ROM Programmers

ROM Programmers

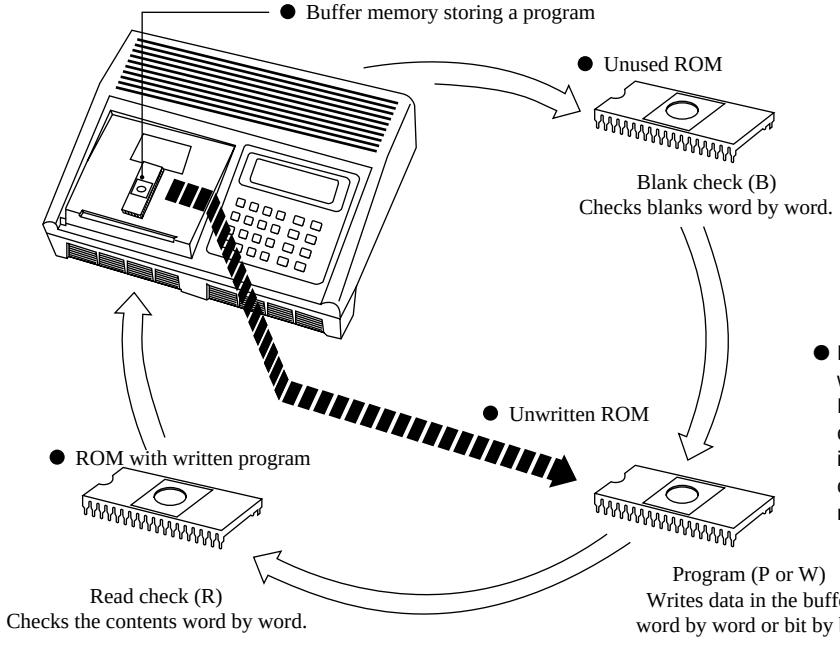
Overview of ROM Programmers

Field-programmable devices are classified into two categories: programmable read only memory (PROM) and programmable logic device (PLD).
As the usage of OA equipment rapidly increases rapidly, the need for PROMs is also increasing in all fields. With the increase in the capacity and processing speed and decrease in the voltage and price per bit of PROMs, the need for PROMs is increasing. The need for PLDs is also rapidly increasing rapidly not only with the increase in the processing speed, capacity and performance of PLDs but with the increase in the density, integrity and decrease in size and development period of OA equipment.
ADVANTEST offers a wide range of programmers for specific applications. Each programmer is backed by ADVANTEST's technology and long experience in highly reliable writing.

(1) R4945A
High-speed programmer which accommodates diverse types of devices. It incorporates the internal 16-Mbit buffer memory, socket adapter and split write function for accommodating up to 16 Mbits.
(2) R4952
High-speed gang programmer which accommodates ROMs with up to 16 Mbits in the master mode. It uses a socket adapter to allow up to ten ROMs to be written at the same time.

1. Reliability of writing
1.1 Entering data from external to the programmer
There are following three methods for entering write data to the programmer.
(1) Entering write data from the keyboard or key switches of the programmer
(2) Copying write data from master device
(3) Entering write data via the RS-232C or parallel interface
With methods (2) and (3) above, a function to prevent data errors is required. With method (2), data entered with single-value determination is checked again by dual-value (VOH and VOL) determination.

Functions which support programming



● Program (P or W) writes data in the buffer word by word or bit by bit.
Blank check, write (program) and read (read check) operations can be performed independently. They can also be performed continuously for convenience in writing to numerous ROMs (B.P.R function).

With method (3), writing reliability is ensured by parity check and check sum.

1.2 High reliability achieved by recognition judgment

Programmers are designed to have written waveform, timing, voltage level, precision and quality that satisfy the requirements of the device manufacturers. For higher reliability, the programmers are examined and approved by device manufacturers and are recommended for users. All ADVANTEST's are approved by virtually all device manufacturers and are always safe to use.

2. Function to support programming

Writing is not the only function of programmers: but also offer easy-to-use data edit function, PLD support software, data management by floppy disk, connection to microcomputer development tools and personal computer and system upgrading.

2.1 Data edit function

The edit function is often required for data set in blocks, to complement move and change.

