tr>
<td>CW Weight</td>
<td>50</td>
</tr>
<tr>
<td>Primary CW Speed Step</td>
<td>2</td>
</tr>
<tr>
<td>Secondary CW Speed Step</td>
<td>4</td>
</tr>
<tr>
<td>Clear populated exchange on callign change</td>
<td></td>
</tr>
<tr>
<td>Keep log of all QSOs to facilitate recovery of log</td>
<td>✔️</td>
</tr>
<tr>
<td>Start Contest Reporting Application</td>
<td></td>
</tr>
<tr>
<td>Mute mic on supported radios</td>
<td></td>
</tr>
<tr>
<td>Format for DXSidebar Cluster</td>
<td></td>
</tr>
<tr>
<td>Auto-Completion Mode</td>
<td></td>
</tr>
<tr>
<td>Use Reverse CW Radio 1</td>
<td></td>
</tr>
</tbody>
</table>

**Buttons:** OK, Cancel, Help
**WinKey Tab**

The WinKey tab is used to configure the WinKey device. It is **NOT USED** in this configuration since there is **NO** WinKey device installed in the hardware configuration.
The **Antennas Tab** is used to map the antenna switch control circuitry to the computer I/O device circuitry. It is **NOT USED** in this configuration since there is **NO** antenna switch control circuitry connected to the computer.

<table>
<thead>
<tr>
<th>Code</th>
<th>Antenna</th>
<th>Bands (1, 2, 3, 4, 5)</th>
<th>Rotor Pos(s) 1, 2</th>
<th>Offset</th>
<th>Bidirect</th>
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<td>0</td>
<td></td>
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<td>80</td>
<td>3.5</td>
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</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Starting UDP Port for Rotor Program: **12040**

Start N1MM Rotor Program: **on**
**N1MM Digital Mode Setup**

This section describes the setup for digital modes (RTTY-FSK, RTTY-AFSK, PSK, and other digital sound card modes) using MMTTY, MMVARI, and FLDIGI. It is a good idea to use these applications stand-alone and configure them before using them as an accessory to N1MM.

**N1MM Configurer Dialog for Digital Modes**

This dialog allows configuration of a number of items (see the TABs). The Phone / CW Modes are discussed in a previous section [N1MM Stand-Alone Setup for Phone / CW](#).

Only the **Mode Control** tab is discussed here.

**Mode Control Tab**

The **Mode Control** tab is used to map the emission mode of the radio to the emission mode of a log entry. RTTY could be accomplished using either FSK or AFSK. The radio mode RTTY will most likely be appropriate for FSK RTTY. The radio mode USB or LSB will most likely be appropriate for AFSK RTTY and digital modes such as PSK.

In the group box titled “Mode sent to radio”, the “Mode” label is the mode in the log entry, the “Radio 1 / VFOA” and “Radio2 / VFOB” are the mode of the radio.

I have chosen to let the actual mode of the radio control what mode is logged rather than depend on a generic or contest band plan.
Digital Modes Tab

The Digital Modes tab is used to configure the connection between N1MM and an accessory program such as MMTTY, MMVARI, FLDIGI, etc. The MMTTY Path should be set to refer to the MMTTY executable. The FLDIGI Path should be set to refer to the FLDIGI executable. MMVARI setup is also configured here.

![Configurer Window](image)

Note: Any Changes made in this section will require the digital window's to be closed and re-opened before changes take effect.
MMTTY Options(O) - Setup Dialog

Demodulator Tab

I have chosen to use the FIR BPF...
The default is the IIR resonator and some experimentation is necessary to get best results.
Limit Amp. is set to 100, it was originally set at 200 but that was high.
Other settings are default from MMTTY, further adjustments should be done with card.
Return to defaults by using the “Set Default (Demodulator)” button.
AFC/ATC/PLL Tab
The AFC should be disabled for FSK operation since the TX tones are set for 2125 mark, 170 Hz shift. The ATC should probably be ON to avoid excessive noise garbage display.
Decode Tab
Since EXTFSK supports ONLY 45.45 baud Murray / Baudot RTTY code, these settings should not be changed.
**TX Tab**

The important setting here is the PTT & FSK Port, which should be set to EXTFSK.

