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April 1st, 2010
Renesas Electronics Corporation

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RENESAS

User's Manual

EP-78054GK-R

Emulation Probe

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Major Revisions in This Edition

Page	Description
Throughout	Change of conversion adapter EV-9500GK-80 to TGK-080SDW of TOKYO ELETECH CORPORATION.
p. 25	Addition of package drawings in **APPENDIX B CONVERSION ADAPTER (TGK-080SDW)**
p. 27	Addition of **APPENDIX C REVISION HISTORY**

The mark ★ shows major revised points.

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Phase-out/Discontinued

INTRODUCTION

Target Readers

This manual is intended for users who wish to debug microcontrollers using an in-circuit emulator and the EP-78054GK-R.

Purpose

This manual describes how to connect the EP-78054GK-R to an in-circuit emulator.

Organization

This manual contains the following information:

General
Connections

How to Read This Manual

Before reading this manual, read the manuals related to the in-circuit emulator to be used and familiarize yourself with the organization and functions of the debugging system.

To understand the overall functions and connections of the EP-78054GK-R:
→ Read this manual in the order of the **CONTENTS**.

To understand the operating environment and organization:
→ Read **CHAPTER 1 GENERAL**.

To understand the details of connections:
→ Read **CHAPTER 2 CONNECTION**.

Conventions

Note : Footnote for item marked with Note in the text

Caution: Information requiring particular attention

Remark: Supplementaly information

Phase-out/Discontinued

Unpacking Carton Box

The carton box of the EP-78054GK-R contains the following items. Confirm that all the items are included. If any item is missing or damaged, consult an NEC sales representative.

Emulation probe × 1
Connector board × 1
User's Manual (this manual) × 1
Mounting screw[Note 1] × 2
★ Conversion adapter (TGK-080SDW)[Note 2] × 1

Notes 1. These screws are used to connect the emulation probe to the in-circuit emulator.

2. This adapter is used to connect the emulation probe to the target system.
★ The TGK-080SDW is a product of TOKYO ELETECH CORPORATION.
For further information, contact Daimaru Kogyo, Ltd. Tokyo Electronic Components Division (+81-3-3820-7112)
TOKYO ELETECH CORPORATION (+81-3-5295-1661)

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CHAPTER 1 GENERAL

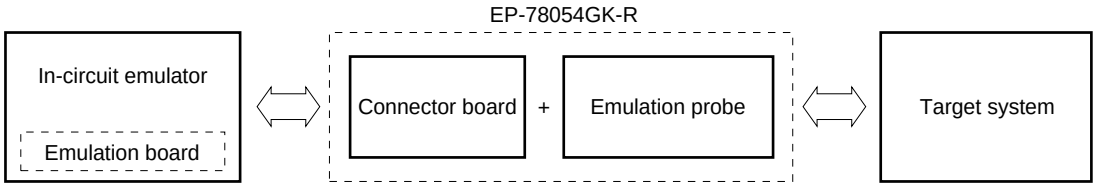
This chapter describes the EP-78054GK-R.

1.1 Operating Environment

The EP-78054GK-R is a probe set that connects an in-circuit emulator and a target system. By connecting the in-circuit emulator and target board with the EP-78054GK-R, the debugging environment of a microcontroller is established and the hardware and software of the target system can be debugged. For details of connection, refer to **CHAPTER 2 CONNECTION**.

Figure 1-1. Operating Environment

- Connecting in-circuit emulator and target system



Phase-out/Discontinued

1.2 Organization

The EP-78054GK-R consists of an emulation probe and a connector board.

(1) Emulation probe

The emulation probe consists of the following three parts:

- **80-pin GK probe**

  Connects the in-circuit emulator and target system.

- **Ground clip**

  Connects to GND of the target system to make the GND potential of the in-circuit emulator the same as that of the target system and thereby improve the static electricity resistance and noise immunity of the system.

- **External sense clip**

  Consists of eight sense clips which are used to check the voltage level of the pins of the IC mounted on the target system.

