NEC

User's Manual

IE-77016-CM-LC

Level Converter for In-Circuit Emulator

Target devices

- μPD77015
- μPD77017
- μPD77018
- μPD77018A
- μPD77019
- μPD77110
- μPD77111
- μPD77112

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[MEMO]

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INTRODUCTION

Target Readers

This manual is intended for engineers who understand the functions of the μPD77016 Family and μPD77111 Family and wish to design application programs using these products.

The μPD77016 Family is used to refer collectively to the μPD77015, 77016, 77017, 77018, 77018, 77018A, 77019, and 77019-013. However, the μPD77016 is not one of the target devices in this manual.
The μPD77111 Family is used to refer collectively to the μPD77110, 77111, and 77112.

Purpose

This manual is designed to give you an understanding of the basic specifications of the IE-77016-CM-LC and its correct use.

Organization

This manual consists of the following chapters.
CHAPTER 1 GENERAL
CHAPTER 2 PART NAMES AND FUNCTIONS OF COMPONENTS
CHAPTER 3 INSTALLATION

How to Read This Manual

It is assumed that the readers of this manual have general knowledge of logic circuits and microcontrollers. The IE-77016-CM-LC is used connected to the IE-77016-98/PC in-circuit emulator. This manual describes the basic setup procedure and how to connect the IE-77016-CM-LC to the IE-77016-98/PC.
For additional information on the IE-77016-98/PC, refer to the **IE-77016-98/PC User's Manual**.

To understand the basic specifications and use method
→ Read this manual in the order of the CONTENTS.

To learn about the operation method of the ID77016, the function of commands, and software settings
→ Read the **ID77016 User's Manual** (separately available)

Conventions

Data significance:	Higher digits on the left and lower digits on the right
Active low representation:	$\overline{\times\times\times}$ (overscore over pin or signal name)
Note:	Footnote for item marked with Note in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numerical representation:	Binary ... ×××× or 0b××××
	Decimal ... ××××
	Hexadecimal ... 0××××

Related Documents The documents listed below may include preliminary versions. However, preliminary versions are not marked as such.

Documents Related to the μPD77016

Document Name / Part Number	Pamphlet	Data Sheet	User's Manual		Application Note
			Architecture	Instructions	Basic Software
μPD77016	U12395E	U10891E	U10503E	U13116E	U11958E
μPD77015		U10902E			
μPD77017					
μPD77018					
μPD77018A		U11849E			
μPD77019					
μPD77019-013		U13053E			

Documents Related to the μPD77111

Document Name / Part Number	Pamphlet	Data Sheet	User's Manual		Application Note
			Architecture	Instructions	Basic Software
μPD77110	U12395E	U13858E	Under preparation	U13116E	U11958E
μPD77111		U12801E			
μPD77112		U13858E			

Documents Related to Development Tools

Document Name		Document Number
IE-77016-98/PC User's Manual	Hardware	EEU-1541
IE-77016-CM-LC User's Manual		This manual