The DIDDLE, TX options can be adjusted to user preferences.
Font/Window Tab
This dialog controls the display of the waterfall and X/Y scope.
I chose a GREEN scope trace, like the good old days of real hardware O-Scopes!
It is useful to use REVERSE rotation since HAM RTTY uses lower sideband (LSB) receive by default and mark-high.
The VFO on the TS-2000 turns clockwise to increase radio frequency, and therefore audio frequency.
Set this depending on how the VFO of your radio works so that the X/Y Scope follows the VFO knob.
Misc Tab
The important setting here is the TX Port which should be COM-TxD(FSK) to use EXTFSK for FSK/RTTY. The USB Port sets the COM port number (COM2 in this case). Other items were left as default.
**Sound Card Tab**

The settings in this dialog are default.

Do NOT use the Realtek Digital Output instead of the Speakers.
Do NOT use the Realtek Digital Input instead of the Microphone.
EXTFSK Window
This window configures the EXTFSK COM port driver.
Port for CW/PTT/FSK is COM2.
PTT is RTS.
FSK is TxD.
CW Key is DTR (not configured in this dialog).

TimeCapMin = 1ms
N1MM Digital Setup

General/MMTTY Setup

Default settings are used for now except Alignment Frequency.
MMTTY and FLDIGI set the MARK frequency which is 2125 (2295 SPACE frequency for 170 Hz SHIFT).
Suggest Monaco font for the Digital Interface RX Window Font Selection.
Note the preferred RTTY and PSK interface selection, but these can be changed after the Digital Window is opened.
**MMVARI Setup**

Note that the Microphone input should be used for Soundcard Input. All other settings are default, experimentation is needed to optimize performance.
Macro Setup
This is the default setting, NO macros are configured yet.
User preferences apply here.
**N1MM + MMTTY Combination**

The Receive Window is blue at the top.
The Transmit Window is white at the bottom.
Macros are at the very bottom.
The Grab Window is to the lower right.
The Interface menu item can be used to select MMTTY, MMVARI, FLDIGI interface version.

The TX button will start transmission, the TXOFF button will return to receive.
The N1MM main entry window MACRO buttons and CTRL-K can be used instead.
It is NOT recommended to use the AFC for FSK, since the TX tones are fixed and you want to transmit on the same frequency as the other station during the contact. Adjust the receiver for the correct X/Y Scope view.
UOS is recommended to avoid reception errors due to noise hits.
N1MM + MMVARI Combination
The Receive Window is blue at the top.
The Transmit Window is white at the bottom.
Macros are at the very bottom.
The Grab Window is to the lower right.
The Interface menu item can be used to select MMTTY, MMVARI, or FLDIGI interface version.

MMVARI Signal Display
N1MM + FLDIGI Combination

The Receive Window is blue at the top.
The Transmit Window is white at the bottom.
Macros are at the very bottom.
The Grab Window is to the lower right.
The Interface menu item can be used to select MMTTY, MMVARI, or FLDIGI interface version.

FLDIGI Signal Display
FLDIGI Configuration – Operator

Use this dialog tab to enter operator and station information.

![FLDIGI Configuration - Operator](image)
FLDIGI Configuration – UI
This dialog tab is used to adjust the User Interface appearance and behavior.
FLDIGI Configuration – Waterfall

This dialog tab configures the waterfall display.
**FLDIGI Configuration – Modems**

This dialog tab adjusts the modem parameters.

