

To our customers,

---

## Old Company Name in Catalogs and Other Documents

---

On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

Send any inquiries to <http://www.renesas.com/inquiry>.

## Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: “Standard”, “High Quality”, and “Specific”. The recommended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as “Specific” without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as “Specific” or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is “Standard” unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
  - “Standard”: Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
  - “High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
  - “Specific”: Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

## Application Note

# CvADPCM

## Voice Data Conversion Tool

---

### Target devices

**78K0 Microcontrollers**

**78K0R Microcontrollers**

**V850E Microcontrollers**

**V850ES Microcontrollers**

[MEMO]

## NOTES FOR CMOS DEVICES

### ① VOLTAGE APPLICATION WAVEFORM AT INPUT PIN

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between  $V_{IL}$  (MAX) and  $V_{IH}$  (MIN) due to noise, etc., the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between  $V_{IL}$  (MAX) and  $V_{IH}$  (MIN).

### ② HANDLING OF UNUSED INPUT PINS

Unconnected CMOS device inputs can be cause of malfunction. If an input pin is unconnected, it is possible that an internal input level may be generated due to noise, etc., causing malfunction. CMOS devices behave differently than Bipolar or NMOS devices. Input levels of CMOS devices must be fixed high or low by using pull-up or pull-down circuitry. Each unused pin should be connected to  $V_{DD}$  or GND via a resistor if there is a possibility that it will be an output pin. All handling related to unused pins must be judged separately for each device and according to related specifications governing the device.

### ③ PRECAUTION AGAINST ESD

A strong electric field, when exposed to a MOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop generation of static electricity as much as possible, and quickly dissipate it when it has occurred. Environmental control must be adequate. When it is dry, a humidifier should be used. It is recommended to avoid using insulators that easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors should be grounded. The operator should be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions need to be taken for PW boards with mounted semiconductor devices.

### ④ STATUS BEFORE INITIALIZATION

Power-on does not necessarily define the initial status of a MOS device. Immediately after the power source is turned ON, devices with reset functions have not yet been initialized. Hence, power-on does not guarantee output pin levels, I/O settings or contents of registers. A device is not initialized until the reset signal is received. A reset operation must be executed immediately after power-on for devices with reset functions.

### ⑤ POWER ON/OFF SEQUENCE

In the case of a device that uses different power supplies for the internal operation and external interface, as a rule, switch on the external power supply after switching on the internal power supply. When switching the power supply off, as a rule, switch off the external power supply and then the internal power supply. Use of the reverse power on/off sequences may result in the application of an overvoltage to the internal elements of the device, causing malfunction and degradation of internal elements due to the passage of an abnormal current.

The correct power on/off sequence must be judged separately for each device and according to related specifications governing the device.

### ⑥ INPUT OF SIGNAL DURING POWER OFF STATE

Do not input signals or an I/O pull-up power supply while the device is not powered. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Input of signals during the power off state must be judged separately for each device and according to related specifications governing the device.

**EEPROM is a trademark of NEC Electronics Corporation.**

**Windows, Windows XP, and Windows Vista are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.**

**PC/AT is a trademark of International Business Machines Corporation.**

- **The information in this document is current as of June, 2008. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**
- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Electronics. NEC Electronics assumes no responsibility for any errors that may appear in this document.
- NEC Electronics does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC Electronics products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Electronics or others.
- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of a customer's equipment shall be done under the full responsibility of the customer. NEC Electronics assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC Electronics endeavors to enhance the quality, reliability and safety of NEC Electronics products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC Electronics products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment and anti-failure features.
- NEC Electronics products are classified into the following three quality grades: "Standard", "Special" and "Specific".

The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of an NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics product before using it in a particular application.

"Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots.

"Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support).

"Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

The quality grade of NEC Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact an NEC Electronics sales representative in advance to determine NEC Electronics' willingness to support a given application.

(Note)

- (1) "NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.
- (2) "NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).

