

AR205

User's Manual

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Introduction

Thank you for choosing the **OKI AR205** Sound Data Generating Tool.

OKI's Sound Data Generator, **VoicePRO Light** is a software tool that allows you to generate Intel HEX format files for OKI Speech LSI products from WAVE files (Windows PCM waveform) created by using a commercially available WAVE Editor software. It also enables you, by using such HEX files, to program an OTP ROM (One-Time-Programmable ROM) chip for OKI Speech LSIs. Use a general-purpose EPROM Programmer to write HEX to an EPROM chip.

This manual has been so designed that even a first-timer in manipulating digital sound data can readily pick up the operations with a fast learning curve.

To get the most out of this tool, the manufacturer encourages you to read this manual thoroughly before using the software and hardware.

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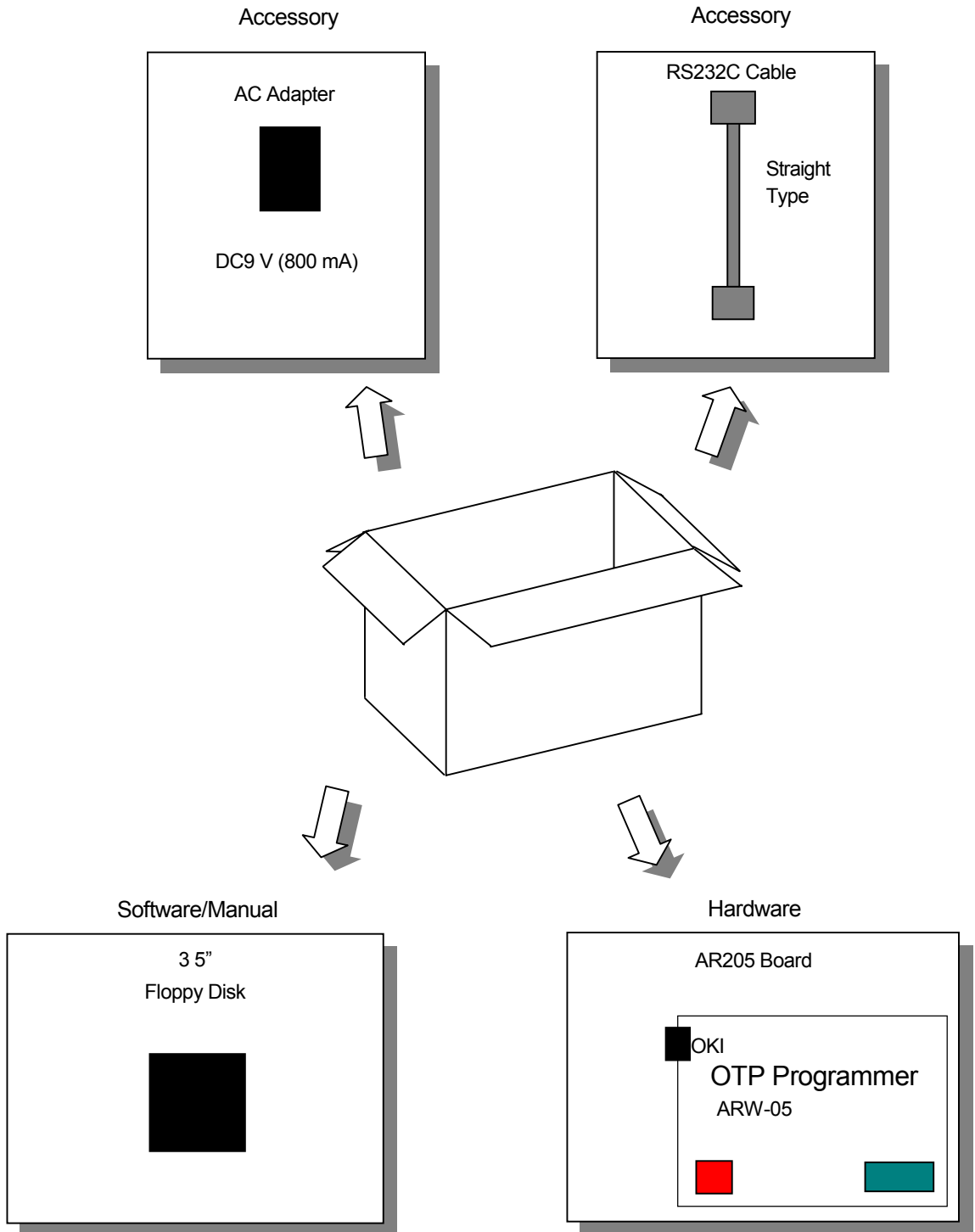
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1. General Description

1.1 System Requirements

PC	IBM PC/AT Compatible with a Pentium CPU (Min.) (Pentium 133 MHz or above recommended)
OS	Windows 95 / 98 (Windows 3.1 and Windows NT not supported)
Memory	Minimum 16 MB (32 MB or above recommended) Minimum 8 MB free memory required
Drives	3.5 in. Floppy Disk Drive for installation HDD Minimum 2 MB free disk space required (HDD of an adequate disk space for storing sound data recommended)
Display	Analog CRT supporting min. 640 X 480 dots resolution and 16 colors (800 X 600 dots or above recommended)
Others	Keyboard Mouse Serial Port: COM1 and COM2 must be properly recognized by your operating system.