Converting 16-bit data into 8-bit data for PROM is an indispensable function for designing 16-bit microcomputer application systems.

2.2 Accessories

For the R4945A and R4952, many socket adapters are available for programming, not only conventional DIP type package ROMs but also SOP, PLCC and LCC package ROMs that can be used with SMD.

		R4945A	R4952
Feature		• Fast programming • Compatible with large-capacity EPROMs with up to 16 Mbits • Compatible with split write for 8-Mbit EPROMs • Initial setting can be recorded.	• Compatible with large-capacity PROMs with up to 16 Mbits • Greatly improved verify speed • Full-remote control with the RS232C and parallel interfaces • Compatible with various device packages by socket adapter
Buffer memory		16 Mbits	8 Mbits
Compatible device capacity		16 Kbits to 16 Mbits	64 Kbits to 16 Mbits (16 Mbits: In the master mode)
Number of items written at the same time		1	1 to 10
Writable device	EPROM	●	●
	EEPROM	●	●
	ROM card	–	●
	1-chip CPU	●	–
	PAL, EPLD, etc.	–	–
* Device package	16- to 32-pin DIP	24, 28, and 32 pins	28 and 32 pins
	40-pin DIP	40 pins (42 pins)	40 pins (42 pins)
	LCC	●	●
	SOP	●	–
	PLCC	●	●
	QFP	●	–
	TSOP	●	–
Compatibility with program algorithm		●	●
Edit function		●	–
Remote control		●	●
Reliability check	Vcc check	2 points	2 points
	Reverse/mis-insertion check	●	●
	Sum check	●	●
	Memory check	●	●
	Self check	●	●
	I/O check	●	●
Interface	Parallel I/O (Centronics)	●	●
	RS-232C	●	●

* PAL is a registered trademark of Monolithic Memories Inc. * IFL is a registered trademark of Signetics Inc. * GAL is a registered trademark of Lattice Semiconductor Inc.

* Both programmers use socket-adapter method.

● indicates that the device accommodates the feature.

ROM Programmers

High-Speed 16-MBit Programmer

R4945A

Compatible with Remote Control Software

- **Writable Flash ROM**
- **Can be used for EPROMs with up to 16 Mbits**
- **Useful for a Wide Variety of Packages Thanks to the Socket Adapter System**
- **Compatible with Various High-Speed Program Algorithms**
- **Can be used for EPROMs with 4, 8 and 16 Mbits with PIN Arrangement by means of Socket Adapter Exchange**
- **Standard Centronics Interface**
- **Can be Used for Split Programming of 8-Mbit EPROMs**
- **Storage of Initial Settings is Possible**

R4945A
EPROM Programmer

Featuring large-capacity 16-Mbit buffer RAM, the R4945A high-speed EPROM programmer is designed for programming diverse types of EPROMs. The 16-Mbit buffer RAM makes it possible to use the programmer for programming and data editing of large-capacity EPROMs and split writing of 8-Mbit EPROMs. In addition, because the R4945A is a socket adapter type (equipped with 32 pins x 2, 40 pins as standard), it allows programming to a wide variety of devices that have different number of pins and come in different packages.
To facilitate operation, the R4945A comes with an easy-to-see liquid crystal display for operation guidance and the ID-AUTO mode which allows automatic setting of different ROM types. In particular, the function to store the initial settings including the ROM type, device function and serial I/O conditions improves the efficiency of your programming tasks.
The reliability of programming is ensured by various functions to check the device quality after programming, such as V_{CC} margin check (2 points), Voh and Vol level check and sum check.
For input and output operations, the R4945A comes with useful standard features including a serial I/O interface that allows remote control of key operation and the Centronics parallel I/O interface.
Thus, with its flexible expendability and easy operation, the R4945A can be used for diverse applications such as debugging and ROM contents check.

■ Can be Used for EPROMs with Up to 16 Mbits

MOS-type PROM chips with a capacity from 16 Kbits to 16 Mbits can be programmed by simple key operation.

■ Useful for a Wide Variety of Packages Thanks to the Socket Adapter System

In addition to 28- and 32-pin EPROM chips in the DIP package, the programmer can be used for EPROM chips in various types of packages such as LCC, PLCC and SOP by simply changing the socket adapters. Furthermore, the programmer can also be used for single-chip CPUs and IC cards that are program-compatible with PROM chips.