M8E 02.11-1

## PREFACE

<b>Readers</b>	This manual is intended for users who wish to design and develop application systems using the 78K0, 78K0R, V850E, or V850ES microcontroller.																
<b>Purpose</b>	This manual is intended to give users an understanding of the functions of CvADPCM that supports application and development of the 78K0, 78K0R, V850E, and V850ES microcontrollers.																
<b>Organization</b>	<p>This manual consists of the following contents.</p> <ul style="list-style-type: none"><li>• Overview</li><li>• Installation</li><li>• Operations</li></ul>																
<b>How to Read This Manual</b>	<p>It is assumed that the readers of this manual have general knowledge in the fields of electrical engineering, logic circuits, microcontrollers, and C.</p> <p>To gain a general understanding of functions: → Read this manual in the order of the <b>CONTENTS</b>. The mark “&lt;R&gt;” shows major revised points. The revised points can be easily searched by copying an “&lt;R&gt;” in the PDF file and specifying it in the “Find what:” field.</p> <p>To understand details of the hardware functions → Refer to the hardware user’s manual of each product.</p> <p>To understand details of the instruction functions</p> <ul style="list-style-type: none"><li>• With the 78K0 or 78K0R microcontroller → Refer to the instruction user’s manual of each product.</li><li>• With the V850E or V850ES microcontroller → Refer to the architecture user’s manual of each product.</li></ul> <p>To understand details of a conversion function → Refer to the <b>ADPCM-SP Voice Compression/Expansion Software Package User’s Manual</b> and <b>ADPCM-SP2 Voice Expansion Software Package User’s Manual</b>.</p>																
<b>Conventions</b>	<table><tr><td>Data significance:</td><td>Higher digits on the left and lower digits on the right</td></tr><tr><td>Active low representation:</td><td><math>\bar{x}</math> (overscore over pin or signal name)</td></tr><tr><td>Memory map address:</td><td>Higher addresses on the top and lower addresses on the bottom</td></tr><tr><td><b>Note:</b></td><td>Footnote for item marked with <b>Note</b> in the text</td></tr><tr><td><b>Caution:</b></td><td>Information requiring particular attention</td></tr><tr><td><b>Remark:</b></td><td>Supplementary information</td></tr><tr><td>Numeric representation:</td><td>Binary ... xxxx or xxxxB Decimal ... xxxx Hexadecimal ... xxxxH</td></tr><tr><td>Prefix indicating power of 2 (address space, memory capacity):</td><td>K (kilo): <math>2^{10} = 1,024</math> M (mega): <math>2^{20} = 1,024^2</math> G (giga): <math>2^{30} = 1,024^3</math></td></tr></table>	Data significance:	Higher digits on the left and lower digits on the right	Active low representation:	$\bar{x}$ (overscore over pin or signal name)	Memory map address:	Higher addresses on the top and lower addresses on the bottom	<b>Note:</b>	Footnote for item marked with <b>Note</b> in the text	<b>Caution:</b>	Information requiring particular attention	<b>Remark:</b>	Supplementary information	Numeric representation:	Binary ... xxxx or xxxxB Decimal ... xxxx Hexadecimal ... xxxxH	Prefix indicating power of 2 (address space, memory capacity):	K (kilo): $2^{10} = 1,024$ M (mega): $2^{20} = 1,024^2$ G (giga): $2^{30} = 1,024^3$
Data significance:	Higher digits on the left and lower digits on the right																
Active low representation:	$\bar{x}$ (overscore over pin or signal name)																
Memory map address:	Higher addresses on the top and lower addresses on the bottom																
<b>Note:</b>	Footnote for item marked with <b>Note</b> in the text																
<b>Caution:</b>	Information requiring particular attention																
<b>Remark:</b>	Supplementary information																
Numeric representation:	Binary ... xxxx or xxxxB Decimal ... xxxx Hexadecimal ... xxxxH																
Prefix indicating power of 2 (address space, memory capacity):	K (kilo): $2^{10} = 1,024$ M (mega): $2^{20} = 1,024^2$ G (giga): $2^{30} = 1,024^3$																

**Related Documents**

The related documents indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

**Documents Related to Voice Conversion Tools**

Document Name	Document No.
ADPCM-SP Voice Compression/Expansion Software Package User's Manual	U18869E
ADPCM-SP2 Voice Expansion Software Package User's Manual	U19013E
CvADPCM Voice Data Conversion Tool Application Note	This manual

**Documents Related to 78K0 Microcontroller Devices**

Document Name	Document No.
78K0/KB2 User's Manual	U17328E
78K0/KC2 User's Manual	U17336E
78K0/KD2 User's Manual	U17312E
78K0/KE2 User's Manual	U17260E
78K0/KF2 User's Manual	U17397E
78K/0 Series Instruction User's Manual	U12326E
78K0/Kx2 Flash Memory Programming (Programmer) Application Note	U17739E
78K0/Kx2 Flash Memory Self Programming User's Manual <sup>Note</sup>	U17516E
78K0/Kx2 EEPROM™ Emulation Application Note <sup>Note</sup>	U17517E

**Note** Contact an NEC Electronics sales representative or distributor.

**Documents Related to 78K0 Microcontroller Development Tools (Software) (User's Manuals)**

Document Name	Document No.	
RA78K0 Ver. 3.80 Assembler Package	Operation	U17199E
	Language	U17198E
	Structured Assembly Language	U17197E
CC78K0 Ver. 3.70 C compiler	Operation	U17201E
	Language	U17200E
SM+ System Simulator	Operation	U17246E
	User Open Interface	U17247E
ID78K0-QB Ver. 2.90 Integrated Debugger	Operation	U17437E
PM+ Ver. 6.00		U18416E

**Caution** The related documents listed above are subject to change without notice. Be sure to use the latest version of each document when designing.