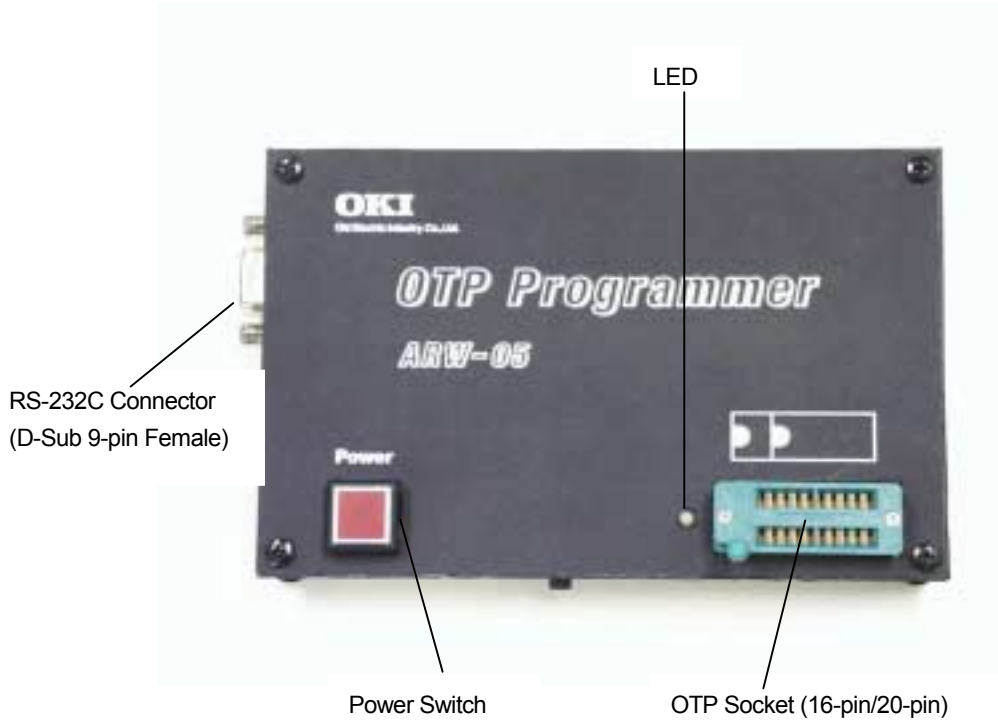
1.2 Your AR205 Package



1.3 Installation

1.3.1 AR205 Board

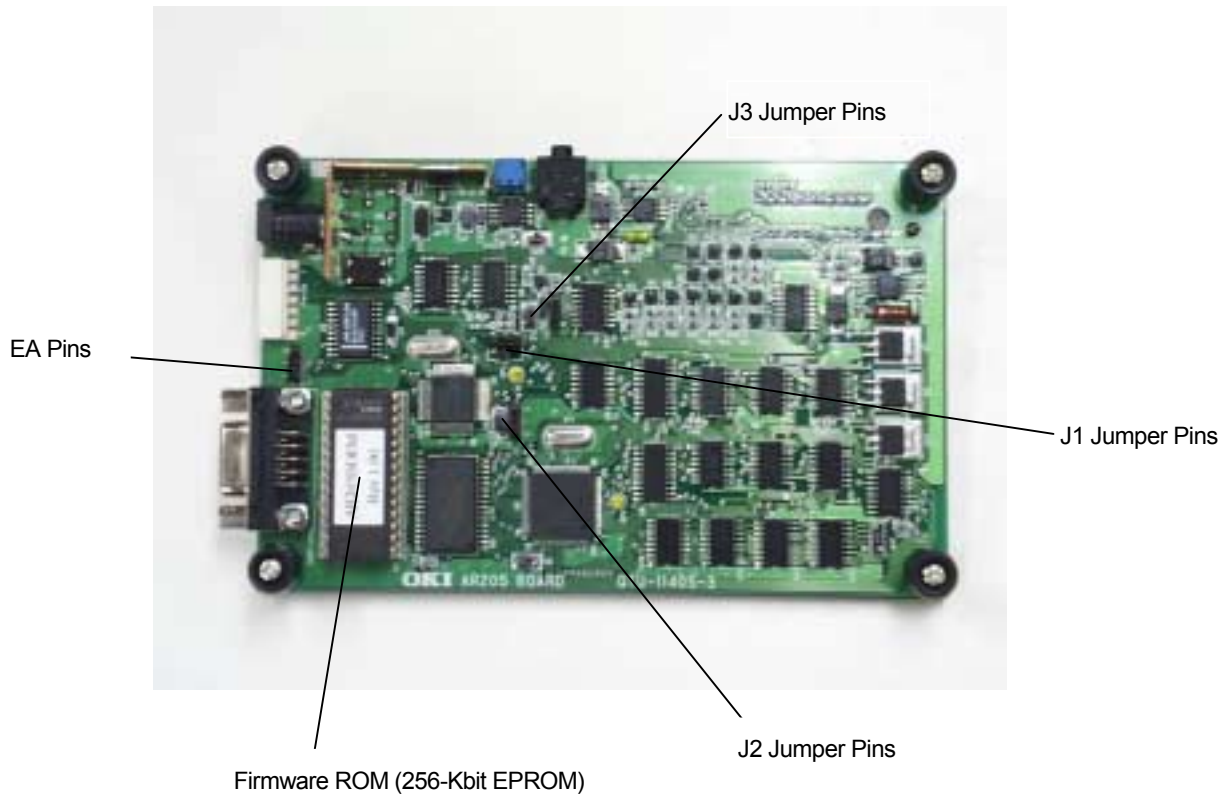
[Top View]



[Side View]



[Bottom View]



1.3.2 AR205 Board Settings

The factory-default jumper settings are as follows:

- J1 1 and 2 are connected.
- J2 1 and 2 are connected.
- J3 Not connected.
- EA 1 and 2 are connected.

