OKI Semiconductor

MS87V1021 Demo Board

MS87V1021 Demonstration Board User's Manual

1. Using the MS87V1021 Demonstration Board

1.1 System Configuration
The Figure 1 below shows a basic configuration. Connect the demonstration board to your host PC using an RS232C cable (reverse type).
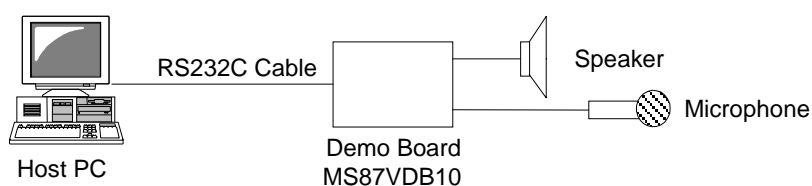

Figure 1 Basic Configuration

1.2 Starting and Ending the Use of the Board
This section describes how to start and end using the board configured as shown in the Figure 1 above.

[To start using the board]
(1) Check that the on-board Power Switch is turned OFF.
(2) Use an RS232C cable to connect a host PC and your demonstration board. Select Port 1 for the RS232C connector on the host PC.
(3) Connect a microphone and a speaker to your demonstration board.
(4) You will find a battery box on the demonstration board. Check that batteries are properly installed.
(5) Turn ON the on-board Power Switch and see the Power LED lights up. Now, you are ready to activate the evaluation tool software (described later in this document) on your host PC.

[To end using the board]
(1) Close the evaluation tool software on your host PC, and then turn OFF the on-board Power Switch. The LED turns off.
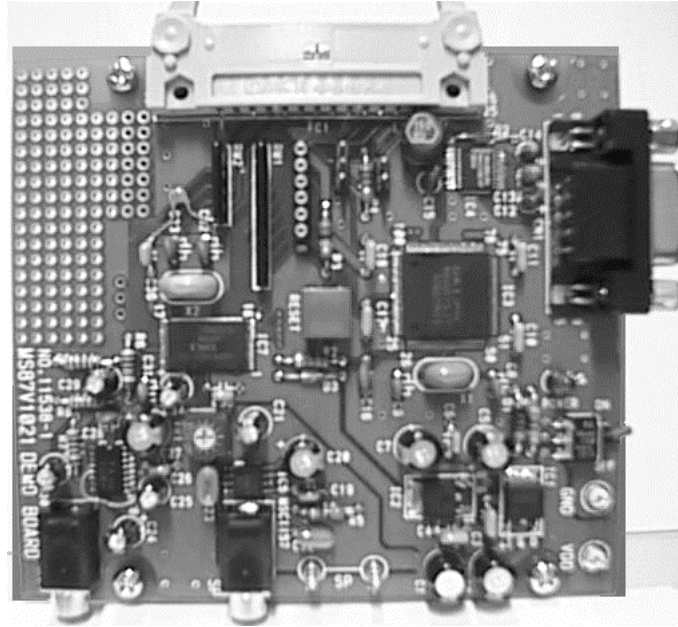
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Figure 2 Top View of Demonstration Board

2. Using the Evaluation Tool Software
The following sections describe the Evaluation Tool software (MS87VET10-01) that allows you to control the demonstration board using your host PC.

2.1   System Requirement
        The evaluation tool software runs on the following platform:
        PC: With a Pentium or above microprocessor
        OS: MS Windows 95 or Windows 98

2.2   Program Directory
        The program has the file structures as shown below:

        MS87VET10-01 ——— MS87VET10-01.exe .... Evaluation tool execution file
                    +—— MS87VET10-01.ini .... Evaluation tool .ini file
                    +—— ST-ADPCM2-8kHz .... Folder for Demo command files

        The MS87VET10-01.ini file contains the information that determines which command file stored in the ST-ADPCM2-8kHz folder is to be assigned to which command button on the User panel (See 2.4.2 later in this document) of the evaluation tool software.