![FLDIGI Configuration Window](image)

### AFC behavior
- Acquisition search range (Hz): 50
- Acquisition S/N (dB): 9

### S/N and IMD behavior
- Dim after: 15 seconds

### Multi-Channel Signal Processing
- Disable on very slow CPUs if signal browser is not used
- Multi-channel detector

**Buttons:**
- Restore defaults
- Save
- Close
FLDIGI Configuration – Rig

This dialog tab adjusts the rig control parameters. Select “Use Separate Serial Port PTT”, “COM2”, and “Use RTS”.
FLDIGI Configuration – ID
This dialog tab adjusts CW and VIDEO ID parameters. They are no longer needed for compliance with FCC rules. The Reed-Solomon ID TX is helpful for notifying other stations of your presence. The Reed-Solomon ID RX is helpful for identifying other stations within your passband.
FLDIGI Configuration – Audio - Devices

This dialog tab and sub-tab configures audio devices. Always use the Microphone and Speaker, not the digital I/O device.
FLDIGI Configuration – Audio - Settings
This dialog tab and sub-tab configures audio device settings.
The default settings are used for now.
FLDIGI Configuration – Audio - TxLevel
This dialog tab and sub-tab configures transmit level.
The default settings are used for now.
Ham Radio Deluxe Version 5 Setup (TS-2000x)
This is a screen shot of the HRD 5 main rig control window as configured for the TS-2000x at W1TR. The Buttons and Sliders were customized according to my preferences.
**HRD Connect Dialog**

This dialog appears when the HRD program starts up or when the “Connect” button is clicked. See below for the port usage for the TS-2000x, IC-756pro3, and IC-7000.

I also automatically have the Logbook window open, but not the DM780 digital window (it can be opened later). No Rotator or Satellite Tracking apparatus exists in the hardware configuration (yet).

I do NOT use full screen mode, and do NOT automatically connect but wait for a manual connect.

**Port Usage TS-2000x**

COM2 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS

COM1 = CAT Control (USB to Serial RS-232), 57600 baud

**Port Usage IC-756pro3**

COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS

COM7 = CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 Address 6E baud

**Port Usage IC-7000**

COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS

COM5 = CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 Address 6E baud
HRD Customize Layout of Sliders (TS-2000x)

This is the dialog used to setup the custom slider configuration.
HRD Customize Layout of Buttons (TS-2000x)

This is the dialog used to setup the custom button configuration.
Ham Radio Deluxe Logger (TS-2000x)

This is a screen shot of the HRD Logger as configured for the TS-2000x at W1TR

Note the buttons and sliders on the left, the database list in the left center, and the HAM and MARS log tabs.
HRD Logger Customized Layout of Buttons and Sliders (TS-2000x)

This dialog is used to customize the buttons and sliders for the logger screen.

**Radio Pane Configuration**

**Connection**
- Mode
- Quick Mem
- Value
- VFD A
- VFD B
- Mem
- Sub
- NR 1
- NR 2
- Band +
- CH +
- AFGAN (main)
- AFGAN (sub)
- Squelch (main)
- Squelch (sub)
- RF gain
- AGC constant
- Noise blanker
- Noise reduction
- DSP high out
- DSP low out

**Default Layout**

**This is the default layout**

**Note:**
- The MODE button must be displayed in the radio pane to support mode tracking in the Add Log Entry window.
- The buttons and sliders you select here must be displayed in Ham Radio Deluxe, otherwise the button state is not updated by HRD.

**Radio Pane Layout**

To configure the radio interface:
- Make sure Ham Radio Deluxe (HRD) is started and connected to a radio.
- In HRD select IP Server from the Tools menu, make sure the IP Server is started.

If a connection can be established:
- All buttons are enabled,
- The Dropdown buttons are automatically loaded with the dropdown buttons shown in HRD’s display.

To change a selection just click on a button and select an entry from the popup window. To clear the current selection select the first entry ‘- - -’.

When you have finished defining your layout press Save. The definitions are saved in your local storage folder (from the Tools menu select the Storage pane).

