# MITSUBISHI CNC

# MELD/SM/GIC 64

## PERSONAL COMPUTER
## DIRECT OPERATION MANUAL

ADVANCED AND EVER ADVANCING
# MITSUBISHI ELECTRIC

# Introduction

This instruction manual describes the methods for handling the expanded functions of the MELDASMAGIC Series and PC-direct operation.
This manual focuses on the . Please use the following instruction manuals in addition to this manual.

For details on the command format of the machining program, etc.:

| | | |
|---|---|---|
| Programming Manual | (For D/M) | BNP-B2182 |
| | (For L/G) | BNP-B2181 |

For details on the MELDASMAGIC MMI operation:

| | | |
|---|---|---|
| MELDASMAGIC MMI Operation Manual | (For D/M) | BNP-B2193 |
| | (For L/G) | BNP-B2194 |

For details on development of the Custom Applications:

Custom Application Interface Library Guide

| | |
|---|---|
| (Programming section) | BNP-B2197 |
| (Function section) | BNP-B2198 |
| (Variable section) | BNP-B2199 |

In order to safely use the MELDASMAGIC Series, thoroughly study the "Precautions for Safety" on the next page.

# Precautions for Safety

Always read the specifications issued by the machine maker, this manual, related manuals and enclosed documents before starting installation, operation, programming, maintenance or inspections to ensure correct use. Thoroughly understand the basics, safety information and precautions of this numerical controller before using the unit.
The safety precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this manual.

| ⚠ **DANGER** | When there is a great risk that the user could be subject to fatalities or serious injuries if handling is mistaken. |
|---|---|
| ⚠ **WARNING** | When the user could be subject to fatalities or serious injuries if handling is mistaken. |
| ⚠ **CAUTION** | When the user could be subject to injuries or when physical damage could occur if handling is mistaken. |

Note that even if the item is ranked as " ⚠ CAUTION", incorrect handling could lead to serious results. Important information is described in all cases, so please observe the items.

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### ⚠ DANGER

Not applicable in this manual.

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### ⚠ WARNING

Not applicable in this manual.

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### ⚠ CAUTION

Items related to product and manual
⚠ For items described as "Restrictions" or "Usable State" in this manual, the instruction manual issued by the machine maker takes precedence over this manual.
⚠ Items not described in this manual must be interpreted as "not possible".
⚠ This manual is written on the assumption that all option functions are added. Refer to the specifications issued by the machine maker before starting use.
⚠ Some screens and functions may differ or may not be usable depending on the NC version.

# Contents

**PC-direct Operation Function**

# PC-direct Operation Function

# 1. Function outline

The PC-direct Operation Function in which the NC unit directly reads and automatically runs a machining program located on a personal computer's (hereafter PC) hard disk, floppy disk or corresponding drive. This function allows the PC's hard disk, etc., to be handled in the same manner as the conventional memory operation, and allows many machining programs or large machining programs created with a CAM, etc., to be handled. Machining programs following the EIA format (same file as format used in memory operation) can be used, and subprogram operation is also supported.

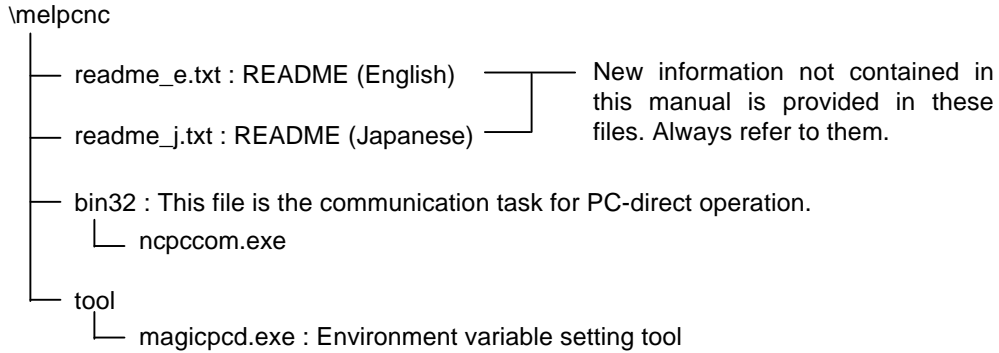To use the PC-direct Operation Function, it is necessary to have the supporting software. It is necessary to purchase the MELDASMAGIC MMI or to create an application having the PC-direct Operation Function.

Users of MELDASMAGIC MMI (option) should refer to Chapters 2 to 7. Users of the Custom API Library provided by Mitsubishi to develop applications incorporating the PC-direct Operation Function should refer to Chapters 2.

# 2. Installation of PC-direct Operation Function

### [Floppy disk configuration]

The following files are stored in the BND-660W303 disk.

```
\melpcnc
    ├── readme_e.txt : README (English) ───┐   New information not contained in
    │                                        ├── this manual is provided in these
    ├── readme_j.txt : README (Japanese) ──┘   files. Always refer to them.
    │
    ├── bin32 : This file is the communication task for PC-direct operation.
    │       └── ncpccom.exe
    └── tool
            └── magicpcd.exe : Environment variable setting tool
```

### [Installation and starting method]

(1) Copy all of the files under melpcnc into the root directory of the hard disk. If MELDASMAGIC MMI is installed, install the software into the same hard disk.
An "Overwrite" warning message will appear if a melpcnc directory already exists, but this is not a problem. Designate "Overwrite".

(2) Restart the personal computer to complete the installation.

# 3. PC-direct Operation Machining Program

## 3.1 Machining program format

The format of the machining programs that can be used with the PC-direct Operation Function is the same as for memory operation. Fixed cycles and subprogram call can also be used. (Each function requires separate options.)

The functions that can or cannot be used with the PC-direct Operation Function are shown in Table 3-1.

**Table 3-1  PC-direct related function list**

| Function name | Usable: O |
|---|---|
| Subprogram control (refer to Table 3-2) | O |
| Hole drilling fixed cycle | O |
| User macros (macro commands, operators) | O |
| User macro interrupt | O |
| Variable command | O |
| Special fixed cycle | O |
| Circular cutting | O |
| Fixed cycle for lathe cutting | O |
| Fixed cycle for compound type lathe cutting | x |
| Multi-system operation | O |
| System standby | O |

**Table 3-2  Correspondence of main program and subprogram**

| Sub / Main | NC side | PC side |
|---|---|---|
| NC side | O | O |
| PC side | O | O |

As shown in Table 3-2, the main program and subprogram can be placed on either the NC side (memory) or PC side (hard disk). The programs can be placed as shown below according to the machining program purpose.
  (1)   Subprogram only in memory, main program on hard disk
  (2)   Both main program and subprogram on hard disk
  (3)   Specific subprogram only in memory, other main program and subprograms on hard disk

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## 3.2   Machining program file format

The machining program file supports the following format.