**Documents Related to 78K0R Microcontroller Devices**

Document Name	Document No.
78K0R/KE3 User's Manual	U17854E
78K0R/KF3 User's Manual	U17893E
78K0R/KG3 User's Manual	U17894E
78K0R/KJ3 User's Manual	U18417E
78K0R/KH3 User's Manual	U18432E
78K0R Microcontroller Instruction User's Manual	U17792E

**Documents Related to 78K0R Microcontroller Development Tools (Software) (User's Manuals)**

Document Name	Document No.	
CC78K0R Ver. 1.00 C compiler	Operation	U17838E
	Language	U17837E
RA78K0R Ver. 1.00 Assembler Package	Operation	U17836E
	Language	U17835E
SM+ System Simulator	Operation	U18601E
PM+ Ver. 6.30		U18416E
ID78K0R-QB Ver. 3.20 Integrated Debugger	Operation	U17839E

**Documents Related to 78K0/78K0R Microcontroller Development Tools (Hardware) (User's Manuals)**

Document Name	Document No.
QB-78K0KX2 In-Circuit Emulator <sup>Note 1</sup>	U17341E
QB-78K0MINI On-Chip Debug Emulator <sup>Note 1</sup>	U17029E
QB-78K0RKX3 In-Circuit Emulator <sup>Note 2</sup>	U17866E
QB-MINI2 On-Chip Debug Emulator with Programming Function	U18371E

- Notes**
1. 78K0 microcontrollers only
  2. 78K0R microcontrollers only

**Caution** The related documents listed above are subject to change without notice. Be sure to use the latest version of each document when designing.

**Documents Related to V850E Microcontroller Devices**

Document Name	Document No.
V850E/MA1 Hardware User's Manual	U14359E
V850E/IA1 Hardware User's Manual	U14492E
V850E/MA2 Hardware User's Manual	U14980E
V850E/IA2 Hardware User's Manual	U15195E
V850E/ME2 Hardware User's Manual	U16031E
V850E/SV2 Hardware User's Manual	U16384E
V850E/MA3 Hardware User's Manual	U16397E
V850E/IA3, V850E/IA4 Hardware User's Manual	U16543E
V850E/IF3, V850E/IG3 Hardware User's Manual	U18279E
V850E1 Architecture User's Manual	U14559E

**Documents Related to V850ES Microcontroller Devices**

Document Name	Document No.
V850ES/SA2, V850ES/SA3 Hardware User's Manual	U15905E
V850ES/PM1 Hardware User's Manual	U16237E
V850ES/IK1 Hardware User's Manual	U16910E
V850ES/KJ2 Hardware User's Manual	U17702E
V850ES/KG2 Hardware User's Manual	U17703E
V850ES/KF2 Hardware User's Manual	U17704E
V850ES/KE2 Hardware User's Manual	U17705E
V850ES/JJ2 Hardware User's Manual	U17714E
V850ES/JG2 Hardware User's Manual	U17715E
V850ES/IE2 Hardware User's Manual	U17716E
V850ES/HJ2 Hardware User's Manual	U17717E
V850ES/HG2 Hardware User's Manual	U17718E
V850ES/HF2 Hardware User's Manual	U17719E
V850ES/HE2 Hardware User's Manual	U17720E
V850ES/SG3 Hardware User's Manual	U17728E
V850ES/SJ3 Hardware User's Manual	U17790E
V850ES/JJ3 Hardware User's Manual	U18376E
V850ES/JG3 Hardware User's Manual	U18708E
V850ES Architecture User's Manual	U15943E

**Caution** The related documents listed above are subject to change without notice. Be sure to use the latest version of each document when designing.

**Documents Related to V850E/V850ES Microcontroller Development Tools (User's Manuals)**

Document Name		Document No.
CA850 Ver. 3.20 C Compiler Package	Operation	U18512E
	C Language	U18513E
	Assembly Language	U18514E
	Link Directive	U18515E
PM+ Ver. 6.30 Project Manager		U18416E
ID850QB Ver. 3.40 Integrated Debugger	Operation	U18604E
SM+ System Simulator	Operation	U18601E
PM+ Ver. 6.20		U18416E
RX850 Ver. 3.20 Real-Time OS	Basics	U13430E
	Installation	U17419E
	Technical	U13431E
	Task Debugger	U17420E
RX850 Pro Ver. 3.20 Real-Time OS	Basics	U13773E
	Installation	U17421E
	Task Debugger	U17422E
AZ850 Ver. 3.30 System Performance Analyzer		U17423E

**Caution** The related documents listed above are subject to change without notice. Be sure to use the latest version of each document when designing.

## CONTENTS

<b>CHAPTER 1 OVERVIEW</b> .....	<b>11</b>
<b>CHAPTER 2 OPERATION ENVIRONMENT</b> .....	<b>12</b>
<b>CHAPTER 3 INSTALLATION PROCEDURE</b> .....	<b>13</b>
<b>CHAPTER 4 OPERATIONS</b> .....	<b>14</b>
<b>4.1 Main Window</b> .....	<b>14</b>
<b>4.2 Export Dialog Box</b> .....	<b>17</b>
<b>4.3 Settings Dialog Box</b> .....	<b>19</b>
4.3.1 Read settings tab .....	19
4.3.2 Edit settings tab .....	20
4.3.3 Recording or Playing settings tab .....	20
4.3.4 Export settings tab .....	21
<b>4.4 Serial Transfer</b> .....	<b>22</b>
4.4.1 Communication specifications .....	22
4.4.2 Communication error .....	22
<b>APPENDIX A INDEX</b> .....	<b>23</b>
<b>APPENDIX B REVISION HISTORY</b> .....	<b>24</b>
<b>B.1 Major Revision in This Edition</b> .....	<b>24</b>

## CHAPTER 1 OVERVIEW

CvADPCM is a tool that generates ADPCM data to implement a voice application for the V850, 78K0R, and 78K0 microcontrollers. Running on Windows™, this tool converts WAV files (PCM) into ADPCM (40 kbps to 16 kbps). The result of conversion is output as a source code that can be read by the PM+ of the V850, 78K0R, or 78K0 microcontrollers. In addition, it can also transfer data directly to a sound board, such as TK-78K0R/KG3+Voice, connected to the COM port of a PC (possible only if the board supports this function).