2.3   Demonstration Board Operating Parameters
        The Demo Board's operating parameters are defined in the command files stored in the ST-ADPCM2-8KHz folder. The Table 1 below shows such operating parameters for each operating mode.

Table 1 The Demo Board's Operating Parameters

Operating Mode	Phrase	Area1		Area2		Dly	Address		Recording Time
		Start	End	Start	End		Start	End	
Normal Play Mode	01h	00h	B1h	02h	21h	—	000800h	0087FFh	8 sec
	02h	00h	B1h	22h	41h	—	008000h	0107FFh	8 sec
	03h	00h	B1h	42h	81h	—	010800h	0207FFh	16 sec
Retroactive Play Mode	—	—	—	C0h	EFh	to 0180h	030000h	03BFFFh	12 sec
Delayed Play Mode	—	—	—	F0h	FFh	to 007Fh	—	—	4 sec

Voice Synthesis Algorithm: ADPCM2, Sampling Frequency: 8 kHz

        To demonstrate all operating modes, the on-board DRAM's memory space is divided into 5 areas as shown in the figure below.

Normal Mode Phrase 1	Normal Mode Phrase 2	Normal Mode Phrase 3	Retroactive Mode	Delayed Mode
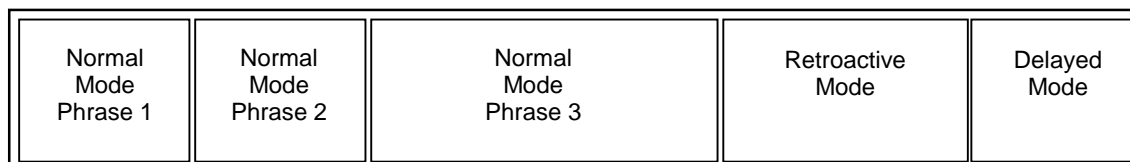
2.4   The Evaluation Tool Window
        To activate the evaluation tool software, double-click MS87VET10-01.exe. Click the [Close] button to exit
        from the program.
        The following sections describe various functions you can use in the evaluation tool window. Also see the
        Figure 3 that illustrates the evaluation tool window.

2.4.1.   The Control Panel ((1) in the Figure 3)
        The Table 2 below summarizes functions of text fields and buttons on the Control panel.

Table 2 List of Text Fields and Buttons on the Control Panel

Field/Button	Description
File Open	To select a control command file to be sent.
File Save	To select a file where received data is saved.
Execute	Runs the selected control command file.
Dtrw	Opens the window for accessing sound data memory space.
Send Data	Displays control commands to be sent. Click the Reset button to remove displayed data.
Received Data	Displays the data received. Click the Reset button to remove displayed data.
Starting Line	Displays the starting line number and its data of the command file to be sent.
Set Start Point	To change the starting line of the command file to be sent.
Break Point	Displays the ending line number and its data of the command file to be sent.
Set Break Point	To change the ending line of the command file to be sent.

2.4.2.   The User Panel ((2) in the Figure 3)
        The User panel consists of command buttons in 3 rows. A specific control command file has been assigned
        to each button. Select and click an appropriate button that corresponds to the operation you want. Each row
        represents the command buttons for a specific operating mode respectively. For further details on the
        function of each command button, see 2.5 later in this document.

        Upper Row Buttons: Command Buttons for Delayed Play Mode
        Middle Row Buttons: Command Buttons for Retroactive Play Mode
        Lower Row Buttons: Command Buttons for Normal Play Mode

        Clicking a command button causes the control command file assigned to the button to be loaded from the
        ST-ADPCM2-8kHz folder. You can view and check the content of the loaded control command file in the
        Send Data text field on the Control panel.
        To run the control command file, click the **Execute** button on the Control panel.
        A message dialog box (Figure 4) saying "Sent successfully" appears when the file has been sent
        successfully.

