

**NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND
TRAINING**



JANUARY 2023

PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN

LEVEL: NTA 6

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ABBREVIATIONS

6s	Seiri, Seiton, Seiso, Setketsu, Shtsuke and Safety
CBET	Competency Based Education and Training
NACTVET	National Council for Technical and Vocational Education and Training
NOS	National Occupational Standards
OS	Occupational Standards
PCB	Printed Circuit Board
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical, and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-based Education:	An instructional programme that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as a performance tool of assessment of the prescribed outcomes.
Occupational/Job analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Performance Criteria:	Indicate expected end results or outcomes in the form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.

Standards:	A set of statements, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	Crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and confirm the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0. INTRODUCTION

Technical Education and Training (TET), one of the most important education sub-sectors in Tanzania, is responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's *Development Vision 2025* intends to raise the country's economy to a middle-income status. This requires an experienced workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical and Vocational Education and Training has begun the job of drafting Occupational Standards that will eventually be adopted as National Technical Education and Training Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupational Standard describes functions, performance criteria, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current and consistent in delivery across all public and private institutions.

However, what must be noted is that, Occupational Standards and Training Standards/Qualifications Standards are different. Occupational Standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical circuits, eliminates troubleshooting in electrical circuits, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and Training Standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training Standards are used to define curricula in training institutions. However, it is critical that there must be a direct link between the Occupational Standards and the Training Standards to respond to demands of the labour market.

In TET delivery, Tanzania adopted the Competence Based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the Occupational Standards. Occupational Standards are thus the starting point for developing Competence Based Education and Training (CBET) programmes. TET institutions will be required to benchmark their curricula with relevant Occupational Standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Electronic Equipment Assembly and Repair Technician Occupation has its own set of occupational standards. This document explains how the Occupational Standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational Standards development process began with an examination of major documents that guide Tanzanian skill development. The 10-year National Skills Development Strategy (2016-2026) was one of the documents reviewed, and it outlined six economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and Logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of Engineers and Educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as Appendix 1 to this document.

The Occupational Standards were then developed. Engineers in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the Occupational Standards. Engineers, Supervisory Technicians on the job, and experienced Electronic Equipment Assembly and Repair Technicians were key informants in the survey to discover occupational trends. The information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of ... online surveys were completed by Engineers from the labour market across the country. Apart from the survey aiding in defining the scope for the occupational analysis, they also served to engage a wide cross-section of Engineers in the occupation. Apart from this, the stakeholders' forum was attended by ... participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by an Electronic Equipment Assembly and Repair Technician. However, the occupational standards are not meant to take the place of individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Electronic Equipment Assembly and Repair Technician may perform tasks in a number of key areas of the Occupational Standards, but not necessarily in all areas. For example, in large operations, other individuals may be employed or designated to perform specific tasks.

The Electronic Equipment Assembly and Repair Technician shall be mainly engaged in Printed Circuit Board (PCB) assembly, debugging and repair of power supply and circuits, office and digital electronic equipment repairing and service acceptance under the supervision of Engineers. They can also perform electronic equipment assembly, debugging and repair, service acceptance and other work in the workshop or user site. Generally, the Electronic Equipment Assembly and Repair Technician performs the following responsibilities:

- a) Manual assembly of PCB
- b) Semi-automatic mixing assembly of PCB
- c) Automatic mixing assembly of PCB
- d) DC voltage-stabilized power and debugging of basic circuits
- e) Debugging of switching power supply
- f) Debugging of high-voltage power supply
- g) Debugging of analog-digital hybrid circuits
- h) Maintenance of analog-digital hybrid circuits
- i) Debugging of high frequency circuits
- j) Installation and debugging of electronic equipment
- k) Faults and maintenance of electronic equipment
- l) Quality inspection and acceptance of small electronic products
- m) Quality inspection and acceptance of electronic equipment installation
- n) Quality inspection and acceptance of electronic equipment repair

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA 4-6.

