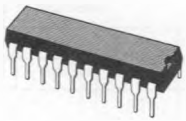
SGS-THOMSON MICROELECTRONICS

TEA6414

BUS CONTROLLED VIDEO MATRIX SWITCH

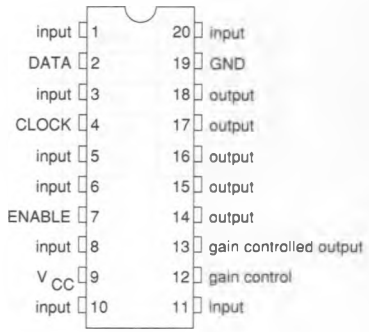
ADVANCE DATA

- 15MHz BANDWIDTH
- 8 INPUTS (CVBS, RGB, MAC, chroma...)
- 6 OUTPUTS (one gain controlled output)
- POSSIBILITY OF MAC SIGNAL FOR EACH INPUT BY SWITCHING-OFF THE CLAMP WITH AN EXTERNAL RESISTOR BRIDGE
- BUS CONTROLLED
- 6.5dB GAIN BETWEEN ANY INPUT AND OUTPUT
- – 55dB CROSSTALK AT 5 MHz
- FULLY PROTECTED AGAINST ESD



TEA6414
DIP20
(Plastic Package)

PIN CONNECTIONS

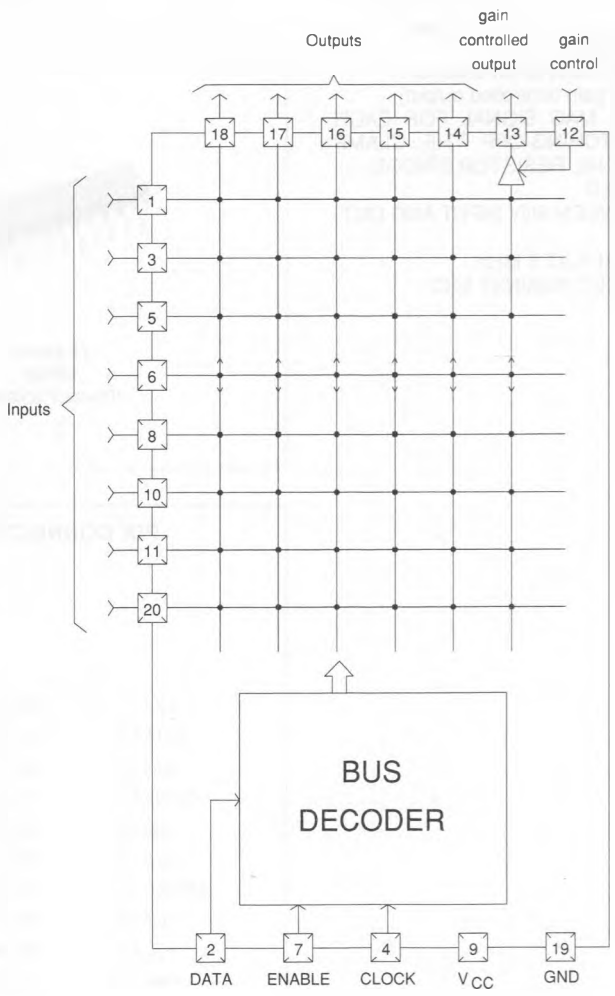


E88TEA6414-01

DESCRIPTION

The TEA6414 switches 8 input VIDEO sources on 6 outputs. Each output can be switched on only one of each input but it is possible to have the same input connected to several outputs. The gain controlled output must be connected to an unclamped input. All the switching possibilities are changed through the 3 Wire-Bus (THOMSON BUS).