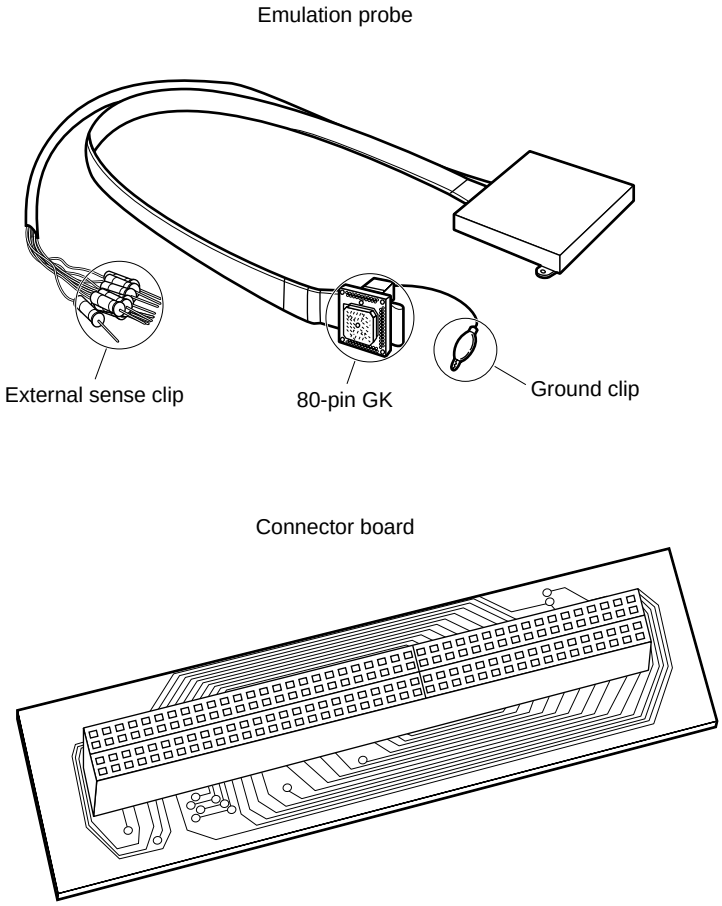
(2) Connector board

The connector board connects the pins that are output to the emulation probe, on the emulation board and is connected to the connector [Note] on the emulation board.

Note The place on the emulation board where the connector board is to be connected differs depending on the emulation board. Refer to the User's Manuals of the in-circuit emulator or emulation board.

Phase-out/Discontinued

Figure 1-2. EP-78054GK-R



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CHAPTER 2 CONNECTION

This chapter describes how to connect the EP-78054GK-R, turn on/off power, and remove the emulation probe from the target system.

2.1 Connecting In-Circuit Emulator and Target System

Connecting the in-circuit emulator and target system following these steps:

(1) Connecting the emulation board and connector board

<1> Turn off the power of the in-circuit emulator.
<2> Connect the emulation board and connector board.
<3> Install the emulation board (with connector board attached) in the in-circuit emulator.

(2) Connecting the in-circuit emulator and the emulation probe

(3) Connecting the emulation probe to the target system

<1> Turn off the power of the target system.
<2> Solder the conversion adapter to the target system.
<3> Insert the tip of the emulation probe into the conversion adapter.

(4) Connecting the external sense clip (if the external sense clip is used)

(5) Turning on the power

Each step, (1) to (5), is described in details next.