- All file names that can be used with Windows can be used for the main program, or in other words the machining program file that executes search.
  Use of "Program No.PRG" or "up to 8 alphanumeric characters.PRG" is recommended for the file name.
  The format is not case-sensitive. "123.PRG", "123.prg", "123. Prg", etc., are all treated as the same file.
- The subprogram file name is "same file name as program No.PRG".
  1. PRG~99999999.PRG
  Note that the file name led by zero cannot be used with the subprogram.
  Example :   0123.PRG,0001.PRG cannot be used.

**File format**

O *Program No.* (*comment: max. 19 half-byte characters*)
```
    :
Program body
    :
```
%
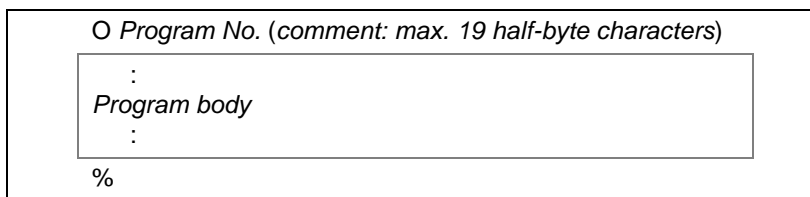
By setting [PD_SubCheck] in the environment file [melcfg.ini] to "1", the main program and subprogram can be placed in the same file as shown below.
Refer to section "8.4 Environment variables" for details on the environment file.
When using this format, the order must always be main program and then subprogram. When the file contains only a subprogram (with no main program), one file must contain only one subprogram. If multiple subprograms are described in one file, only the first subprogram will be recognized.

**Caution** :   When the environment that can use this format is used (when PD_SubCheck = 1), the larger the file size is, the longer the operation search will take.

**File format**

O *Main Program No.* (*comment: max. 19 half-byte characters*)

> :
> *Main program body*
> :

O *Sub Program No.* (*comment: max. 19 half-byte characters*)

> :
> *Subprogram body*
> :

%

**Correct example**

100.PRG

O100 (Main program)

> :
> *Main program body*
> :

O8001 (Subprogram 1)

> :
> *Subprogram 1 body*
> :

O8002 (Subprogram 2)

> :
> *Subprogram 2 body*
> :

%
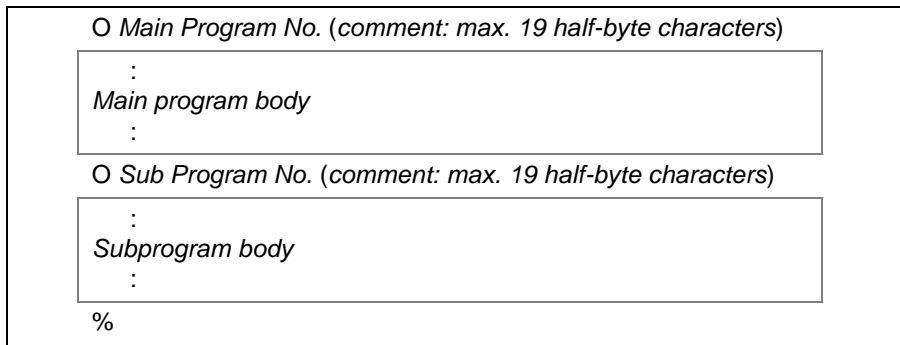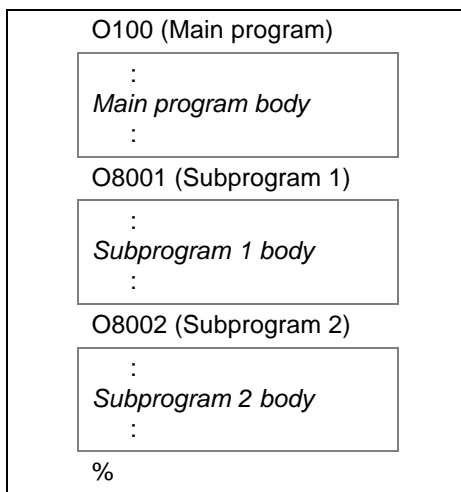
## 3.3　Handling of program No. during operation search

When carrying out an operation search, the program No. will be the file name or the O No. at the head of the file as shown below.

If the file name is "value.PRG", the file name will be the program No.

123.PRG

```
O100(COMMENT...)
.....
```

123.PRG

```
G28 X0 Y0
.....
```

In the cases on the left, the file name is "value. PRG" so the program No. will be 123.

If the file name is not "value.PRG", the O No. at the head of the file will be the program No.

ABC.PRG

```
O123(COMMENT...)
.....
```

Since the file name on the left is not "value. PRG", the "O No." in the file, or in other words, 123 will be the program No.

An error will occur in cases other than the above (when the file name is not "value.PRG" and there is no "O No." in the file).

## 3.4  Subprogram call

The command format used for calling the subprogram is selected from the following four formats according to the purpose. Refer to the Programming Manual for details on each command.

**(1)  Subprogram control**
M98 P [Program No.] H [Sequence No.] L [No. of repetitions]

**(2)  User macro simple call**
G65 P [Program No.] H [Sequence No.] [Argument ...] L [No. of repetitions]

**(3)  User macro movement command call**
G66 P [Program No.] H [Sequence No.] [Argument ...] L [No. of repetitions]

**(4)  User macro per block call**
G66.1 P [Program No.] H [Sequence No.] [Argument ...] L [No. of repetitions]

The subprogram designated with P [Program No.] is first searched from the same directory as the main program. If the subprogram is not found, it will be searched from the directory designated with the "Reference priority" in the PC-direct Environment window (explained later). If the subprogram is not found after searching all directories, an error will occur.
The subprogram search time will be the time designated with "Time out" in the PC-direct Environment window. If there is no designation, the default time of 30 seconds will apply.