BLOCK DIAGRAM



E88TEA6414-02

Note : When any input is not used, it must be bypassed to ground through a 220nF capacitor, so as to avoid degrading the crosstalk.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage Pin 9	11.5	V
T_{amb}	Operating Ambient Temperature Range	0 to + 70	°C
T_{stg}	Storage Temperature Range	– 20 to + 150	°C

THERMAL DATA

$R_{th\ (j\text{-}a)}$	Junction-ambient Thermal Resistance	80	°C/W

ELECTRICAL CHARACTERISTICS

T_{amb} = 25°C, V_{CC} = 10V, R_{load} = 10kΩ, C_{load} = 3pF (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{CC}	Power Supply Voltage Pin 9	7	10	11	V
I_{CC}	Power Supply Current (without load on outputs ; V_{CC} = 10V)		37	45	mA

GAIN CONTROLLED OUTPUT (pin 13 ; forced input DC level = 5V with an external resistor bridge on the selected input, see application diagram)

Symbol	Parameter	Min.	Typ.	Max.	Unit
	Dynamic Pin 13	3			V_{pp}
	Output Impedance		120	150	Ω
	Min. Gain ($I_{control}$ on pin 12 = – 0.8mA)	– 10	– 9	– 8	dB
	Nominal Gain ($I_{control}$ = 0, V_{in} = 1Vpp)	5.5	6.5	7.5	dB
	Max. Gain ($I_{control}$ on pin 12 = 0.8mA)	12	13	14	dB
	Bandwidth (– 3dB attenuation)	7	10		MHz
	Crosstalk (f = 5MHz)		– 55		dB
	DC Level	5.7	6	6.3	V

GAIN CONTROL

Symbol	Parameter	Min.	Typ.	Max.	Unit
	Nominal Voltage Pin 12	3.7	4	4.3	V
	Impedance	0.8	1	1.2	kΩ
	Max. Gain Control Current (for gain max. – 0.5dB)	0.04	0.1	0.2	mA
	Min. Gain Control Current (for gain min. + 0.5dB)	– 0.3	– 0.2	– 0.14	mA

ELECTRICAL CHARACTERISTICS (continued)

INPUTS

Symbol	Parameter	Min.	Typ.	Max.	Unit
	Max Signal Amplitude (CVBS signal)	2			V_{pp}
	Input Current (per output connected, input voltage = 5VDC) (this current is X6 when all outputs are connected on the input)		1	2	µA
	DC Level	3.3	3.6	3.9	V
	DC Level Shift (temperature from 0 to 70°C)			100	mV

OUTPUTS (V_{in} = $1V_{pp}$ for all dynamic tests)

Symbol	Parameter	Min.	Typ.	Max.	Unit
	Dynamic Pin 14-15-16-17-18	4			V_{pp}
	Output Impedance		25	50	Ω
	Gain	5.5	6.5	7.5	dB
	Bandwidth (– 1dB Attenuation)	7	10		MHz
	Crosstalk (f = 5MHz)		– 55		dB
	DC Level	2.9	3.2	3.5	V

GENERAL DESCRIPTION

The main function of the IC is to switch 8 input video sources on 6 outputs.

Each output can be switched on only one of each input. On each input an alignment of the lowest level of the signal is made (bottom of synch. top for CVBS or black level for RGB signals).

Each nominal gain between any input and output is 6.5dB. For D2MAC signal the alignment is switched off by forcing, with an external resistor bridge, 5 V_{DC} on the input.

Each input can be used as a normal input or as a MAC input (with external resistor bridge).

All the switching possibilities are changed through the BUS.

Driving 75Ω load needs an external transistor.

On the output (pin 13) the gain is controlled in the range + 13dB, – 9dB in order to adjust the output level to 2Vpp. The nominal gain (6.5dB) is obtained when pin 12 is DC not connected and AC grounded. The gain is controlled by varying current on pin 12.

It is possible to have the same input connected to several outputs.

The starting configuration (power supply from 0 to 8V) is undetermined.

6 words of 8 bits are necessary to determine one configuration.