ADPCM stands for adaptive differential PCM, and it supports the following algorithms.

- CCITT Recommendation G.726 (40 kbps, 32 kbps, 24 kbps, 16 kbps)
- NEC Electronics' ADPCM-SP (32 kbps, 24 kbps, 16 kbps)
- NEC Electronics' ADPCM-SP2 (32 kbps, 16 kbps)

<R>

**Remark** TK-78K0R/KG3+Voice is a product of TESSERA TECHNOLOGY INC..  
Phone: 81-44 271-7533 TESSERA TECHNOLOGY INC.

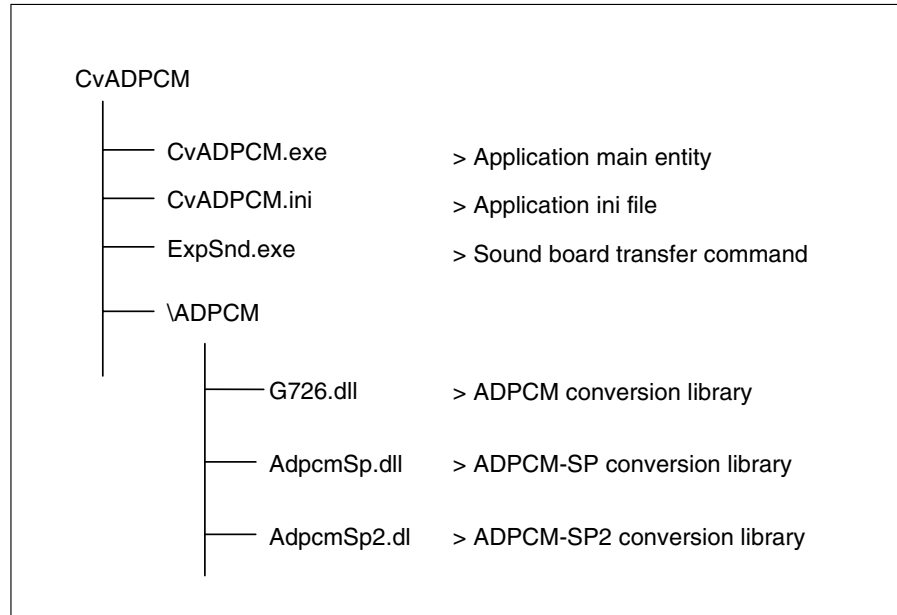
## CHAPTER 2 OPERATION ENVIRONMENT

CvADPCM can be used on a PC on which Windows XP™ or Windows Vista™ correctly runs. This tool may not run on Windows 2000 because it uses the functions of DirectX.

## CHAPTER 3 INSTALLATION PROCEDURE

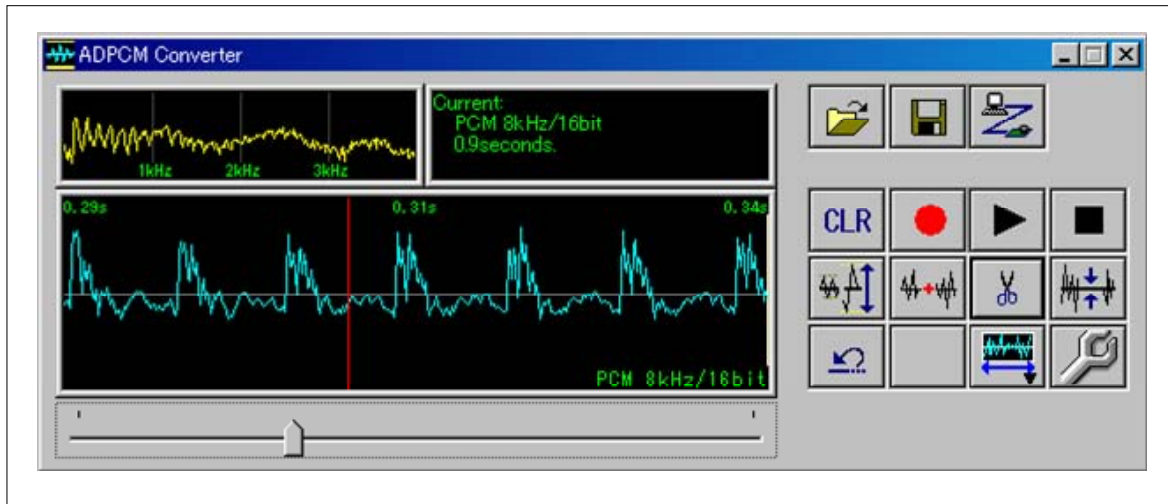
Extract and expand CvADPCM.zip in any folder.