# 4. PC-direct Operation using MMI

The PC-direct operation runs in the "Memory" operation mode. Set the operation mode on the machine operation board to "Memory" before starting PC-direct operation. (Refer to the Instruction Manual issued by the machine maker for details.)
The set operation mode will display on the right side of the MELDASMAGIC MMI main window. (Refer to Fig. 4-1.)
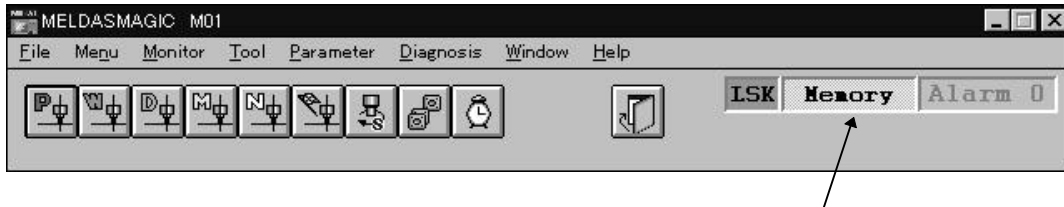


Operation mode is displayed.

**Fig. 4-1    MELDASMAGIC MMI main window operation mode display**

## 4.1   Operation search

The operation search is carried out in the MELDASMAGIC MMI Search window. When the PC side memory device (C: drive, etc.) is selected with "Dri<u>v</u>es", the "<u>D</u>irectories" and "File <u>N</u>ame" will display. Select the directory where the target file is located and select the file to be searched. When the [<u>S</u>earch] button is pressed, the operation search will start. To carry out a search with the sequence No. and block No. designated, press the [<u>O</u>ption] button, designate the respective information in the Search Option window, and then press the [<u>S</u>earch] button.
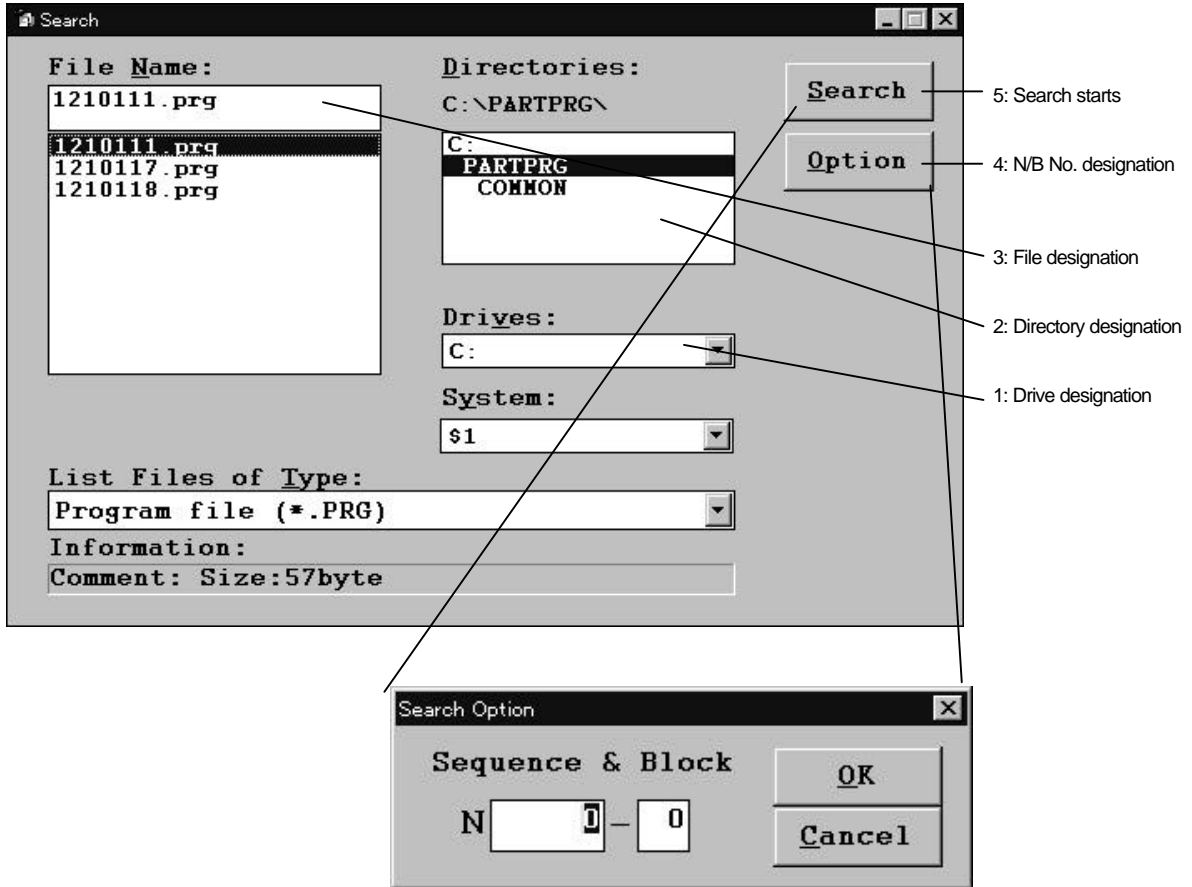


**Fig. 4-2   Search window**

**Operation at reset and power shut off**

When the operation search is completed, the searched information (main program file name, etc.) is held even when the unit is reset. Thus, if automatic operation is to be started without carrying out a search after resetting the unit, the machining program searched last will be automatically started.
The search information is also held when the personal computer (NC Card) power is turned OFF. If operation is automatically started without carrying out a search after turning the power ON again, the program searched last will be started. However, in this case, the MELDASMAGIC MMI must be operated before starting automatic operation.

## 4.2   Changing the environment variables

The drive, directory, order or priority and reference limit times for when the PC-direct operation searches for a machining program must be defined in the environment variables. The environment variables can be set and changed in the window that opens when the MELDASMAGIC MMI menu

"Parameter" "PC-direct Env." or [button image] button is selected.