BUS SELECTIONS (THOMSON BUS)

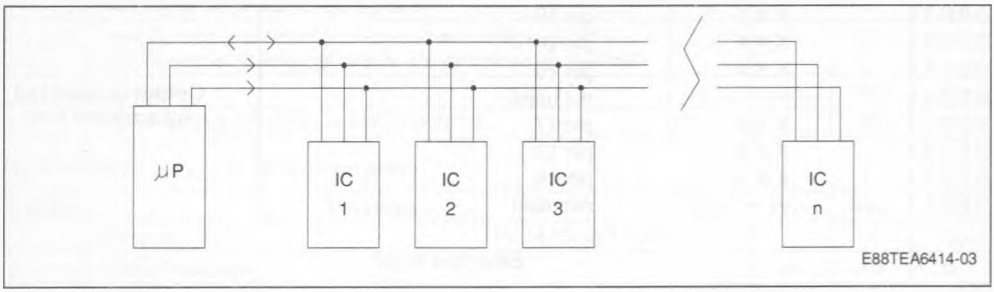
ADDRESS MSB	DATA LSB	Selected Output	
0 0 0 0 0	X X X	pin 18	Output is selected by address bits
0 0 1 0 0	X X X	pin 14	
0 0 0 1 0	X X X	pin 15	
0 0 1 1 0	– – –	not used	
0 0 0 0 1	X X X	pin 17	
0 0 1 0 1	X X X	pin 13	
0 0 0 1 1	X X X	pin 15	
0 0 1 1 1	– – –	not used	

		Selected Input	
0 0 X X X	0 0 0	pin 5	Input is selected by data bits
0 0 X X X	1 0 0	pin 8	
0 0 X X X	0 1 0	pin 3	
0 0 X X X	1 1 0	pin 20	
0 0 X X X	0 0 1	pin 6	
0 0 X X X	1 0 1	pin 10	
0 0 X X X	0 1 1	pin 1	
0 0 X X X	1 1 1	pin 11	

Example : 00100 101 connect pin 10 (input) to pin 14 (output).
(equals 25 in hexadecimal).

SPECIFICATION FOR THE THOMSON BIDIRECTIONAL DATA BUS

The bidirectional data bus has three lines (DATA, CLOCK, ENABLE) and operates serially. Transmission on the DATALINE is effected bidirectionally, whilst the ENABLE- and CLOCKLINES are driven only by the microprocessor. It is possible to select several ICs from the µP via the THOMSON BUS.



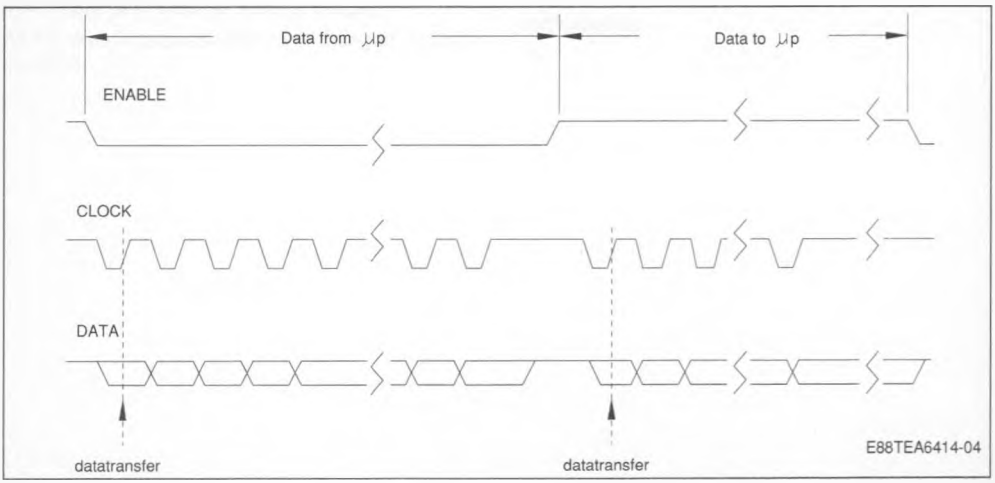
The identification or address of each particular IC is achieved by the length of the word (number of clock pulses), and each IC responds with its own particular word length. The address length is determined only while ENABLE is low, by counting the clock pulses. The rising edge of the ENABLE signal indicates the end of the address sequence.