Phase-out/Discontinued

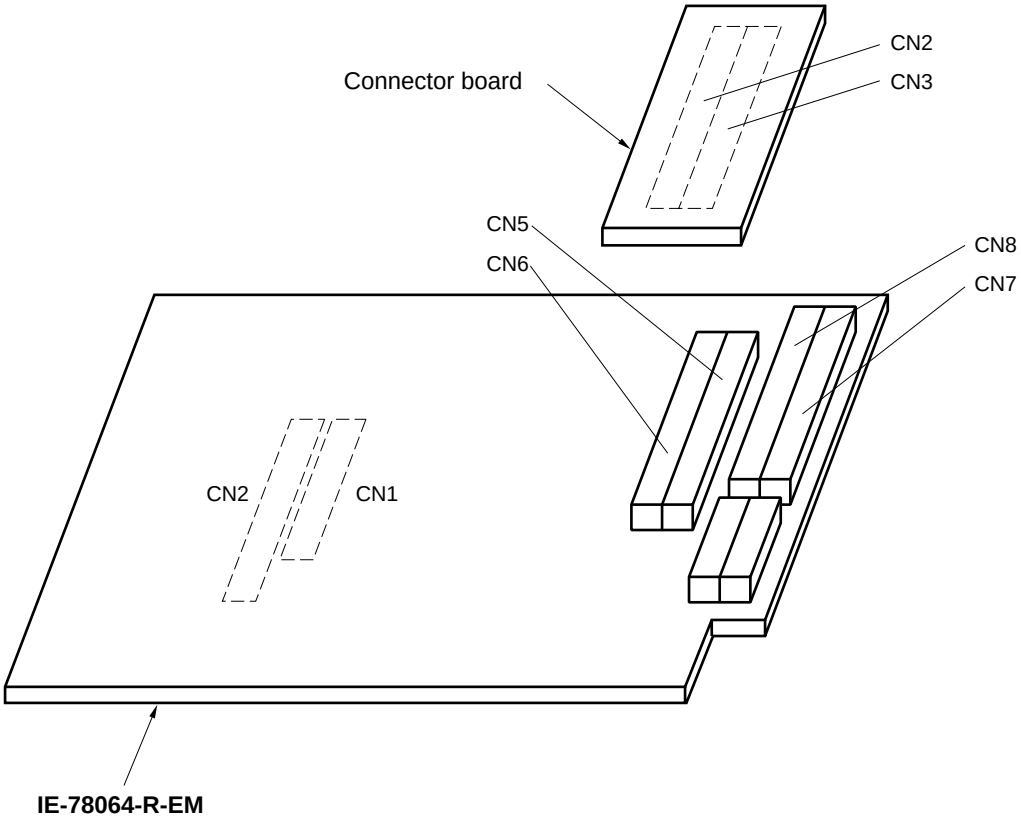
(1) Connecting emulation board and connector board

Connect the connector board to the emulation board.

In the following description, it is assumed that the IE-78064-R-EM is used as the emulation board.

(1) Connect CN5 and CN6 of the IE-78064-R-EM to CN3 and CN2 of the connector board.
(2) Turn off the power of the IE-78000-R.
(3) Remove the screws (at six places) from the top of the IE-78000-R, and open the lid.
(4) Pull the card pullers at both edges of the board, and pull out the IE-78000-R-BK.
(5) Fasten the IE-78064-R-EM and IE-78000-R-BK with screws.
(6) Return the IE-78000-R-BK, onto which the IE-78064-R-EM has been mounted, to the original position in the IE-78000-R.