Example: Files expanded to CvADPCM folder



## CHAPTER 4 OPERATIONS

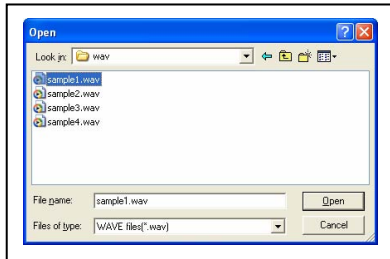
### 4.1 Main Window



#### <1> Open WAV file icon



Opens a WAV file.

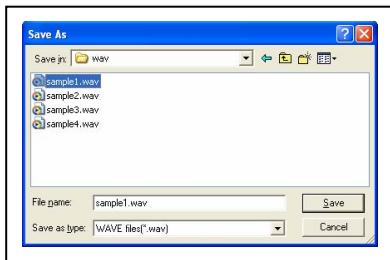


When this icon is clicked, the Open dialog box is displayed and any WAV file can be opened.

#### <2> Save WAV (PCM 8 kHz/16 bits) file icon



Saves a WAV file.



When this icon is clicked, the Save As dialog box is displayed and a WAV file can be saved.

CvADPCM converts read data, through 8 kHz sampling and 16-bit quantization, and saves the result of conversion to a file.

#### <3> Export data icon



This icon is used to convert a file currently being read.

For details of exporting data, refer to **4.2 Export Dialog Box**.

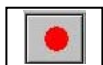


<4> Clear data icon



This icon is used to clear the data currently being read.

<5> Record icon



This icon is used to record voice.

If recording is carried out while another WAV file is read, the recorded WAV file is added after the already read WAV file.

<6> Playback icon



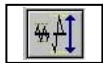
This icon is used to playback the data currently read.

<7> Stop recording or playback icon

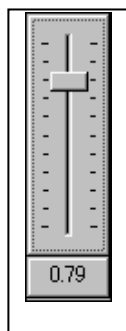


This icon is used to stop recording or playback.

<8> Volume control icon

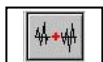


This icon is used to turn up or down the volume of the WAV file currently read.

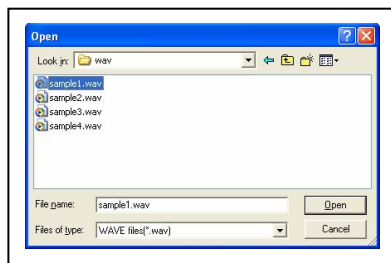


When this icon is clicked, the volume control knob shown here is displayed, so that the volume can be adjusted by sliding the adjuster bar.

<9> Merge WAV files icon



This icon is used to read a new WAV file and merge it with a WAV file that has already been read.



The newly read data is converted into 8 kHz, 16-bit data, and merged after already read data.

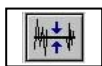
<10> Delete selected part icon



This icon is used to delete voice data in a selected range.

It deletes voice data in a range specified by using the mouse on the waveform view window. For the waveform view window, see <17> Waveform view window.

<11> Mute selected part icon



This icon is used to mute a selected range.  
It mutes a range specified by using the mouse on the waveform view window. For the waveform view window, see <17> Waveform view window.

<12> Undo icon



This icon is used to restore the previous operation.

<13> Change waveform view width icon



This icon is used to change the display scale on the waveform view window.  
Five display scales are selectable: 0.05 s, 0.1 s, 0.2 s, 0.5 s, and 1.0 s.  
For the waveform view window, see <17> Waveform view window.

<14> Settings icon



This icon is used to open the Settings dialog box for configuring settings.  
For details of the Settings dialog box, refer to **4.3 Settings Dialog Box**.

<15> Frequency view window



This window displays the spectrum at the cursor position on the waveform view window.

<16> File information window



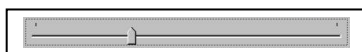
This window displays information on the WAV file currently opened.  
It displays a file name, sampling rate/quantization size, and playback time.

<17> Waveform view window



This window displays the waveform of the WAV file currently opened.

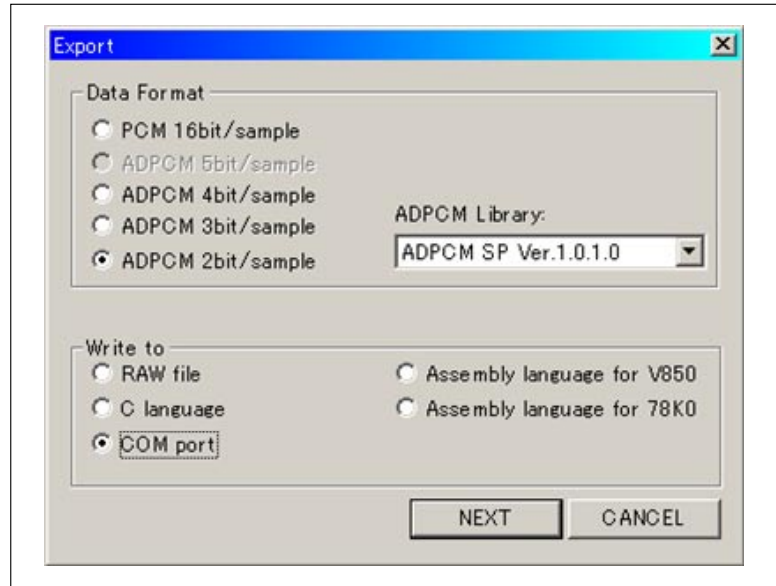
<18> View zone slide bar



The data zone to be displayed on the waveform view window can be changed by using this slide bar.