In the Radio pane press the Connect button ‘>’ to connect to HRD.
**HRD Logger Customized Bands**

This dialog is used to customize the bands used for the QSO Entry Dialog. Note that bands are configured for USAF MARS Frequency Designators, HF, VHF, and NA for logging of off-the-air MARS activity.

![Bands Editor](image)
HRD Logger Customized Modes

This dialog is used to customize the modes used for the QSO Entry Dialog. Note the NA mode used for off-the-air MARS activity.
HRD Logger Customized RST Options

This dialog is used to customize the RST Options used for the QSO Entry Dialog.

Note that the mode NA has an RST value of NA.

*(note: this section needs to be further edited)*

<table>
<thead>
<tr>
<th>Mode</th>
<th>R...</th>
<th>S...</th>
<th>List</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM, FM, LSB, SSB, USB</td>
<td>59</td>
<td>59</td>
<td>LC, GR, 51, 52, 53, 54, 55, 56, 57, 58, 59, 59+5dB, 59+10dB</td>
</tr>
<tr>
<td>CW</td>
<td>599</td>
<td>599</td>
<td>519, 529, 539, 549, 559, 569, 579, 589, 599</td>
</tr>
<tr>
<td>SSTV</td>
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<td>595</td>
<td>515, 525, 535, 545, 555, 565, 575, 585, 595</td>
</tr>
<tr>
<td><em>Default</em></td>
<td>599</td>
<td>599</td>
<td>519, 529, 539, 549, 559, 569, 579, 589, 599</td>
</tr>
</tbody>
</table>

**Default Values**

- **Load the Rcvd and Sent values when the ALE window is reset**

**Help**

**Define the RST values shown in the Rcvd and Sent fields of the Add Logbook Entry (ALE) window on a per-mode basis. Each definition contains:**

- **Modes:** either one or more mode names, or flagged as the *Default* entry (see Default Entry below).
- **Rcvd and Sent values**: these values are applied to the default buttons next to the Rcvd and Sent fields.
- **List**: the values which appear in the Rcvd and Sent dropdown fields.
HRD Logger RST Options Edit Dialog

This dialog is used to customize the RST Options used for the QSO Entry Dialog. The USAF MARS terms LC (Loud & Clear), GR (Good Readable), FR (Fair Readable), WR (Weak Readable), VR (Very Weak Readable), and WU (Weak Unreadable) were added.
HRD Logger My Station Dialog (TS-2000x)
This dialog is used to configure station and operator information used for the Add / Update QSO Entry Dialog.

### These values are used in the Add and Modify Logbook windows

<table>
<thead>
<tr>
<th>Values</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Callsign:</td>
<td>W1TR</td>
</tr>
<tr>
<td>Owner:</td>
<td>W1TR</td>
</tr>
<tr>
<td>Operator:</td>
<td>W1TR</td>
</tr>
<tr>
<td>Name:</td>
<td>Teny G. Glagowski</td>
</tr>
<tr>
<td>Street:</td>
<td>25 Hnath Road</td>
</tr>
<tr>
<td>City:</td>
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</tr>
<tr>
<td>Equipment:</td>
<td>TS-2000X + ALS-600S + Dipole / Beam</td>
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</tbody>
</table>

### These values are used in the Add and Modify Logbook windows

<table>
<thead>
<tr>
<th>Values</th>
<th>Profile</th>
</tr>
</thead>
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<td>AF1A1DI</td>
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<td>Name:</td>
<td>Teny G. Glagowski</td>
</tr>
<tr>
<td>Street:</td>
<td>25 Hnath Road</td>
</tr>
<tr>
<td>City:</td>
<td>Ashford</td>
</tr>
<tr>
<td>County:</td>
<td>Windham</td>
</tr>
<tr>
<td>State:</td>
<td>CT</td>
</tr>
<tr>
<td>ZIP:</td>
<td>06278</td>
</tr>
<tr>
<td>Equipment:</td>
<td>TS-2000X + ALS-600S + Dipole / Beam</td>
</tr>
</tbody>
</table>

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Latitude: 41.924769
Longitude: -72.190317
CQ zone: 5
ITU: 8
Power: 50.0 Watts
Country: United States
HRD Logger Database Selection Dialog
This dialog is used to configure log databases for use with HRD.