Figure 2-1. Connecting IE-78064-R-EM and Connector Board

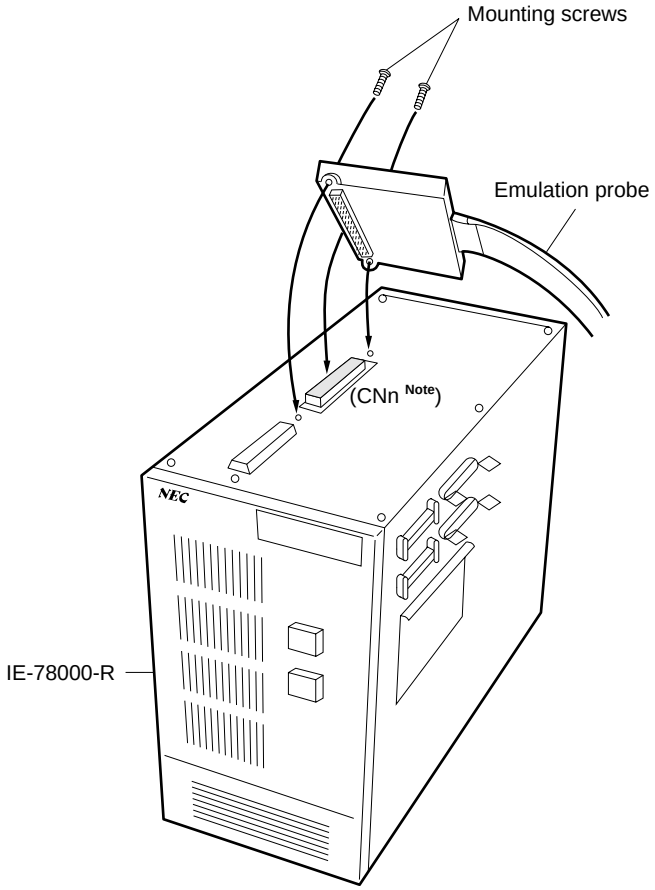


Phase-out/Discontinued

(2) Connecting in-circuit emulator and emulation probe

(1) Connect the emulation probe to the DIN connector for emulation probe use that is on the top of the in-circuit emulator.
(2) After connection, be sure to fix the emulation probe and in-circuit emulator with screws.

Figure 2-2. Example of Connecting IE-78000-R and Emulation Probe



Note The position to be connected differs depending on the emulation board.
Refer to the User's Manual of the in-circuit emulator or emulation board.

Phase-out/Discontinued

(3) Connecting emulation probe to target system

Connect the emulation probe to the target system in the following sequence:

Cautions 1. Before connecting the emulation probe to the target system, be sure to connect the ground clip first. Otherwise, the in-circuit emulator may be damaged by static electricity.

2. Be sure to connect the pins in the correct direction. If they are connected in the wrong direction, the in-circuit emulator may be damaged.

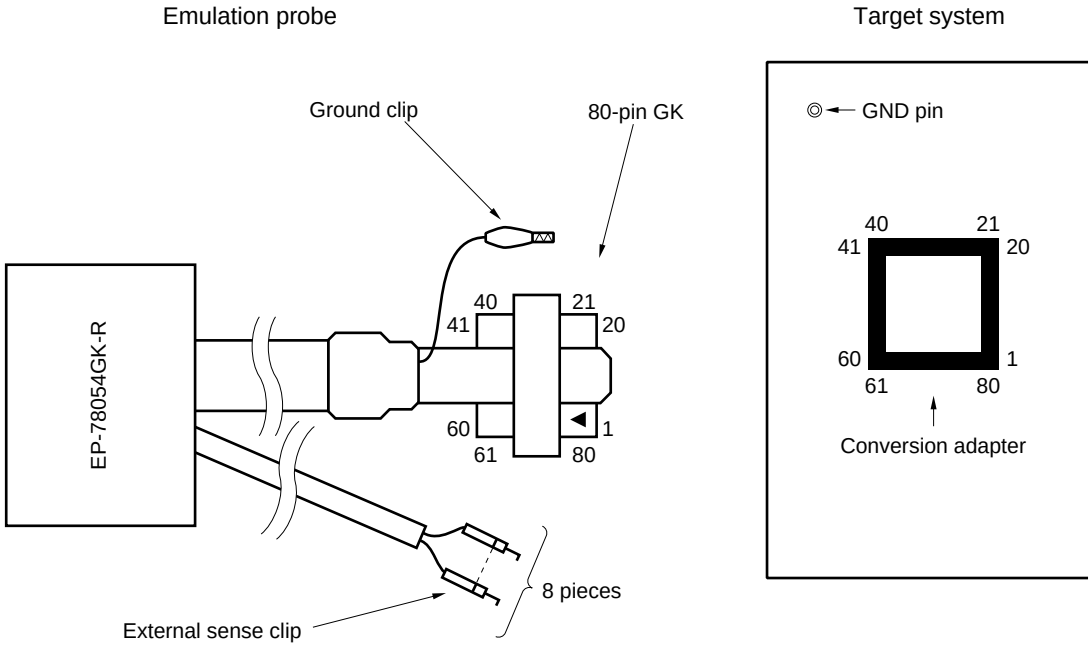
(1) Turn off the power of the target system.

★ (2) Solder the conversion adapter (accessory: TGK-080SDW) to the target system.

(3) Connect the ground clip of the emulation probe to the ground (GND) of the target system.

(4) Connect the emulation probe to the target system so that the position of the 80-pin GK at the tip of the emulation probe comes to the position of pin 1 of the conversion adapter soldered onto the target system in step (2) above.