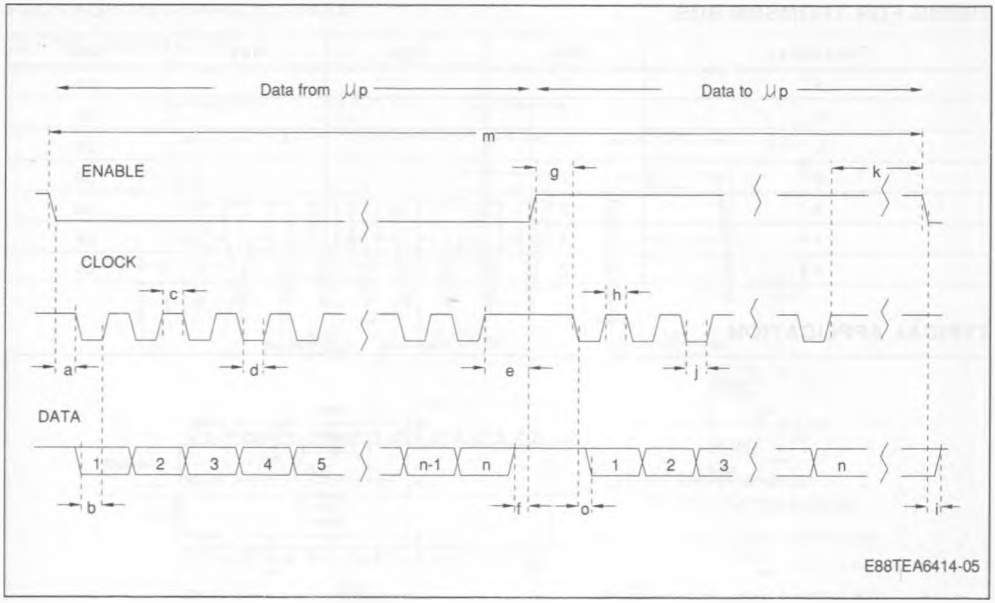
Normally, there are several locations within the same chip, which must be selected individually, the datastream may, therefore be split into subaddress and data. In the case where an IC is not using the complete specified subaddress range it is possible to employ the unused subaddress range with a second or third IC with the same word length. The bit-number of the subaddress is flexible.

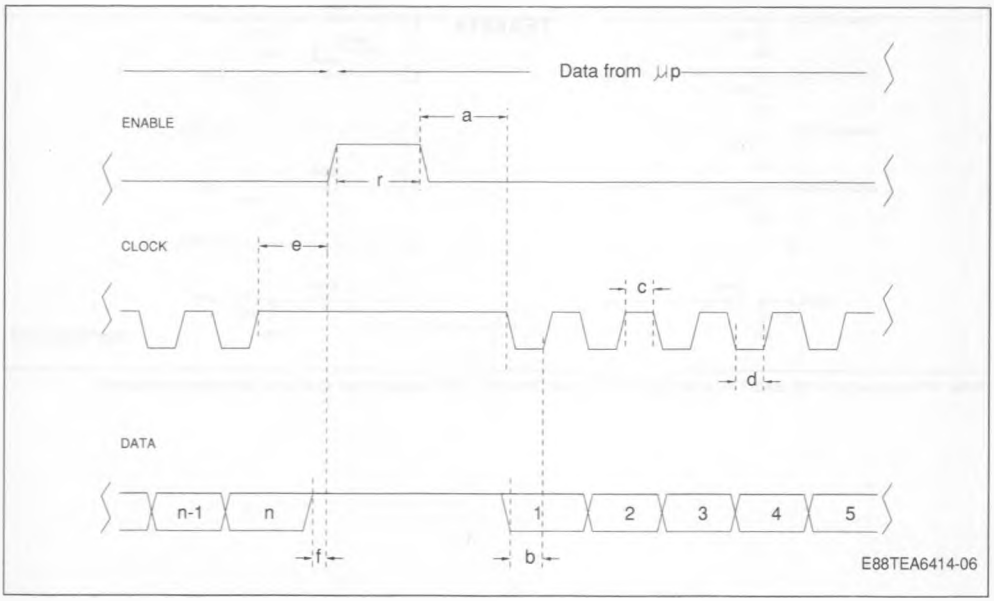
The reply word length from any of the ICs to the µP is also flexible. This bidirectional transmission is possible from the last addressed IC after the positive going edge of the ENABLE signal if the ENABLE signal remains high and the CLOCK impulses are present on the line. The µP in effect clocks out the data from the chip. When an IC is able to send information in the bidirectional way, the µP decides whether to take all information, to suppress completely the information or to stop the transfer after any bit.