## 4.2 Export Dialog Box

The Export dialog box shown below is displayed when the Export data icon is clicked.



This dialog box is used to output the current voice data to an external device.

### <1> Data Format

Selects a conversion format.

- PCM 16bit/sample  
Outputs data in the linear PCM (16 bits/sample) format.
- ADPCM 5bit/sample  
Outputs data in the ADPCM (5 bits/sample) format.  
This can be selected only when ADPCM G.726 is selected in the ADPCM Library drop-down list box.
- ADPCM 4bit/sample  
Outputs data in the ADPCM (4 bits/sample) format.
- ADPCM 3bit/sample  
Outputs data in the ADPCM (3 bits/sample) format.
- ADPCM 2bit/sample  
Outputs data in the ADPCM (2 bits/sample) format.

## &lt;2&gt; ADPCM Library:

Selects an ADPCM library for conversion.

By default, the following three types of libraries are selectable.

ADPCM SP Ver.1.0.1.0	ADPCM of NEC Electronics Select this library or ADPCM SP2 when TK-78K0R/KG3+Voice is used. For details, refer to the <b>ADPCM-SP Voice Compression/Expansion Software Package User's Manual</b> .
ADPCM SP2 Ver.1.0.1.0	ADPCM of NEC Electronics Select this library or ADPCM SP when TK-78K0R/KG3+Voice is used. For details, refer to the <b>ADPCM-SP2 Voice Expansion Software Package User's Manual</b> .
ADPCM G.726 Ver.0.1.0.0	ADPCM conforming to CCITT recommendation G.726. Note that the TK-78K0R/KG3+Voice does not support this library.

## &lt;3&gt; Write to

Selects a destination to which the result of conversion is to be output.

- RAW file  
Generates a binary file.
- C language  
Generates a file in the C source file format.
- COM port  
Transfers data with an external device, such as TK-78K0R/KG3+Voice, serially through RS-232C (or USB). Sets a COM port number in advance in the Export settings tab on the Settings dialog box. For serial output, refer to **4.4 Serial Transfer**.
- Assembly language for V850  
Generates a file in the assembler file format for the V850 microcontrollers.
- Assembly language for 78K0  
Generates a file in the assembler file format for the 78K microcontrollers.

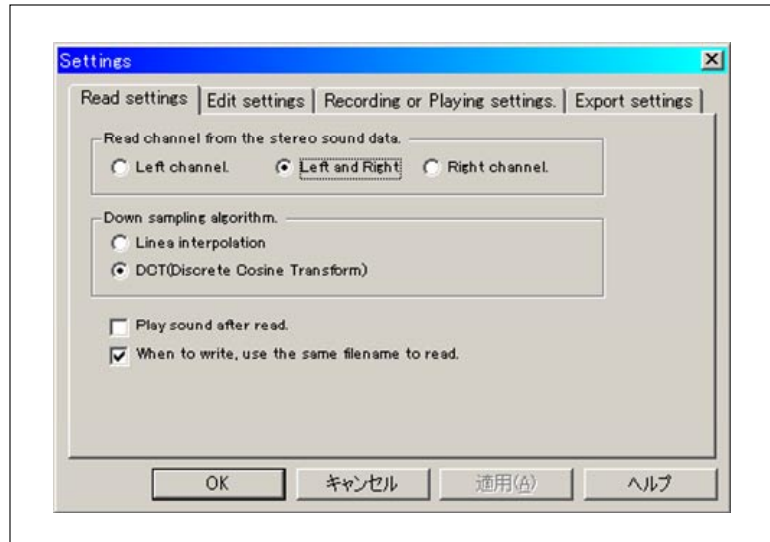
After selecting the necessary items, click NEXT. The output processing will be started if a COM port is selected as the output destination. If a file is selected, a dialog box for specifying a file name is displayed. Enter a file name and click Save to output the data to the specified file.

<R> **Remark** TK-78K0R/KG3+Voice is a product of TESSERA TECHNOLOGY INC..  
Phone: 81-44 271-7533 TESSERA TECHNOLOGY INC.

### 4.3 Settings Dialog Box

The Settings dialog box is displayed when the Settings icon is clicked.

#### 4.3.1 Read settings tab



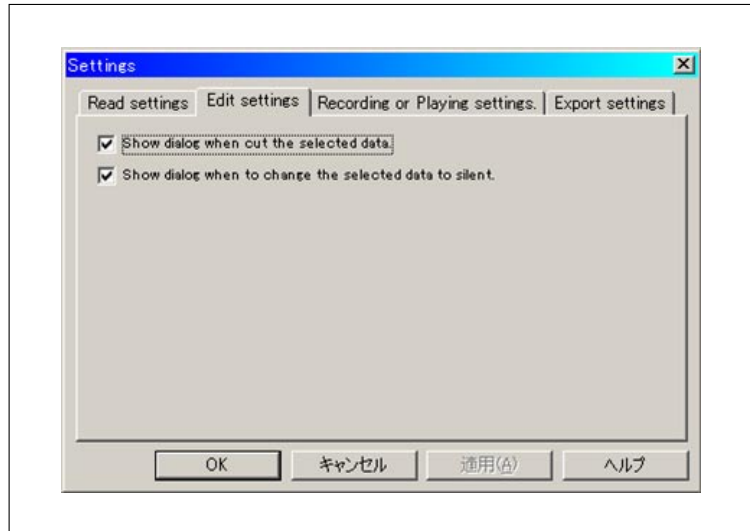
<1> Read channel from the stereo sound data  
Selects left channel, right channel, or both.