■ Compatible with Various High-Speed Program Algorithms

The R4945A accommodates high-speed program algorithms of various companies including AMD, Fujitsu, Hitachi, Intel, Intel quick, NEC, Sharp, WSI, N.S and so on.

■ Writable Flash ROM

R4945A can write to a Flash ROM by adding the R49451D socket adapter and socket assembly.
The R49451D also supports a 3V Flash ROM, and employs the socket assembly method to enable easy support for a wide variety of packages (TSOP, SOP, etc.). Reliability is assured with connector docking.

■ Can be used for Split Programming of 8-Mbit EPROMs

With the built-in 16-Mbit buffer memory, the R4945A can be used for split programming of 8-Mbit EPROMs.

■ Storage of Initial Settings is Possible

The initial settings such as the ROM type, device functions and serial I/O conditions can be stored in memory. Therefore, when programming the same PROM, programming tasks can be performed efficiently without repeating the initial setting procedure.

High-Speed 16-MBit Programmer

R4945A

Specifications

Programmable ROM chips: Various EP/EEPROM chips (described in the socket adapter section)
Buffer memory capacity: 2 Mbytes (16 Mbits)
Program power supply:
V_{CC} power supply: +4.75 V ±0.25 V, 300 mA (max.)
+5 V ±0.25 V, 300 mA (max.)
+5.25 V ±0.25 V, 300 mA (max.)
+6.00 V ±0.25 V, 300 mA (max.)
+6.25 V ±0.25 V, 300 mA (max.)
+6.5 V ±0.25 V, 300 mA (max.)
V_{PP} power supply: +21.0 V ±0.50 V, 100 mA (max.)
+13.0 V ±0.30 V, 200 mA (max.)
+12.75 V ±0.30 V, 200 mA (max.)
+12.5 V ±0.30 V, 200 mA (max.)
+5.0 V ±0.25 V, 50 mA (max.)
Output voltage comparison level:
V_{OL}: +0.50 V ±50 mV (I_{OL} 1.8 mA ±0.2 mA)
V_{OH}: +2.35 V ±100 mV
Standard interface:
Serial I/O interface: RS-232C
Parallel I/O interface: Centronics
Debug I/O interface:
16k- to 512k-bit EPROM emulation is possible by connecting the TR49403 debug RAM (with parallel I/O interface)
Device functions:
Blank check, Programming, Read check, BPR continuous operation, PR continuous operation, Copy/read check, Erase/blank check (EEPROM only), Option, Security
Address mode: Normal mode and page mode
Data mode:
8-bit wide ROM, Normal, 16-bit split
32-bit split (2 split simultaneous write possible)
16-bit wide ROM, normal
32-bit split (data exchange possible)
Program method:
Intel method, Intel quick method, Fujitsu method and other high-speed programming methods
EPROM protection function: Checks for power-down when a device is inserted, opposite direction insertion and erroneous insertion (ON/OFF possible)
Reliability check functions:
V_{CC} margin check (2 points), V_{OL}/V_{OH} level check, Data sum check
Self-diagnostic functions: Internal memory check, System memory check
Manual diagnostic functions:
MUP address check, MUP data check, Program voltage check, Program timing check, Serial I/O check
Alarm functions: Key switch key tone (ON/OFF possible), Pass/fail alarm tone (ON/OFF possible)
Data edit functions: Insert, Delete, Compliment, Block store, Block move, Block search, Block change, RAM clear
Automatic setting functions: ROM type, I/O conditions, Translation format, Various settings (Precheck, Last address stop, Time-out, ID, Alarm ON/OFF), Backedup by EEPROM
Translation format:
DG binary, DEC binary, ASCII HEX, INTELLEC HEX, MOTOROLA S, EXTENDED TEKHEX, ASM-86 HEXADECIMAL, HP64000ABS, TEXTRONIX•HEXADECIMAL