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

CONTENTS

LIST OF FIGURES

CHAPTER 1 GENERAL

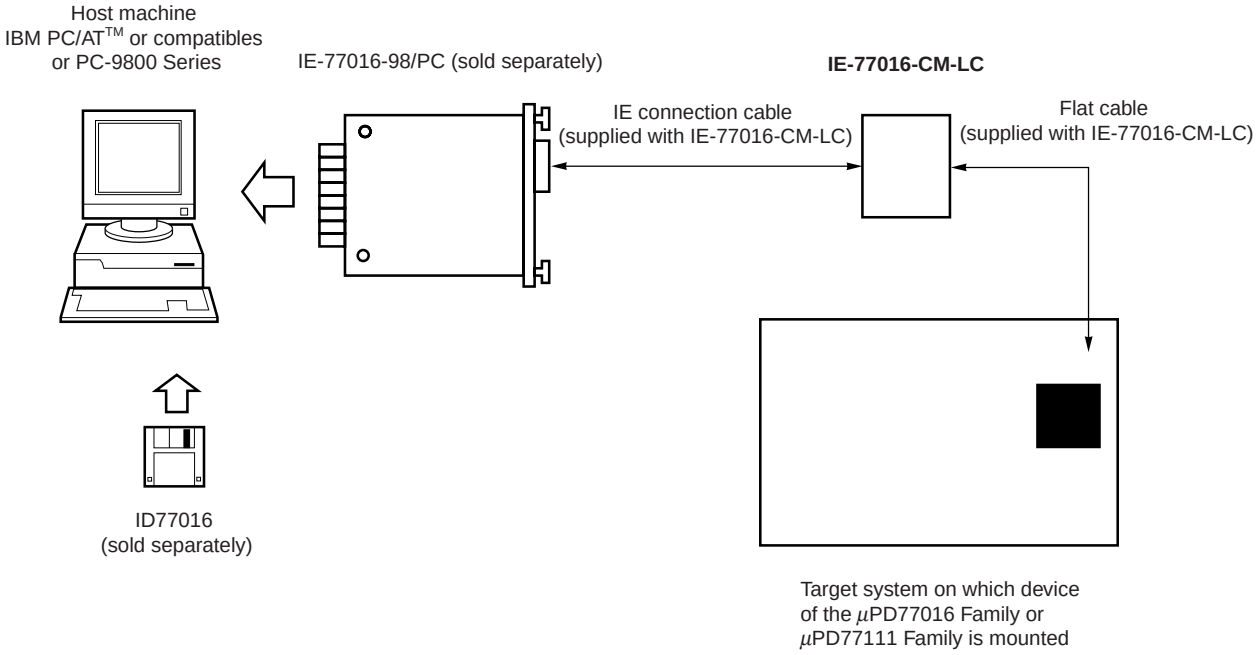
The IE-77016-CM-LC is a JTAG signal level converter that converts +5 V JTAG interface signals input/output from an IE-77016-98/PC, which is an in-circuit emulator for the μPD77016 Family[Note] and the μPD77111 Family, to +3 V or +2.5 V JTAG interface signals.

By combining the IE-77016-CM-LC with the IE-77016-98/PC and ID77016 (debugger control software), it is possible to use the in-circuit emulation function built in the μPD77016 Family and the μPD77111 Family.

Figure 1-1 shows the system configuration.

Note The μPD77016 is excluded. In the case of the μPD77016, the +5 V JTAG interface signals input/output from the IE-77016-98/PC can be input/output as is to the device debug pin. At this time, use the cable provided with the IE-77016-98/PC.

Figure 1-1. System Configuration



Remark The term ID77016 is a debugger control software product name in Japan.
Outside of Japan, please regard ID77016 as general debugger control software.

1.1 Checking Packing Box

The IE-77016-CM-LC packing box contains an IE-77016-CM-LC main unit, a guarantee card, a packing list, and a bag (accessory bag) containing the accessories.

The accessory bag contains this manual and the cables. Please verify the contents of this bag. If there are missing or damaged items, contact an NEC sales representative or an NEC distributor.

(1) Main unit

IE-77016-CM-LC

(2) Accessories

IE-77016-CM-LC connection cable × 1
10-pin flat cable × 1
12-pin flat cable × 1
14-pin flat cable × 1
User's Manual (This manual) × 1
Guarantee card × 1
Packing List × 1

1.2 Operating Environment

The IE-77016-CM-LC's operating environment conforms to the operating environment of the IE-77016-98/PC and ID77016.

1.2.1 IE-77016-98/PC (sold separately)

This is the board for the interface between the in-circuit emulation function built in the device and the host machine. There are two types of board available depending on the host machine. The IE-77016-PC is inserted in the ISA bus slot of IBM PC/AT or compatibles, and the IE-77016-98 is inserted in the C bus slot of PC-9800 Series computers. For details, refer to the **IE-77016 98/PC User's Manual**.

1.2.2 ID77016 (sold separately)

This is the debugger control software for controlling the on-chip emulation function in the device from the host machine. It operates on Windows™ 95/NT. For details, refer to the **ID77016 User's Manual**.

CHAPTER 2 PART NAMES AND FUNCTIONS OF COMPONENTS

The part names of the IE-77016-CM-LC and their function are described below.