<2> Down sampling algorithm  
Specifies a mode to convert into 8 kHz the voice data that has been read if the data exceeds 8 kHz (data of less than 8 kHz is not processed). If the Linear interpolation option button is selected, the data can be converted at high speeds, but the sound quality of some voices may degrade because noise is superimposed. If the DCT (Discrete Cosine Transform) option button is selected, the sound quality barely degrades but it takes time for data conversion.

<3> Play sound after read  
When this check box is selected, the voice data is played back once immediately after its WAV file has been read.

<4> When to write, use the same filename to read  
When this check box is selected, the name of the read file is displayed on the Save As dialog box that is displayed when the Save WAV (PCM 8 kHz/16 bits) file icon is clicked. Because CvADPCM converts the format of data through 8 kHz sampling and 16-bit quantization, the file can be protected from being overwritten by clearing this check box. If a file is repeatedly edited and saved, select this check box so that the file does not have to be specified each time it is edited or saved.

### 4.3.2 Edit settings tab



When deleting or muting a specified range, whether to display a confirmation dialog box upon clicking of the corresponding icon can be selected in the Edit settings tab.

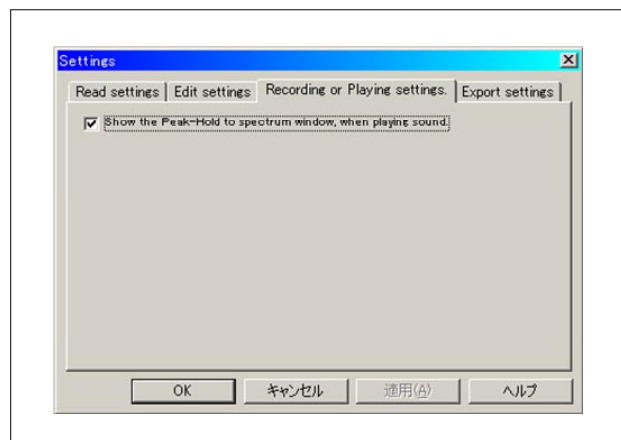
<1> Show dialog when cut the selected data

When this check box is selected, a confirmation dialog box is displayed if the Delete selected part icon is clicked.

<2> Show dialog when to change the selected data to silent

When this check box is selected, a confirmation dialog box is displayed if the Mute selected part icon is clicked.

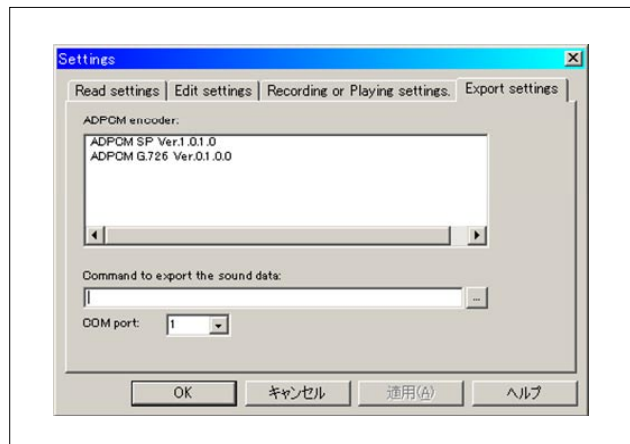
### 4.3.3 Recording or Playing settings tab



<1> Show the Peak-Hold to spectrum window, when playing sound

When this check box is selected, the peak display of the spectrum of the voice data played back is recorded.

#### 4.3.4 Export settings tab



<1> ADPCM encoder:

This field lists the available ADPCM libraries stored in the ADPCM directory of CvADPCM. A library to be used cannot be selected from this list. A library can be selected when exporting is executed.

<2> Command to export the sound data:

This text box is used to specify a command to be transferred to the sound board connected via the COM port. The default value is ExpSnd.exe in the directory where CvADPCM has been installed. Usually do not change the content.

<3> COM port:

Select a COM port number to which a sound board such as TK-78K0R/KG3+Voice is assigned.

<R>

**Remark** TK-78K0R/KG3+Voice is a product of TESSERA TECHNOLOGY INC..  
Phone: 81-44 271-7533 TESSERA TECHNOLOGY INC.

## 4.4 Serial Transfer

CvADPCM has a function to transfer compressed data to an external device, such as TK-78K0R/KG3+Voice, through serial connection.

<R> **Remark** TK-78K0R/KG3+Voice is a product of TESSERA TECHNOLOGY INC..  
Phone: 81-44 271-7533 TESSERA TECHNOLOGY INC.

### 4.4.1 Communication specifications

The communication specifications of the serial transfer function are as follows.

<1> Output port

An output port can be specified in the COM port drop-down list on the Export settings tab in the Settings dialog box.