**Caution** :   When the environment variables are set with the PC-direct Environment window, an operation search must always be executed before starting the next automatic operation. The set environment variables are valid after the operation search.
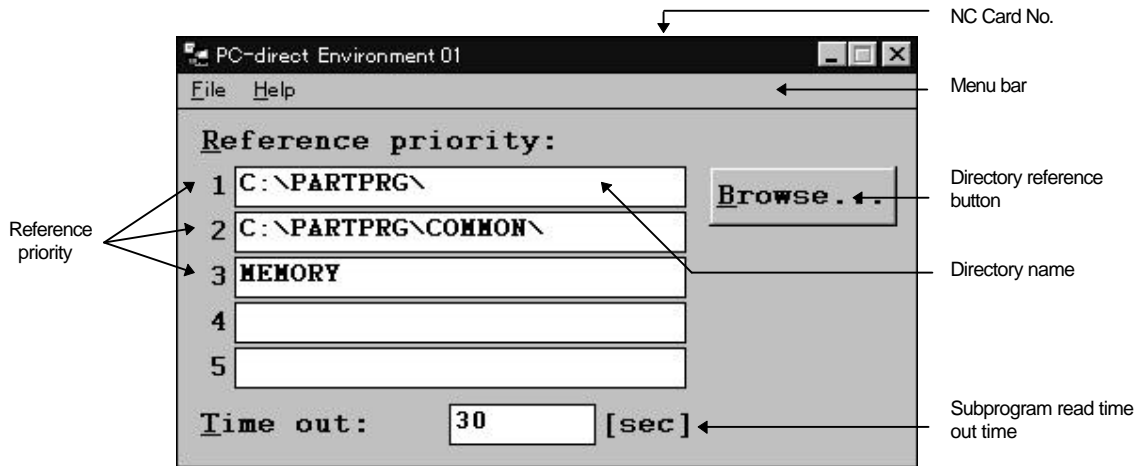


**Fig. 4-3   PC-direct Environment window**

**Menu bar**          The functions of the menu bar commands are as follows.

| Menu | Command | Function |
|------|---------|----------|
| File | Open | The environment settings of the designated NC Card are displayed. |
| | Save | The environment settings are overwritten and saved. |
| | Save As... | The environment settings are saved for a designated NC Card. |
| | Exit | The PC-direct Environment window is exited. |
| Help | Version... | The version information of the PC-direct Environment window is displayed. |

**Displays**

| Display/setting item | Details |
|---|---|
| NC Card No. | The No. of the NC Card for which the environment is to be set is displayed. |
| Reference priority | The priority for referring to the subprograms is displayed. (The smaller the number is, the higher the priority is.) |
| Directories | Set the directories (absolute path) to be referred to when reading the subprogram. Set "MEMORY" to designate the NC memory. |
| Time out | The time to wait when reading the subprogram is set. (Unit: sec.) |
| Browse ... | The PC-direct Reference priority window will open. |

**Changing the card No.**

■**To change the card No.**

(1) Click on the [File] - [Open] commands.
→The Open window will appear.
If the environment settings have been changed, the Save As window will appear.
Refer to "Saving the environment settings" for details on the Save As window.



NC Card No. to display
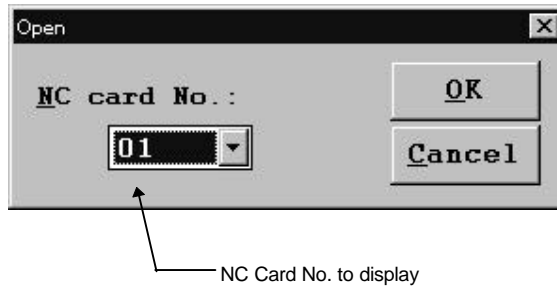
**Fig. 4-4   Open window**

(2) Click on the downward arrow at the right of the NC Card display box, select the NC Card No. to display, and then click on the [OK] button.
→ The Open window will close, and the environment settings of the selected NC Card will appear in the PC-direct Environment window. The designated NC Card No. will appear at the title of the PC-direct Environment window.

**Editing the directory**

■**To edit the directory that is referred to when reading the subprogram**

•To change the directory using key inputs
  (1)  Click on the section where the directory name to be changed is displayed.
      →  The cursor will appear at the clicked directory display section.
  (2)  Input the directory name to be set, and then press the [Enter] key.
      →  The input directory will be displayed and activated.

•To set the PC side directory name using the PC-direct Reference priority window
  (1)  Click on the section where the directory name to be changed is displayed.
      →  The cursor will appear at the clicked directory display section.
  (2)  Click on the [Browse...] button in the PC-direct Environment window.
      →  The PC-direct Reference priority window will appear, and the current directory of the current drive will display.
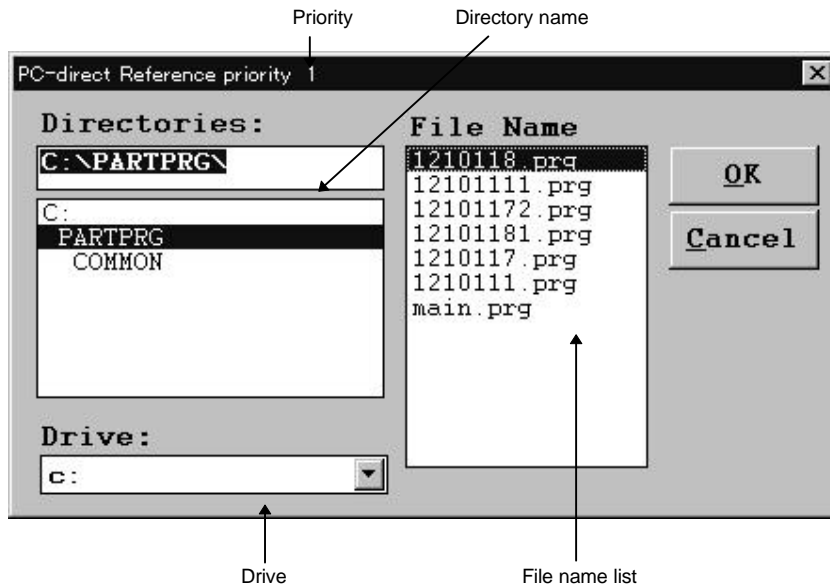


**Fig. 4-5   PC-direct Reference priority window (selection of PC side drive)**

  (3)  Select and click on the directory to be changed from the directory list display.
      →  The designated directory will appear in the directory display box, and the "*.PRG" files in the designated directory will appear in the file name list display area.

  (4)  To change the drive, click on the downward arrow at the right of the drive display box, and select the drive.
      →  The current directory of the designated drive will appear at the directory display box, and the "*.PRG" files in that directory will display in the file name list display area.

  (5)  Click on the [OK] button.
      →  The directory name displayed in the directory name display box of the PC-direct Reference priority window will be displayed and activated in the directory display box to be changed in the PC-direct Environment window. When the changes are completed, the cursor will move to the next priority directory display box.