Normally you don't have to change the above default jumper settings.

However, in case that the LED indicator on the AR205 board would not go on in green even after turning the board on, connect the J3 jumper pins once to get them short circuit and then disconnect them to make it open again.

This will cause the board's control circuit to be initialized (reset), and the LED lights up in green.

1.3.3 AR205 Board Specifications

Dimensions	: 97 X 158 X 30 (mm)
Power Consumption	: Maximum 3.5 W (Recommended AC Adapter: DC 9 to 10V/400 to 850 mA)
Weight	: 130g
Operating Temperature	: 10°C to 40°C

1.3.4 Connecting and Activating the Board

1. Connect a cable from AC Adapter to the AR205 board,
2. Hook up the AC Adapter to a wall outlet (AC 100 to 240V),
3. Use a RS232C cable to connect the AR205 board and your PC,
4. Start up your PC,
5. Turn on the AR205 board power switch.

Then, the LED indicator on the AR205 board goes on in green.

This status indicates that the control circuit has been initialized and is ready to operate. If the on-board LED indicator would not go on in green, the control circuit is not initialized due to some cause. In this case, initialize the control circuit using the J3 jumper pin as described in 1.3.2

1.3.5 Installing Software

You have Windows 95/98 up and running.

To run the installation program, double-click **AR205_Install.exe** on **Drive A** or **B** (Floppy Disk Drive where the Installation disk is inserted).

And then, follow the instructions displayed on setup screens to install the software.

1.4 Application Programs

The **VoicePRO Light** consists of the following application programs:

VpRomf.exe **ROM File Editor Window**
VpRomw.exe **ROM Writer Control Window** (dialog)

The two programs can run independently. You should start each program individually in the folder where the programs were installed.

1.5 Starting an Application

To start an application program, double-click the **VpRomf.exe** or **VpRomw.exe** icon in the folder where the programs has been installed, with the AR205 board activated (the LED indicator is on in green). Next, select a baud rate and click **OK**.

The program starts to open the ROM File Editor Window or the ROM Writer Control Window. The initial value of baud rate is 115200 bps. If an error message appears on the screen of your personal computer, select a baud rate less than 115200 bps.

1.6 Notice After Starting Programs

1. To change the baud rate of communication between the AR205 board and a personal computer, turn off the power switch of the AR205 board and end the personal computer program. Then, select a baud rate again after starting the program according to the procedure.
2. If the **VoicePRO Light** program and other application program are activated concurrently on a personal computer, the **VoicePRO Light** program may not operate normally, especially in case that voice phrases are registered using the ROM File Editor Window.
We recommend you to use an operating environment only for the ROM Editor Window.
3. The AR205 board may heat during operation. This is caused by heat sinking of an operating power supply device. This heating has no influence on operation. However, be careful not to place the AR205 board on the desk in touch with other products.
4. In the **VoicePRO Light** program, a new PCM file is created in a folder in which the WAVE file is stored, when the **Intel HEX** format file is created from the WAVE file (Windows PCM waveform). Therefore, the folder size should be twice the size of the existing WAVE file.
5. When creating a PCM file, if a file with the same name exists in a folder, back up the PCM file so as to prevent overwriting.

2. ROM File Editor Window [VpRomf.exe]

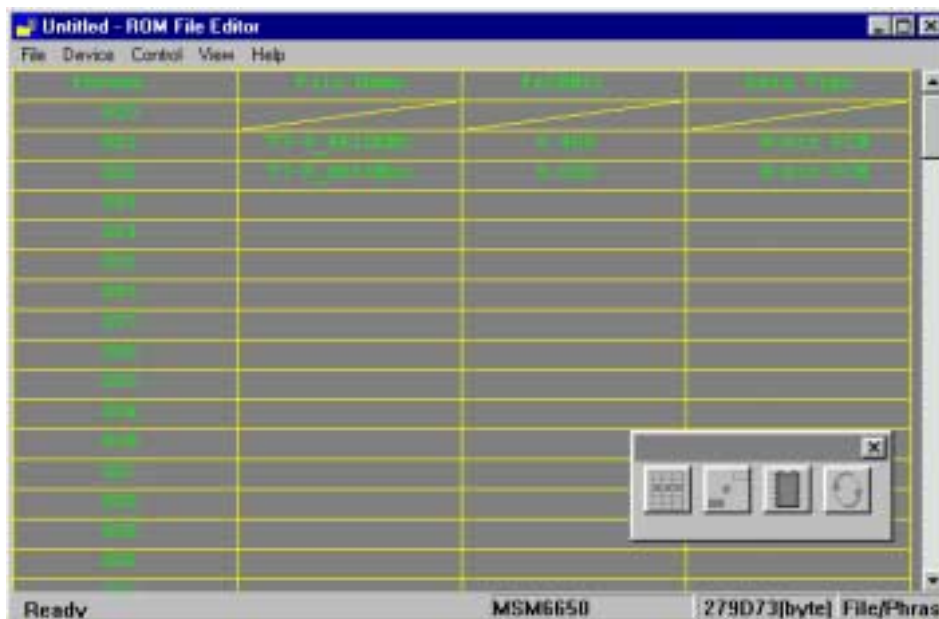
2.1 What is ROM File?