2.4.3.   The ROM Panel ((3) in the Figure 3)
        This panel contains the command button to play a pre-recorded message on the on-chip ROM. Enter the
        phrase number you want to play and then click the **RomPlay** command button.

2.4.4.   The Stop/Pause Panel ((4) in the Figure 3)
This panel contains the Stop, Pause and Status command buttons.

The functions of each command button are as follows:

Stop Button: Stop command to stop on-going operation.
Pause Button: Pause command to pause on-going operation.
Status Button: Status command to read out the LSI's status information.

By clicking the Status button you can view the LSI's status information in the **Received Data** text field.
The commands corresponding to these buttons are executed simply by clicking each button. You don't
have to click the **Execute** button.

2.4.5.   The Pwdn Panel ((5) in the Figure 3)
This panel contains the command buttons for power-down operations. The functions of each command
button are as follows:

Self Button   :   Pdwn1 command (DRAM data is retained)
NonSelf Button   :   Pdwn2 command (DRAM data is not retained)

To reset power-down state, push either the Reset button on the demonstration board. If you enter the Status
command right after resetting power-down state, it will output "18".

2.4.6.   The Address Calculator ((6) in the Figure 3)
When you click the **Address Calculator** button, the Address Calculator dialog box (as shown in Figure 5)
appears. You can use this tool to calculate such values as Page and Address values by entering Area values,
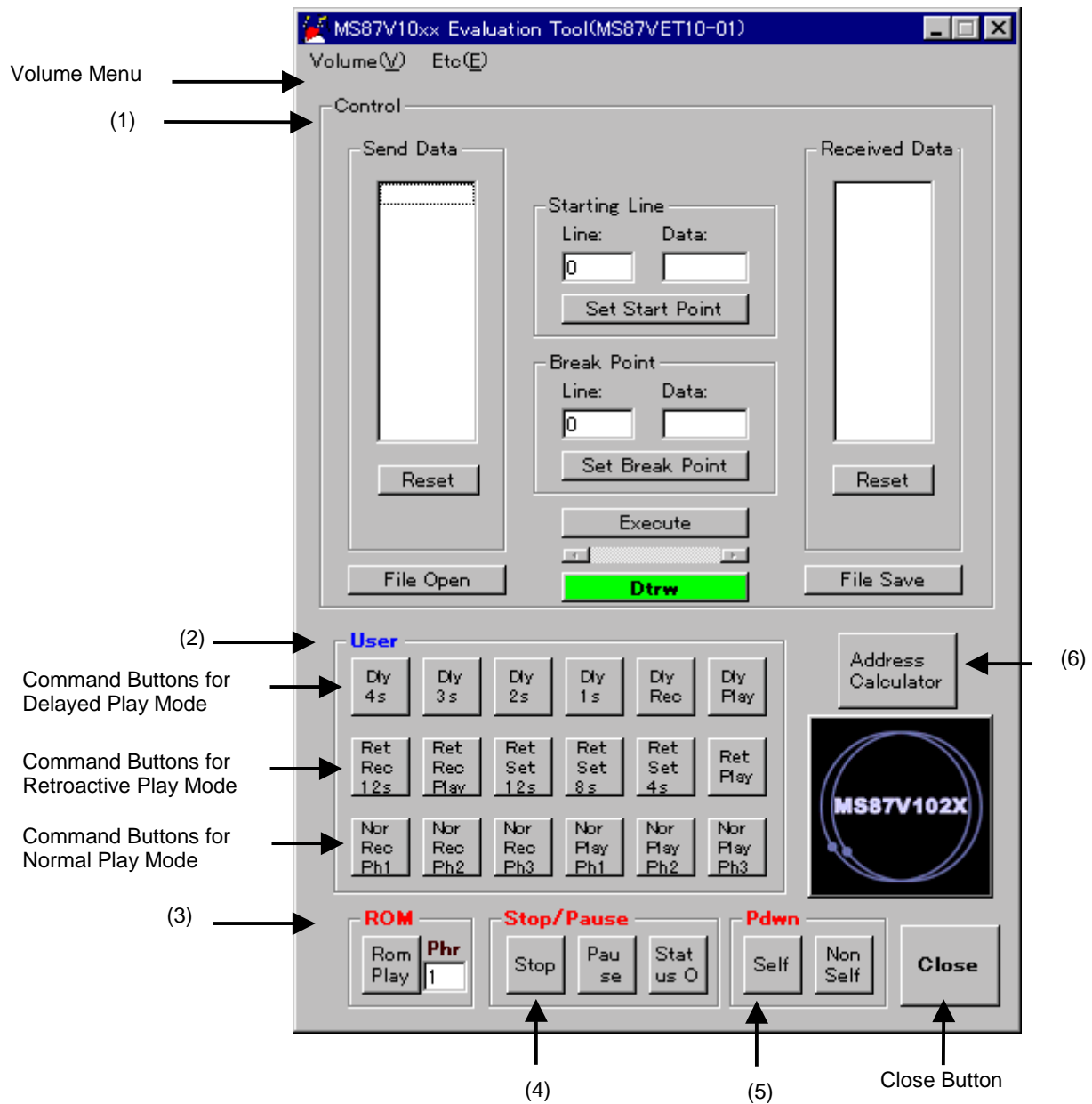and Delay time and recording time based on the selected sampling frequency.