General Specifications
Display: 16 characters × 2 lines
Power requirement: 90 VAC to 250 VAC
Power frequency: 48 to 66 Hz
Enviranment: Temperature 0°C to +40°C, Humidity 85% or less
Storage temperature: -15°C to +60°C
Power consumption: 37 VA or less
Dimensions: Approx. 280(W) × 59(H) × 210(D) mm (excluding socket adapter)
Approx. 280(W) × 78(H) × 210(D) mm (with R49451A mounted)
Mass: 1.5 kg or less (excluding socket adapter)
1.7 kg or less (with R49451A mounted)
Socket Adapter/standard accessory:
R49451A (standard): 32 pin x 2, 40 pin x 1, DIP type
Accessories (Optional)

U-253	UV Eraser
A01242-200	Connection cable for RS-232C (for PC9801)
A01224	Connection cable for Centronics

Options

Major socket adapters for R4945A (optional)

- **R49444A/B**: For LCC
- **R49445A/B/C/D**: For SOP
- **R49446A/B/C**: For PLCC
- **R49451C**: Mask pin arrangement, 40 pins, 42 pins, DIP type
  Applicable devices: Am27C400, HN27C4000G, D27C400, M5M27400AK, M5M27404AK, µPD27C4000DZ, µPD27C8000DZ, MSM27C822ZB, TMS27C400, TC574200D, TC578200D, TC5716200D
- **R49451D**: Flash ROM (TSOP, SOP, etc.)
- **R49455F**: Intel, 56 pins, TSOP type
  Applicable devices: E28F200BX-T, E28F200BX-B, E28F400BX-T, E28F400BX-B
- **R49457D**: Hitachi, H8/532, H8/534, 84 pins, PLCC type
  Applicable devices: HD6475328 (H8/532), HD6475348 (H8/534)
- **R49457E**: Hitachi, H8/536, 84 pins, PLCC type
  Applicable devices: HD6475368 (H8/536)
- **R49452E**: Intel, 87C series, 40 pins, DIP type
  Applicable devices: 87C51 (D step), 87C51FA (D step), 87C51FB (B step), 87C51FC (A step)

For details, see the description of socket adapters for programmers.

ROM Programmers

Programming for Up to 10, 8-Mbit PROMs

R4952

Compatible with Remote Control Software

- **Can be Used for 16-Mbit PROMs**
- **High-Speed Programming Algorithm**
- **Reduction in Function Execution Time**
- **Standard Serial I/O and Parallel I/O Interface**

R4952
EPROM Gang Programmer

The R4952 gang programmer allows high-speed programming for up to ten 16-Mbit PROMs with large capacity and diverse packages. Simultaneous writing for up to 10 PROMS is possible.
The standard RS-232C and parallel interfaces allow files managed by the host computer to be transferred and remote-controlled. With the standard 8-Mbit buffer memory, the ADVANTEST's unique hard stack system makes it possible to reduce the overhead time and function execution time.

■ Can be Used for 16-Mbit PROMs

Typical EPROMs and EEPROMs with a capacity of 64 Kbits to 16 Mbits can be programmed with easy operation. (16-Mbit PROM programming is available only in the Master mode.)

■ High-Speed Programming Algorithm

Accommodates various high-speed programming algorithms including 4-byte and 2-word programming.

■ Reduction in Function Execution Time

By making ADVANTEST's unique hard stack system faster, the read verification time can be reduced to approx. 1/2 times. (Measured by ADVANTEST.)

■ Standard Serial I/O and Parallel I/O Interface

The standard RS-232C interface allows remote control and data input and output for the R4952 from the host computer. With the standard Centronics parallel interface, high-speed data input is possible.
For example, write data of the R4952 is transferrable to the host computer and the data can be compared and checked.

Specifications

Applicable devices:
EPROM/EEPROM (including flash EEPROM) with a capacity of 64 kbits to 16 Mbits (16 Mbits: in the master mode)
* Applicable types depend on the socket adaptor.
* For details, see the device list for each manufacturer.

Standard socket adaptor:
R49512B, 32 pins, DIP type

Simultaneous write operation: 1 to 10 ROMs

Buffer memory capacity: 8 Mbits (1 Mbyte)

Device functions:
Blank check, Program, Erase, Read check, Copy, B.P.R. sequence, E.B.P.R. sequence (with EEPROM), P.R. continuous operation

Data mode: Master mode, Buffer RAM mode

Address modes:
8-bit wide ROM: Normal, 16-bit split, 32-bit split
16-bit wide ROM: Normal (data exchangeable), 32-bit split (data exchangeable), page splitting

Write modes:
High-speed programming: Intel, Intel quick, Fujitsu, AMD, T.I. snap. and other mega-bit high-speed EPROM program of each manufacturer.