A ROM chip has its own file format different from those used with your computer system. Therefore, sound data files you worked on with a WAVE editor must be reformatted or converted into ROM file format known as **Intel HEX** format before you can burn those files into a microchip. The ROM File Editor allows you to generate **Intel HEX** format files for ROM from such files as you recorded, edited, manipulated and evaluated by using a WAVE editor.

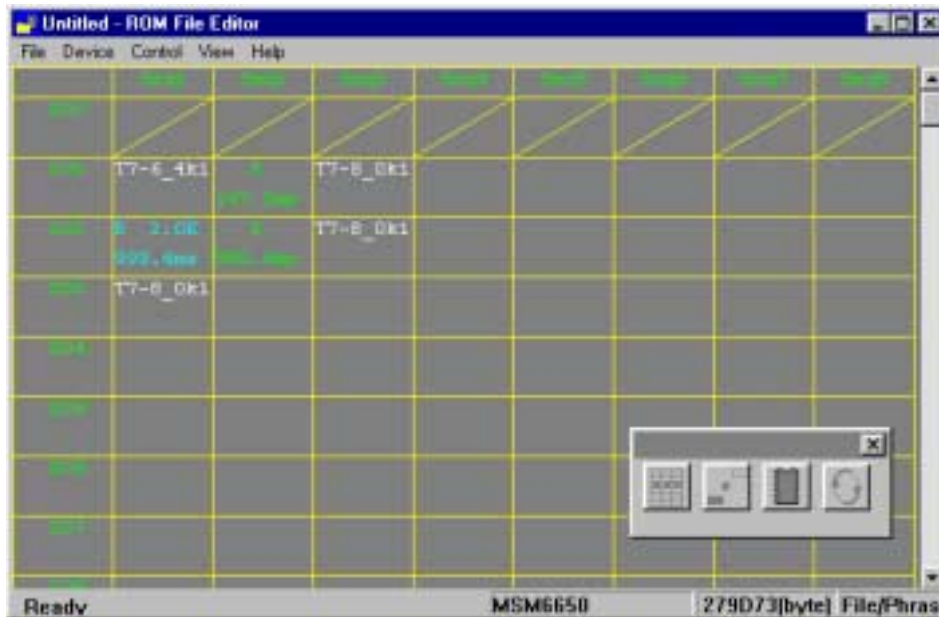
Usable voice file format: The monaural WAVE file (16-bit or 8-bit PCM only) and **VoicePRO** (PCM file) format are supported. However, the voice (PCM file) format is not supported.

2.2 ROM File Editor Window

2.2.1 File Entry Mode



2.2.2 Phrase Entry Mode



2.2.3 Worksheet

The ROM File Editor has two worksheet modes, **File Entry** mode and **Phrase Entry** mode. However, when you try to generate ROM files for a device without an on-chip Phrase Control Table, **Phrase Entry** mode is unavailable.

You can switch from one mode to the other by choosing the **Control | Worksheet Mode** command or clicking the corresponding button on the Toolbar.

File Entry Mode Worksheet

File Entry mode worksheet is a workplace where you can assign a sound data file to a specific Phrase Number (No.). This spreadsheet-like worksheet has predefined rows and columns; the left-most column (Row Heading) represents Phrase number for each row, while the adjacent 3 columns represent column headings, **File Name**, **Fs[KHz]** and **Data Type** respectively. The maximum phrase numbers available on the worksheet vary depending on the target device you selected.

Phrase Entry Mode Worksheet

Phrase Entry mode worksheet is a workplace where you can enter phrasing order, in other words, you can assign a phrase (or, in some occasion, how much length of silence, etc.) to a specific **Sequence No.** within a specific **User-defined Word**.

On this worksheet, you can only enter a phrase number to which a sound data file has been assigned on the **File Entry** mode worksheet.

This spreadsheet-like worksheet also has predefined rows and columns; the row headings representing **User-defined Word No.**, while the column headings representing **Sequence No.** The maximum numbers of **User-defined Word** on the worksheet vary depending on the target device you selected.

2.2.4 Menu Bar

The Menu Bar of the ROM File Editor Window has the following menu items:

File

New	Clears the current worksheet, both File Entry mode and Phrase Entry mode worksheets.
Open	Retrieves an existing ROM-file Information file.
Save	Saves the current worksheet data to the ROM-file Information file under the file name "as is".
Save As	Saves the current worksheet data to a ROM-file Information file under a new file name.
File/Phrase Entry	Opens a worksheet to enter files or phrases.
Exit	Closes the window to exit from the program.

Device

Device	Selects a target device.
Options	Sets up device options.

Control

Delete	Deletes all entries on the current worksheet.
ROM File	Generates a ROM file based on the current worksheet data.
Control ROM	Creates a Control ROM for MSM6588.
Worksheet Mode	Switches worksheet mode from File Entry mode to Phrase Entry mode or vice versa. This command is disabled when the selected device doesn't have the on-chip Phrase Control Table.