2.1 Part Names of IE-77016-CM-LC Component

Figure 2-1. External View of IE-77016-CM-LC

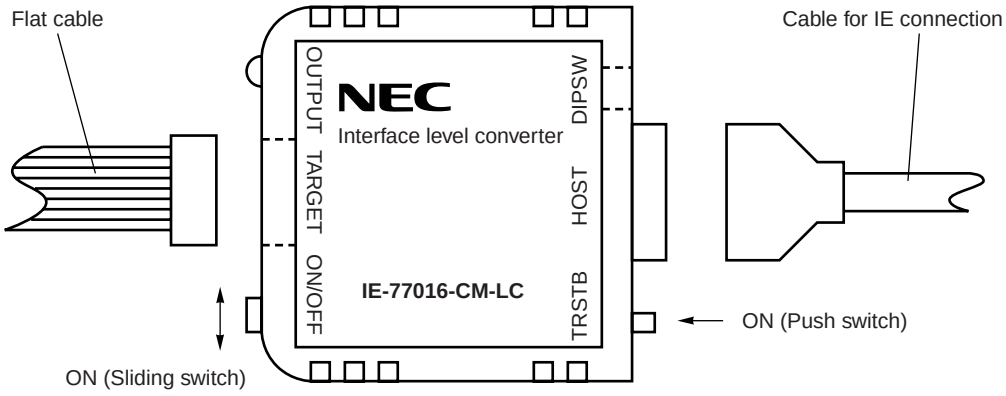
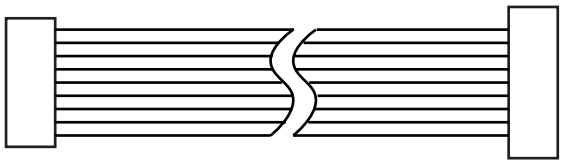


Figure 2-2. External View of Flat Cable

(a) 10-pin flat cable (for the μPD77016 Family)
(b) 12-pin flat cable (for the μPD77111 Family)
(c) 14-pin flat cable (for the μPD77111 Family)



2.2 Functions of IE-77016-CM-LC Component

2.2.1 IE-77016-CM-LC Component Functions

Name	Function
ON/OFF (SW1)	JTAG interface signal output ON/OFF ON : Output JTAG signal from host to target system. OFF: Do not output JTAG signal from host to target system.
TRSTB (SW2)	Forced $\overline{\text{TRST}}$ signal output When ON, an active signal is input to the $\overline{\text{TRST}}$ pin of the device. This switch is enabled/disabled by the value of DIPSW-2.
DIPSW-1 (DIPSW-1)	JTAG interface signal level selection. ON : +2.5 V OFF: +3.3 V (factory setting)
DIPSW-2 (DIPSW-2)	Forced $\overline{\text{TRST}}$ signal output enable/disable selection. ON : Enabled OFF: Disabled (factory setting)
OUTPUT (LED1)	JTAG signal output indicator. Lights when the JTAG signal is output from the target system.
TARGET (J1)	Connector used for connection to target device. Use the flat cable supplied with the IE-77016-CM-LC together with the device to be debugged.
HOST (J2)	Connector used for connection to IE-77016-98/PC. Use the IE connection cable supplied with the IE-77016-CM-LC to connect to the host machine.

2.2.2 Functions of Accessories

Name	Function
Cable for IE connection	Connects the IE-77016-CM-LC with the IE-77016-98/PC.
10-pin flat cable	Connects the IE-77016-CM-LC with the target device on the target system (for the μPD77016 Family).
12-pin flat cable	Connects the IE-77016-CM-LC with the target device on the target system (for the μPD77111 Family).
14-pin flat cable	Strengthened version of the 12-pin flat cable. When using this cable, a corresponding measure must also be implemented on the target system side (for the μPD77111 Family).

CHAPTER 3 INSTALLATION

3.1 IE-77016-CM-LC Settings

3.1.1 DIPSW1: Selecting the JTAG interface signal level

This DIP switch is used to select whether to convert the +5 V signal output from the IE-77016-98/PC to +2.5 V or +3.3 V.

If a device of the μPD77016 Family or μPD77111 Family is used, set this DIP switch to OFF.

To select the +2.5 V input/output voltage for the JTAG interface, for example in order to support ASIC products, set this DIP switch to ON.

