

Physics

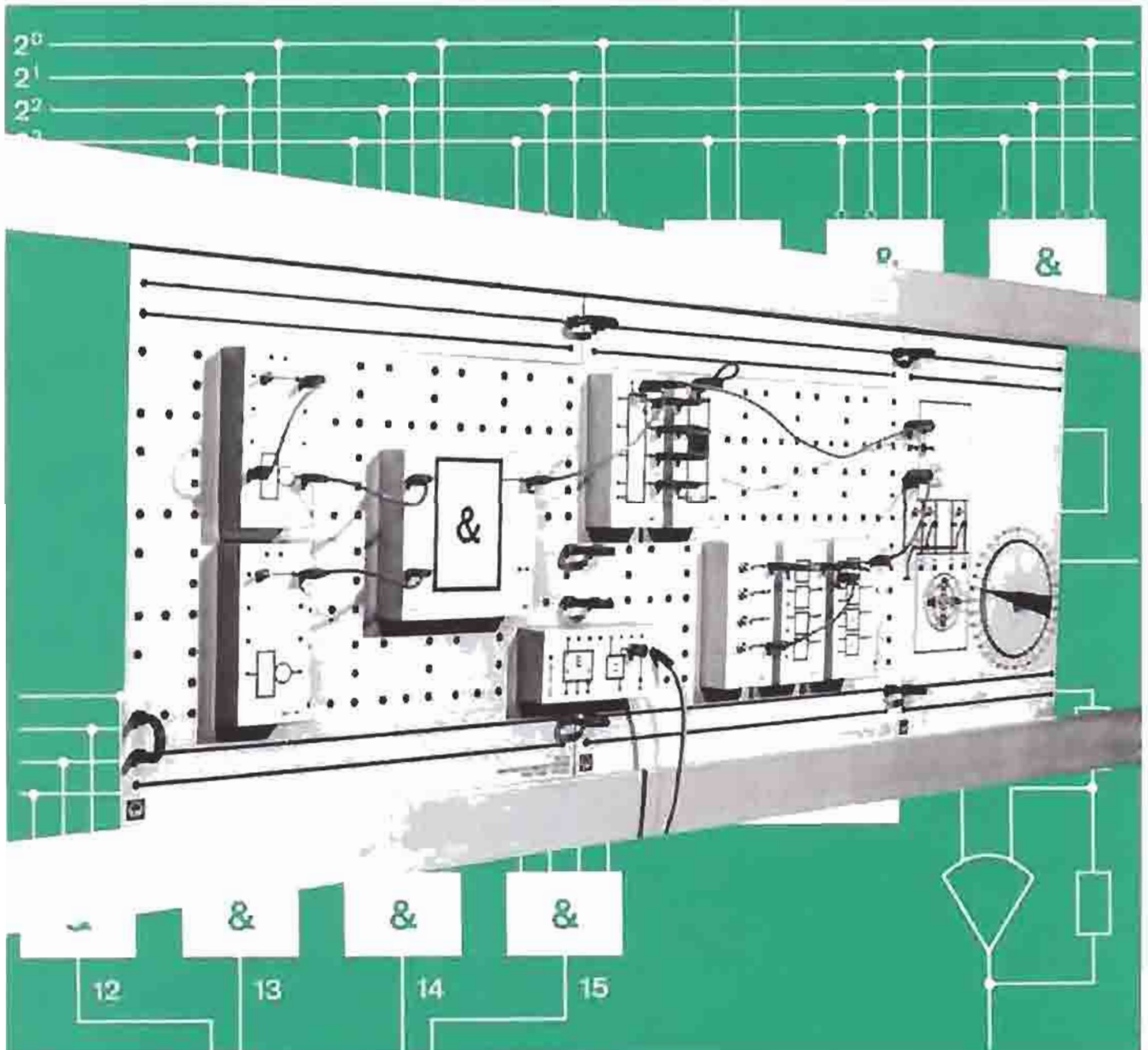
Chemistry - Biology

Technology



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## SIM 5.1 Digital Technology

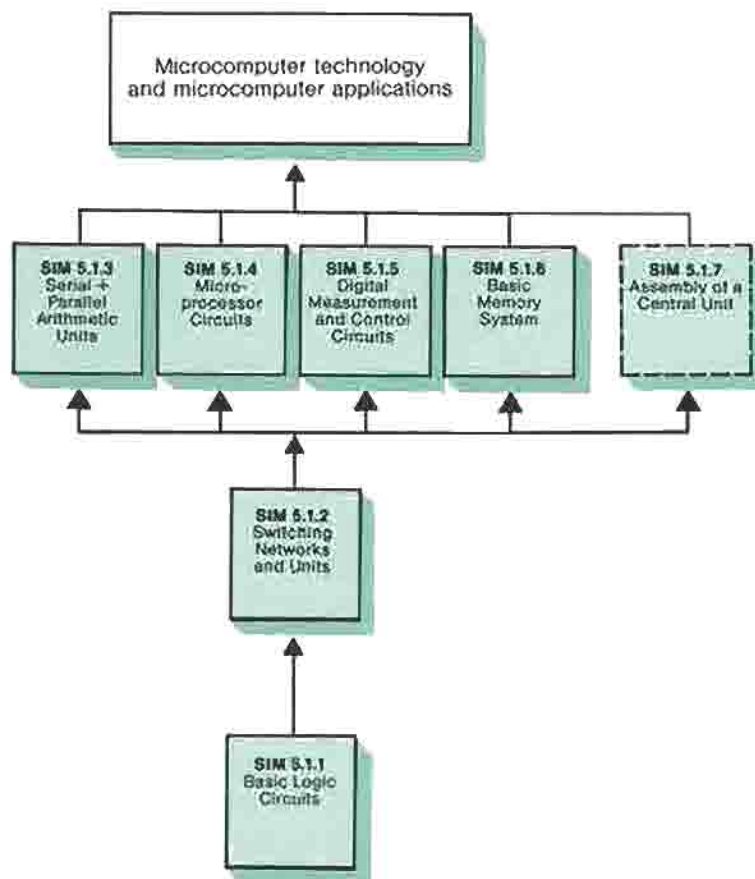


# SIM 5.1 – Digital Technology with the SIMULOG-System LS-TTL

The influence of microprocessor technology on all spheres of the economy, technology and administration is unmistakable. Knowledge of digital technology is a necessary prerequisite for introduction to this new technology. The curricula in both pre-vocational and vocational areas have already adapted to this develop-

ment with newly formulated teaching and learning objectives. The SIMULOG-System (SIM) for digital technology has been structured with these objectives in mind. The topic areas corresponding to these objectives are covered by equipment sets with the same titles. The design concept of the basic and supplementary sets en-

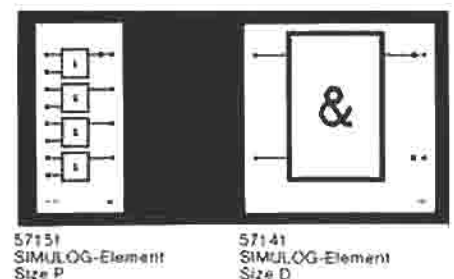
ables a gradual step by step acquisition of the necessary components and equipment specifically related to the individual educational objectives. In addition to this, the compact sets, M8, C9 and S10 offer economical and tailor made equipment sets for experiments in any single specific topic.



## The SIM-System and its Advantages

Besides the unlimited uses of the SIM-system in training laboratories (standard version P) with 40 mm x 90 mm components, the following equipment sets are available especially for use in demonstration (version D) with 90 mm x 90 mm components.

- SIM 5.1.1 Basic Logic Circuits
- SIM 5.1.2 Switching Networks and Units



The circuits and experiments are assembled on base panels with socket-fields with reverse polarity protection, for plugging in the elements and supplying them with 5 V stabilised D.C. voltage.