Figure 3 Evaluation Tool Window

Figure 4 Confirmation Dialog Box that appears when commands have been sent successfully

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Page-Value Fields   Address-Value Fields   Delay-Value Field

Enter Area values

Address Calculator

Area   Page   Address   Dly

Start [ ] H → [ ] H → [ ] H   [ ] H

End [ ] H → [ ] H → [ ] H

Sec

☐ Page only   [ ] Sec

FoscSet

Select sampling frequency value [▼]

Close

Check this box if you want to calculate addresses using page values
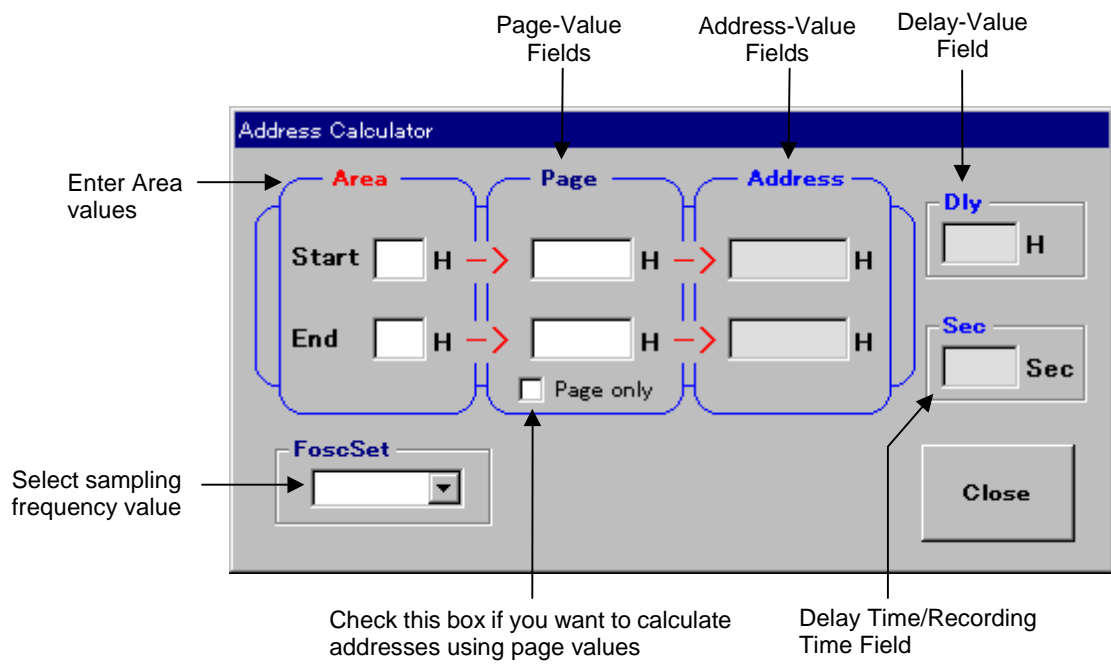
Delay Time/Recording Time Field

