

Study Guide – MTM 3120 MIDTERM

Part I

March 9, 2003

One way to use a study guide such as this is to create index cards with the topic or question on one side and the answer or definition on the other. Studying then is easy and portable.

Runstein and Huber, Chapter 6

Pages 189-197

- ✓ Understand the concept of *sampling*
- ✓ Be able to discuss the differences between a *continuous* signal and a *discrete* one
- ✓ Understand the difference between sampling rate and sampling time
- ✓ Know the *Nyquist Theorem* and why it is important to digital recording and reproduction
- ✓ Be able to define *alias frequencies* and explain what occurs in signals if they are present
- ✓ Be able to describe the concept of the *brick wall* filter, know if one is practical in real life (it would have infinite attenuation by the way) and what must be done to achieve the needed results
- ✓ Why do we use the strange sampling rate of 44.1KHz?
- ✓ Be able to define what an *anti-aliasing filter* is
- ✓ Be able to define *oversampling* and describe what it is used for in practical terms (hint: it makes it easier to create an *anti-aliasing filter* which is effective, but why?)
- ✓ Be able to provide a definition of *quantization*
- ✓ Understand the general concept of *quantization errors* and what can be done to alleviate them
- ✓ Understand the concept of *signal to error ratio (S/E)* be able to calculate for 8, 16, 24 and 32 bit words (know the formula $S/E = 6N + 1.8\text{dB}$)
- ✓ Be able to define *dither* and explain what it is used for
- ✓ Be able to define the basic aspects of the *DAC* and *ADC* processes, also know these tools in their most basic forms and be able to describe their various aspects and how they work
- ✓ Be able to define *pulse-code modulation (PCM)*

Pages 209 – 218

- ✓ Know the various types of *rotating-head digital recorders* (three types)
- ✓ Be able to describe why *rotating-head helical scan paths* are needed for digital audio recording, what do they provide for
- ✓ Understand the basics of the *DAT* machine (you should know the particulars from reading the DA-30 manual!)
- ✓ Understand the basics of the *ADAT* and *DA-88*
- ✓ Know what *TDIF-1* is and what it is used for (216)

- ✓ Be able to discuss the emergence of *digital audio sampling systems* based on computer technology and why this is perhaps more effective than tape-based systems
- ✓ Be able to discuss the implications for production that *random access* of digital audio data provides
- ✓ Be able to describe the basic difference between *tape-based storage* and *random access storage* of data

Pages 226 – 250

- ✓ Be able to describe the basic qualities of a *hard-disk recorder* or a *digital audio workstation* (DAW)
- ✓ Know the three basic advantages of the DAW that Runstein points out on page 226
- ✓ Be able to discuss how the DAW integrates the various functions of the recording production process and what the implications are for the future
- ✓ Be able to define nondestructive editing
- ✓ Be able to discuss the various signal processing changes to digital recording that are effected in non-real time on the DAW (level, EQ, dynamics, reverb, fades and so on)
- ✓ Be able to discuss the differences between *nondestructive* and *destructive* editing methods, know when *destructive* editing might be useful
- ✓ Be able to describe the utility of on-screen editing graphics (the TDR) and how it is an aid to digital editing
- ✓ Know why it is useful in editing to be able to zoom to the level of the individual sample (231)
- ✓ Know the basic editing tools and how they work: cut, copy, paste, fade, crossfade
- ✓ Be able to define what *normalization* is and contrast this with *gain change* (236)
- ✓ Be able to discuss in basic terms the *advanced DSP editing tools* that a DAW might provide
- ✓ Be able to discuss in basic terms the concepts associated with *pitch and time changing* (238)
- ✓ Be able to describe the salient features of *multi-channel hard-disk recording systems* (244)
- ✓ Be able to define what a DAW is as it relates to audio, video and music production (246)
- ✓ Be able to define the five important characteristics of the DAW (248)

End of part one.

Study Guide – MTM 3120 MIDTERM
Part II
March 9, 2003

One way to use a study guide such as this is to create index cards with the topic or question on one side and the answer or definition on the other. Studying then is easy and portable.

O2R Manual – Review previous material regarding controls and basic operations, including automix and scene memory functions.

Sections on EQ, Dynamics Processing and Internal Effects – New Material (CD-ROM II)

- ✓ Understand the concepts of *scene memories* and *automixes*, be able to discuss how they both work together on complex projects
- ✓ Know how to store and recall both *scene memories* and *automixes* on the console, know what is different about doing this from *ProjectManager* on the Macintosh
- ✓ Know how to save and recall EQ, dynamics and effects from the internal libraries, know how to back these up in *ProjectManager* as well
- ✓ Understand the basic concepts of the *dynamics processing* section and be able to in basic terms define, *compressor*, *gate* and *expander*, be able to apply what they do in practice to hypothetical musical materials
- ✓ Understand the basic parameters of the *internal effects* processors, know about what kinds of *time-based processing* is possible on the O2R, *reverb*, *chorus*, *flanging* and *echo* for example, know this material in general terms only

Review the ProjectManager Manual (CD-ROM I)

- ✓ Be able to describe what resynchronization means when working with the PM and the O2R
- ✓ Be able to describe the best method for work with PM in the context of the session, when to turn it on, how to set up a recording or mix session and so on, be able to explain why PM is an important piece of the over system of the O2R
- ✓ Be able to explain how certain O2R functions are possible to control from the PM screen, and be able to explain why this is often desirable

February '02 Mix Magazine Article - Anatomy of an MP3 - page 68

Don't worry – I will try to dig this up for you and place at the web!

- ✓ Know the basic concepts associated with MP3 files, including the use of the *FFT* and the notion of *filterbanks*
- ✓ Know the terms listed in the glossary
- ✓ Be able to define *psychoacoustic analysis*
- ✓ Understand the notion of lossy and lossless compression and be able to say something about *entropy coding*
- ✓ Study the diagrams and know what the various labeled parts do

I think this is just enough for a challenging midterm...but you never know, there could be a question or two from other assigned reading... ;-)

End of Part II