Intelligent identifier mode (ID mode):
ID AUTO: Automatically sets the ROM type.
ID CHECK: Checks the set ROM type.

ROM type selection: Scroll setting by means of the Maker and Type keys.

Output voltage comparison level:
V_{OL} +0.5 V ±35 mV (I_{OL} ≒ 1.8 mA)
V_{OH} +2.3 V ±35 mV

EPROM protective functions:
- Power-down at device insertion
- Check for reverse or improper insertion (ON/OFF possible)

Data edit functions:
RAM edit, Checksum, Data clear, Clear move

Reliability check functions:
- V_{CC} margin check (4.75 V, 5.25 V)
- V_{OL} and V_{OH} level check
- Checksum

Automatic setting functions:
(Backed up by the EEPROM)
Type, I/O conditions, Translation format, etc.

Set data backup:
Set data including ROM type, baud rate, translation data bit configuration etc. can be stored and recalled from EEPROM.

I/O Specifications

Standard interface:
- Serial I/O interface in conformance with RS-232C
  Baud rate: 110 to 19,200 bps
  Parity: Non, even, odd
  X ON, X OFF
- Parallel I/O interface in conformance with Centronics

General Specifications

Display: Function state: Indicated by the LED indicator.
Type settings: Displayed on the LCD screen in 16 characters x 2 lines.

Power supply: 90 to 132 VAC or 198 to 250 VAC (selectable by the rear switch)

Option No.	Standard	40
Power voltage (V)	90 to 132	198 to 250

Power frequency: 48 to 66 Hz

Power consumption: 70 VA or less

External dimensions: Approx. 364(W) × 80(H) × 256(D) mm
For applicable socket adapters, see the description of socket adapters for programmers.

R4945A

Socket adapters for the R4945A

R49451A (standard)
For DIPs with 16K- to 8M-bit capacity

R49451C
For mask pin arrangement

R49442A
For 40-pin one-chip CPUs
Hitachi HD63701VO

R49442C
For 40-pin one-chip CPUs
8748/8749

R49442D
For 40-pin one-chip CPUs
8751/8752

R49443B
For 64-pin one-chip CPUs shrink
Hitachi HD63701YO

R49443C
For 64-pin one-chip CPUs shrink
Mitsubishi M50747E/6E

R49443F
For 64-pin one-chip CPUs shrink
Fujitsu 89P715/715A

R49444A
For 32-pin LCCs
16K- to 512K-bits
Fujitsu, AMD, etc.

R49444B
For 36-pin LCCs
1M-bits
Fujitsu

R49445C
For 28-pin SOPs
16K- to 512K-bits
Toshiba

R49445B
For 28-pin SOPs
16K- to 512K-bits
Fujitsu

R49445E
For 32-pin SOPs
1M bits or more
NEC

R49446A
For 32-pin PLCCs
16K- to 512K-bits
Intel

R49446B
For 32-pin PLCCs and PLCCs
1M- to 2M-bits
Intel, Mitsubishi

R49446C
For 32-pin PLCCs
1M bits or more
Fujitsu, AMD

R49447A
For 64-pin QFPs
Fujitsu
89P715/715A

R49449B
Fujitsu serial ROMs
MB8541P (DIP and SOP)

R49449C
BIP PROM pin-compatible
For EPROMs (300MIL/600MIL)

R49452E
One-chip 87C51

ROM Programmers

Program Socket Adapter

R4945A and R4952

Socket adapters for the R4945A

R49455F
56 pins
For TSOPs
E28F200BX
E28F400BX

R49457D
84 pins
For PLCCs
HD6475328
HD6475348

R49457E
84 pins
For PLCCs
HD6475368

R49457F
168 pins
For QFPs
SH7050/51

R49451D+A03004
48 pins
For TSOPs
MBM29 Series

Socket adapters for the R4952

R49512B
For 32-pin DIPs
64K- to 8M-bits

R49514B
4M- to 16M-bits
For 40- to 42-pin mask-pin compatible DIPs

R49516A
64K- to 512K-bits
For 32-pin LCCs
For master devices
(28-pin lever socket × 1 and 32-pin LCC socket × 1)