Figure 5 Address Calculator Dialog Box

2.5   More about the User Panel
        The following sections describe functions of the command buttons on the User panel.

2.5.1.   Command Buttons for Delayed Play Mode
        The Table 3 below lists functions of the command buttons for Delayed Play Mode.

Table 3 List of Command Button Functions for Delayed Play Mode

Command Button	Function
Dly4s	Records and plays with 4 sec time lag
Dly3s	Records and plays with 3 sec time lag
Dly2s	Records and plays with 2 sec time lag
Dly1s	Records and plays with 1 sec time lag
DlyRec	Suspends play operation while recording and playing
DlyPlay	Resumes play operation

Voice Synthesis Algorithm: ADPCM2, Sampling Frequency: 8 kHz

Control files loaded by clicking a command button have the syntax rules as follows:
When you describe a command to be sent in the control file, you must insert, prior to the command description, a line of control code where you can define byte count to be sent and to be received. The control code consists of 8 bits; the upper 4-bit is for the byte count to be sent and the lower 4-bit for the byte count to be received.
Remember that these control codes are required only to control this evaluation tool, which means what actually sent to the MS87V1021 is the command only.
The following shows some examples of control command descriptions.

        Control Code "10":   Byte count to be sent = 1 Byte;   Byte count to be received = 0 Byte
        Control Code "21":   Byte count to be sent = 2 Byte;   Byte count to be received = 1 Byte

Describe the command to be sent following the control code as shown above.
The example below shows a control file description when you send the Mode command (1-byte command).

        Line 1: Control Code "10":   Byte count to be sent = 1 Byte;
                                            Byte count to be received = 0 Byte
        Line 2: Command to be sent "01": Mode command

The example below shows a control file description when you send the Status command ("FF").

        Line 1: Control Code "11":   Byte count to be sent = 1 Byte;
                                            Byte count to be received = 1 Byte
        Line 2: Command to be sent "FF": Status command

The Status command is used to receive 1-byte status data.

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The following list shows the contents of a control file (DelF80A2_4s.cmd) loaded by clicking the **Dly4s** command button:

```
10 ...... Send 1 Byte, Receive 0 Byte
01 ...... Mode command        (Set the operating mode to Delayed Play Mode)
30 ...... Send 3 Bytes, Receive 0 Byte
39 ...... Area2 command
F0 ...... Start2 [7:0]        (Value for the Start Block Address of the Arear2)
FF ...... End2 [7:0]          (Value for the End Block Address of the Arear2)
30 ...... Send 3 Bytes, Receive 0 Byte
38 ...... Delay command
00 ...... Dly [15:8]          (the upper 8-bit value for Dly)
7F ...... Value for Dly [7:0] (the lower 8-bit value for Dly; setting the Delay time to about 4 sec)
20 ...... Send 2 Bytes, Receive 0 Byte
10 ...... Rec command
18 ...... Set the Method to ADPCM2 and sampling frequency to 8 kHz
10 ...... Send 1 Byte, Receive 0 Byte
30 ...... Start command       (start recording)
20 ...... Send 2 Bytes, Receive 0 Byte
20 ...... Play command        (start playing)
18 ...... Set the Method to ADPCM2 and sampling frequency to 8 kHz
```

2.5.2.   Command Buttons for Retroactive Play Mode
The Table 4 below lists functions of the command buttons for Delayed Play Mode.