This reply word, synchronized to the clock from µP, is sent only once. Should a subsequent clock impulse be present on the clock line, it will switch the IC in question to high impedance.

The register, from which the bidirectional information comes, is addressed with the IC address. When more than one bidirectional register exists, the selection is made by the previously selected subaddress.



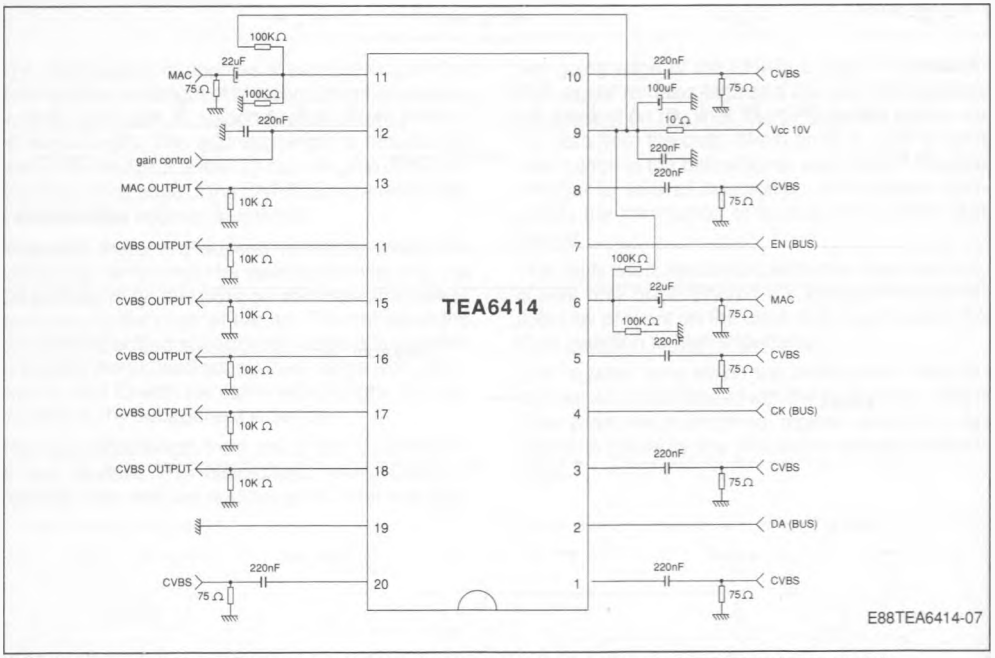

Data from µp
Data to µp
m
ENABLE
g
k
CLOCK
c
h
a
d
e
j
DATA
1
2
3
4
5
n-1
n
1
2
3
n
b
f
o
i
E88TEA6414-05


Data from µp
ENABLE
a
r
CLOCK
e
c
d
DATA
n-1
n
1
2
3
4
5
f
b
E88TEA6414-06

TIMING FOR THOMSON BUS

Parameter	Min.	Typ.	Max.	Unit
a	1			µs
b	1			µs
c	1			µs
d	1			µs
e	2			µs
f	1			µs
r	2			µs

TYPICAL APPLICATION



Note : When any input is not used, it must be bypassed to ground through a 220nF capacitor, so as to avoid degrading the crosstalk.

PACKAGE MECHANICAL DATA

20 PINS – PLASTIC DIP