

Using The MxTools Dialler

INTRODUCTION

Versions 2.8.4 onwards of MxTools incorporate a dialler feature to allow the remote monitoring and configuration of the MX800 radio base stations using modems. Although all the serial communications features have been maintained in the dialler implementation, some of the normal MxTools capabilities may be disabled as a security measure.

The MxTools dialler facility will allow the remote monitoring and configuration of the MX800 series of radio base stations. Also included is the serial network capability where individual base stations can be interrogated and configured using a multi-drop serial communications network.

HARDWARE REQUIREMENTS

The following is a suggested minimum list of equipment needed to use the dialler feature of MxTools.

- An external modem capable of 9600 baud fixed rate communications on its serial port. Modem settings must be able to be stored in non-volatile memory. The modem must also use the standard AT command set. This is the modem for the remote end.
- An internal or external modem which uses the standard AT command set. The modem can use any COM port from 1 through 4. This is the modem at the PC (MxTools) end.
- The standard serial LapLink cable that is supplied with MxTools for connection between the modem and the radio.

Additional equipment required for serial networking include the following.

- A multi-drop serial network. This can be either a dedicated hardware implementation or the jumper setting in the MX800 radio base station. This only applies to the standard motherboard and not the LC option. Additional serial cables as required to daisy-chain the radio base stations.

- MX800 standard motherboard radio base stations with firmware version 2.8.2 or later. The basic serial network support code is contained in firmware version 2.8.2 and later. Only the hardware ID is used for the serial network. Firmware version 2.9.0 onwards has enhanced serial network support. This includes a software name ID and a software number ID.
- Hardware ID jumpers for the MX800 radio base station. Only the standard motherboards have the DB-25 connector required for the hardware ID. Please refer to the Help screen in MxTools for the pin assignments for the hardware ID.

The pin designations for the DB-25 connector are given in the table below:

Port A	DB-25 Pin
Bit 4	23
Bit 5	10
Bit 6	22
Bit 7	9

These pins can be connected to pin 13 of the DB-25 connector which can be either HIGH or LOW depending on the position of JMP 19 on the radio motherboard. For example, if pins 9 and 10 are connected to pin 13 on the connector, the resulting hardware ID is then 1010b (0xA) or 10. The default ID number with nothing connected is 1111b (0xF) or 15. The hardware ID overrides the numeric software ID setting changing it to the hardware ID number when the hardware ID is other than 15 (default). The hardware IDs can be checked using the 'Remote' screen in MxTools.

Current serial network implementation in MxTools is limited to the standard motherboard MX800 radio base station.

SOFTWARE REQUIREMENTS AND CONFIGURATION

The version of MxTools required is version 2.8.4 or later. Previous versions do not have the

dialler support but have the serial network capability (from version 2.8.1 onwards).

CONFIGURING THE REMOTE MODEM

The remote modem needs to be setup to communicate via the serial port at a speed of 9600 baud with no hardware handshaking. The modem settings will also need to be stored in non-volatile memory and as the default profile.

To configure the remote modem, perform the following steps:

1. Open a terminal program, such as HyperTerminal, and with the following settings, 9600 baud, no parity, 8 data bits and 1 stop bit.
2. Connect to the modem and check for a response. The modem should respond with 'OK' when 'AT' is typed followed by a carriage return.

3. Send the following string to the modem followed by a carriage return, 'ATS7=60&B1&C0&D0&H0&I0&R1&S0'.

S7=60 sets a carrier wait time of 60 seconds. &B1 sets the serial port speed to a fixed speed. &C0 sets the DCD to always ON, regardless of the state of the remote carrier. &D0 sets the DTR to override mode. &H0 disables all transmit data flow control. &I0 disables all receive data flow control. &R1 sets the modem to ignore the RTS signal and CTS is always ON. &S0 sets DSR to always ON.

The modem should respond with 'OK' if the command string was accepted.

4. Send the following command string to the modem followed by a carriage return, 'ATS0=3&W0&Y0'.

S0=3 sets the modem to autoanswer after 3 rings. &W0 tells the modem to save the current profile to memory profile 0. &Y0 sets the default memory profile to 0 after reset or power-up.