Table 4 List of Command Button Functions for Retroactive Play Mode

Command Button	Function
RetRec12s	Records for 12 sec in Retroactive Play Mode
RetRecPlay	Starts playing while recording in Retroactive Play Mode
RetSet12s	Sets the Delay time to 12 sec after recording
RetSet8s	Sets the Delay time to 8 sec after recording
RetSet4s	Sets the Delay time to 4 sec after recording
RetPlay	Starts playing using the parameters set with RetSet12s, RetSet8s or RetSet4s

Voice Synthesis Algorithm: ADPCM2, Sampling Frequency: 8 kHz

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The following list shows the contents of the control command file (RetF80A2_Rec_12s.cmd) loaded by clicking the **RetRec12s** command button:

      10 ...... Send 1 Byte, Receive 0 Byte
      02 ...... **Mode** command   (Set the operating mode to Retroactive Play Mode)
      30 ...... Send 3 Bytes, Receive 0 Byte
      39 ...... **Area2** command
      C0 ...... Start2 [7:0]   (Value for the Start Block Address of the Arear2)
      EF ...... End2 [7:0]   (Value for the Start Block Address of the Arear2)
      30 ...... Send 3 Bytes, Receive 0 Byte
      38 ...... **Delay** command
      01 ...... Value for Dly [15:8] (the upper 8-bit value for Dly)
      80 ...... Value for Dly [7:0] (the lower 8-bit value for Dly; setting the Delay time to about 12 sec)
      20 ...... Send 2 Bytes, Receive 0 Byte
      10 ...... **Rec** command
      18 ...... Set the Method to ADPCM2 and sampling frequency to 8 kHz
      10 ...... Send 1 Byte, Receive 0 Byte
      30 ...... **Start** command   (start recording)

The list below shows the content of the control command file (RetF80A2_Set_12s.cmd) loaded by clicking the **RetSet12s** command button.
This control command file is used to retrieve the Start Address (Stadr [23:0]) and the End Address (Enadr [23:0]) values that indicate the location of the data recorded onto the DRAM by executing the **RetRec12s** command button. You can view the retrieved address information in the **Received Data** text field on the Control panel. Such address values are displayed in the following order; Stadr [23:16], Stadr [15:8], Stadr [7:0], Enadr [23:16], Enadr [15:8], Enadr [7:0].

      10 ...... Send 1 Byte, Receive 0 Byte
      02 ...... **Mode** command   (Set the operating mode to Retroactive Play Mode)
      30 ...... Send 3 Bytes, Receive 0 Byte
      39 ...... **Area2** command
      C0 ...... Start2 [7:0]   (Value for the Start Block Address of the Arear2)
      EF ...... End2 [7:0]   (Value for the End Block Address of the Arear2)
      30 ...... Send 3 Bytes, Receive 0 Byte
      38 ...... **Delay** command
      01 ...... Value for Dly [15:8] (the upper 8-bit value for Dly)
      80 ...... Value for Dly [7:0] (the lower 8-bit value for Dly; setting the Delay time to about 12 sec)
      26 ...... Send 2 Bytes, Receive 6 Bytes
      51 ...... **Adrrd** command   (to read address information)
      00 ...... Value for selecting the internal register

The list below shows the contents of a control command file (RetF80A2_Play.cmd) loaded by clicking the **RetPlay** command button.

This control command file is used to execute a play session using the parameters set with the **RetSet12s**, **RetSet8s** or **RetSet4s** command button. Before sending the control command file, you must rewrite "**xx**" listed below with the End Address (Enadr [23:0]) values obtained by clicking the **RetSet12s**, **RetSet8s** or **RetSet4s** command button.

To rewrite the addresses, enter the values directly to the **Send Data** text field on the **Control** panel.