**Fig. 4-6   PC-direct Environment window (before reading directory)**
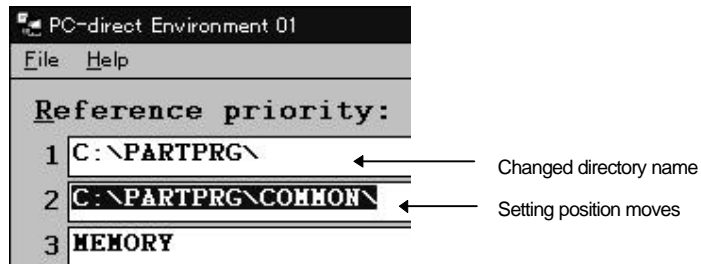


**Fig. 4-7   PC-direct Environment window (after reading directory)**

•To set NC Card memory using PC-direct Reference priority window

(1)   Click on the box where the directory name to be changed is displayed.
     → The cursor will appear at the clicked directory display section.

(2)   Click on the [Browse...] button in the PC-direct Environment window.
     → The PC-direct Reference priority window will appear, and the current directory of the current drive will display.

(3)   Click on the downward arrow at the right of the drive display box, and select the (NC Card).
     → MEMORY will appear at the directory display box.
       The directory list display box and file name list display area will be displayed in grey.
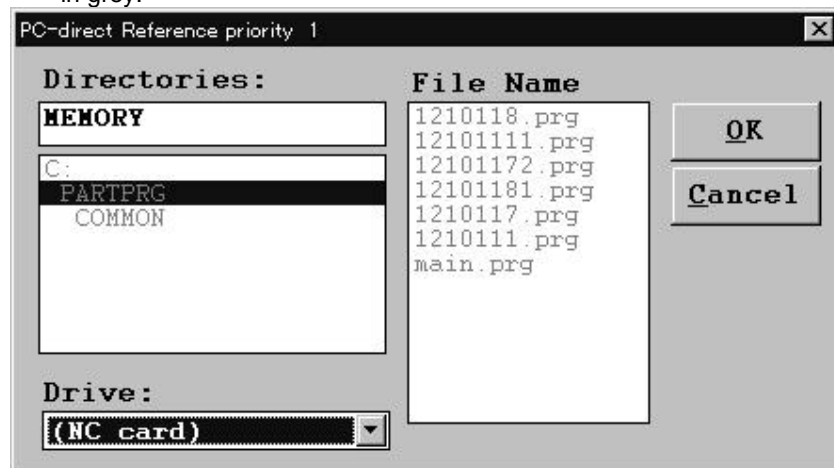


**Fig. 4-8 PC-direct Reference priority window (selection of NC Card)**

(4)  Click on the [OK] button.
→ MEMORY will be displayed and activated in the directory display box to be changed in the PC-direct Environment window.
When the changes are completed, the cursor will move to the next priority directory display box.
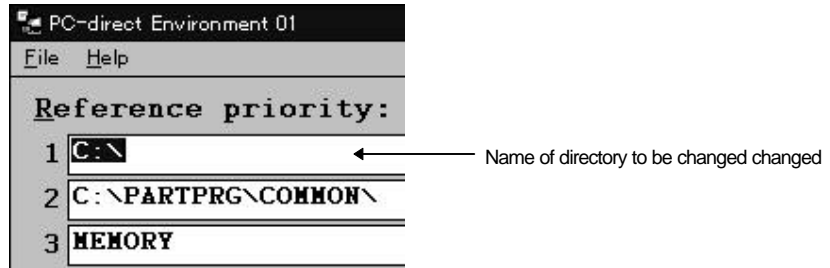
**Moving the directory name**

■**To move the directory name and change the priority**

(1)  Drag the displayed directory name for which the priority is to be changed.
→ The mouse pointer will change to an upward arrow.



Mouse pointer
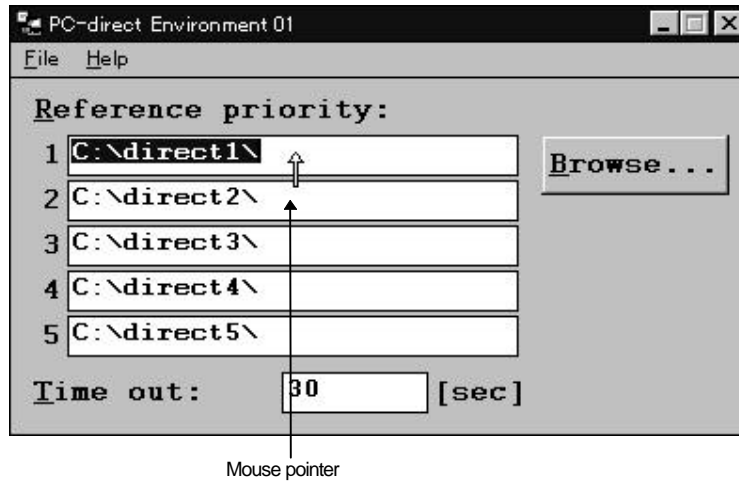
**Fig. 4-9   Start of directory name dragging**

(2)  Move to another directory name display section while dragging.
→ A square frame will move with the mouse movement.
The movement destination directory name will be highlighted.



Directory name being moved
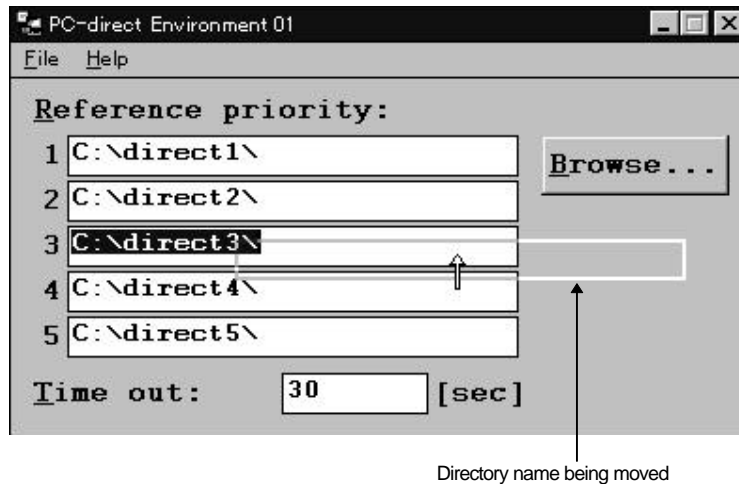
**Fig. 4-10   During directory name dragging**

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(3) Drop the directory name.
→ The directory will be inserted in the dropped position.