Figure 2-3. Connecting 80-Pin GK Emulation Probe



Phase-out/Discontinued

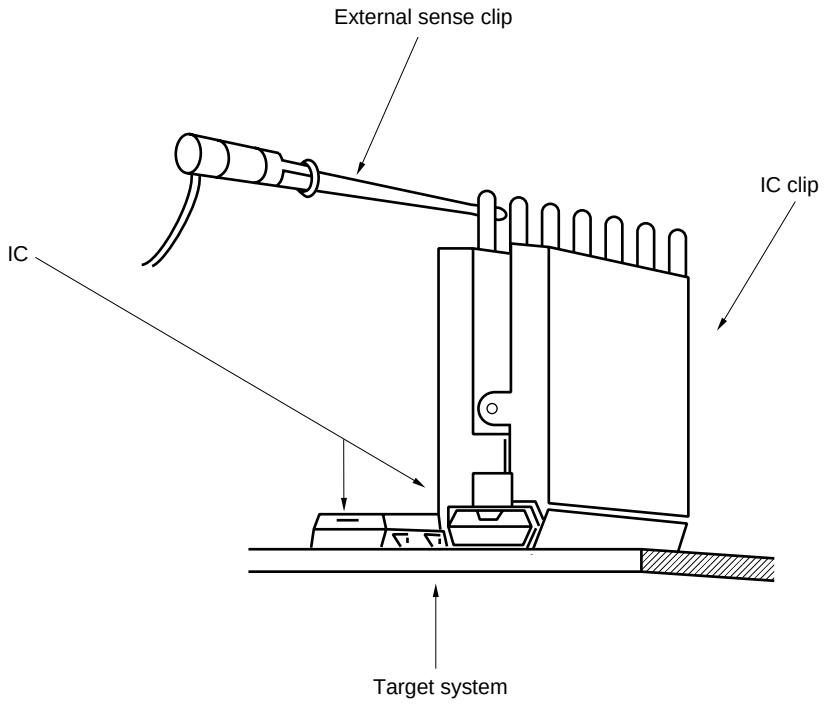
(4) Connecting external sense clip

Connect the external sense clip in the following sequence:

Caution Connect the external sense clips to the TTL level signal lines. If they are connected to other signal lines, the high and low levels of the signals cannot be accurately detected. In addition, the sensors of the in-circuit emulator may be damaged depending on the voltage level.

(1) Turn off power to the target system and then to the in-circuit emulator.
(2) Mount a commercially available IC clip to the IC on the target system to be traced.
(3) Connect the external sense clip to the IC clip.
(4) Turn on power to the in-circuit emulator and then to the target system.

Figure 2-4. Connecting External Sense Clip



Remark To connect the external sense clip, use an IC clip whenever possible, to prevent mis-touch and improve operability.

Phase-out/Discontinued

2.2 Turning on/off power

After connecting the emulation probe and target system, turn on power. Be sure to turn on or off power in the sequence describe below.

Caution Be sure to turn on/off power in the correct sequence. Otherwise, the in-circuit emulator may be damaged.

(1) Power-on sequence

<1> Turn on the power of the in-circuit emulator.
<2> Turn on the power of the target system.

(2) Power-off sequence

<1> Turn off the power of the target system.
<2> Turn off the power of the in-circuit emulator.

