

Application Note AN 64: NEC EMMA to NetChip NET2270 Interface



Document # 670-0139-6401

Date: 03/23/04

1 Applicability

NEC EMMA – Enhanced MultiMedia Architecture processor for digital TV receivers/decoders/recorders
NetChip NET2270 – USB 2.0 High-speed Programmable Peripheral Controller

2 General Description

This document assumes that an EMMA device is being used, and that the VRCLK frequency is 166.5 MHz. Following is a table showing the connections between the EMMA and NET2270 (See Figure 1 for the schematic):

Signal	EMMA	NET2270
Address	GADD[5:1]	LA[4:0]
Data	GDATA[15:0]	LD[15:0]
Chip Select	GCSB1#	CS#
Read Strobe	GOEB#	IOR#
Write Strobe	GWEB#	IOW#
Interrupt	PPORT[1]	IRQ#

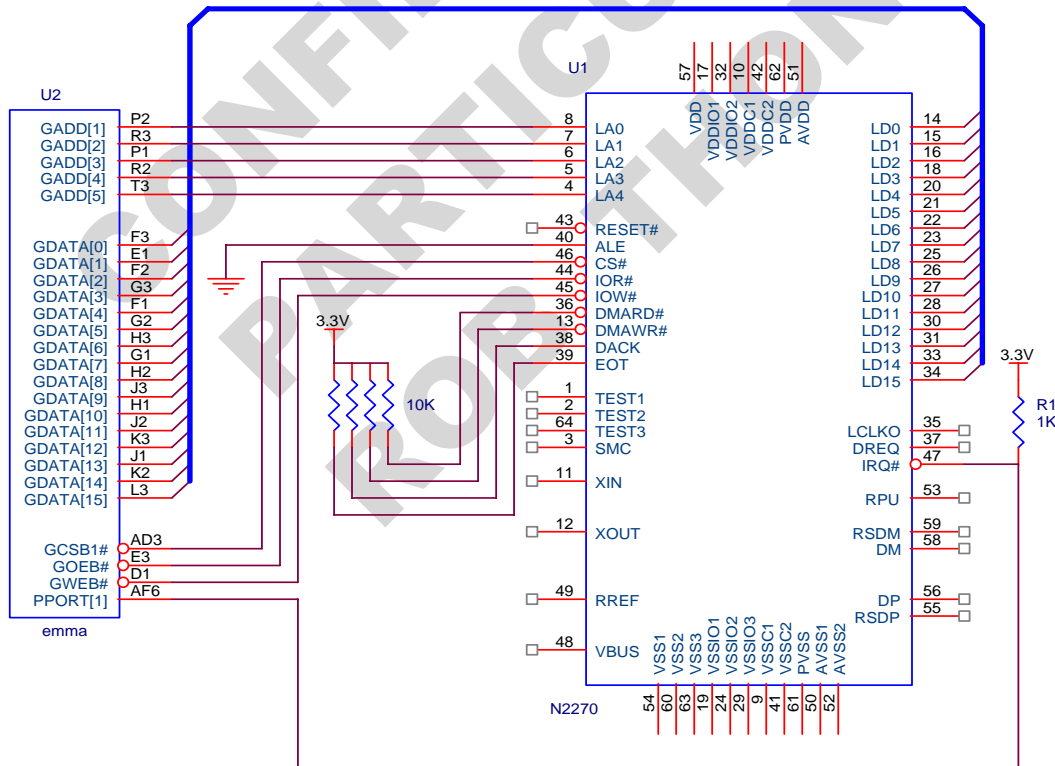


Figure 1: NEC EMMA to NetChip NET2270 Interface



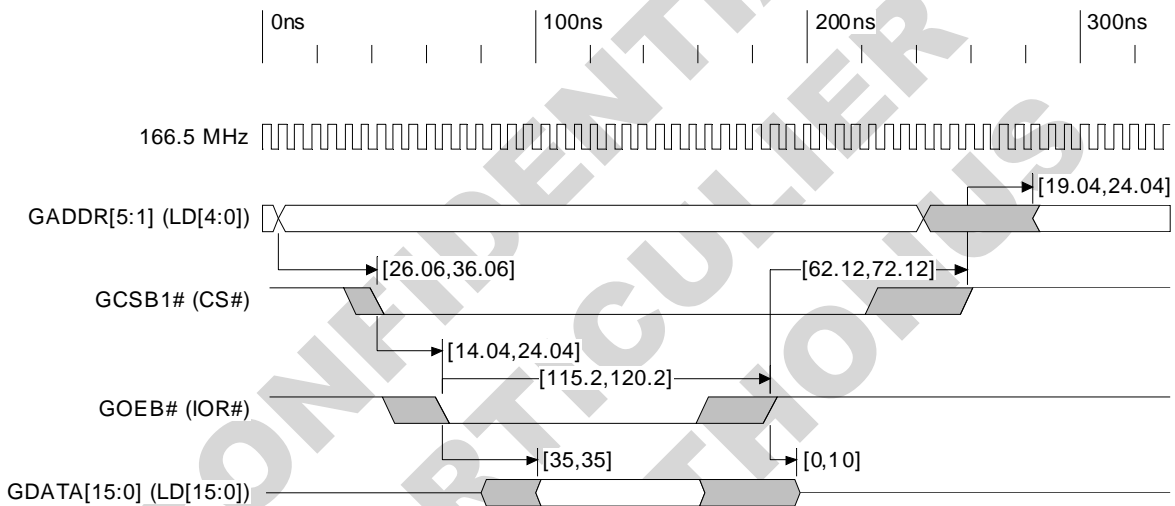
© PLX Technology, Inc., 2004
870 Maude Avenue, Sunnyvale, California 94085
TEL (650) 526-1490 FAX (650) 526-1494
<http://www.plxtech.com/netchip>

