MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Electrical Engineering

6.331 Advanced Circuit Techniques

Design Problem 2   Issued : March 15, 2002
D/A Converter   Due : Friday, April 12, 2002

Design a D/A converter for the following specifications. Your design should operate from
15±0.5-volt supplies. Input digital signals are TTL compatible.

Design an 8 bit D/A converter which provides an unloaded scale factor of 2.5V/MSB
and has a settling time of 50 ns to 1/2 LSB. The circuit should have an output resistance
less than 500Ω and will not be loaded with more than 10pF of capacitance when high speed
operation is required. Your design should operate over a temperature range of $25° \pm 10°$C.
This design is not intended for integration, so the use of unlimited numbers of components
is discouraged.

In order to simplify your design of the high speed DAC, you may have an unloaded scale
factor of either plus or minus 2.5V/MSB. The output may be either positive, negative, or
both (which ever is most convenient for your design), however, the output voltage must be
referenced to ground.

Build a 2-bit version (MSB and LSB) of your design in order to demonstrate feasibility.
We would like to see your circuit operating. At checkoff, we will want to measure your scale
factor, TTL noise imunity, and settling time (with your window circuit).