View

Toolbar	Toggles Show/Hide the Toolbar.
Status Bar	Toggles Show/Hide the Status Bar.

Help

About VpRomf	Displays the Version and Copyright dialog box of the VpRomf.exe program.
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2.2.5 Toolbar

The Toolbar buttons correspond to the following menu items, which appear in order of listing:
You can toggle Show/Hide the Toolbar by choosing the **View | Toolbar** command.

File File/Phrase Entry	/	Control Delete
Control ROM File	/	Control Worksheet Mode

2.2.6 Status Bar

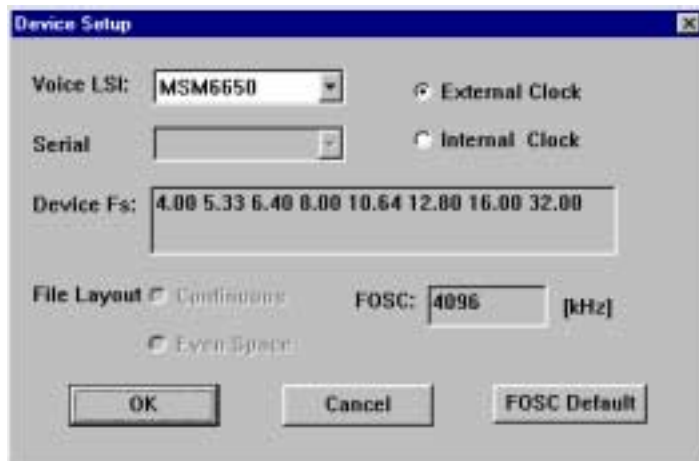
The Status Bar displays the following four types of information. You can toggle Show/Hide the Status Bar by choosing the **View | Status Bar** command.

- Brief description on the function of selected menu command or Toolbar button function
- Name of the device currently selected
- Total data size in Bytes
- Current operation or process

2.3 Setting Up Options

2.3.1 Selecting and Setting Up a Target Device

Choosing the **Device | Device** command opens the **Device Setup** dialog box, where you can set up the following options;



Voice LSI

Select your target LSI from the pull-down list containing the following devices;

MSM6378A / MSM6379 / MSM63P74 / MSM6585 / MSM6588 / MSM6650 / MSM6652A /
MSM6653A / MSM6654A / MSM6655A / MSM6656A / MSM6658A / MSM66P54 /
MSM6688 / MSM9802 / MSM9803 / MSM9805 / MSM9810 / MSM9831 /
MSM9836 / MSM9841 / MSM9842 / MSM9845.

Serial ROM

Select a Serial ROM type from the pull-down list if you selected a target device that is used with an external Serial ROM (e.g. MSM6585);

MSM 6595A / MSM6596A / MSM6597A

Device Fs

Select a sampling frequency from the pull-down list.

FOSC

Enter an oscillation frequency at KHz in the text box if you need to change the default FOSC value.

External Clock ... Select X'tal for MSM6650 family and MSM9800 family.
Select the external clock for MSM9831.

Internal clock ... Select CR for MSM6650 family and MSM9800 family.
Select X'tal for MSM9831.

File Layout

In case that the selected target device has no on-chip Phrase Control Table (e.g. MSM6585), you need to choose either one of the following file layout options;

- Continuous :** Layouts all data files continuously without any blank space in-between.
Even Space : Start addresses of each voice file are allocated in units of 128 bytes.

If you choose the **Even Space** option, you also need to enter a unit size in the **Unit Size** text box. The size you enter in the **Unit Size** text box must be larger than the largest single file size among those to be entered in the **File Entry** mode worksheet. For those files smaller than the storage unit size, the remaining open space will be automatically filled out with Silence data.

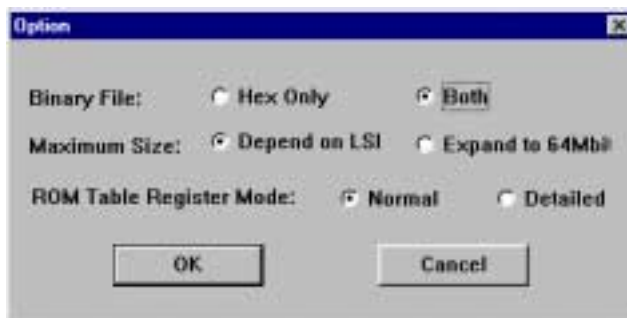
Click **OK** when all options are properly set up in this dialog box. Your settings take effects immediately, and the worksheet data both in **File Entry** and **Phrase Entry** mode are cleared. Then, a new worksheet appears in **File Entry** mode ready to accept your entry. In addition, the **Use this type as default** check box in the **Data Type** dialog box (described later in this manual) is unchecked, if it has been checked.

Click the **FOSC Default** button to restore the default values for **Device Fs** and **FOSC**, or to change **FOSC**.

By default, the MSM6650 is selected for **Voice LSI** when you open the dialog box.

2.3.2 Setting Up Device Options

By choosing the **Device | Options** command, the **Options** dialog box opens.



You can set up the following options in this dialog box;

Binary File

You can select either one of the following;

- HEX Only** Selecting this option allows you to generate HEX files only.
Both Selecting this option allows you to generate both binary and HEX files.