R49515A
64K- to 512K-bits
For 32-pin PLCCs
For master devices
(28-pin lever socket × 1 and 32-pin PLCC socket × 1)

R49516B
1M- to 8M-bits
For 32-pin LCCs
For master devices
(32-pin lever socket × 1 and 32-pin LCC socket × 1)

R49515B
1M- to 8M-bits
For 32-pin PLCCs
For master devices
(32-pin lever socket × 1 and 32-pin PLCC socket × 1)

R49528A
FCN-564P068-G/XO-V4

R49515C
1M- to 8M-bits
For 44-pin PLCCs
For master devices
(40-pin lever socket × 1 and 44-pin PLCC socket × 1)

Socket adapters for the R4953

R49531A
For 32-pin DIPs
256K- to 8 M - bits

The following products are manufactured to order. (Contact our sales office listed at the back of this document.)

Socket Name	Applicable devices	Pin	Package
R49534D	E28F016SA Series	56-pin	TSOP
	LH28F016 Series		
	LH28F800		
R49534E	E28F008SA Series	40-pin	TSOP
	E28F008SAT		
R49534F	LH28F400SU Series	56-pin	TSOP
R49534H	E28F002/4/8BX Series	40-pin	TSOP
	LH28F004SU Series		
R49534J	MBM29F002/004/008/080 Series	40-pin	TSOP
R49534K	MBM29F200/200/400/800 Series	48-pin	TSOP
	MBM29FLV160/200/400/800 Series		
R49534KR	MBM29FLV800 Series (R Type)	48-pin	TSOP
R49534L	LH28F800 Series	48-pin	TSOP
R49534M	MBM29F016/080 Series	48-pin	TSOP
R49534N	MSM27C401CZ	32-pin	TSOP
R49534P	LH28F008SCHSD-ZL	48-pin	TSOP
R49535E	MBM29F200/400/800 Series	44-pin	TSOP
	MBM29LV400/800	44-pin	SOP
R49536B	HN27C4096/H Series	44-pin	JLCC
R49536C	MBM29LV002/004 Series	40-pin	SON
R49537A	28F008S Series	40-pin	CSP
	LH28F008SCH Series	48-pin	CSP
R49537C	LH28F320S Series	80-pin	CSP
R49537D	MBM84VA Series	48-pin	BGA

TR49403 Debug RAM

U-253 Ultraviolet Eliminator

TR49403
Debug RAM

TR49403 which is connected to R4945A, TR4943, etc., for emulating EPROM has a built-in memory to realize high-speed accessing and easy operation.

Specifications

Emulation memory capacity: 512k bits
Connectable programmer: TR4943, R4944, R4944A, R4945, R4945A, R4932
Emulation available EPROM: depends on which EPROM programmer to connect
Maximum number of connected programmers
:2 pcs. However, total capacity depends on which EPROM programmers to connect.
Data width: 8 bits or 16 bits
Access time: Maximum 190 ns (from address terminal)
Maximum 130 ns (from OE or CE)
Power consumption: approx. 16 VA or less
Outside dimensions/weight: approx. 210 (W) × 55 (H) × 280 (D) mm, 2.3 kg or less

Accessories

Name	Type	Part code	Remarks
24-pin DIP plug and cable	A01206		2 pcs.
28-pin DIP plug and cable	A01207		2 pcs.
External power cable	MP-43		
Case			

To use TR49403, external power supply is necessary.

U-253
Ultraviolet Eliminator

Specifications

Number of simultaneously deleted EPROMs: maximum 8 pcs.
Irradiated ultraviolet wavelength/intensity: 253.7 nm, 5000 μW/cm^2
Timer setting: 2 to 60 minutes
Power supply: 90 to 100 VAC, 0.25 A, 50/60 Hz change-over switch
Outside dimensions: approx. 243 (W) × 100 (H) × 91 (D) mm
Weight: 1.6 kg