<2> Transfer rate, data bit length, parity bit, and stop bit length

These parameters can be specified in the Command to export the sound data text box on the Export setting tab in the Settings dialog box.

### 4.4.2 Communication error

If error message “Exporting has failed. code = 2” is displayed, check the setting of the COM port by referring to **4.3.5 Export settings tab**. This error message may be displayed if the target device is not connected to the port specified by the COM port drop-down list box on the Export settings tab.



## APPENDIX A INDEX

### A

ADPCM library	
ADPCM G.726 Ver. 0.1.0.0 .....	18
ADPCM SP Ver.1.0.1.0.....	18
ADPCM SP2 Ver.1.0.1.0.....	18
ADPCM Library .....	18

### E

Export dialog box .....	17
-------------------------	----

### I

Installation procedure.....	13
-----------------------------	----

### M

Main window .....	14
-------------------	----

### S

Settings dialog box.....	19
Edit settings tab.....	20
Export settings tab .....	21
Read settings tab .....	19
Recording or Playing settings tab.....	20
Serial transfer.....	22

## APPENDIX B REVISION HISTORY

### B.1 Major Revisions in This Edition

Page	Description
<b>CHAPTER 1 OVERVIEW</b>	
p. 11	Modification of <b>Remark</b>
<b>CHAPTER 4 OPERATIONS</b>	
pp. 18, 21, 22	Modification of <b>Remark</b> in <b>4.2 Export Dialog Box</b> , <b>4.3.4 Export settings tab</b> , and <b>4.4 Serial Transfer</b>

*For further information,  
please contact:*

**NEC Electronics Corporation**  
1753, Shimonumabe, Nakahara-ku,  
Kawasaki, Kanagawa 211-8668,  
Japan  
Tel: 044-435-5111  
<http://www.necel.com/>

**[America]**

**NEC Electronics America, Inc.**  
2880 Scott Blvd.  
Santa Clara, CA 95050-2554, U.S.A.  
Tel: 408-588-6000  
800-366-9782  
<http://www.am.necel.com/>

**[Europe]**

**NEC Electronics (Europe) GmbH**  
Arcadiastrasse 10  
40472 Düsseldorf, Germany  
Tel: 0211-65030  
<http://www.eu.necel.com/>

**Hanover Office**  
Podbielskistrasse 166 B  
30177 Hannover  
Tel: 0 511 33 40 2-0

**Munich Office**  
Werner-Eckert-Strasse 9  
81829 München  
Tel: 0 89 92 10 03-0

**Stuttgart Office**  
Industriestrasse 3  
70565 Stuttgart  
Tel: 0 711 99 01 0-0

**United Kingdom Branch**  
Cygnus House, Sunrise Parkway  
Linford Wood, Milton Keynes  
MK14 6NP, U.K.  
Tel: 01908-691-133

**Succursale Française**  
9, rue Paul Dautier, B.P. 52  
78142 Velizy-Villacoublay Cédex  
France  
Tel: 01-3067-5800

**Sucursal en España**  
Juan Esplandiú, 15  
28007 Madrid, Spain  
Tel: 091-504-2787

**Tyskland Filial**  
Täby Centrum  
Entrance S (7th floor)  
18322 Täby, Sweden  
Tel: 08 638 72 00

**Filiale Italiana**  
Via Fabio Filzi, 25/A  
20124 Milano, Italy  
Tel: 02-667541

**Branch The Netherlands**  
Steijgerweg 6  
5616 HS Eindhoven  
The Netherlands  
Tel: 040 265 40 10

**[Asia & Oceania]**

**NEC Electronics (China) Co., Ltd**  
7th Floor, Quantum Plaza, No. 27 ZhiChunLu Haidian  
District, Beijing 100083, P.R.China  
Tel: 010-8235-1155  
<http://www.cn.necel.com/>

**Shanghai Branch**  
Room 2509-2510, Bank of China Tower,  
200 Yincheng Road Central,  
Pudong New Area, Shanghai, P.R.China P.C:200120  
Tel:021-5888-5400  
<http://www.cn.necel.com/>

**Shenzhen Branch**  
Unit 01, 39/F, Excellence Times Square Building,  
No. 4068 Yi Tian Road, Futian District, Shenzhen,  
P.R.China P.C:518048  
Tel:0755-8282-9800  
<http://www.cn.necel.com/>

**NEC Electronics Hong Kong Ltd.**  
Unit 1601-1613, 16/F., Tower 2, Grand Century Place,  
193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong  
Tel: 2886-9318  
<http://www.hk.necel.com/>

**NEC Electronics Taiwan Ltd.**  
7F, No. 363 Fu Shing North Road  
Taipei, Taiwan, R. O. C.  
Tel: 02-8175-9600  
<http://www.tw.necel.com/>

**NEC Electronics Singapore Pte. Ltd.**  
238A Thomson Road,  
#12-08 Novena Square,  
Singapore 307684  
Tel: 6253-8311  
<http://www.sg.necel.com/>

**NEC Electronics Korea Ltd.**  
11F., Samik Lavied'or Bldg., 720-2,  
Yeoksam-Dong, Kangnam-Ku,  
Seoul, 135-080, Korea  
Tel: 02-558-3737  
<http://www.kr.necel.com/>