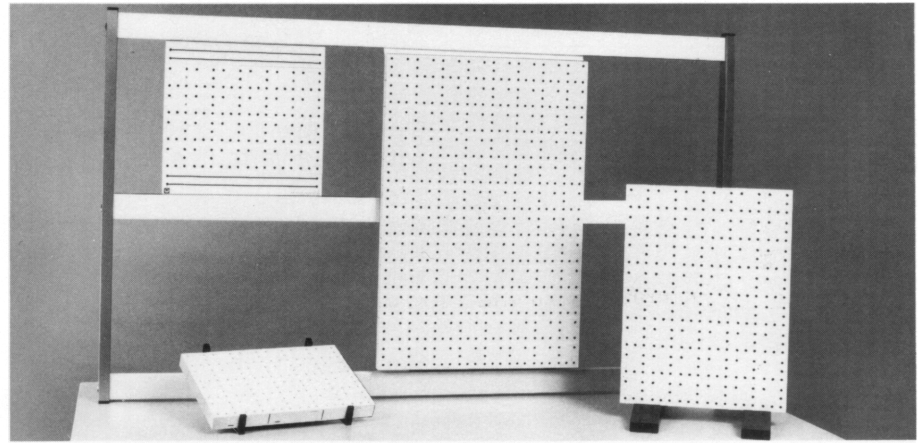
The base panels are available in the following sizes:

Size A4 (300 mm x 200 mm) and

Size A3 (300 mm x 400 mm) for table top mounting or mounting on vertical stands and in the following sizes:

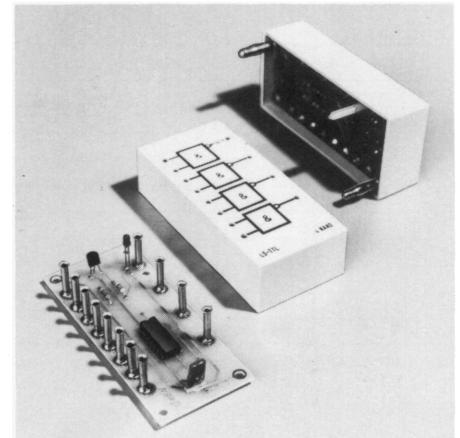
297 mm x 300 mm and

634 mm x 400 mm for mounting in the panel frames of the DIN A4 Training Panel System (TPS).

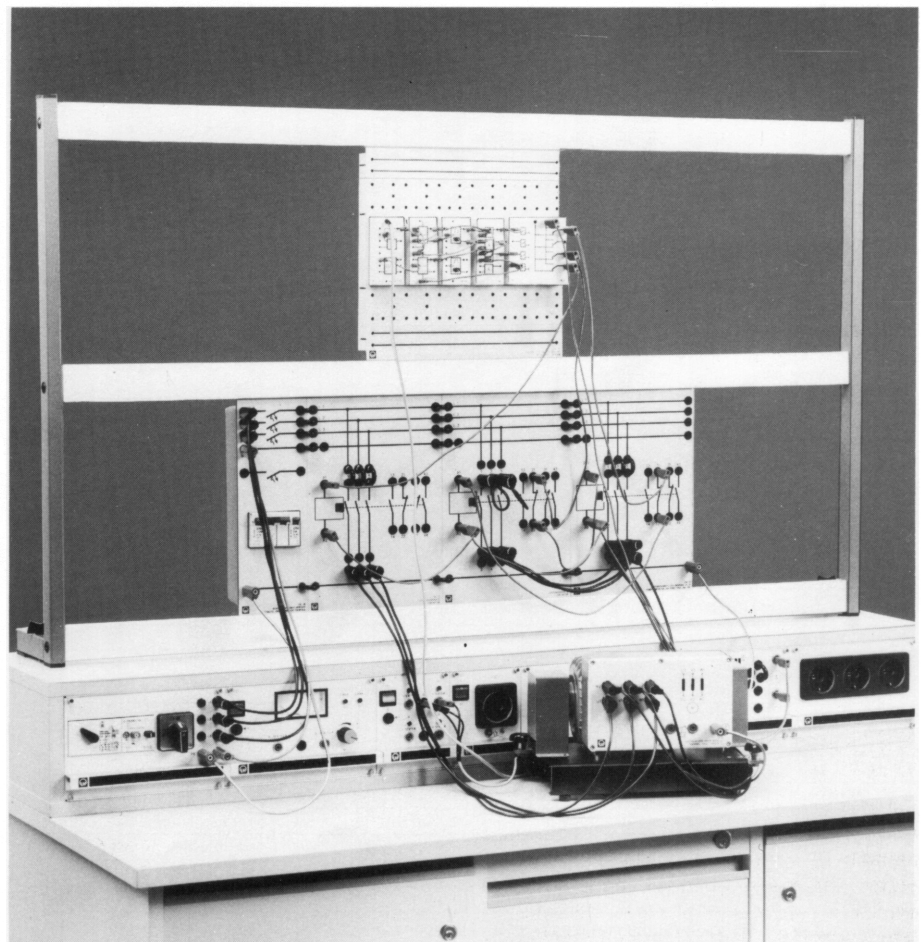


The integrated circuits of the SIMULOG-elements in LS-TTL technology have a particularly low power consumption. Additional protection circuits for the inputs and outputs are not necessary. The IC inputs and outputs are directly accessible for measurement.

Inputs and outputs are connected using highly flexible 0,5 mm<sup>2</sup> connecting leads with 2 mm dia. hard-gold plated cage-spring plugs for multiple connections. For interface connection to the TPS and STE systems adapter cables with 2 mm/4 mm dia. plugs are available.



The circuit symbols according to German industrial standard (DIN) are printed on the SIMULOG units using a non-erasable screen-print process. The output status is indicated on LEDs. Due to the structural similarities of the three systems (size, 4 mm sockets, raster format) matching and compatibility between the SIMULOG, the LH Plug-in System (STE) and the LH Training Panel System (TPS) are ensured. Thus parallel to the circuits set up with the SIMULOG units, individual digital units and circuits can be assembled using discrete components in the STE system and subsequently integrated into the experiment as a whole. TPS interfaces enable a particularly practice-oriented use of digital technology. The TPS system offers numerous supplementary units whenever models for traffic light systems, stepping motors and power contactors for electrical machines are to be assembled.



Motor Starting Control (Star-Delta)



## Experiment Topics for Basic Set SIM 5.1.1

### Basic Logic Operations

- AND
- OR
- NOT

### Operations with two Variables

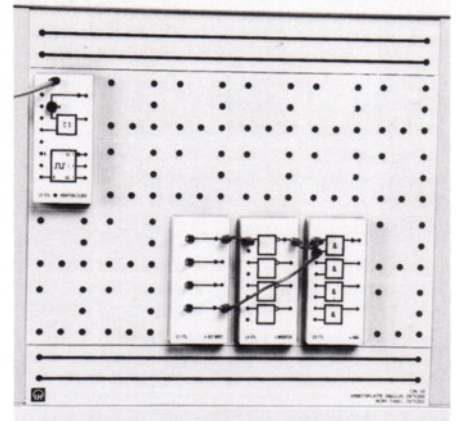
- NAND
- NOR
- XOR, Antivalence
- NOXOR, Equivalence
- Realisation of all 16 possible variables
- Commutative laws
- Laws of de Morgan

### Operations with three Variables

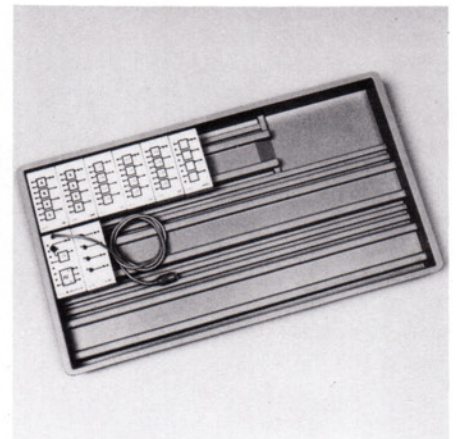
- Associative laws
- Distributive laws
- KV diagram
- Half adder
- Full adder

### Simple Multivibrator Circuits

- RS flipflop with NAND gates
- RS flipflop with NOR gates



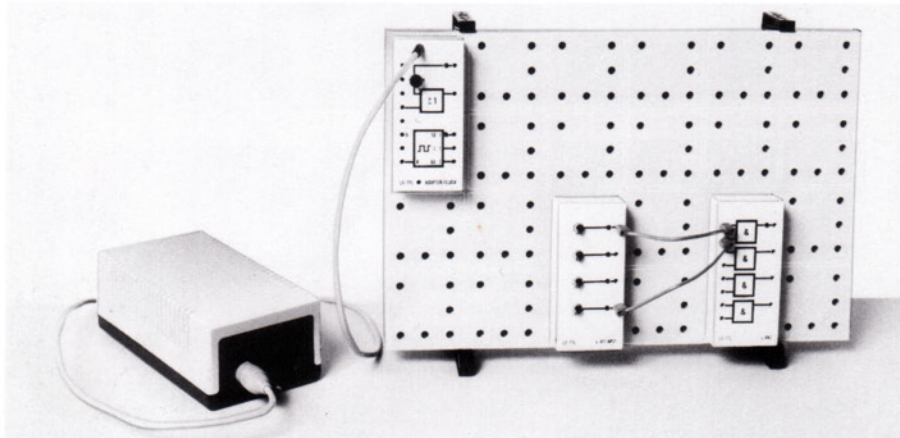
AND Circuit with negated input



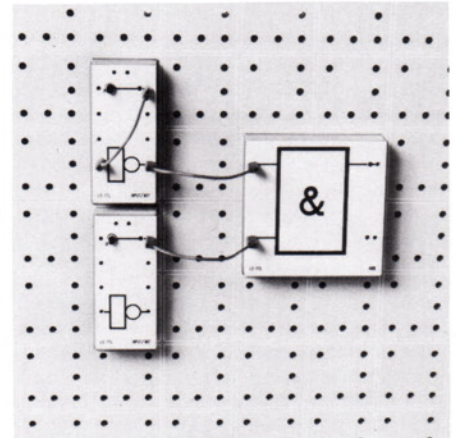
Equipment Set SIM 5.1.1

571011 Basic Logic Circuits P1, Equipment Set SIM 5.1.1, consisting of:					
Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
1	571 34	Adapter Clock			
1	571 36	4-Bit Input			
<b>Required Accessories:</b>					
1	571 51	4 AND	1	571 29	Base panel size A4*
1	571 52	4 NAND	1	571 21	Set of 5 connecting leads, 4 cm
1	571 54	4 OR	1	571 22	Set of 5 connecting leads, 8 cm
1	571 55	4 NOR	1	571 23	Set of 5 connecting leads, 15 cm
1	571 57	4 XOR	1	522 33	Regulated Power Supply Unit 5 V, 1 A*
1	571 58	4 Inverter	1	571 31	Tray for SIMULOG LS-TTL
			1	571 172	Exp. Manual: SIMULOG LS-TTL Part 1

\*Alternative base panels, stands and power supply units, see page 11 and 12



AND Circuit with Experimental Elements

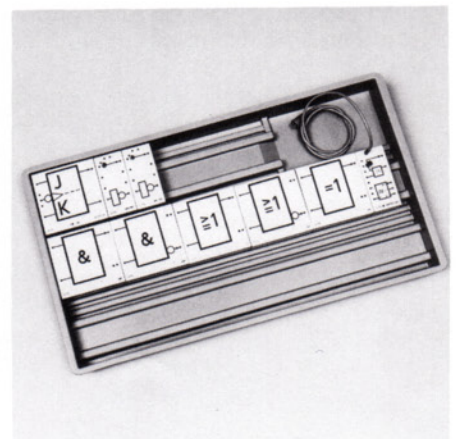


AND Circuit in demonstration

### For Demonstration:

571111 Basic Logic Circuits D1, Demonstration Set, consisting of:					
Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
1	571 34	Adapter Clock			
2	571 35	Input/NOT			
<b>Required Accessories:</b>					
1	571 41	AND	1	571 28	Base panel size A3*
1	571 42	NAND	2	580 12	Vertical Stand for the Base panel*
1	571 44	OR	1	571 22	Set of 5 connecting leads, 8 cm
1	571 45	NOR	1	571 23	Set of 5 connecting leads, 15 cm
1	571 47	XOR	1	571 24	Set of 5 connecting leads, 30 cm
1	571 49	JK-Flipflop	1	522 31	Regulated Power Supply Unit 5 V, 0,4 A*
			1	571 31	Tray for SIMULOG LS-TTL
			1	571 172	Exp. Manual: SIMULOG LS-TTL, Part 1

\*Alternative base panels, stands and power supply units, see page 11 and 12



Demonstration Set D1

## Experiment Topics for Supplementary Set SIM 5.1.2

### Logic Gates with more than two Inputs

- AND/NAND
- OR/NOR

### Operations with two 4-Bit Words

- AND, NAND, OR, NOR, XOR
- Multiplexers
- Demultiplexers

### Code Converters

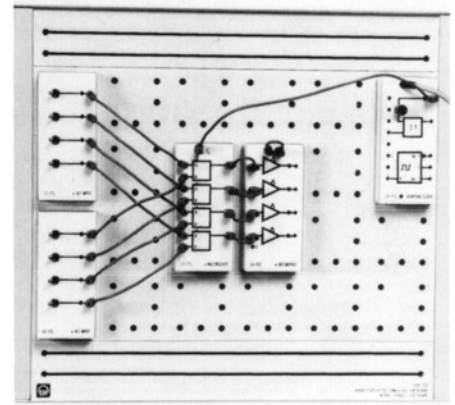
- Coders (decimal to binary)
- Decoders (binary to decimal)
- Code converters (Gray to binary)

### Multivibrators and Flipflops

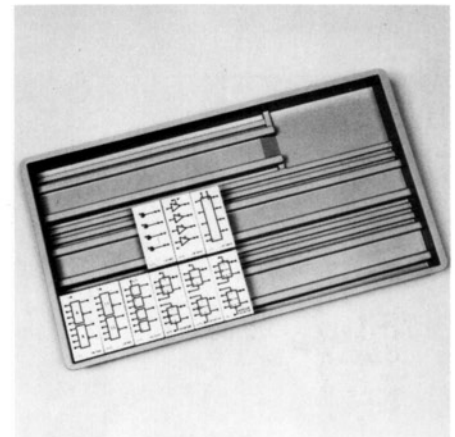
- Bistable, monostable and astable multivibrators
- RS flipflop
- D flipflop
- RS-Master-Slave flipflop
- JK flipflop
- Dual slope triggered JK flipflop

### Counters and Registers

- Asynchronous binary counter
- Asynchronous BCD counter
- Synchronous 4-bit counter
- Synchronous forward/backward counter
- 4-Bit counter with parallel input
- Shift register
- Ring shift register



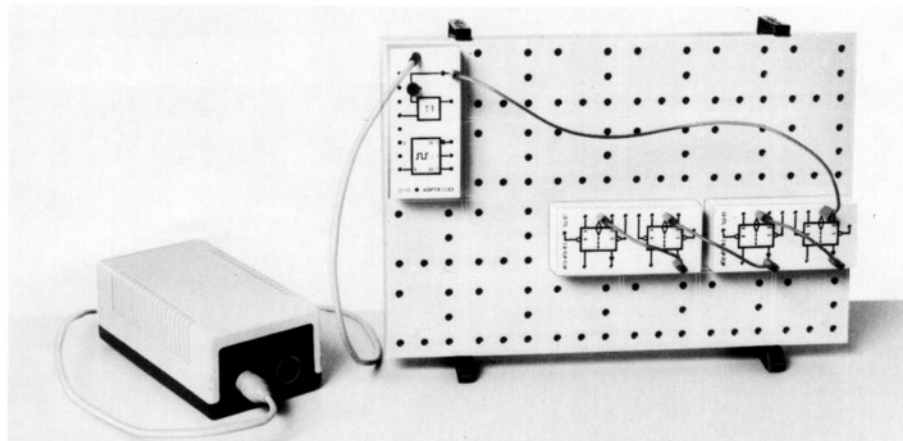
Multiplexer for two 4-Bit words



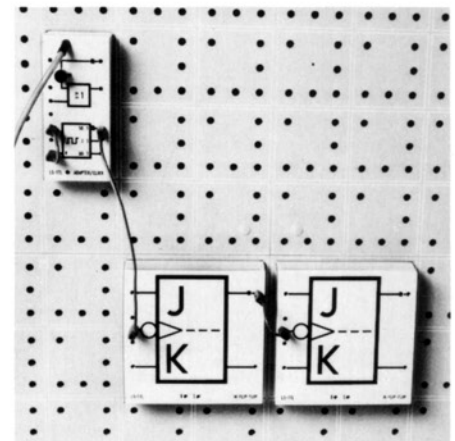
Equipment Set SIM 5.1.2

### 571022 Switching Networks and Units P2, Equipment Set SIM 5.1.2, consisting of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
1	571 36	4-Bit Input	1	571 87	4 Multiplexer
1	571 37	4-Bit Output	<b>Required Accessories:</b>		
1	571 53	2 AND/NAND			
1	571 56	2 OR/NOR	1	571 21	Set of 5 connecting leads, 4 cm
2	571 59	2 JK Flipflop	1	571 22	Set of 5 connecting leads, 8 cm
1	571 62	2 JK Master-Slave Flipflop	1	571 23	Set of 5 connecting leads, 15 cm
1	571 63	2 RS Flipflop	1	571 24	Set of 5 connecting leads, 30 cm
1	571 77	4-Bit-Counter			



Asynchronous Binary Counter

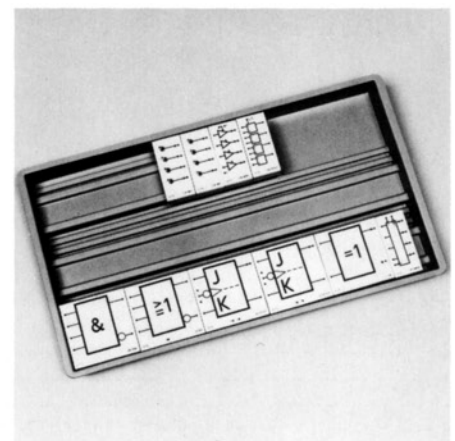


Digital Divider in demonstration

### For Demonstration:

### 571122 Switching Networks and Units D2, Demonstration Set, consisting of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
2	571 36	4-Bit Input	1	571 87	4 Multiplexer
1	571 37	4-Bit Output	<b>Required Accessories:</b>		
1	571 43	AND/NAND			
1	571 46	OR/NOR	2	571 21	Set of 5 connecting leads, 4 cm
1	571 47	XOR	1	571 22	Set of 5 connecting leads, 8 cm
2	571 49	JK Flipflop	1	571 23	Set of 5 connecting leads, 15 cm
1	571 77	4-Bit Counter			



Demonstration Set D2



## Experiment Topics for Supplementary Set SIM 5.1.3

### Serial Data Transfer

- Shift register with parallel data I/O
- Serial data transfer between two shift registers

### Serial Arithmetic Units

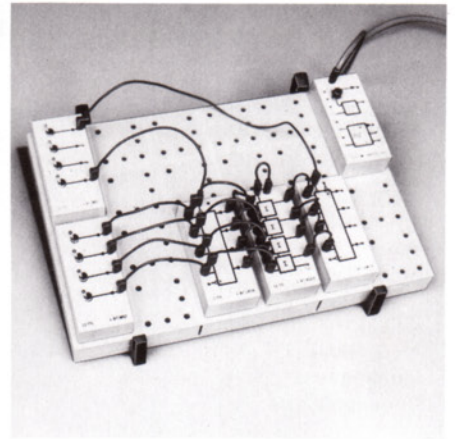
- Serial operating switching network
- Serial operating switching network with accumulator
- Serial adding network with discrete full adder
- Serial adding network with integrated full adder
- Automatic serial adding network
- Automatic serial subtracting network

### Parallel Data Transfer

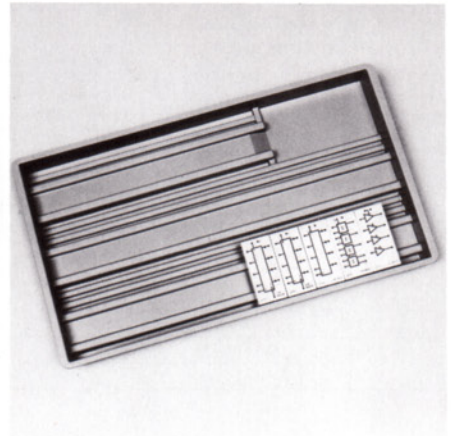
- 4-Bit latch
- Parallel data transfer between 4-bit registers
- 4-Bit buffers (3 state)
- Input via two bus drivers on a 4-bit data bus

### Parallel Arithmetic Units

- Parallel operating switching network
- Parallel adding network
- Parallel operating adding/subtracting network
- Parallel adding network linked to the data bus



Parallel Adding Network

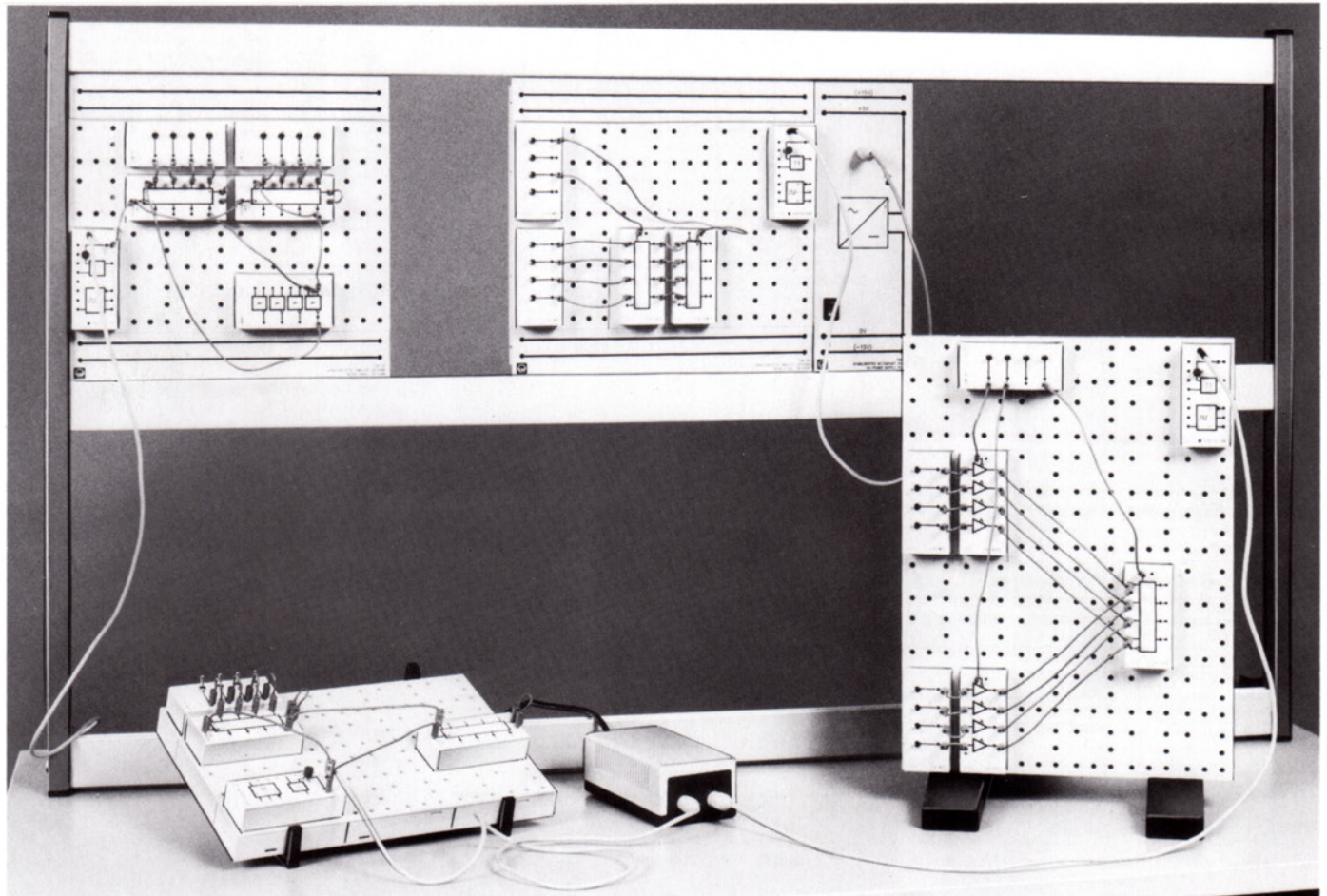


Equipment Set SIM 5.1.3

### 571044 Serial and parallel Arithmetic Units E4, Equipm. Set SIM 5.1.3, consist of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
2	571 64	4-Bit Register			
1	571 65	4-Bit Latch			
1	571 76	4-Bit Adder	2	571 21	Set of 5 connecting leads, 4 cm
1	571 89	4-Bit Buffer	1	571 24	Set of 5 connecting leads, 30 cm

**Required Accessories:**



Serial operating switching network, parallel and serial data transfer, data bus

## Experiment Topics for Supplementary Set SIM 5.1.4

### Connecting the Data Bus, Address Bus and Control Bus to the Microprocessor 6502

- Data bus connection for instruction and data input
- Control signals: Reset, Ready, Read and Write
- Address bus connection for address indication and start address
- Data bus connection for data output, first instructions
- Program counter and address structure

### Transfer Instructions

- Immediate addressing
- Implicit addressing
- Zero-page addressing
- Stack pointer addressing

### Operating Instructions

- Rotation and shift instructions
- Arithmetic operations
- Logic operations

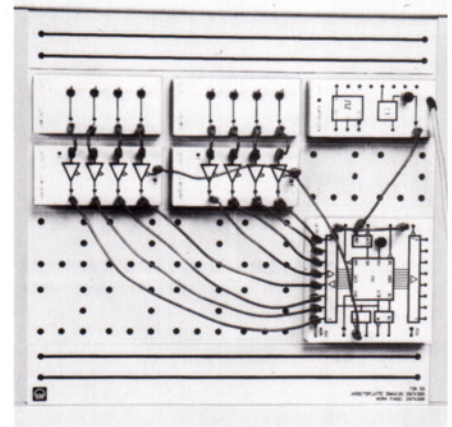
### Memory Connection

- Connection of RAM-ICs to the address and data bus
- Control signals for RAM-ICs: Chip-Select, Read and Write
- Program input using DMA

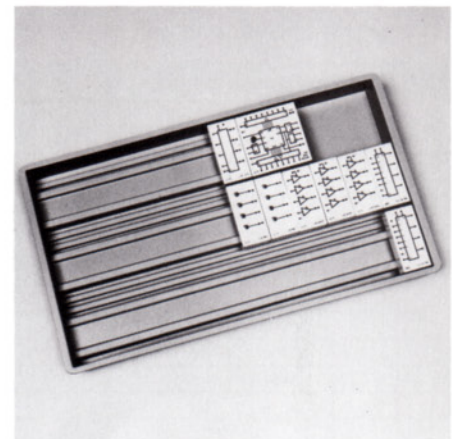
### Jump Instructions

- Jump and branch instructions
- Sub-routine call
- Interrupt processing

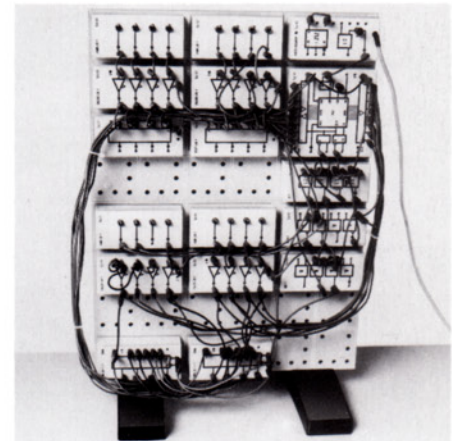
### Program Examples



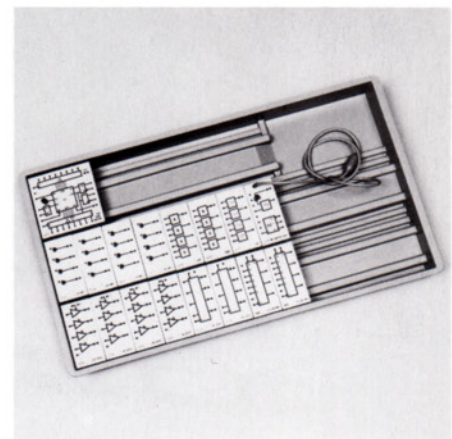
Instruction Input in the Microprocessor



Equipment Set SIM 5.1.4



Processor with Data In/Output and Memory



Compact Set M8

### 571077 Microprocessor Circuits E7, Equipment Set SIM 5.1.4, consisting of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
2	571 36	4-Bit Input	<b>Required Accessories:</b>		
3	571 37	4-Bit Output			
1	571 65	4-Bit Latch	1	571 28	Base panel size A3*
2	571 67	32 x 4 Bit RAM	2	580 12	Vertical stand for base panel*
1	571 70	Microprocessor 6502	4	571 21	Set of 5 connecting leads, 4 cm
			1	571 22	Set of 5 connecting leads, 8 cm
			2	571 23	Set of 5 connecting leads, 15 cm
			1	571 24	Set of 5 connecting leads, 30 cm
			3	571 25	Set of 5 connecting leads, 50 cm
			1	571 192	Exp. Manual: SIMULOG LS-TTL, Part 3

\*Alternative base panels, stands and power supply units, see pages 11 and 12

## Experiment Topics for Compact Set M8

cf. Supplementary Set SIM 5.1.4

### 571088 Microprocessor Circuits M8, Compact Set, consisting of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
1	571 34	Adapter/Clock	<b>Required Accessories:</b>		
4	571 36	4-Bit Input			
4	571 37	4-Bit Output	1	571 28	Base panel size A3*
1	571 51	4 AND	2	580 12	Vertical stand for the base panel*
1	571 52	4 NAND	6	571 21	Set of 5 connecting leads, 4 cm
1	571 54	4 OR	3	571 22	Set of 5 connecting leads, 8 cm
2	571 65	4-Bit Latch	4	571 23	Set of 5 connecting leads, 15 cm
2	571 67	32 x 4-Bit RAM	2	571 24	Set of 5 connecting leads, 30 cm
1	571 70	Microprocessor 6502	3	571 25	Set of 5 connecting leads, 50 cm
			1	522 33	Regulated Power Supply Unit 5V, 1 A*
			1	571 31	Tray for the SIMULOG LS-TTL
			1	571 192	Exp. Manual: SIMULOG LS-TTL, Part 3

\*Alternative base panels, stands and power supply units, see pages 11 and 12

## Experiment Topics for Supplementary Set SIM 5.1.5

### Digital Measurement Circuits

- Revolution counter with photo-electric cell
- Incremental displacement angle measurement, forward/backward counter
- Frequency measurement with gate time
- Time measurement with fixed time base
- Digital clock with second indication
- Reaction time measurement

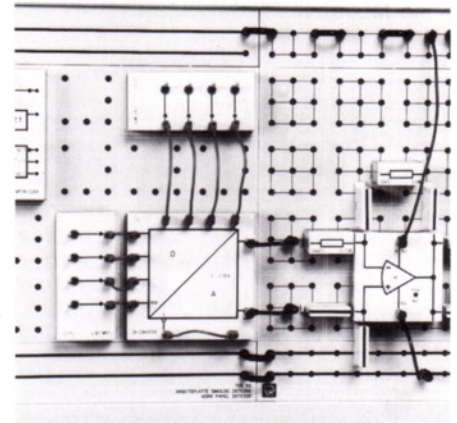
- Lift control, 2 storeys
- Lift control, 3 storeys
- Traffic light control
- Traffic light control, with pedestrian crossing
- Traffic light control, traffic-flow dependent
- Control of a stepping motor, half/full step, right/left rotation
- Sequence control with stepping motor

### Digital Control Circuits

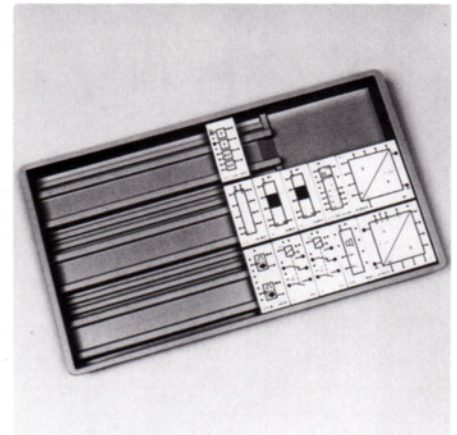
- Alarm system
- Lighting control with relays
- Motor current switching with 2 relays

### D/A-Converter, A/D-Converter

- D/A converter
- A/D converter
- A/D converter, automatically controlled



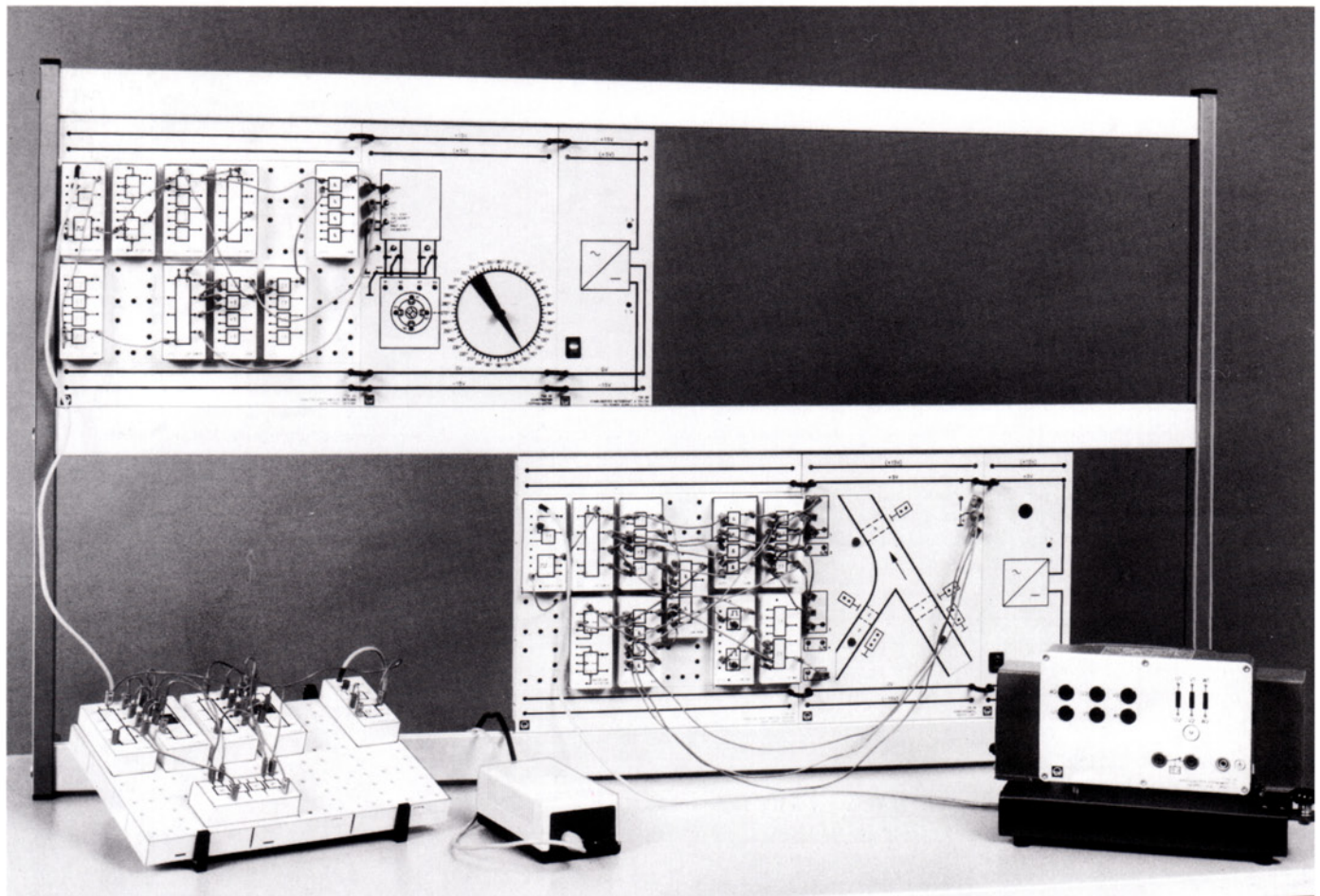
DA Converter with Signal Processing



Equipment Set SIM 5.1.5

### 571033 Dig. Measurement a. Control Circuits E3, Equipm. Set SIM 5.1.5, cons. of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
2	57138	LED Display	<b>Required Accessories:</b>		
1	57150	4 Schmitt-Trigger	2	57121	Set of 5 connecting leads, 4 cm
1	57161	2 One Shot	2	57122	Set of 5 connecting leads, 8 cm
1	571615	2 Delay	1	57125	Set of 5 connecting leads, 50 cm
1	57177	4-Bit Counter	1	571202	Exp. Manual: SIMULOG LS-TTL, Part 4
1	57179	Quartz Oscillator	<b>Recommended Accessories:</b>		
2	57180	Relay	1	72852	Lift three storeys
1	57181	Speaker	1	72855	Stepping motor
1	57185	D/A Converter	1	72856	Traffic light
1	57186	A/D Converter	1	72857	Washing machine
			2	57163	2 RS Flipflop
			1-2	571375	Traffic light
			3	57126	Set of 5 adapter cables, 2 mm/4 mm



Sequence Control with Stepping Motor, traffic-flow dependent Traffic Light Control, Digital Clock



## Experiment Topics for Supplementary Set SIM 5.1.6

### Parallel Data Storage

- 4-Bit latch
- 4-Bit counter with parallel data I/O
- Parallel data transfer between 4-bit registers
- 4-Bit output as a bus driver (3 state)

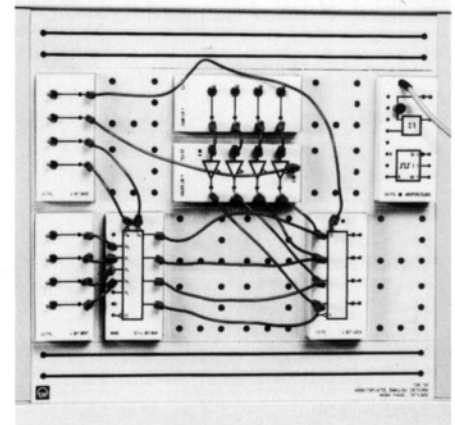
### Memory Addressing

- Addressing of latch ICs
- 32 x 4-Bit RAM with bidirectional data bus
- Address bus and control signals for addressing, writing and reading

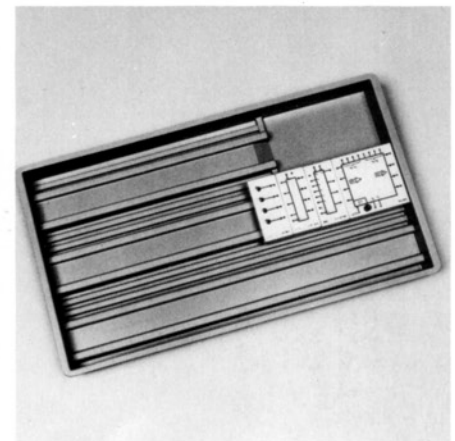
- 1024 x 4-Bit RAM with separate data lines for writing and reading
- Differentiation of memory pages

### Simple Programmable Logic Control Circuits (PLC)

- Storage with read-out of a binary coded datum
- Traffic light control
- Traffic light control, traffic-flow dependent
- Control of a stepping motor, half/full step right/left rotation
- Sequence control with stepping motor



Data Storage in a RAM-IC



Equipment Set SIM 5.1.6

### 571066 Basic Memory System, simple PLC E6, Equipment Set SIM 5.1.6, cons. of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
1	57136	4-Bit Input			
1	57165	4-Bit Latch			
1	57167	32 x 4-Bit RAM	1	571202	Exp. Manual: SIMULOG LS-TTL, Part 4
1	57172	PLC			
<b>Required Accessories:</b>					
			1	72855	Stepping motor
			1	72856	Traffic light
			2	57126	Set of 5 adapter cables 2 mm/4 mm
			1	57173	4 Relay
<b>Recommended Accessories:</b>					

## Equipment Topics for Compact Set S10

### Clock Control

- Clock generator controlling LED, buzzer, relay, motor etc.
- Clock control with time-division
- Clock control of a counter
- Motor control with counter and decoder

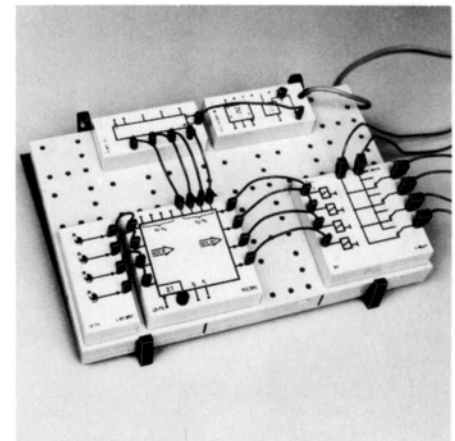
### Memory for Control Signals

- 4-Bit counter as parallel memory
- 1024 x 4-Bit RAM as a memory for many words

- Addressing of an address for writing or reading a datum
- Differentiation of memory pages

### Simplest PLCs (Programmable Logic Controls)

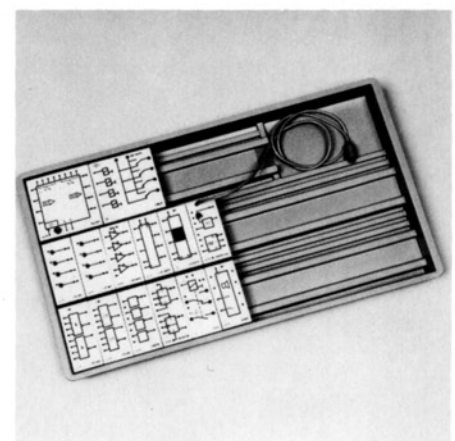
- Storage and read-out of a binary coded datum
- Traffic light control
- Simple washing machine programme
- Switch yard (station)
- Motor-driven functional models



PLC for a motor driven Functional Model

### 571100 Basic PLC S10 Compact Set, consisting of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
1	57134	Adapter/Clock			
2	57136	4-Bit Input			
1	57137	4-Bit Output	1	57129	Base panel size A4 *
1	57138	LED Display	2	57121	Set of 5 connecting leads, 4 cm
1	57153	2 AND/NAND	2	57122	Set of 5 connecting leads, 5 cm
1	57156	2 OR/NOR	1	57123	Set of 5 connecting leads, 15 cm
1	57158	4 Inverter	1	57124	Set of 5 connecting leads, 30 cm
1	57159	2 JK Flipflop	1	52233	Stabilized Power Supply, 5 V, 1 A *
1	57172	PLC	1	57131	Tray for SIMULOG LS-TTL
1	57173	4 Relay	1	571202	Exp. Manual: SIMULOG LS-TTL, Part 4
1	57177	4-Bit Counter			
1	57180	Relay			
1	57181	Speaker			
<b>Required Accessories:</b>					
			1	72856	Traffic light
			2	57126	Set of 5 adapter cables, 2 mm/4 mm
					Motor driven functional models
<b>Recommended Accessories:</b>					



Compact Equipment Set S10

\*Alternative base panels, stands and power supply units, see pages 11 and 12



## Experiment Topics for Supplementary Set SIM 5.1.7

### Function of the modules

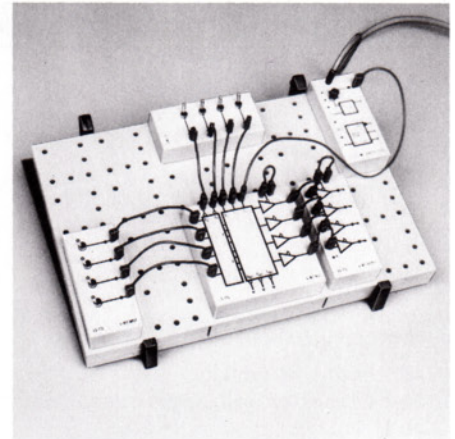
- Write/Read memory (RAM)
- Arithmetic logic unit (ALU)
- CPU timer

- Decoding and control signals
- Implicit addressing
- Indirect addressing
- Direct addressing
- Immediate addressing
- Program counter
- Unconditional jump instructions
- Conditional jump instructions

### Structure of the Control Unit

- Software structure
- Instruction register
- Internal data bus/data transfer
- Data connections

### Program Examples

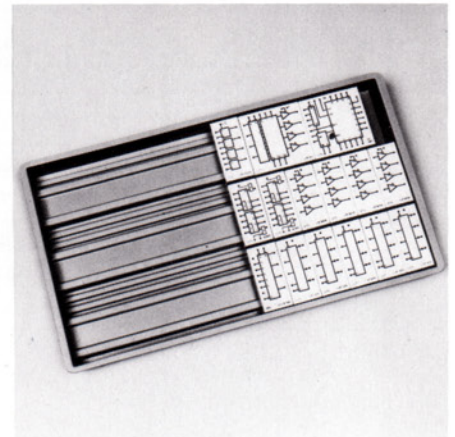


Arithmetic Logic Unit (ALU)

### 571055 Assembly of a Central Unit E5, Equipment Set 5.1.7, consisting of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
5	571 65	4-Bit Latch			
1	571 67	32 x 4-Bit RAM			
1	571 75	4-Bit ALU	1	571 28	Base panel size A3*
1	571 78	CPU Timer	2	580 12	Vertical stand for base panels*
2	571 82	Decoder	7	571 21	Set of 5 connecting leads, 4 cm
1	571 87	4 Multiplexer	2	571 22	Set of 5 connecting leads, 8 cm
4	571 89	4-Bit Buffer	10	571 23	Set of 5 connecting leads, 15 cm
			4	571 24	Set of 5 connecting leads, 30 cm
			2	571 25	Set of 5 connecting leads, 50 cm
			1	571 182	Exp. Manual: SIMULOG LS-TTL, Part 2

\*Alternative base panels, stands and power supply units, see pages 11 and 12



Equipment Set SIM 5.1.7

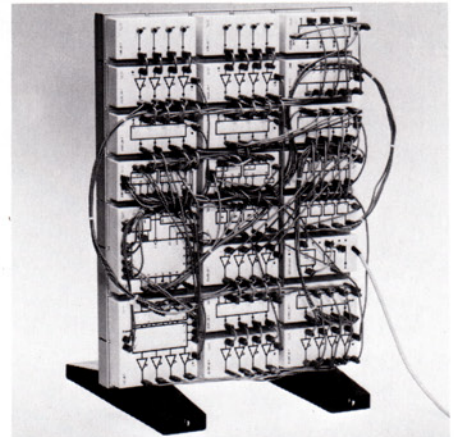
## Experiment Topics for Compact Set C9

cf. Supplementary Set SIM 5.1.7

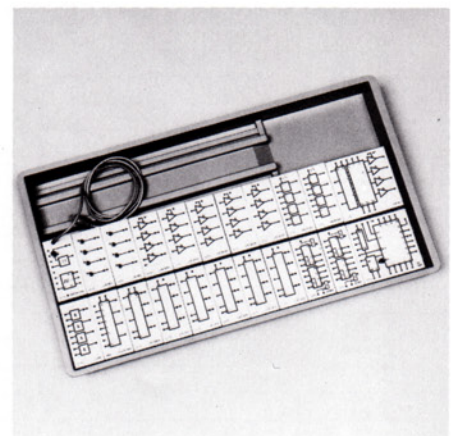
### 571099 Assembly of a Central Unit C9, Compact Set, consisting of:

Qty.	Cat. No.	Description	Qty.	Cat. No.	Description
1	571 34	Adapter/Clock			
2	571 36	4-Bit Input			
1	571 37	4-Bit Output	1	571 28	Base panel size A3*
1	571 51	4 AND	2	580 12	Vertical stand for base panels*
5	571 65	4-Bit Latch	9	571 21	Set of 5 connecting leads, 4 cm
1	571 67	32 x 4-Bit RAM	4	571 22	Set of 5 connecting leads, 8 cm
1	571 75	4-Bit ALU	12	571 23	Set of 5 connecting leads, 15 cm
1	571 77	4-Bit Counter	5	571 24	Set of 5 connecting leads, 30 cm
1	571 78	CPU Timer	2	571 25	Set of 5 connecting leads, 50 cm
2	571 82	Decoder	1	522 33	Regulated Power Supply Unit 5V, 1A
2	571 87	4-Multiplexer	1	571 31	Tray for SIMULOG LS-TTL
4	571 89	4-Bit Buffer	1	571 182	Exp. Manual: SIMULOG LS-TTL, Part 2

\*Alternative base panels, stands and power supply units, see pages 11 and 12



Control Unit



Compact Set C9

## Accessories

### Base Panels

The base panels enable placement of the SIMULOG elements ensuring correct information flow, and reverse polarity protected power supply.

Standard versions for experimenting on bench top or in vertical stands:

#### 57128 Base Panel size A3 f. SIMULOG

For demonstration and laboratory exercises, with 48 socket fields for a maximum of 24 elements.

Can be mounted using:

58012 Vertical stand for base panel size A3 (2 each)

#### 57129 Base Panel Size A4 f. SIMULOG

For student and laboratory exercises, with 24 socket fields for a maximum of 12 elements.

Can be mounted using:

57677 Pair of panel holders for base panel size A4

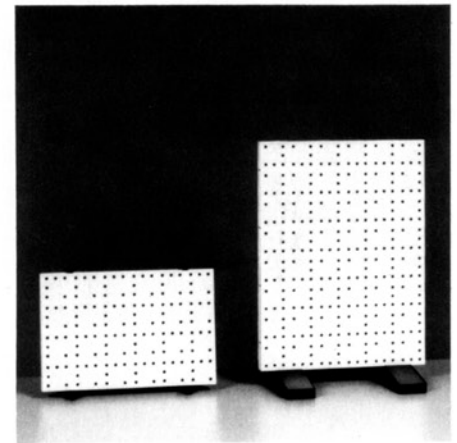
TPS Version for mounting in panel frames of the DIN A4 size Training Panel System (TPS) Electrical Engineering/Electronics:

#### 72655 Base Panel SIM 297 x 300

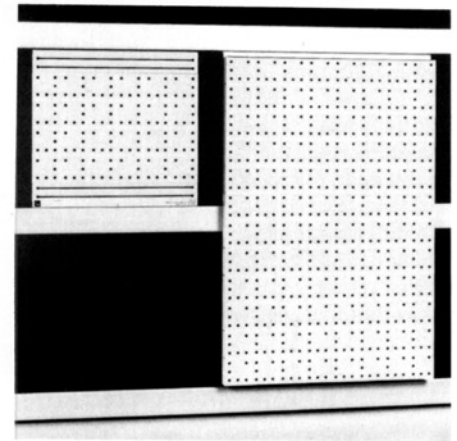
For student and laboratory exercises, with 24 socket fields for a maximum of 12 elements and with 2 x 2 continuous bus bars.

#### 72659 Base Panel SIM 634 x 400

For demonstration and laboratory exercises, with 96 socket fields for a maximum of 48 elements.



Base Panels 57129/28 with stands and panel holders



Base Panels 72655/59 mounted in Panel Frames

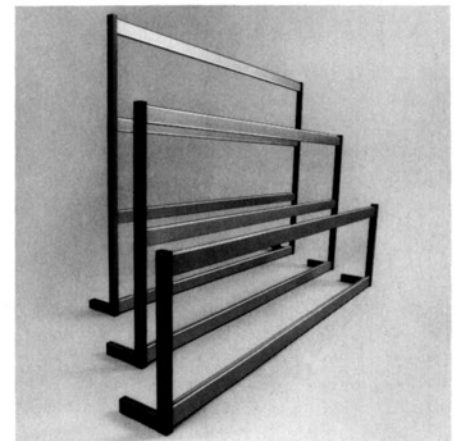
### Panel Frames

#### 72604 Panel Frame-L 150, two level

- 2-level frame for training panels in DIN A4 equivalent height
- 3 aluminium profile rails with 2 brush strips
- 2 L-bases of rectangular steel tubing
- mounted to bench top with 2 M8 wing screws
- width: 1450 mm, height: 730 mm, depth: 150 mm

#### 72605 Panel Frame-L 180, two level

- 2-level frame for training panels in DIN A4 equivalent height
- 3 aluminium profile rails with 2 brush strips
- 2 L-bases of rectangular steel tubing
- mounted to bench top with 2 M8 wing screws
- width: 1750 mm, height: 730 mm, depth: 150 mm

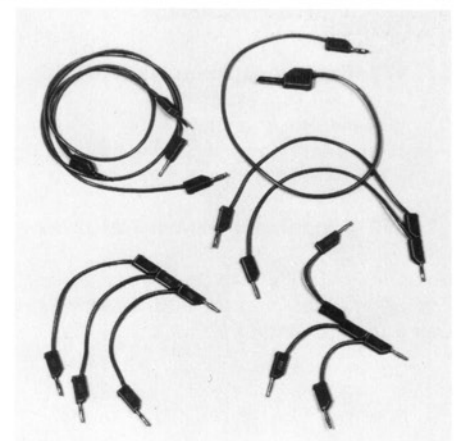


Panel Frames

### Connecting Leads

Highly flexible 0.5 mm<sup>2</sup> connecting leads with 2 mm dia. hard-gold plated cage-spring plugs. Adapter cable with 2 mm/4 mm dia. plugs for adaptation to the STE and TPS systems.

Cat. No.	Description	Plugs
57121	Set of 5 connecting leads, 4 cm	2 mm dia.
57122	Set of 5 connecting leads, 8 cm	2 mm dia.
57123	Set of 5 connecting leads, 15 cm	2 mm dia.
57124	Set of 5 connecting leads, 30 cm	2 mm dia.
57125	Set of 5 connecting leads, 50 cm	2 mm dia.
57126	Set of 5 adapter cables, 30 cm	2 mm/4 mm dia.



Connecting Leads

## Power Supply Units

Reasonably priced regulated power supply units which ensure supply with correct polarity for the SIMULOG components via the base panel and the Adapter/Clock 571 34.

### 522 31 Regulated Power Supply Unit 5 V/0.4 A

Basic unit, adequate for supplying circuits with sets SIM 5.1.1 and SIM 5.1.2  
Mains supply 220 V/50 Hz  
Output via 6-pin DIN socket for Adapter/Clock.

#### Optional:

TPS power supply unit for mounting in panel frames of Training Panel System (TPS)

### 726 84 Power Supply 5 V/3 A

Standard regulated power supply unit for mounting in the panel frames together with the base panel SIM 297 mm x 300 mm (726 55) for example.  
Mains supply: 220 V, 50/60 Hz  
Output via 4 mm sockets or 6-pin DIN socket for the Adapter/Clock.

The units are short-circuit proof and supply a mains synchronous pulse train for the signal-outputs of the Adapter/Clock. Protection class 2 with permanently attached mains-cable and monitor LED.

### 522 33 Regulated Power Supply Unit 5 V/1 A

Standard unit, suitable for supplying circuits of all sets  
Mains supply 110/130 V or 220/240 V, 50/60 Hz  
Output via 2 x 6-pin DIN sockets for Adapter/Clock

#### Optional:

Supply units from the LH 19" plug-in system; 3 HU plug-in units for equipping bench-top consoles and housings as well as printed board carriers in the international 19" standard.

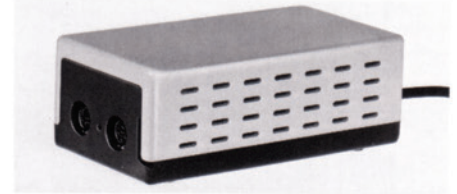
An adapter cable for connecting the 6 pin DIN plug of the Adapter/Clock 571 34 is also recommended.

### 501 17 Adapter Cable, 3 pole, 0,5 m with 6pin DIN-socket and 4 mm plugs.

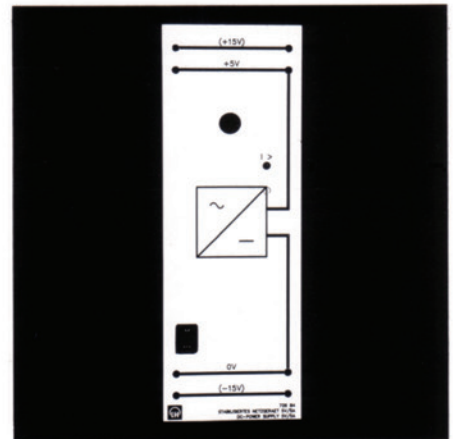
A selection of units with corresponding voltages and currents can be found in our LTS (Laboratory Technical Equipment System) catalog.



522 31



522 33



726 84

## Storage

### 571 31 Tray for the SIMULOG LS-TTL

Molded plastic tray for space-saving and convenient storage of SIMULOG-elements, and accessories.

Width: 552 mm, Depth: 285 mm  
(see page 10).

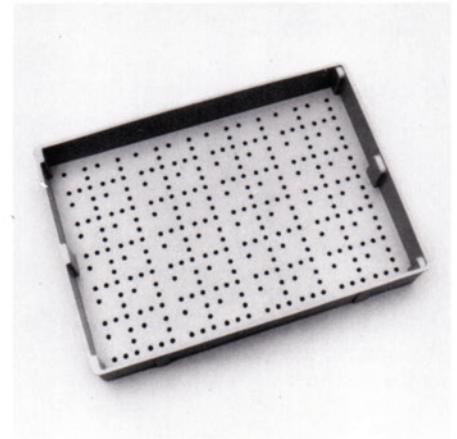
### 650 69 Tray SIM

moulded, double shell plastic tray, can be stacked, for space saving and convenient storage of SIM plug-in elements, components and accessories.

Storage capacity:

- 24 SIM elements 40 x 90 mm or,
- 8 SIM elements 90 x 90 mm and
- 4 SIM elements 40 x 90 mm

Depth: 461 mm, Width: 332 mm,  
Height: 79 mm



650 69

## Literature

### 571 172 Experiment Manual SIMULOG LS-TTL, Part 1

"Logic Networks and Units"

For setting up circuits and experiments using the sets SIM 5.1.1/5.1.2/5.1.3

### 571 182 Experiment Manual SIMULOG LS-TTL, Part 2

"Assembly of a Central Unit"

For setting up circuits and experiments using the set SIM 5.1.7

### 571 192 Experiment Manual SIMULOG LS-TTL, Part 3

"Microprocessor Circuits"

For setting up circuits and experiments using the set SIM 5.1.4

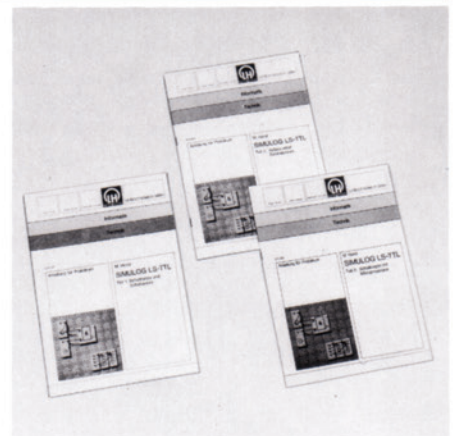
### 571 202 Experiment Manual SIMULOG LS-TTL, Part 4

"Digital Control Circuits"

For setting up circuits and experiments using the sets SIM 5.1.5 and 5.1.6

### 571 162 Experiment Manual Programmable Logic Controls

For basic applied computer science training using the set S10



571 172/182/192