Max. Data Size

You can select either one of the following;

- Depend on LSI** Limits the max. data size up to the size allowed by the selected device.
Expand to 64 Mbit Expands the max. data size up to 64 Mbit. (Unavailable in Ver. 1.00)

Worksheet Display Mode

You can select either one of the following;

Normal Displays normal worksheet screen in **Phrase Entry** mode.

Detailed Displays detailed worksheet screen in **Phrase Entry** mode.

The **Detailed** worksheet screen is available only when the selected target device is one of the MSM6650 series.

Click **OK** when all required options are properly set up in this dialog box. Your settings take effects immediately.

2.4 Entering Sound Data Files – File Entry Mode

To enter sound data files to the **File Entry** mode worksheet, follow the steps below;

Select the **File | File/Phrase Entry** command or click the corresponding Toolbar button to start entering files in **File Entry** mode. The Status Bar indicates **File/Phrase Entry** on the right-most corner while you are in this mode.

2.4.1 Selecting a Destination Phrase Number

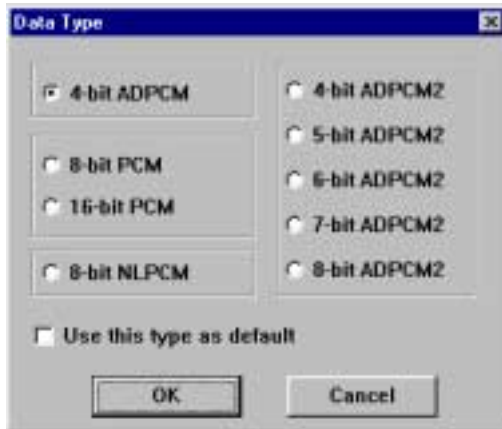
Click to select a Phrase No. to which you assign a sound data file. If the phrase number you clicked has no assigned file yet, you can assign a file as a new entry. While, your new entry replaces the existing one if the phrase number you clicked has already the file assigned. You can't assign any file to Phrase No. 00.

2.4.2 Selecting a Sound Data File

Now the **File Open** dialog box opens. Select a file to be assigned to the phrase number.



2.4.3 Selecting a Data Type



Now the **Data Type** dialog box opens, where you can select one of the following data types; 4-bit ADPCM / 8-bit PCM / 16-bit PCM / 8-bit NLPCM / 4-bit ADPCM2 / 5-bit ADPCM2 / 6-bit ADPCM2 / 7-bit ADPCM2 / 8-bit ADPCM2 (8-bit NLPCM is 8-bit Oki Non-linear PCM algorithm.)

Remember that data types that are not supported by the selected target device are dimmed out in this dialog box.

If you check the **Use this type as default** check box in the dialog box, the selected data type is used as the default data type for files you will select thereafter. So the **Data Type** dialog box will not appear any longer.

To reset this setting, change the target device by choosing the **Device | Device** menu.

When entering sound data files is complete, right-click anywhere on the worksheet, before selecting a new phrase number, to exit from **File/Phrase Entry** mode.

If you enter sound data files which are “for read-only”, the message “A file didn’t open it” appears on the screen. File Entry is disabled. In this case, do File Entry after releasing “for read-only” using the property of sound data files.

2.5 Deleting an Entry – File Entry Mode

To start Delete mode, choose the **Control | Delete** menu command or click the corresponding button on the Toolbar. (While in **Delete** mode, the Status Bar displays “Delete” on the right-most corner.)

The **Delete** command removes an entry (i.e. a sound data file assigned to a specific phrase number), but leaves the sound data file itself unchanged on the hard-disk.

Click to select a Phrase No. from which the file entry is to be removed. Now the entry is removed and the phrase is left blank and open until another new file is assigned. (The following Phrase No. would not move upwards to fill the opening.)

Right-click anywhere on the worksheet to exit from Delete mode.

2.6 Entering a Phrase – Phrase Entry Mode (for MSM6650 family and MSM9800 family)

To enter phrasing order to the worksheet in **Phrase Entry** mode, follow the steps described below;

Select the **File | File/Phrase Entry** command or click the corresponding button on the Toolbar to start entering a phrase in **Phrase Entry** mode. The Status Bar indicates **File/Phrase Entry** on the right-most corner while you are in this mode.

2.6.1 Selecting a Cell for Entering a Phrase



Click to select a cell to which you want to assign a phrase.

If you click a **User-Defined Word No.** or a blank **Sequence No.**, the left-most blank cell (one with the smallest **Sequence No.**) available in the row is automatically selected for the new entry. While, your new entry will replace the existing one if you click a **Sequence No.** that already has a phrase assigned.

Note that you can't enter any phrase to User-Defined Word No. 00.