Inserted directory name
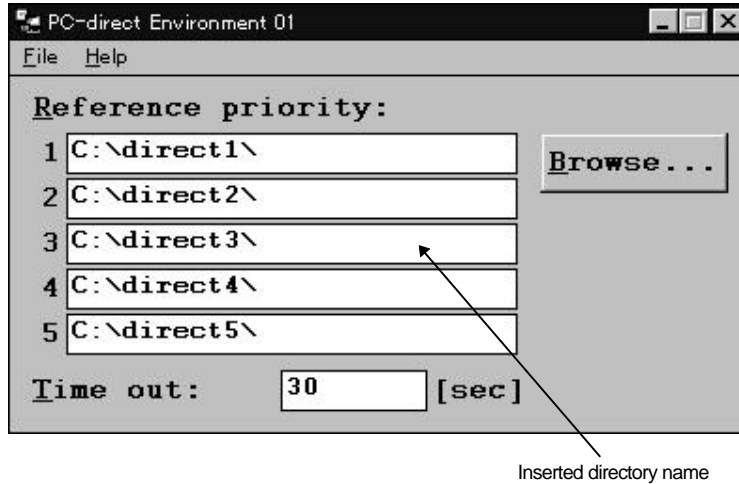
**Fig. 4-11　Dropping the directory name**

**Editing the time out time**

■**To edit the subprogram time out time**

(1) Click on the [Time out] display box.
→ The cursor will appear at the [Time out] display box.
The [Browse...] button will display in grey and operation will be inhibited.

(2) Input the value to be set.
→ The setting range is as shown below.

| Display item | Setting range (unit) |
|---|---|
| Time out | 1 to 300 (sec.) |

(3) Press the [Enter] key or [TAB] key. The cursor at the [Time out] display box can also be moved to another position.
→ The input value will be validated.

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**Saving the environment settings**

■**To save the PC-direct operation environment settings**

•To overwrite

(1) Click on the [File] - [Save] commands.
   → The save confirmation window will appear.
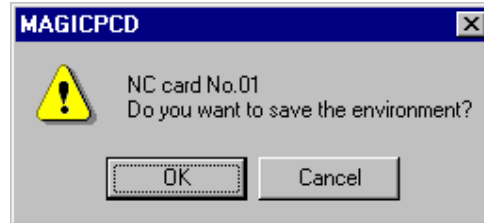


**Fig. 4-12   Environment setting save confirmation window**

(2) Click on the [OK] button.
   → The PC-direct operation environment settings will be saved in the NC Card that the No. is displayed at the title.

•To designate a card No. and save the settings

(1) Click on the [File] - [Save As...] commands.
   → The Save as window will appear.



**Fig. 4-13   Save as window**

(2) Click on the downward arrow at the right of the NC Card No. display, and designate the card No.
   → The designated NC Card No. will display at the NC Card No. display section.

(3) Click on the [OK] button.
   → The currently displayed PC-direct operation environment settings will be saved in the designated No. NC Card.

**Exiting**

■**To exit the PC-direct operation environment settings**

(1) Click on the [<u>F</u>ile] - [E<u>x</u>it] commands.
  → The PC-direct Environment window will close.

**Version display**

■**To display the version of the PC-direct Environment window**

(1) Click on the [<u>H</u>elp] - [<u>V</u>ersion...] commands.
  → The version information of the PC-direct Environment window will appear.

# 5. Other Functions

**(1) PC-direct operation performance**

  1) Fine segment capacity

      The fine segment interpolation capacity is 4000 [mm/min] at a 1 [mm] segment length.
The hardware specifications require a machine with an i486-DX2 66MHz, 16MB (72-pin) 60 ns memory mounted, or a higher performance.

**(2) Correspondence to multiple NC Cards**

If two or more NC Cards are mounted on the same PC, machining programs can be simultaneously supplied to each NC Card. However, the supply of the machining program will not be fast enough when supplying programs configured for fine segments, etc. Thus, a deceleration could occur at the block joints.

# 6. Error List

**• E30  The path length is too long.**

| | |
|---|---|
| [Definition] | The path set in the environment variable [Reference priority] is too long. |
| [Cause] | The path set in the [Reference priority] exceeds 128 bytes, or the total number of characters of the registered path and directory path of searched program exceeds 512 bytes. |
| [Measures] | Delete unnecessary path from the environment variable [Reference priority] or change to a directory configuration that has a shorter path. |

**• E31  No option.**

| | |
|---|---|
| [Definition] | The PC-direct operation option is not provided. |
| [Cause] | The communication task "NCPCCOM.EXE" used for PC-direct operation is not running. |
| [Measures] | Confirm the options. If the option is provided, confirm that the PC-direct operation software is correctly installed. |

**• E32  Searching time was already over.   It failed in operation search.**

| | |
|---|---|
| [Definition] | The file being searched for was not found within the limit time. |
| [Cause] | The file designated for the operation search does not exist, or accessing to the drive took so much time that the search could not be completed within the time set in environment variable [Time out]. |
| [Measures] | Check the name and directory of the machining program file being searched for. Lengthen the environment variable [Time out] setting. |

**• E61  The specified file does not exist.**

| | |
|---|---|
| [Definition] | The file designated for operation search was not found. |
| [Cause] | The file was not in the designated place during the search. The file format may be incorrect. |
| [Measures] | Confirm that the file is in the drive designated for the search. Confirm that the "O *program No.*" block is provided at the head of the machining program. |

**• P232  NO PROGRAM No. 16**

| | |
|---|---|
| [Definition] | Reading of the designated file failed. |
| [Cause] | The called subprogram file was not found in the candidate path defined in the environment variable [Reference priority]. The candidate path defined in the environment variable [Reference priority] is incorrect. The path defined in the environment variable [Reference priority] is too long. |
| [Measures] | Confirm the environment variable [Reference priority] path, and confirm that the subprogram file exists. Also check the subprogram file name and file format. Set the environment variable [Reference priority] path to be within 115 characters. |

• **P232   NO PROGRAM No. 30**

[Definition]   The designated file could not be read within the time set in the environment variable [Time out].

[Cause]   The value set in the environment variable [Time out] is too small. A drive that takes time for referring to the file is located in the reference path.
Due to the same reasons as "P232 No program No. 16", the time reached the settijng of [Time out] before the file was found.

[Measures]   Check the measures provided for "P232 No program No. 16".
If the environment variable [Reference priority] path and the program format are correct, lengthen the environment variable [Time out] setting, or remove the drive that requires time for file accessing from the environment variable [Reference priority].

# 7. Restrictions

    (1)  If it takes time to read in the machining programs from the PC due to the operation state of the PC's other applications, the speed could decelerate at the joints of the blocks during automatic operation.

