

# 1 TM990/202-3 EPROM/RAM Module

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**Note** The TM990/202B board is different – see <https://www.radwell.co.uk/Buy/SIEMENS/TEXAS%20INSTRUMENTS%20PLC/TM990-DIV-202B>.

## 1.1 Features

- Two memory banks of 8 sockets each.
- Each memory bank can be fitted with:
  - ◆ 4016 (2K × 8) static RAMs (24-pin) or
  - ◆ 2516 (2K × 8) EPROMs (24-pin) or
  - ◆ 2532 (4K × 8) EPROMs (24-pin) or
  - ◆ 2564 (8K × 8) EPROMs (28-pin).

**Note** 4016 RAMs are compatible with the 6116 RAM devices.

- Configurable memory start address for each memory bank on 4K boundaries.
- Supports 16- or 20-bit host-memory addressing.
- Configurable wait states for each memory bank.
- Activity LED lights when either memory bank is accessed; remains on until system reset.

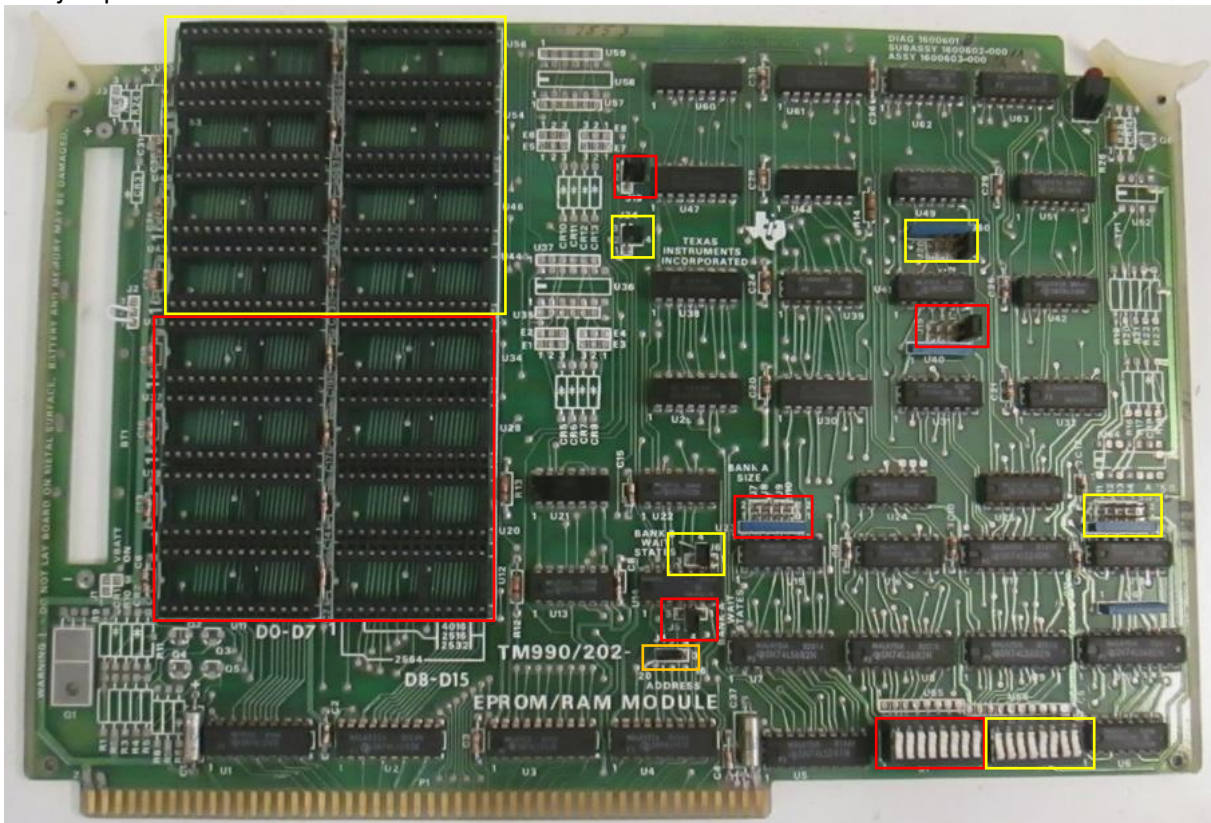
## 1.2 Configuration

### 1.2.1 General

**Table 1 General Configuration**

Memory Bank	Configuration	4016 RAM	2516 EPROM	2532 EPROM	2564 EPROM
A	Memory device IC sockets: U11/U12, U19/U20, U27/U28, U33/U34				
	Switch S1	Set memory bank start address - see section 1.2.2			
	J5	Set number of wait states required - 1, 3 or 4 as marked on PCB			
	J7 - J10	Set memory bank size according to number of memory devices fitted - see section 1.2.3			
	J15 - J18	Fit J15	Fit J16	Fit J17	Fit J18
	J19	1 - 2	2 - 3	2 - 3	2 - 4
B	Memory device IC sockets: U43/U44, U45/U46, U53/U54, U55/U56				
	Switch S2	Set memory bank start address - see section 1.2.2			
	J6	Set number of wait states required - 1, 3 or 4 as marked on PCB			
	J11 - J14	Set memory bank size according to number of memory devices fitted - see section 1.2.3			
	J20 - J23	Fit J20	Fit J21	Fit J22	Fit J23
	J24	1 - 2	2 - 3	2 - 3	2 - 4
(Both)	J4	1 - 2 for 20-bit addressing 2 - 3 for 16-bit addressing			

- memory bank A IC sockets, switch and jumpers
- memory bank B IC sockets, switch and jumpers
- jumper affects both banks



### 1.2.2 Memory Bank Start Address

For memory bank A, set switch S1 for the required memory bank starting address. For memory bank B, set switch S2. See Table 2.