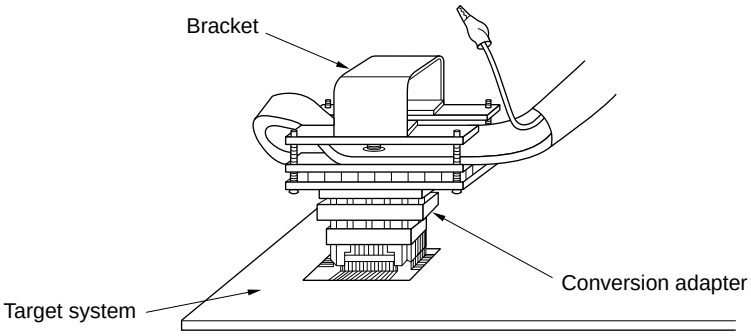
Phase-out/Discontinued

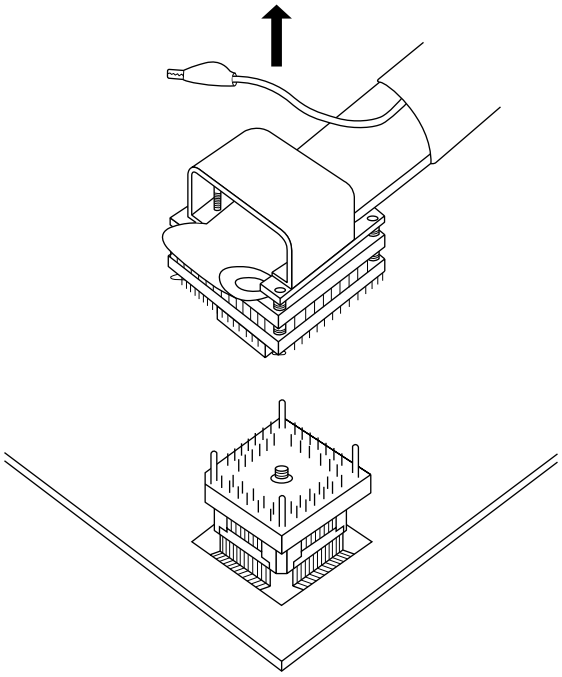
2.3 How to Remove Emulation Probe from Target System

Remove the emulation probe from the target system in the following sequence:

(1) Turn off the power of the target system.
(2) Turn off the power of the in-circuit emulator.
(3) Pull up the bracket at the tip of the emulation probe at right angles to the target system, to remove the emulation probe from the conversion adapter.

Figure 2-5. Removing Emulation Probe





Phase-out/Discontinued

[MEMO]

Phase-out/Discontinued

APPENDIX A PIN NUMBER OF 80-PIN GK EMULATION PROBE

CNn Pin No.	Emulation Probe	CNn Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe
1	GND	25	15	49	34	73	61
2	GND	26	16	50	33	74	NC
3	EXT0	27	17	51	32	75	NC
4	EXT1	28	18	52	31	76	70
5	EXT2	29	19	53	41	77	69
6	EXT3	30	20	54	42	78	68
7	EXT4	31	21	55	43	79	67
8	EXT5	32	NC	56	44	80	66
9	EXT6	33	NC	57	45	81	65
10	EXT7	34	30	58	46	82	64
11	1	35	29	59	47	83	63
12	2	36	28	60	48	84	62
13	3	37	27	61	49	85	80
14	4	38	26	62	50	86	79
15	5	39	25	63	51	87	78
16	6	40	24	64	52	88	77
17	7	41	23	65	53	89	76
18	8	42	22	66	54	90	75
19	9	43	40	67	55	91	74
20	10	44	39	68	56	92	73
21	11	45	38	69	57	93	72
22	12	46	37	70	58	94	71
23	13	47	36	71	59	95	GND
24	14	48	35	72	60	96	GND

Remarks 1. CNn pin number

CNn: connector connecting the emulation probe

The value of n differs depending on the emulation board connected. Refer to the User's Manual of the emulation board or in-circuit emulator.

2. The meanings of the symbols and numbers in the column emulation probe are as follows:

GND : ground clip (GND)