3 EMMA Read Transaction from NET2270

The read cycle can be performed in 30 clock periods at 166.5 MHz. The address setup time of 5 nsec is provided by the EMMA, because the address is valid 40.1 nsec before the assertion of the read strobe. The 1 nsec address hold time of the NET2270 is provided by the EMMA, because the address is held valid for 81.16 nsec after the read strobe is de-asserted. The 35 nsec data access time of the NET2270 meets the 72.12 nsec data setup time of the EMMA.

When OE# is negated at the end of the cycle, the data is sampled by the EMMA and the NET2270 stops driving the data bus. The NET2270 floats its data bus within 10 nsec, which is well before any write data might be driven by the EMMA.

The EMMA provides the 33 nsec read recovery time required by the NET2270.

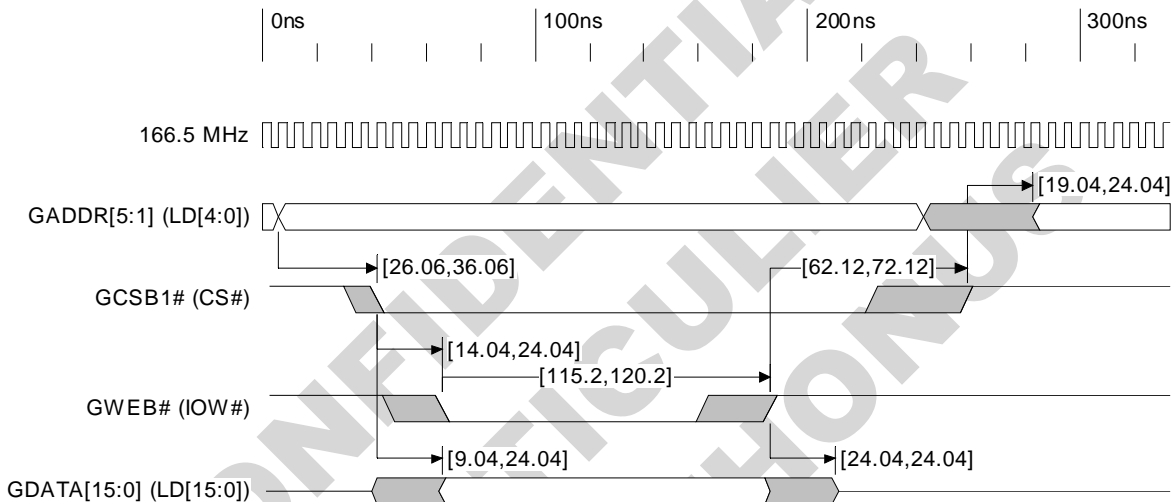


4 EMMA Write Transaction to NET2270

The write transaction can be performed in 30 clock periods at 166.5 MHz. The address setup time of 5 nsec and the address hold time of 1 nsec are provided by the EMMA, because the address is valid 40.1 nsec before the assertion of the write strobe and the address is held for 81.16 nsec after the write strobe is de-asserted.

The data setup and hold times of the NET2270 are easily met, since the data is present at least 120.2 nsec before GWEB# is de-asserted, and is held for at least 24.04 nsec after GWEB# is de-asserted. The IOW# pulse wide requirement of 5 nsec is provided by the EMMA, since it drives GWEB# for 115.2 nsec.

The EMMA provides the 55 nsec write recovery time required by the NET2270.



5 Summary

The EMMA can be interfaced to the NetChip NET2270 with no external logic. All timing parameters can be met at 166.5 MHz. The total read/write cycle time is 180.3 nsec (30*6.01). This implies a maximum data transfer rate of 11 Mbytes/sec.