HRD Logger Layout Selection Dialog
This dialog is used to configure log databases for use with HRD.
Ham Radio DM780 Digital Interface Screen (TS-2000x)

This is a screenshot of the HRD DM780 Digital Interface Screen for the TS-2000x at W1TR.

Note the buttons and sliders on the left, the database list in the left center, and the HAM and MARS log tabs.
HRD DM780 Program Options – PTT Dialog
This dialog is used to configure PTT Options for DM780.

Port Usage TS-2000x
COM2 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM1 = CAT Control (USB to Serial RS-232), 57600 baud

Port Usage IC-756pro3
COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM7 = CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 Address 6E baud

Port Usage IC-7000
COM6 = CW/PTT/FSK (USB to Serial RS-232), CW=DTR, PTT=RTS
COM5 = CAT Control (USB to Serial RS-232 to CT-17 CI-V), 19200 Address 6E baud
HRD DM780 Program Options – Soundcard Dialog

This dialog is used to configure Soundcard Options for DM780.
Input / Receive should be the Microphone input.
Output / Transmit should be the Speakers output.
The Digital Interface should NOT be used.

![Soundcard Dialog](image-url)
**M110A Operation**

The M110A software is similar to the HRD DM780, MMTTY, MMVARI, FLDIGI, MixW software programs. The M110A mode is most similar to the MT63 communication mode available in DM780 and MixW but more accurate than RTTY or PSK31. It is a non-protocol (connectionless mode) that uses Forward Error Correction (FEC) similar to MT63, and PACTOR FEC mode to increase the probability of sending an entire message in one transmission (unlike RTTY or PSK31).

**Setup**

**Software Download and Installation**

The M110A software is available at [www.n2ckh.com/MARS_ALE_FORUM/m110a.html](http://www.n2ckh.com/MARS_ALE_FORUM/m110a.html) as well as other places.

First, download the MS110ADMT Beta Build #1 with full INSTALL.EXE and execute this program which will install the baseline software and accessories. UnZIP the downloaded file (M110A_B1_FI.zip) and execute the install.exe program, it is a self-installing executable.

If using Vista or Windows 7, it is advisable to NOT use a Sub Directory within the Program Files directory for installation due to user privilege problems. Better to use something like C:\MyApps\M110A-Data Modem Terminal (DMT) instead.

Next, download the current Build, Candidate #3 for MS110ADMT Beta Build #2 with .EXE update. UnZIP the downloaded file (DMT_C3B2.zip). The DMT_C3B2.exe file is a stand-alone executable. Copy this file to the same directory used for installation of the above Beta Build #1. Then make a shortcut from this EXE and put it on your desktop, task bar, and double click the shortcut, or simply double-click this file to start execution. It depends on the other files already installed in the directory to work properly.
Configuration Settings

**Display on EOM Checkbox**
By default, this box is checked.
When it is checked, only a completely and perfectly received message will be displayed in the Receive Window. This may be a good setting during routine operations when the system is known to be working correctly.

When it is NOT checked, partially received messages and some garbage may be displayed.
When debugging and experimenting, it may be better to NOT check this box.

**KWND/ICOM**
Check for Kenwood Radios, Uncheck for ICOM radios. This only affects the CAT commands sent to the radio to control TX / RX mode. If hardware PTT is used, this setting is irrelevant!
**DTR/RTS**
Check for PTT assigned to the DTR line (usually this is for CW in other sound card software). Uncheck for PTT assigned to the RTS line (usually this is for PTT in other sound card software). Recommended setting UNCHECKED.

