

**1. Module details****Module name****VCR Advanced****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 – 40 hours.

**Module code**

NUE903

**Discipline code**

0703230

**2. Module purpose**

The purpose of this module is to provide the student with the knowledge and skills to describe the electronic processes used in modern VHS VCR techniques and to safely apply this knowledge and associated skills to the service and repair of VHS VCRs.

**3. Prerequisites**

NUE901 TV Micro Controllers.  
NUE802 VCR Basic Principles.

**4. Relationship to competency standards**

This module provides some of the knowledge and skills underpinning competence in the following standards: Metals and Engineering Industry National Competency Standards, Units 18.45A, 18.56A, 18.65A. National Electrotechnology Industry Standards, Units NES205, NES302, NES303, NES305, NES306, NES402, NES403, NES406, NES407.

**5. Content****Chrominance processing principles**

Down converted colour recording principles

Specifications

Colour cross talk and the need for phase rotation

Functional block diagram in record mode

Functional block diagram in playback mode

Practical circuits

Alignment of practical circuits

**System control principles**

System control requirements

Serial and parallel data transmission in VCRS

Input devices

Functional block diagram

Operating principles

Display and timer operation

Practical circuits

Methods of testing practical system control circuits

Variable speed and trick mode operation including principle of operation during pause modes, principle of operation during variable speed playback modes and application of variable speed and trick modes to servo systems

**Advanced VCR techniques**

Practical circuit operation  
 Hi Fi systems  
 Digital tracking systems  
 Digital picture storage  
 Digital still pictures  
 Bar code systems  
 Multi-standard VCR

**6. Assessment strategy**

**Assessment methods**

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.

**Conditions of assessment**

Normally learning and assessment will take place in a classroom / laboratory environment.

**7. Learning outcome details**

**Learning outcome 1**

**Describe the operation of the chrominance processing principles employed by a VHS VCR and demonstrate the application of these principles to a practical circuit.**

**Assessment criteria**

- 1.1 List the requirements and specifications for chrominance processing.
- 1.2 Describe the need for using down converted chroma principles.
- 1.3 Draw a block diagram of a typical chrominance recording process including the phase rotation sections and relevant waveforms.
- 1.4 Draw a block diagram of a typical chrominance playback section including relevant waveforms.
- 1.5 Describe the effect that each stage of the chrominance record section has on the chrominance wavefom.
- 1.6 Describe the circuit operation of a typical chrominance circuit diagram.
- 1.7 Describe the correct alignment of the chrominance stage in a VCR.

<b>Learning outcome 2</b>	<b>Describe typical system control sections used in a microprocessor controlled VCR and demonstrate the testing of a typical control system.</b>	
<b>Assessment criteria</b>	<p>2.1 Draw a block diagram of a typical system control section of a VCR.</p> <p>2.2 Describe the operation of a typical system control section using block diagrams and waveforms where applicable.</p> <p>2.3 Describe the operation and function of each input device.</p> <p>2.4 Describe the function and operation of each output devices.</p> <p>2.5 Demonstrate an ability to safely test each input and output device individually referring to given circuit diagrams.</p> <p>2.6 Draw a block diagram of the timer and display section.</p> <p>2.7 Describe the operation for the display section.</p>	
<b>Learning outcome 3</b>	<b>Describe the operation of a typical analogue and digital servo system.</b>	
<b>Assessment criteria</b>	<p>3.1 List the servo system requirements and specifications of a VCR.</p> <p>3.2 Draw a typical block diagram of the analogue speed and phase control loops.</p> <p>3.3 Describe the operation of an analogue servo system using waveforms.</p> <p>3.4 Draw a typical block diagram of the digital speed and phase control loops.</p> <p>3.5 Describe the operation of a digital servo system using waveforms.</p> <p>3.6 Describe the principles of operation in cue, review and variable speed modes.</p> <p>3.7 Draw the block diagrams of the servo operation in pause, cue, review and variable speed modes.</p> <p>3.8 Describe the operation of an analogue and digital servo system using practical circuits.</p>	
NUEITAB June, 1998	V1.2 3/5	<i>VCR Advanced</i>

**Learning outcome 4**

**Assessment criteria**

3.9 Demonstrate methods used to test practical servo systems.

**Describe the processes used in advanced VCR techniques.**

4.1 Draw a block diagram and describe the operation of a Hi Fi section of a VCR including relevant specifications and waveforms.

4.2 Describe the principle of SVHS VCR listing the specifications and system requirements.

4.3 Draw the block diagram of a SVHS VCR luminance processing stage and describe the operation of the stage using waveforms.

4.4 Describe the operation of a multi-standard VHS VCR when playing tapes of different standards.

4.5 Describe how a control track may be used to provide index and searching systems.

4.6 Draw a block diagram showing the principle of digital frame storage and describe the operation.

4.7 Describe the operation of a digital tracking system.

4.8 Describe the principles of bar coding and other coding systems that may be used by a VCR.

**8. Delivery of the module**

**Delivery strategy**

Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective way to achieve this is by the integration of theory and practice where students learn by experimentation and through research and laboratory reports. It is recommended that learning and assessment be facilitated in a holistic manner which may require a learning outcome sequence other than that indicated in the module.

**Resource requirements**

Resources should be sufficient for students to carry out experiments on an individual basis. This will require a range of VHS VCRs and appropriate test equipment.

Useful references include:

Schonbeck R 1996, *Electronic Video Systems*  
Prentice Hall, Englewood Cliffs  
ISBN 0-02-408013-6

Trundle E 1996, *Newnes Guide to TV and Video Technology*  
Butterworth-Weinermann Oxford  
ISBN 07506 23748

Botto D 1992, *A Basic Guide to Colour TV and VCRs*  
Electronics Australia, Federal Publishing, Alexandria

**Occupational health  
and safety requirements**

A safe and healthy environment will be provided for students and teachers as well as safe procedures with regard to learning / teaching activities.