Setting value	Function
ON	Signal is converted to +2.5 V and output from the TARGET (J1) connector.
OFF	Signal is converted to +3.3 V and output from the TARGET (J1) connector (factory setting).

3.1.2 DIPSW2: Forced $\overline{\text{TRST}}$ signal output enable/disable selection

The TRSTB (SW2) switch is used to enable/disable forced $\overline{\text{TRST}}$ signal output.

Normally, set this switch to OFF.

Also, if the target device that is used belongs to the μPD77016 Family, the TRSTB (SW2) switch is disabled regardless of the setting of this switch.

Setting value	Function
ON	Enables TRSTB (SW2) switch.
OFF	Disables TRSTB (SW2) switch (factory setting).

3.2 IE-77016-98/PC Settings

Following the instructions given in the IE-77016-98/PC User's Manual, set up the IE-77016-98/PC to the host machine.

3.2.1 Connecting the IE-77016-CM-LC and IE-77016-98/PC

Connect the J2 connector of the IE-77016-CM-LC and the CN3 connector of the IE-77016-98/PC to the IE connection cable supplied with the IE-77016-CM-LC. Do not use the JTAG cable supplied with the IE-77016-98/PC.

3.3 Connecting the Target System and IE-77016-CM-LC

3.3.1 In the case of the μPD77016 Family (except μPD77016)

Connect the IE-77016-CM-LC to the target system using the 10-pin flat cable supplied with the IE-77016-CM-LC.

First connect the 14-pin connector of the flat cable to the J1 connector of the IE-77016-CM-LC. Then connect the 10-pin connector to the pin provided on the target system side (Refer to **APPENDIX TARGET SYSTEM PINS**).

3.3.2 In the case of the μPD77111 Family

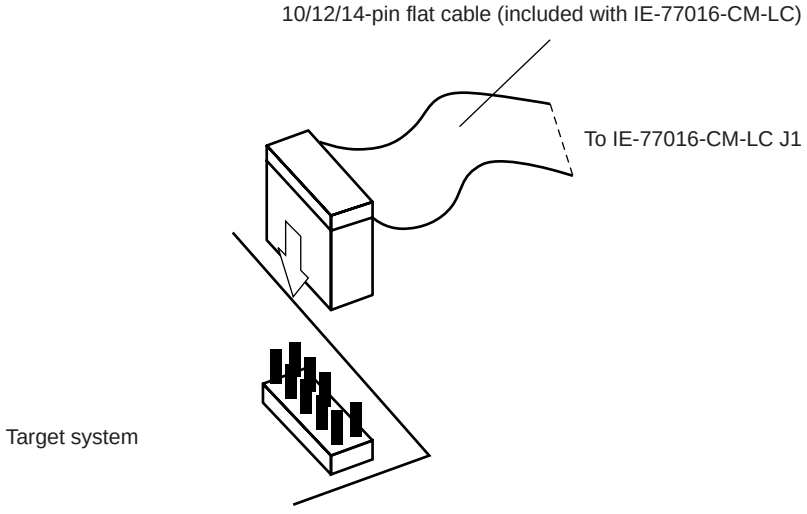
Connect the IE-77016-CM-LC to the target system using the 12-pin (or 14-pin) flat cable supplied with the IE-77016-CM-LC.

First connect the 14-pin connector of the flat cable to the J1 connector of the IE-77016-CM-LC. Then connect the 12-pin (or 14-pin) connector to the pin provided on the target system side (Refer to **APPENDIX TARGET SYSTEM PINS**).

Remark Connector pins with 14-pin specifications are recommended for the target system side. In the case of the supplied flat cables, the 14-pin flat cable is recommended over the 12-pin flat cable due to its higher strength.

If connecting a connector pin with 12-pin specifications to the target system, the 14-pin flat cable can be used, if enough space is left when positioning components around the connector pin so that the flat cable connector does not interfere with the components on the target device. In this case, since there are no signals for the 2 extra pins of the 14-pin flat cable, no special handling is required for these 2 pins.

Figure 3-1. Connecting Target System and IE-77016-CM-LC



3.4 Switching Power ON

Next, switch the power ON following the sequence described below. Follow the reverse sequence when switching the power OFF.