5. Check that all the settings have been saved by issuing 'AT&V0' followed by a carriage return. The modem will respond by showing the active configuration profile.

6. Turn off the modem and turn it on again. Check that the modem has powered up with the desired settings by issuing 'AT&V0' followed by a carriage return.

The remote modem should be now ready for use.

CONFIGURING MXTOOLS

Once the remote modem has been configured, MxTools should be set up to use the dialler. This is done in the 'Options' menu in MxTools.

1. Select the COM to which the dialling modem is connected. Available COM ports are 1 through 4.
2. Select the appropriate baud rate for the modem (2400, 9600, 14400 or 19200).
3. Select the connection method by selecting the Modem radio button. The modem baud rate works independently of the MxTools direct cable connect baud rate.
4. Click on the 'OK' button to save the settings and configure the COM port.

The modem dialler in MxTools is now ready for use.

USING THE MXTOOLS DIALLER

The dialler function can be accessed through one of two methods, the 'Connect' menu '... connect to MX800' option or '... using the Dialler' option. When using the '... connect to MX800' option, there is a new command button to call up the dialler.

1. Enter the number to be dialled in the 'Dial' combo box. MxTools will remember the dialled numbers and add new numbers to the dial list.
2. Click on the 'Dial' command button. MxTools will initialise the modem if it has been initialised. The initialisation string is visible in the text box. The modem will dial the requested number and begin negotiations with the remote modem. The caption on the 'Dial' button changes to 'Hang Up'.
3. Once the modems have successfully connected, click on the 'Close' button to dismiss the dialler screen.

4. Carry out the normal operations as per the direct cable connect using MxTools. Use the 'Connect' button to connect to the radio base station. Diagnostic and calibration information can be read from and written to the MX800 base station as usual.
 5. To disconnect, open the dialler screen through the 'Connect' menu and selecting the '... using the Dialler' option.
 6. Click on the 'Hang Up' button. The modem will return to the command state and hang up the current call.
 7. Close the dialler screen by clicking on the 'Close' button.
3. Click on the 'Poll Network' button to interrogate the base stations connected on the serial network. MxTools will look for base stations with hardware IDs from 0 through 15. If a base station is present on the current selected hardware ID, a 'PRESENT' status will be shown next to the hardware ID.
 4. Once the polling has been completed, select the desired base station by clicking on its associated 'Select' radio button. MxTools will connect to the base station and read its configuration and calibration information.

NOTE The channel information is not downloaded automatically when connecting to a base station.

Other remote radio base stations can be monitored and configured as detailed above. For radios connected in a multi-drop serial line, the radios can be monitored and configured using the MxTools serial network as described in the sections following.

THE MXTOOLS SERIAL NETWORK

MxTools version 2.8.1 and later has the ability to control and monitor up to 15 radios connected on a multi-drop serial network. The MX800 radio base stations need to have firmware versions 2.8.2 and later to be able to use the serial network.

The MxTools serial network operates in a manner similar to a token passing network. When the base stations are operating in network mode, only the addressed base station will respond to any commands from MxTools.

STARTING AND STOPPING THE MXTOOLS SERIAL NETWORK

The following is the procedure to start the MxTools serial network.

1. If using the dialler, set up the serial communications as described above.
2. Select the '... to Network' option in the 'Connect' menu or use the 'START' button in the main screen. A new screen will be displayed with the following command buttons, 'Poll Network', 'Select', 'Stop Network' and 'Close'.

5. Once a base station has been selected, all the configuration and monitoring operations are available. The channel information should be downloaded if any of the channel information settings are to be changed.
6. Another base station can be selected by clicking on the 'START' button or selecting the '... the Network' option in the 'Connect' menu.
7. To stop the serial network, click on the 'Stop Network' button. Once the serial network has been stopped, the 'Poll Network' button must be clicked to re-start the serial network.
8. Once all the required operations have been performed, the serial communications can be terminated as previously described.

NOTE When working in the serial network mode, please ensure that the current channel information corresponds to the selected base station's channel information. This will avoid the error of programming a base station with the channel information meant for another base station.

NOTE The MxTools connect process includes the downloading of the radio serial and model number, the radio configuration information, the multiple CTCSS settings, the Morse code settings and the calibration information.