    (2)  Time is required for subprogram call, return from subprogram and commands that change the program flow such as GOTO•DO ~ END, so the interpolation could decelerate and stop.

    (3)  Do not rewrite the file, change the file name, move between the directory and drive, or delete the machining program referred to during automatic operation. Correct operation will not be possible.

    (4)  It will take time to search for a large program. This is because the main program and subprogram configuration are checked during the search.

# 8. Incorporation of PC-direct Operation Function using Custom API Library

This chapter should be read by users who are incorporating the PC-direct Operation Function in user-developed applications.

The PC-direct Operation Function has a system configuration as shown in Fig. 8-1. By calling the Custom API Library (DLL) from the user-created application, the PC-direct Operation Function (operation search, etc.) can be realized.
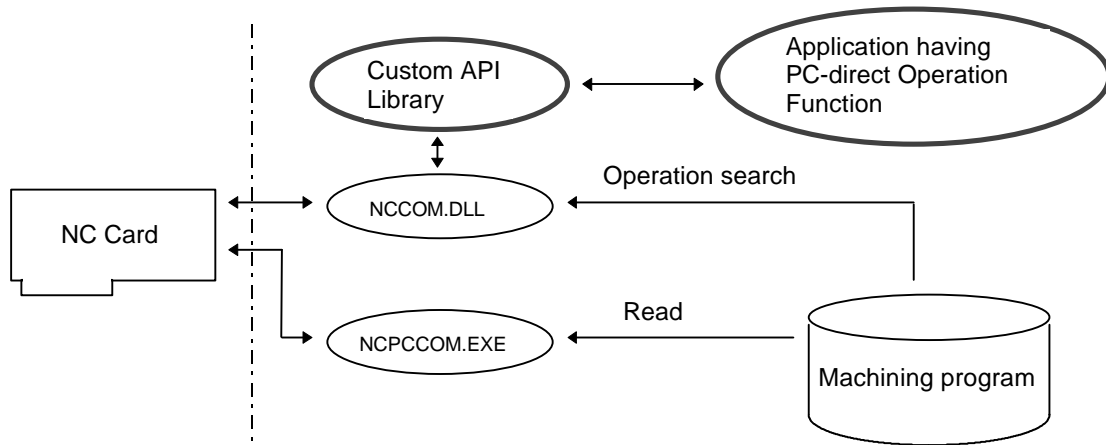


**Fig. 8-1   PC-direct operation system configuration**

The following API functions are included in the Custom Application Interface Library (Custom API Library) that realizes the PC-direct Operation Function.

1. API function that searches for machining program on hard disk (melSelectExecPrg)
2. API function that acquires the display of machining program being run with PC-direct operation, and the operation status, etc. (melGetCurrentPrgBlock, etc.)

These API functions can be called with the language that supports DLL such as Visual Basic, etc.

## 8.1   Operation search using Custom API Library

The operation search is carried out with the API function melSelectExecPrg

dwStatus
   =melSelectExecPrg(hWnd,lAddress,lpSelectPrg,lDataType,lSequenceNum,lBlockNum)

| | | |
|---|---|---|
| HWND | hWnd | : Window Handle for local window |
| long | lAddress | : Address (NC Card, system designation) |
| LPVOID | lpSelectPrg | : Drive path and file name of program to be operation searched |
| long | lDataType | : T_STR |
| long | lSequenceNum | : Sequence No. to be searched |
| long | lBlockNum | : Block No. to be searched |

The size and the head address of the character string which contains the drive, path and file name are set in lpSelectPrg, and the sequence No. and block No. are set in lSequenceNum and lBlockNum respectively. These are then called out.
An example of a search application program that uses Visual Basic is shown below.

– Example of search application program using Visual Basic 2.0 –

```
Dim iNCDriveNumber As Integer      ' NC Card No. setting variable
Dim iNCSystemNumber As Integer     ' NC system No. setting variable
Dim CurFile As String              ' Machining program file setting variable
Dim lSequenceNum As Long           ' Sequence No. setting variable
Dim lBlockNum As Long              ' Block No. setting variable
Dim dwStatus As Long
Dim lAddress As Long
Dim lpSelectPrg As STRINGTYPE


CurFile =    [            ]         ' The machining program file name is designated (with path)
lSequenceNum = [          ]         ' The sequence No. to be searched for is designated
lBlockNum = [             ]         ' The block No. to be searched for is designated


' An argument that designates the NC Card No. and NC system is created.
lAddress = ADR_MACHINE(iNCDriveNumber) Or ADR_SYSTEM (iNCSystemNumber)
```

```
' An argument that designates the machining program (with path designation) to be searched
is created.
lpSelectPrg.lBuffSize = LenB(CurFile)                    ' Character string length is set
dwStatus = melSetPointer (hWnd, lpSelectPrg.lpszBuff,CurFile)   ' Character string head address
                                                           is set
' Operation search is executed
dwStatus = melSelectExecPrg(hWnd,lAddress,lpSelectPrg,T_STR,lSequenceNum,lBlockNum)


If dwStatus = 0 Then
      sMes = "Search complete."                          ' Operation search succeeded
Else
      sMes = "Search error.   &h" & Hex$ (dwStatus)      ' Operation search failed
End If
MsgBox sMes                                              ' Search results are displayed
```

**Example 1)**

When the work1.prg sequence No. 5 and block No. 3 located under the C:\partprg are to be searched, the blank ☐ area line of the above program is designated as shown below.

CurFile = <u>C:\partprg\work1.prg</u>
lSequenceNum = <u>5</u>
lBlockNum = <u>3</u>

**Example 2)**

When 123.prg located in the NC Card memory is to be searched, the blank ☐ area line of the above program is designated as shown below.

CurFile = <u>123.prg</u>
lSequenceNum = <u>0</u>
lBlockNum = <u>0</u>

## 8.2　Operation mode

The PC-direct operation runs under the operation mode "Memory". Thus, the operation panel and ladder must be designed for the memory mode. (The memory mode and PC-direct mode will be automatically switched between according to the searched drive.)

| Mode switch signal<br>$1 / $2 | Operation mode | Status output signal<br>$1 / $2 |
|---|---|---|
| Mode —— Y219/W90 —— | Memory, PC-direct | —— X1E8/U68 |

## 8.3　Processes after power shut off

The operation searched information (file name, etc.) is saved in the PC's hard disk and NC even after the PC and NC power is shut off. Thus, if operation is started automatically without executing an operation search after the power is turned ON, the program searched for last will be started. However, the PC side communication task "NCPCCOM.EXE" must be started before starting automatic start up to validate this function.