(1) Switch ON the host machine.
(2) Switch ON the target system.
(3) Set the SW1 of the IE-77016-CM-LC to ON[Note] (JTAG signal is output).

Note This switch does not control the power of the IE-77016-CM-LC.

Caution If removing or replacing devices on the target system, be sure to set SW1 of the IE-77016-CM-LC to OFF when you switch OFF the power of the target system.

3.5 Starting Up ID77016

Start up the ID77016 on the host machine. For details, refer to the **ID77016 User's Manual**.

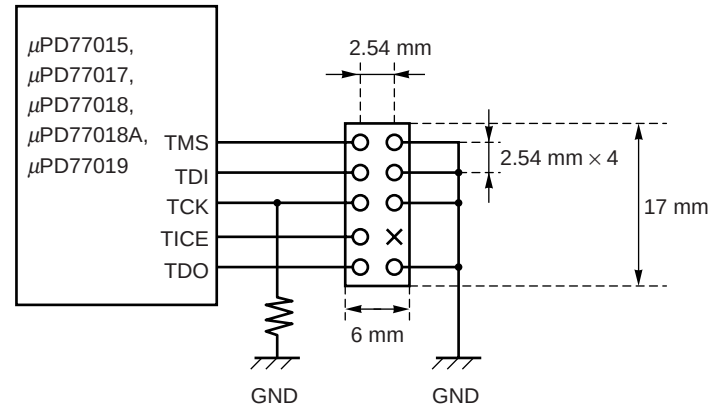
[MEMO]

APPENDIX TARGET SYSTEM PINS

Provide a dedicated debug pin on the target system.

[In the case of the μPD77016 Family (except μPD77016)]

- When using the 10-pin flat cable

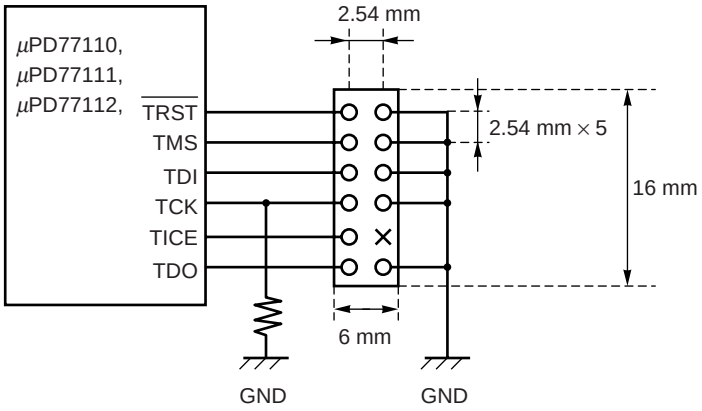


○ = Pin (□0.635, I = 6 mm)

× = Key Removed (to prevent incorrect insertion, to not provide pin.)

[In the case of the μPD77111 Family]

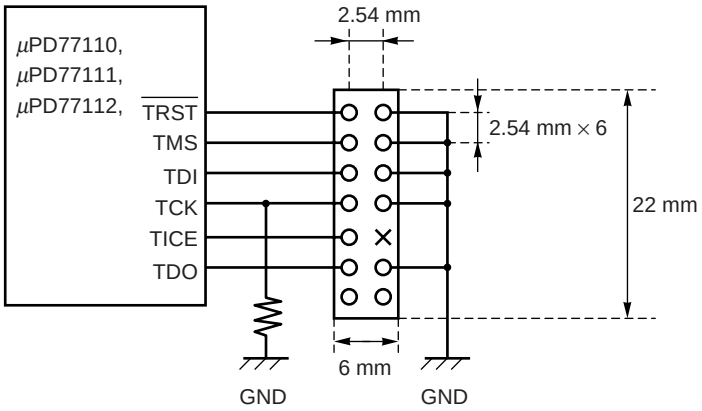
- When using the 12-pin flat cable



○ = Pin (□0.635, I = 6 mm)

× = Key Removed (to prevent incorrect insertion, to not provide pin.)

- When using the 14-pin flat cable (Recommended)



○ = Pin (□0.635, I = 6 mm)

× = Key Removed (to prevent incorrect insertion, to not provide pin.)

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