2.6.2 Selecting a Sound Type



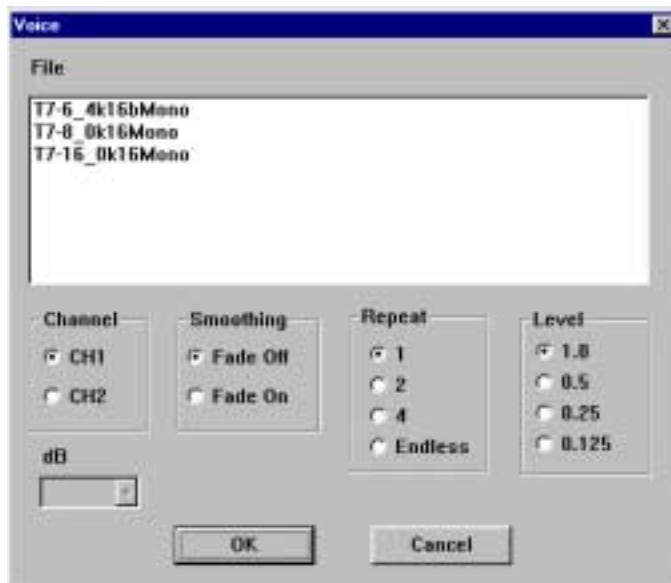
Now the **Sound Type** dialog box opens. Select one of the following data types;

- Voice** For regular sound data files
- Silence** For silence data
- Beep** For beep sound (Unavailable with some target devices)

2.6.3 Selecting Attributes

The attributes to be selected vary depending on the sound type you selected in the **Sound Type** dialog box.

2.6.3.1. When You Select “Voice”



The **Voice** dialog box opens. Select/enter an appropriate value for each attribute. Some attributes are unavailable depending on your target device selected.

- File** Select a sound data file from those files entered to the **File Entry** worksheet.
- Channel** Select either **CH1** or **CH2** for playback.
- Smoothing** Select either **Fade Off** or **Fade On**.
- Repeat** Select a number of repeating cycles from 1 / 2 / 4 / Endless.
- Level** Select an output level from 1.0 / 0.5 / 0.25 / 0.125.

2.6.3.2. When You Select “Silence”



The **Silence** dialog box opens. Select or enter an appropriate value for each attribute. Some attributes are unavailable depending on your target device.

- | | |
|----------------|--|
| Channel | Select either CH1 or CH2 for playback. |
| Length | Enter a time length value for Silence in milliseconds. Since the minimum time unit for Silence is 16.384 msec (32 msec for some devices), the value displayed is automatically adjusted, after your entry, to the closest multiple of 16.384 (or 32) msec. |

2.6.3.3. When You Select “Beep”



The **Beep** dialog box opens. Select or enter an appropriate value for each attribute.

- | | |
|------------------|---|
| Frequency | Select a frequency for beep sound from 0.5 / 1.0 / 1.3 / 2.0 kHz. |
| Length | Enter a time length value for Beep sound in milliseconds. Since the minimum time unit for Beep is 16.384 msec, the value displayed is automatically adjusted, after your entry, to the closest multiple of 16.384 msec. |
| Level | Select an output level for beep sound from 0.5 / 0.33 / 0.25 / 0.125. |

When the required phrase entry is complete, right-click anywhere on the worksheet, before selecting a new cell, to exit from **File/Phrase Entry** mode.

2.7 Deleting an Entry – Phrase Entry Mode

To start **Delete** mode, choose the **Control | Delete** menu command or click the corresponding Toolbar button (While in **Delete** mode, the Status Bar displays “Delete” on the right-most corner).

Click to select a **User-Defined Word No.** to be deleted. All phrase entries to any **Sequence No.** within the selected **User-Defined Word No.** are deleted. The deleted cells remain blank and open until new phrases are assigned. (The following User-Defined Word No. data would not move upwards to fill the opening.)

To delete a phrase entry in a specific cell (i.e. a phrase assigned to a specific **Sequence No.** within a **User-Defined Word No.**), click the cell that contains the phrase to be removed. When the entry is removed and the cell becomes open, cells of the next sequence numbers move to the left to fill out the opening.

Right-click anywhere on the worksheet to end **Delete** mode.

2.8 Generating a ROM File

When you finish entering files and phrases to both **File Entry** and **Phrase Entry** worksheet, you are ready for generating ROM files.

To generate ROM files, follow the steps described below;

Choose the **Control | ROM File** command or click the corresponding button on the Toolbar.

The **Save AS** dialog box opens. Enter a file name for the HEX file to be generated. (Extension **.HEX**)

And then, the **ROM Size** dialog box opens. Select an appropriate ROM size from the following list.

256-Kbit ROM / 512-Kbit ROM / 1-Mbit ROM / 2-Mbit ROM / 4-Mbit ROM / 8-Mbit ROM

Click **OK** to start generating ROM files.

Note: If the selected ROM size is smaller than the total file size to be programmed, the system automatically generates divided HEX files for programming across multiple ROM chips. When this happened, such HEX files are named “xxx1.HEX”, “xxx2.HEX”, “xxx3.HEX” …….

Generating ROM files can take some time, so wait until the “**End of Generating ROM Files**” message appears.

In addition to ROM files (xxx.HEX), an information file (xxx.inf) and, if so selected, binary files (xxx.bin) are generated in the above process.

Remember that the **Control | ROM File** command does not create or save a ROM-file information file (the file containing the **File Entry** and **Phrase Entry** worksheet data).

If you need to keep such data for future use, you must save the file separately. (See 2.9: Saving and Retrieving a ROM-file Information File” later in this document.)

2.8.1 For MSM9831

Before you can generate ROM files for MSM9831, you need to finish with entries to the **Phrase Entry** worksheet. If you select the **Control | ROM File** command with the **Phrase Entry** worksheet undefined, you will see the following warning message; “**Phrase Entry Worksheet Undefined!**”

You can automatically make entries to the **Phrase Entry** worksheet by clicking **OK**.