EXT0 to EXT7 : external sense clip

1 to 80 : emulation probe 80-pin GK pin number

NC : No connection

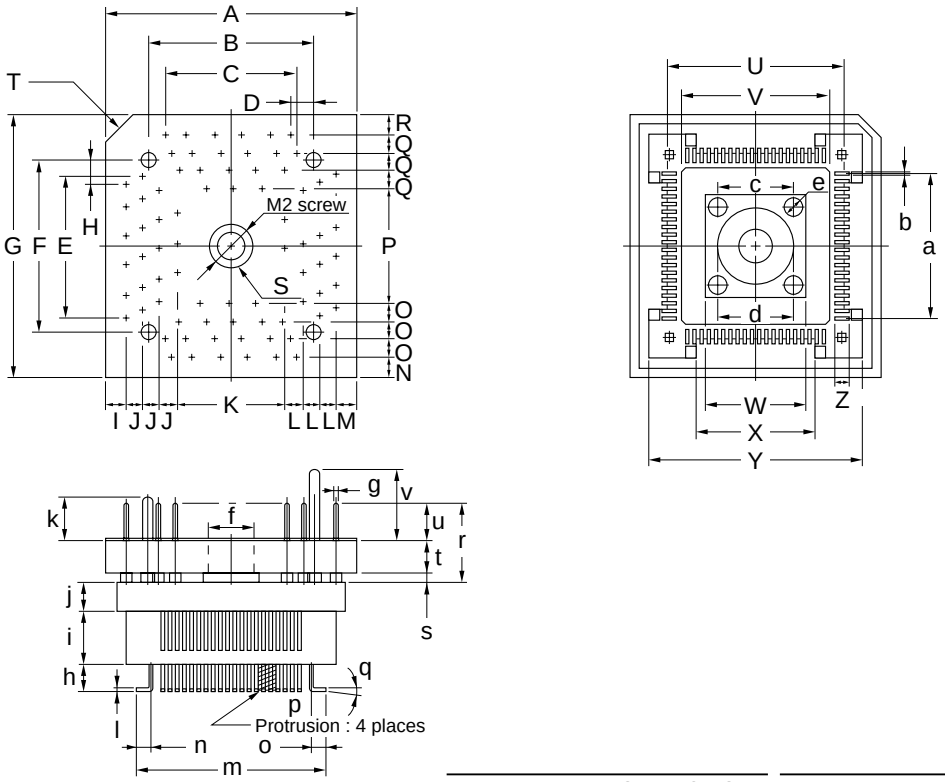
Phase-out/Discontinued

[MEMO]

Phase-out/Discontinued

★ APPENDIX B PACKAGE DRAWINGS OF CONVERSION ADAPTER (TGK-080SDW)

TGK-080SDW (TQPACK080SD + TQSOCKET080SDW)
Package dimension (unit: mm)



ITEM	MILLIMETERS	INCHES
A	18.0	0.709
B	11.77	0.463
C	0.5x19=9.5	0.020x0.748=0.374
D	0.5	0.020
E	0.5x19=9.5	0.020x0.748=0.374
F	11.77	0.463
G	18.0	0.709
H	0.5	0.020
I	1.58	0.062
J	1.2	0.047
K	7.64	0.301
L	1.2	0.047
M	1.58	0.062
N	1.58	0.062
O	1.2	0.047
P	7.64	0.301
Q	1.2	0.047
R	1.58	0.062
S	ϕ3.55	ϕ0.140
T	C 2.0	C 0.079
U	12.31	0.485
V	10.17	0.400
W	6.8	0.268
X	8.24	0.324
Y	14.8	0.583
Z	1.4±0.2	0.055±0.008

ITEM	MILLIMETERS	INCHES
a	0.5x19=9.5±0.10	0.020x0.748=0.374±0.004
b	0.25	0.010
c	ϕ5.3	ϕ0.209
d	ϕ5.3	ϕ0.209
e	ϕ1.3	ϕ0.051
f	ϕ3.55	ϕ0.140
g	ϕ0.3	ϕ0.012
h	1.85±0.2	0.073±0.008
i	3.5	0.138
j	2.0	0.079
k	3.0	0.118
l	0.25	0.010
m	14.0	0.551
n	1.4±0.2	0.055±0.008
o	1.4±0.2	0.055±0.008
p	h=1.8 ϕ1.3	h=0.071 ϕ0.051
q	0~5°	0.000~0.197°
r	5.9	0.232
s	0.8	0.031
t	2.4	0.094
u	2.7	0.106
v	3.9	0.154

TGK-080SDW-G1E

Note: TGK-080SDW is a product incorporating TQPACK080SD and TQSOCKET080SDW of TOKYO ELETECH CORPORATION.

Phase-out/Discontinued

[MEMO]

Phase-out/Discontinued

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APPENDIX C REVISION HISTORY

The revision history of this edition is shown below. “Chapter” indicates the chapter of the preceding edition where the revision was made.

Edition	Revisions	Chapter
2nd	Change of conversion adapter EV-9500GK-80 to TGK-080SDW of TOKYO ELETECH CORPORATION.	Throughout
	Addition	**APPENDIX B CONVERSION ADAPTER** package drawings of (TGK-080SDW)

Phase-out/Discontinued

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[MEMO]

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