**Note** The individual DIP switches are the opposite way round to what might be expected. Switch 1 as denoted on the PCB by the pin 1 marking is for the least significant address bit A3.

**Table 2** Memory Bank Start Address Switches

XA0 (Sx/8)	XA1 (Sx/7)	XA2 (Sx/6)	XA3 (Sx/5)	A0 (Sx/4)	A1 (Sx/3)	A2 (Sx/2)	A3 (Sx/1)	Memory Bank Starting Address
- (OFF)	- (OFF)	- (OFF)	- (OFF)	0 (ON)	0 (ON)	0 (ON)	0 (ON)	>0000
- (OFF)	- (OFF)	- (OFF)	- (OFF)	0 (ON)	0 (ON)	0 (ON)	1 (OFF)	>1000
- (OFF)	- (OFF)	- (OFF)	- (OFF)	0 (ON)	0 (ON)	1 (OFF)	0 (ON)	>2000
- (OFF)	- (OFF)	- (OFF)	- (OFF)	0 (ON)	0 (ON)	1 (OFF)	1 (OFF)	>3000
...	...	...	...	...	...	...	...	...
- (OFF)	- (OFF)	- (OFF)	- (OFF)	1 (OFF)	1 (OFF)	1 (OFF)	0 (ON)	>E000
- (OFF)	- (OFF)	- (OFF)	- (OFF)	1 (OFF)	1 (OFF)	1 (OFF)	1 (OFF)	>F000

Assuming only 16-bit addressing used (jumper J4 set to 2 - 3), so XA0 - XA3 not relevant.

### 1.2.3 Memory Bank Size

Set the jumpers identified in Table 3 according to the memory bank size (in 4K increments).

Example: if a memory bank starting address is set to >3000, and the memory bank size is set to >1000, the memory bank will respond in the address range >3000 - >4000.

**Table 3 Memory Bank Size Jumpers**

Memory Bank Size	Memory Bank A				Memory Bank B			
	J7	J8	J9	J10	J11	J12	J13	J14
>1000	ON	ON	ON	ON	ON	ON	ON	ON
>2000	OFF	ON	ON	ON	OFF	ON	ON	ON
>3000	ON	OFF	ON	ON	ON	OFF	ON	ON
>4000 (limit for 4016 RAMs and 2516 EPROMs)	OFF	OFF	ON	ON	OFF	OFF	ON	ON
>5000	ON	ON	OFF	ON	ON	ON	OFF	ON
>6000	OFF	ON	OFF	ON	OFF	ON	OFF	ON
>7000	ON	OFF	OFF	ON	ON	OFF	OFF	ON
>8000 (limit for 2532 EPROMs)	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
>9000	ON	ON	ON	OFF	ON	ON	ON	OFF
>A000	OFF	ON	ON	OFF	OFF	ON	ON	OFF
>B000	ON	OFF	ON	OFF	ON	OFF	ON	OFF
>C000	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
>D000	ON	ON	OFF	OFF	ON	ON	OFF	OFF
>E000	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
>F000	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF