

9. CIRCUIT DESCRIPTION AND DIAGRAMS

9.1 Symbol Explanation

9.1.1 Arrows A black arrow on a line indicates in which direction an AC signal flows. A white arrow on a line indicates in which direction the information of a DC signal flows. An exception from this rule is the supply lines and their connections, which are always indicated by a supply voltage level or its associated label.

9.1.2 Logic circuits A small circle at an external input means that the specific input is active LOW, i.e. it produces the desired function, in conjunction with other inputs if its voltage is the lower of the two logic levels in the system, otherwise the specific input is HIGH. A clock input is indicated by an open triangle. A small circle at a clock input means that the outputs change on the HIGH to LOW clock transition. A small circle at an output indicates that when the function designated is true, the output is LOW. Inputs and outputs are labelled with mnemonic letters as described in table 9.1.

9.1.3 Logic Functions Logic functions are labelled with mnemonic letters in brackets. An active LOW function is given a bar over the label.

9.1.4 Voltages Typical DC voltages are indicated on the circuit diagrams next to the points to which they refer and are marked with a "V". Typical logic levels are indicated in brackets (LOW/HIGH) on the circuit diagrams next to the point to which they refer and are marked with a "V". Typical AC voltages are likewise indicated on the circuit diagrams. They are marked with "Vpp" or "mVpp" and values are in RMS unless otherwise stated.

9.2 ABBREVIATIONS

A	= ampere, amperes
B	= battery, motor
C	= capacitor
Car.	= carbon
Cer.	= ceramic
CR	= thyristor
D	= diode
F	= farad, fan
FS	= fuse
H	= henry
IC	= integrated circuit
k	= kilo or 10^3
L	= inductor
LED	= light emitting diode
LS	= loudspeaker
lin.	= linear
log.	= logarithmic
m	= milli or 10^{-3}
M	= mega or 10^6
ME	= instrument
MF	= metal film
Mi	= mica
MO	= metallic oxide
MP	= metallized paper
u	= micro or 10^{-6}
n	= nano or 10^{-9}
NPO	= temp. coefficient 0
N150	= temp. coefficient -150
NTC	= neg. temp. coefficient
p	= pico or 10^{-12}
PL	= connector (plug or cable with plug)
Polyes.	= polyester
Polyst.	= polystyrene
Pot.	= potentiometer
PTC	= pos. temp. coefficient
Q	= transistor
R	= resistor
RL	= relay
SK	= connector (socket or cable with socket)
SL	= lamp
Sol. al.	= solid aluminium
SW	= switch
T	= transformer
Tan.	= tantalum electrolytic capacitor
V	= working voltage DC or volts
Vac.	= working voltage AC
Var.	= variable
Varicap	= variable capacitance diode
V1	= valve

Vpp = peak to peak voltage
VR = neon lamp
ww = wire wound
W = watt, watts
W.alum. = wet aluminium electrolytic
X = crystal, crystal osc. or crystal filter

Table 9.1

Label	Short for	Meaning
A	Trig Input	triggers one-shot on falling edge
Ax	Address	selects a memory location (data word) or a multiplexer input
B	Trig Input	triggers one-shot on rising edge
B/D	Binary /Decimal	selects counting mode (modulus 16 or 10)
BI	Blank Input	deactivates BCD-to-7 segment decoder (blanks connected display)
CxY	Control Signal	programmable bidirectional hand-shake signal to/from peripheral
CEP, CET	Clock Enable	enables clock signal to counter
CP	Clock Pulse	edge activated input for updating synchronous circuit
CSx	Chip Select	selects a memory or peripheral circuit (bus slave)
Dx	Data	input to D flip-flop and register or bidirectional information path for bus connected device
E	Enable Input	enables clock signal
EO	Enable Output	activates output(s) from combinatorical circuit
EQ	Enable Output	activates output(s) from sequential circuit
HLT	Halt	suspends MPU activity and releases busses
IxY	Input Data	input for combinatorical circuit
IRQy	Interrupt Request	wired-OR flag from peripheral to MPU indicating interrupt detected
J, K	Data	input to J-K flip-flop
Kx	Mode Select	selects counting mode for programmable counter
LE	Latch Enable	updates latching register
LT	Lamp Test	activates all outputs on BCD-to-7 segment decoder
MR	Master Reset	input for initializing MPU or clearing programmable registers in peripheral circuit
MRDY	Memory Ready	hand-shake flag to MPU indicating new bus cycle may be started

Table 9.1 continued

NI1	Non-maskable Interrupt Output	flag to MPU, which cannot be masked softwarewise indicating interrupt detected output from combinatorical circuit
Ox		
PxY	Data (bidirectional)	input to programmable counter or programmable bidirectional signal to/from peripheral
PE	Parallel Enable	loads Px data into programmable counter
Qx	Output	output from sequential circuit
R	Reset	forces flip-flop(s) to LOW state
RBI	Ripple Blank Input	deactivates BCD-to-7 segment decoder (blanks connected display) if data correspond to leading zero, when decoders are cascaded
RSx	Register Select	addresses programmable registers in peripheral circuit
S	Set	forces flip-flop(s) to HIGH state
Sy	Select Data	selects data path through multiplexer
SYNC	Synchronize	issued from bus master (MPU) to synchronize data transfer
TC	Terminate Count	output from counter indicating new cycle started (corresponds to carry or borrow depending on counting direction)
U/D	Up/Down	selects counting direction
VI1A	Valid Memory Address	issued from bus master (MPU) to indicate stable address bus
WI	Write Input	input to bus slave to make it accept data from master
WQ	Write Output	output from master (MPU) when it is a data source

(1) "x" is a numerical index (zero origin indexing) corresponding to bit position

(2) "y" is an alphabetical index used for multiple ports