2.9 Saving and Retrieving a ROM-file Information File

2.9.1 Saving a ROM-file Information File

By choosing the **File | Save As** menu command, you can create a ROM-file Information file and save the current entries on the **File Entry** and **Phrase Entry** worksheet. (Select the **File | Save** command if you want to overwrite an existing file.)

The **Save As** dialog box opens, where you can select a desired drive and directory and enter a new file name, as required. (File extension: **.MKR**)

2.9.2 Retrieving a ROM-file Information File

To open and view an existing ROM-file Information file that contains the **File Entry** and **Phrase Entry** worksheet data, choose the **File | Open** command.

2.10 Creating a Control ROM for MSM6588

When you evaluate a sound data ROM for MSM6588 by using a dedicated evaluation board, you need to have a control ROM in addition to the sound data ROM.

To create a Control ROM for MSM6588, follow the steps described below:

Before you can start creating a control ROM for MSM6588, you need to have its ROM files generated in advance. The information file (xxx.inf) generated together with the ROM files in the process is used to create the Control ROM.

Select the **Control | Control ROM** command to open the **File Open** dialog box, where you can select a desired information file.

An additional ROM file for the Control ROM is generated. (Use a 256-Kbit ROM only) The ROM file generated here is automatically named xxxC.HEX, where xxx represents the name of the information file you selected. For example, when you select “sample.inf” file, “samplec.HEX” file is generated.

If you select an information file for other devices than MSM6588 in the **File Open** dialog box, an error dialog box appears with the following error message;

“Invalid Information File! The selected file is NOT for MSM6588!”

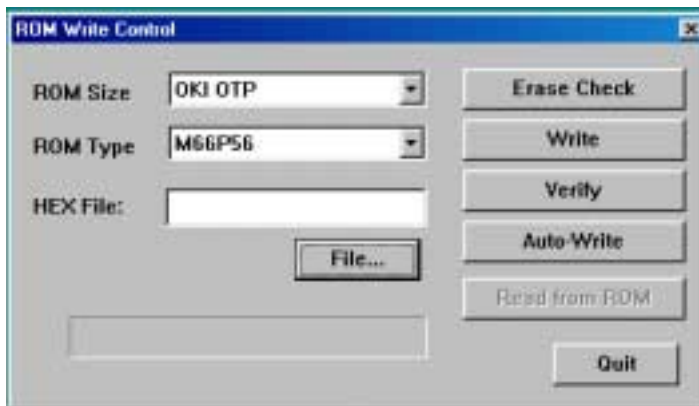
Click **OK** to reopen the **File Open** dialog box. Reselect a correct information file.

3. ROM Writer Control Window [VpRomw.exe]

The ROM Writer Control window is a dialog-only window where you can control programming operations. With this window, you can perform all necessary operations for writing HEX files generated with the ROM File Editor to an OTP ROM chip.

The written OTP ROM chip is mounted in a dedicated demo-board and is used for actual sound evaluation. If you want to use this OTP ROM chip for purposes (for products, etc.) other than actual sound evaluation, use other dedicated OTP ROM chip writer.

3.1 ROM Writer Control Dialog Box



3.2 Selecting a ROM Type and Size

Select a ROM type from the **ROM Size** pull-down list box. The list includes the following ROM size options;

256-Kbit ROM / 512-Kbit ROM / 1-Mbit ROM / 2-Mbit ROM / 4-Mbit ROM / 8-Mbit ROM / OKI OTP

And then, select a ROM or OTP type (the product code) from the **ROM Type** pull-down list box.

3.3 Selecting a HEX File

Enter the name of Intel HEX file to the **HEX File** text box. You can type in the file name or click the **Browse...** button to open the **Open File** dialog box where you can select a desired HEX file.

3.4 Mounting an OTP ROM onto the Socket

Mount an OTP ROM chip onto the socket on the OTP Programmer that is included in your package . Be sure to place a microchip in the proper direction in accordance with the picture printed on the OTP Programmer.

3.5 Erase Checking

Click the **Erase Check** button to start erase check of the device. Erase check (checking that the OTP ROM chip has no programmed data) starts and the Progress Bar displays the progress of the operation.

3.6 Programming an OTP ROM

Now you are ready to start programming. Click the **Write** button in the dialog box. The OTP Programmer starts programming (writing the contents of the HEX file to the OTP ROM chip) and the Progress Bar displays the progress of the operation.

3.7 Verifying

Click the **Verify** button in the dialog box to verify programmed data. The OTP Programmer starts verifying (comparing the contents of the HEX file with that of OTP ROM) and the Progress Bar displays the progress of the operation.

3.8 Auto-Write Function

Click the **Auto-Write** button in the dialog box. The **Auto-Write** button allows you to automate a series of programming operations, Erase Checking, Writing HEX data to an OTP ROM chip and Verifying, into a single continuous workflow.

3.9 Quitting the ROM Writer Control Dialog Box

To quit the ROM Writer Control window, left-click the **Quit** button in the dialog box. The dialog box closes to end the program.

3.10 Programming MSM66P54/P56 in SOP Package

An optional adapter socket (not included in this package) is required to program an MSM66P54 or MSM66P56 chip in SOP package. Contact your AR205 distributor for further information.