The communication task "NCPCCOM.EXE" will be automatically started when "NCCOM.DLL" is running, so make sure that the application that acquires the NC side data starts immediately after the power is turned ON. Registering the created application with [Start] – [Program] – [Startup] is recommended.

## 8.4   Environment variables

The PC-direct operation requires environment variables that define the drive, directory, priority, reference limit time used when searching for a machining program. The environment variables are described in the environment file "melcfg.ini". The environment setting tool "MAGICPCD.EXE" enclosed with the FD or a commercial editor, etc., can be used for this description. Calling "MAGICPCD.EXE" from the application is recommended. Refer to Chapter 4.2 for details on the operation of MAGICPCD.EXE.

The environment file format is described below. Note that the PD_Preference and PD_Time_out are set for each NC unit (each [MachineXX]).

The environment variables include the following:
   (1)  PD_Preference that designates the drive and directory used to search for the file when calling a subprogram
   (2)  PD_Time_out that designates the time-out time to read the subprograms

### (1)   PD_Preference specifications

| | |
|---|---|
| **[Definition]** | **The drive and path priorities used when searching for the subprogram are defined.** |
| **[Format]** | **PD_Preference=Drive name: path; drive name: path;...** |

- Set for each [MachineXXX]
- Up to five drives and path designations can be set
- If more than five settings are made, the first five settings are valid
- If there are multiple PD_Preference definition lines, the first definition is valid
- When the NC memory is designated, the drive name is MEMORY, and the directory is omitted
- If there is no environment file, no PD_Preference definition or no priority designation, the search will be carried out in the following order;
    Main program drive: Directory → Memory
- If the character string indicating the drive + path contains 128 or more characters, an error will occur
- If the total ((main drive path + 1) + Σ (registered drive path + 1)) is 512 bytes or more, an error will occur

– Example –
 • To search the subprogram in the order of memory → C:\PARTPRG (PC)
        PD_Preference=MEMORY;C:\PARTPRG

 • To search the subprogram in the order of C:PARTPRG\SUB → C:\PARTPRG
        PD_Preference=C:\PARTPRG\SUB;C:\PARTPRG

**(2) PD_Time_out setting range specifications**

**[Definition]** **The effective time for the operation search and subprogram search is set**
PD_Time_out defines the time from when the NC requests the PC side for data reading to when the reading starts. The subprogram is sequentially searched for in the drive and directory designated in the environment file "melcfg.ini". However, if it takes time to check for an incomplete connection or the existence of a file causing the target file not to be found within the time out time, an error will occur.

**[Format]** **PD_Time_out = 1 to 300 [Time out time (sec.)]**
- Set for each [MachineXXX]
- If 0 or less is set, the default setting of 30 seconds will be applied
- If 300 or more is set, 300 seconds will be applied
- If there is no environment file, or if PD_Time_out is omitted, the default setting of 30 seconds will be applied
- If a setting other than a numerical value is made, the default setting of 30 seconds will be applied

– Example –

PD_Time_out=15 ............................. 15 seconds [When designated in the range of 0 to 300 seconds]

PD_Time_out=400 .......................... 5 minutes (300 seconds) [When a setting exceeding 300 is designated]

PD_Time_out= ................................ 30 seconds [When there is no designation]

PD_Time_out=DEFAULT_TIME ....... 30 seconds [When a setting other than a numerical value is designated]

```
;
;[MachineXX]
;        (lAddress=0xXX000000, Drive="MXX:")
;
;Controller=NCXJ                    (Maximum 40 characters)
;        (NCXJ:MELDASMAGIC50, NCXK:MELDASMAGIC, M6B:MELDAS600)
;
;Device=ISA1~ISA8
;        (ISA1:ISA bus 0xc0000- , ...)
;
;PD_Preference=MEMORY;C:\          (Maximum of 5 path)
;        (MEMORY:NC SIDE, C:\:search path)
;
;PD_Time_out=30                    (PD_Time_out=1 - 300)
;        (PD_Time_out=time out[sec])
;
;PD_SubCheck=0                     (PD_SubCheck=0 or 1)
;
[Machine01]
Controller=NCXK
Device=ISA7
PD_Prefernce = Drive: directory; drive: directory; ...
```

The drive and directory are designated in the order to search for the subprogram

PD_Time_out=*time out time*

The subprogram reading time out time is designated [Unit: sec.]

PD_SubCheck=*0 or 1*

Set "1" when the main program contains a subprogram, and set "0" when the main program file and subprogram file are independent. (Default is 0)

**Fig. 8-2   Environment file (melcfg.ini) format**

## 8.5  Option determination

The PC-direct Operation Function is an option. The validity of this function is determined by the method below. Change the user-developed application operation and screen configuration by providing or not providing this option.

The PC-direct Operation Function option is provided using melSelectExecPrg.
As in the example program below, designate CHECK_OPTION_PCDIRECT macro in the designation area of the operation search program in the melSelectExecPrg argument, and call the function. The function return value (dwStatus) is zero when the PC Direct Option is provided. When the PC-direct Option is not provided an ME_OPE_SELECTPRG_NCPCCOM error (no option) will result.
An example program of option determination by Visual Basic is shown below.

– Example program of PC-direct Function option determination by Visual Basic –

```
Dim iNCDriveNumber As Integer            ' Variable for setting NC Card No.
Dim CurFile As String                    ' Variable for setting machining program file
Dim dwStatus As Long
Dim lAddress As Long
Dim lpSelectPrg As STRINGTYPE


CurFile = CHECK_OPTION_PCDIRECT          ' Designate command for option check
lAddress = ADR_MACHINE (iNCDriveNumber)  ' Create argument designating NC Card No.
' Create argument designating machining program (path designation attached) to be searched
lpSelectPrg.lBuffSize = LenB (CurFile)                   ' Set character string length
dwStatus = melSetPointer (hWnd, lpSelectPrg.lpszBuff, CurFile)    ' Set character string head address


' Execute option determination of PC-direct Operation Function
dwStatus = melSelectExecPrg (hWnd, lAddress, lpSelectPrg, T_STR, 0, 0)
If dwStatus = 0 Then
      ' PC-direct Operation Function provided
Else If dwStatus = ME_OPE_SELECTPRG_NCPCCOM Then
      ' PC-direct Operation Function not provided
Else
      ' Other error (API Function call error)
End If
```

# Revision History

| Sub-No. | Date of revision | Revision details |
|---------|------------------|------------------|
| ∗ | July 1997 | First edition created. |