> 80 ...... Send 8 Bytes, Receive 0 Byte
> 50 ...... **Adrwr** command (Writes address data)
> 00 ...... Value for selecting the internal register
> 00 ...... Value for Stadr [23:16]
> 00 ...... Value for Stadr [15:8]
> 00 ...... Value for Stadr [7:0]
> **xx** ...... Value for Enadr [23:16] (You need to rewrite)
> **xx** ...... Value for Enadr [15:8]   (You need to rewrite)
> **xx** ...... Value for Enadr [7:0]   (You need to rewrite)
> 20 ...... Send 2 Bytes, Receive 0 Byte
> 20 ...... **Play** command
> 18 ...... Sets the Method to ADPCM2 and sampling frequency to 8 kHz
> 10 ...... Send 1 Byte, Receive 0 Byte
> 30 ...... **Start** command (Start playing)

2.5.3.   Command Buttons for Normal Play Mode

The Table 5 below lists functions of the command buttons for Normal Play Mode:

Table 5 List of Command Button Functions for Normal Play Mode

Command Button	Function
NorRecPh1	Records Phrase1 for 8 sec.
NorRecPh2	Records Phrase2 for 8 sec.
NorRecPh3	Records Phrase3 for 16 sec.
NorPlayPh1	Plays Phrase1.
NorPlayPh2	Plays Phrase2.
NorPlayPh3	Plays Phrase3.

Voice Synthesis Algorithm: ADPCM2, Sampling Frequency: 8 kHz

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The following list shows the contents of the control command file (NorF80A2_Rec_Ph1.cmd) loaded by clicking the **NorRecPh1** command button:

```
10 ...... Send 1 Byte, Receive 0 Byte
03 ...... Mode command  (Sets the operating mode to Normal Play Mode)
30 ...... Send 3 Bytes, Receive 0 Byte
36 ...... Area1 command
00 ...... Start1 [7:0]        (Value for the Start Block Address of the Arear1)
B1 ...... End1 [7:0]          (Value for the End Block Address of the Arear1)
30 ...... Send 3 Bytes, Receive 0 Byte
39 ...... Area2 command
02 ...... Start1 [7:0]        (Value for the Start Block Address of the Arear2)
21 ...... End1 [7:0]          (Value for the End Block Address of the Arear2)
80 ...... Send 8 Bytes, Receive 0 Byte
50 ...... Adrwr command
01 ...... Value for Phrase [7:0]
00 ...... Value for Stadr [23:16]
08 ...... Value for Stadr [15:8]
00 ...... Value for Stadr [7:0]
00 ...... Value for Enadr [23:16]
87 ...... Value for Enadr [15:8]
FF ...... Value for Enadr [7:0]
20 ...... Send 2 Bytes, Receive 0 Byte
10 ...... Rec command
18 ...... Set the Method to ADPCM2 and sampling frequency to 8 kHz
10 ...... Send 1 Byte, Receive 0 Byte
30 ...... Start command (Start recording)
```

The following list shows the content of a control file (NorF80A2_Play_Ph1.cmd) loaded by clicking the **NorPlayPh1** command button:

```
10 ...... Send 1 Byte, Receive 0 Byte
03 ...... Mode command    (Sets the operating mode to Normal Play Mode)
30 ...... Send 3 Bytes, Receive 0 Byte
36 ...... Area1 command
00 ...... Start1 [7:0]        (Value for the Start Block Address of the Arear1)
B1 ...... End1 [7:0]          (Value for the End Block Address of the Arear1)
30 ...... Send 3 Bytes, Receive 0 Byte
39 ...... Area2 command
02 ...... Start1 [7:0]        (Value for the Start Block Address of the Arear2)
21 ...... End1 [7:0]          (Value for the End Block Address of the Arear2)
20 ...... Send 2 Bytes, Receive 0 Byte
20 ...... Play command
01 ...... Value for Phrase [7:0]
10 ...... Send 1 Byte, Receive 0 Byte
30 ...... Start command (Start playing)
```

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