**CAT COM PORT**
The first TextBox control is the port number, i.e. 2 means COM2. The ListBox is the baud rate. When using hardware PTT, the COM port number of the PTT/CW serial port or USB to serial port connected to the radio PTT line is used and the baud rate is irrelevant. When using CAT control TX/RX, the COM port number of the CAT control serial port or USB to serial port connected to the radio CAT control interface is used, and the baud rate setting must match the radio. Recommended Setting 2.

**DATA PORT**
The first TextBox control is the port number, i.e. 1 means COM2. The ListBox is the baud rate. Recommended Setting 0.

**Audio Device Configuration: PCSDM Button**
Use this button to open the following pop-up window to select the audio input and output devices as shown:

![PC Sound Device Setup](image)

**Transmit MODE:**
The recommended setting for HF MARS communications is 300 BPS LONG. Other settings may work but this is the default starting point for initial operations.

Use the INC button to increase the baud rate.

Use the DEC button to decrease the baud rate.

Use the INT button to change the interval from LONG to SHORT

**RigBlaster Considerations**
Some RigBlaster models require that the PTT line be asserted for the audio path to flow from the computer to the radio. When the PTT line is asserted, the microphone input may be disabled to avoid room noise from being mixed in with the digital signal being generated by the computer. For this reason, it is better to use hardware PTT control with a RigBlaster interface than TX/RX CAT control unless the serial port you are using for CAT control also routes the RTS line to the PTT assert signal in the RigBlaster.
BlockTerm Configuration

**MS-DMT (M110a Modem) Configuration**

Note: CAT COM PORT is 2 (COM2), used for PTT/CW/FSK on TS-2000x

Note: DATA PORT 7 (COM7), used for BlockTerm Connection
**Com0Com Setup**

NOTE: Virtual COM7 is connected to Virtual COM12

**BlockTerm Configuration**

NOTE: COM12 is used to connect BlockTerm to MS-DMT (M110a Modem)
Send and Receive Operations

To use this software after proper setup:

**Clear Button**
This button will clear the contents of the Receive Window

**Receive Operation**
By default, the software is in Receive Mode. If adequate audio is passing from the radio audio output to the computer input (either line input or microphone) then received messages will display in the Receive Window.

**Transmit Operation**
Press the Clear Button to clear the Transmit Window. Cut and Paste from another source of information, or simply type the message into the Transmit Window. Press the Send Button to begin sending. The software will automatically key the transmitter (PTT ON) and transmission will occur. When the transmission is complete, the software will automatically unkey the transmitter (PTT OFF) and transmission will end and Receive Mode will resume.

It may be necessary to adjust the speaker output level (Windows control differs depending on which O/S, i.e. Win2K, WinXP, Vista, Win7). Ideally with compression enabled in the radio, the level of compression will be barely a few decibels, or the compressor turned off. The RF Output should be such that it does NOT always saturate at the maximum power level or anywhere close to it.

The above settings are for use in my TS-2000x system which has a CAT control port of COM1, and CW/PTT/FSK port of COM2. The interface is a RigBlaster Pro setup with the CAT port completely bypassing the RigBlaster, and the CW/PTT/FSK port passing through the RigBlaster Pro and then to the TS-2000. The MC-60 microphone is connected to the RigBlaster Pro and the RigBlaster Pro is connected to the TS-2000x microphone input.

Note that I set the CAT COM PORT to COM2 since I am using hardware PTT, and the DTR/RTS is not checked thereby making the PTT work on the RTS line like other digital mode software. The baud rate is irrelevant in this case.

I tried to use TX/RX CAT control, but it didn’t work. Although the software keyed up the radio, no audio was passed from the computer to the radio because the hardware PTT line in the RigBlaster Pro was not asserted.

This configuration has successfully been used to send and receive M110A messages on the MARS region frequencies.