4.0. VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0. OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN – NTA 6

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	AUTOMATIC MIXING ASSEMBLY OF PCB	DUTY NO.	601
TASK TITLE	ASSEMBLY OF PCB	TASK NO.	6011
PERFORMANCE CRITERIA	The person performing this task must be able to complete the assembly of PCB in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the PCB assembly workshop under the supervision of Electronic Equipment Assembly and Repair Engineers. The tools and equipment to be used include: 1. Wave soldering equipment; 2. Temperature curve testers; 3. Welding tools such as soldering irons, tin pans heat guns and so on; 4. Automatic optical testers; 5. Multimeters; 6. Electrostatic protection kits; 7. Lead forming tooling/equipment; 8. Magnifiers; 9. Commonly-used tools such as tweezers, diagonal pliers, and needle-nose pliers; 10. Personal protective equipment.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Read information of more than four multi-lead components such as the specification, model, pin number and so on; 3. Conduct lead correction for more than four multi-lead components; 4. Tin leading lines for more than four multi-lead components; 5. Determine the installation sequence of components in accordance with the type, package size and electrostatic sensitivity level of components; 6. Weld more than four multi-lead components; 7. Inspect pre-welding status of wave soldering equipment; 8. Test soldering temperature curve of wave soldering of PCB with		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Read the specifications, models, pin numbers and other information of multi-lead components; 1.2 Correct more than four multi-lead component leads; 1.3 Tin more than four multi-lead components; 1.4 Determine the installation sequence of components; 1.5 Complete the welding of PCBs with wave soldering equipment; 1.6 Conduct the overhaul of PCB. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic principles of component welding; 2.2 Basic principles of PCB assembly. 3.0 Theories The person performing this task must be able to explain the following:	

temperature curve testers; 9. Operate automatic optical testers and other equipment to check the assembly quality of PCBs; 10. Remove and take the place of more than four multi-lead components; 11. Observe the health and safety prevention measures during working; 12. Keep the workplace clean; 13. Store the tools.	3.1 Knowledge of assembly of PCB; 3.2 Specific flow and process specification of wave soldering; 3.3 Basic knowledge of PCB overhaul; 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The assembly of PCB is completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	AUTOMATIC MIXING ASSEMBLY OF PCB	DUTY NO.	601
TASK TITLE	CABLE PROCESSING	TASK NO.	6012
PERFORMANCE CRITERIA	The person performing this task must be able to complete cable processing in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Pneumatic tangent equipment; 2. Semi-rigid cable forming equipment; 3. Semi-rigid cable strpping equipment; 4. Semi-rigid cable straightening equipment or fixtures; 5. Optical fiber thermal stripping machines; 6. Optical fiber cutting knives; 7. Optical fiber joint grinding discs; 8. Optical fiber cleaning rods; 9. Optical fiber welding equipment; 10. Optical fiber joint protection heat shrinkable tubes; 11. Soldering irons; 12. Wire stripping tools; 13. Pressure welding tools; 14. Commonly-used tools such as tweezers, diagonal pliers, and needle-nose pliers;		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Straighten semi-rigid cables; 2. Form semi-rigid cables; 3. Process semi-rigid cable ends; 4. Withdraw optical fiber cables; 5. Process the head stripping of optical fiber cables; 6. Connect optical fiber cables; 7. Weld twisted pair and high frequency cables; 8. Crimp multiple independent conductors and flat cables; 9. Obtain the tools and equipment required for performing this task; 10. Observe the health and safety prevention measures during working; 11. Keep the workplace clean; 12. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Machine semi-rigid cables; 1.2 Process optical fiber cable; 1.3 Weld twisted pair and high frequency cables; 1.4 Crimp multiple independent conductors and flat cables; 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic principles of cable processing; 2.2 Basic principles of cable crimping; 2.3 Basic principles of cable welding. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Specification for cable processing;	

	3.2 Use of cable processing equipment. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Cable processing is completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	AUTOMATIC MIXING ASSEMBLY OF PCB	DUTY NO.	601
TASK TITLE	CABLING	TASK NO.	6013
PERFORMANCE CRITERIA	The person performing this task must be able to complete the cabling of electronic equipment in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Cable reel support; 2. Special wire breakers and wire strippers; 3. Cable testers; 4. Multimeters; 5. Various kinds of insulating tapes 6. Flashlights and head lamps; 7. Various kinds of nylon ties 8. Commonly-used disassemble tools; 9. Welding tools; 10. Pressure welding tools; 11. Wiring harness repair tools and protective tools; 12. Personal protective equipment (such as gloves, work clothes, safety shoes, etc.).		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Arrange high and low level wires separately; 2. Arrange AC and DC power cords separately; 3. Arrange high and low frequency signal wires separately; 4. Arrange grounding conductors; 5. Protect and dispose redundant wires in wiring harnesses; 6. Connect similar conductors continuously; 7. Obtain the tools and equipment required for performing this task; 8. Test the quality of wiring harnesses; 9. Check the harness reinforcement measures; 10. Observe the health and safety prevention measures during working; 11. Keep the workplace clean;		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Reasonable arrangement of wire harnesses such as level wires, power cords, signal wires and grounding conductors; 1.2 Protect the redundant conductors in the harnesses; 1.3 Connect similar conductors continuously; 1.4 Using cable testers to detect the quality of wiring harnesses; 1.5 Check harness reinforcement measures. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Wiring principle of complete sets; 3.0 Theories The person performing this task must be able to explain the following: 3.1 Specification for fabrication and inspection of wire	

12. Store the tools.	harnesses; 3.2 Operation specifications for cable testers. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The electronic equipment wiring is completed by the person performing this task in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DEBUGGING OF HIGH-VOLTAGE POWER SUPPLY	DUTY NO.	602
TASK TITLE	BUILD DEBUGGING SYSTEMS FOR VARIOUS POWER SUPPLY COMPONENTS	TASK NO.	6021
PERFORMANCE CRITERIA	The person performing this task must be able to build various power component debugging systems in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Oscilloscopes; 2. Multimeters; 3. Continuously adjustable input voltage source; 4. Isolation transformers; 5. Electronic load machines; 6. Power instruments; 7. Commonly-used disassemble tools; 8. Personal protective equipment (such as gloves, work clothes, safety shoes, etc.). 9. Warning signs; 10. Safety protection fences.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Build debugging systems in accordance with the types of power supply components; 3. Check whether the security protection measures of high-voltage power supply are effective; 4. Observe the health and safety prevention measures during working; 5. Keep the workplace clean; 6. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Use oscilloscopes, power meters and other commonly-used electrical performance detecting instruments; 1.2 Construct power supply debugging systems; 1.3 Safety guarantee measures before detecting the debugging of high-voltage power supply. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Safety protection of high voltage electrical equipment; 2.2 Basic principles of power circuits. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Precautions of classifying and connecting power	

	supply components; 3.2 Specification for power supply debugging. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Various power component debugging systems are built in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity;

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DEBUGGING OF HIGH-VOLTAGE POWER SUPPLY	DUTY NO.	602
TASK TITLE	CONNECTIVITY INSPECTION AND INSULATION RESISTANCE MEASUREMENT OF HIGH-VOLTAGE POWER SUPPLY COMPONENTS	TASK NO.	6022
PERFORMANCE CRITERIA	The person performing this task must be able to perform the connectivity inspection and insulation resistance measurement of high-voltage power supply components in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Multimeters; 2. Insulation resistance testers; 3. Commonly-used disassemble tools; 4. Personal protective equipment (such as gloves, work clothes, safety shoes, etc.).		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Use multimeters to check the connectivity of high-voltage power supply; 3. Use insulation resistance testers to measure insulation resistance of high-voltage power supply components; 4. Observe the health and safety prevention measures during working; 5. Keep the workplace clean; 6. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Check whether the connectivity of high-voltage power supply is correct; 1.2 Check whether the insulation resistance of high-voltage power supply assembly meets the specification requirements. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic principles of safety inspection before debugging high-voltage power supply components. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Connectivity inspection of high-voltage power supply components; 3.2 Operation of Insulation Resistance Testers. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills;	

	4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The connectivity inspection and insulation resistance measurement of high-voltage power supply components are performed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity;

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DEBUGGING OF HIGH-VOLTAGE POWER SUPPLY	DUTY NO.	602
TASK TITLE	TESTING AND FAULT LOCATION OF HIGH-VOLTAGE POWER SUPPLY	TASK NO.	6023
PERFORMANCE CRITERIA	The person performing this task must be able to complete the test of high-voltage power supply and fault locating in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Oscilloscopes; 2. Multimeters; 3. High voltage rods; 4. Insulation resistance testers; 5. Continuously adjustable input voltage source; 6. Isolation transformers; 7. Electronic load machines; 8. Power instruments; 9. Commonly-used disassemble tools; 10. Personal protective equipment (such as gloves, work clothes, safety shoes, etc.). 11. Warning signs; 12. Safety protection fences.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Test and adjust the voltage indicator in the adjustable high-voltage power circuits; 3. Judge the fault cause and locate the fault position in accordance with the faults phenomena; 4. Record the fault phenomena and put forward the solutions in accordance with the fault cause and fault location; 5. Observe the health and safety prevention measures during working; 6. Keep the workplace clean; 7. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Test high-voltage power circuits; 1.2 Analyze and locate the fault phenomena; 1.3 Troubleshoot simple faults during testing. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Working principles of high-voltage power circuits. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Performance indicator of high-voltage power circuits; 3.2 Tools and equipment required for debugging high-voltage power circuits; 3.3 Underpinning knowledge of fault maintenance of	

	high-voltage power circuits. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The high-voltage power supply testing and fault location are completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MAINTENANCE OF ANALOG-DIGITAL HYBRID CIRCUITS	DUTY NO.	603
TASK TITLE	FAULT ANALYSIS AND LOCATION OF LOW FREQUENCY ANALOG CIRCUITS AND DIGITAL CIRCUITS	TASK NO.	6031
PERFORMANCE CRITERIA	The person performing this task must be able to perform fault analysis and location of low frequency analog circuits and digital circuits in accordance with technical requirements and industry standards		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Multimeters; 2. Oscilloscopes; 3. Current clamps; 4. Signal generators; 5. Infrared thermal imagers; 6. Logic analyzers; 7. The voltage supply; 8. Circuits debugging toolings; 9. Soldering irons; 10. Electrostatic protective equipment; 11. Commonly-used disassemble tools.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Find out and eliminate the anomaly or fault of low frequency analog circuits and digital circuits when they are powered on; 3. Analyze and locate the fault points of low frequency analog circuits and digital circuits to be debugged in accordance with the fault phenomena during debugging; 4. Test the function and performance of large-scale complex digital circuits by means of logic analyzers; 5. Observe the health and safety prevention measures during working; 6. Keep the workplace clean; 7. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Eliminate the abnormality or fault when the circuits is energized; 1.2 Analyze and locate fault points in accordance with circuit fault phenomena; 1.3 Use logic analyzers to test complex digital circuits. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic working principles of analog-digital hybrid circuits 3.0 Theories The person performing this task must be able to explain the following: 3.1 Underpinning knowledge of fault detection and maintenance of analog-digital hybrid circuits; 3.2 Basic operations of logic analyzers.	

	4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Ability to analyze problems.
DESCRIPTION OF THE END PRODUCT / SERVICE	Fault analysis and location of low frequency analog circuits and digital circuits are performed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MAINTENANCE OF ANALOG-DIGITAL HYBRID CIRCUITS	DUTY NO.	603
TASK TITLE	THE WHOLE PROCESS RECORD OF CIRCUIT DEBUGGING AND ABNORMAL SITUATIONS DISPOSAL	TASK NO.	6032
PERFORMANCE CRITERIA	The person performing this task must be able to record the whole process of circuit debugging and deal with abnormal situations in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Multimeters; 2. Oscilloscopes; 3. Current clamps; 4. Signal generators; 5. Infrared thermal imagers; 6. Logic analyzers; 7. The voltage supply; 8. Circuits debugging toolings; 9. Soldering irons; 10. Electrostatic protective equipment; 11. Commonly-used disassemble tools.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Record the whole debugging process of low frequency analog circuits and digital circuits; 3. Conduct theoretical analysis of abnormal data; 4. Put forward rework requirements of faulty low frequency analog circuits and digital circuits in accordance with the debugging results; 5. Observe the health and safety prevention measures during working; 6. Keep the workplace clean; 7. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Standardize the whole process of recording circuit debugging; 1.2 Analyze abnormal data and deal with abnormal situations. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic working principles of analog-digital hybrid circuits. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Basic specification for debugging records of analog-digital hybrid circuits; 3.2 Basic knowledge of circuit fault analysis and repair of analog-digital hybrid circuits;	

	4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Ability to analyze problems.
DESCRIPTION OF THE END PRODUCT / SERVICE	Complete process of circuit debugging is recorded and abnormal situations is disposed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity;

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MAINTENANCE OF ANALOG-DIGITAL HYBRID CIRCUITS	DUTY NO.	603
TASK TITLE	ENVIRONMENT SETTINGS AND STATUS CONFIRMATION OF SOFTWARE AND HARDWARE REQUIRED FOR ONLINE PROGRAMMING SOFTWARE	TASK NO.	6033
PERFORMANCE CRITERIA	The person performing this task must be able to complete the software and hardware environment setting and status confirmation required for online programming software in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Computers; 2. Platforms for online programming and writing software; 3. The voltage supply; 4. Circuit boards to be burned; 5. Emulators; 6. Electrostatic protective equipment; 7. Auxiliary toolings; 8. The relevant standard operation procedures.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Set up the software environment required for online programming and writing in accordance with the requirements of circuit debugging standard operation procedures and confirm the status; 3. Complete the hardware settings such as accessories and emulators required by online programming software and confirm the status; 4. Observe the health and safety prevention measures during working; 5. Keep the workplace clean; 6. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Ensure the online programming software platforms work normally; 1.2 Connect the accessories and emulators required by the software for programming online. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic principles of setting up online software debugging environment. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Basic operations of software platforms; 3.2 Workflows of software loading 4.0 Essential Skills	

	4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The software and hardware environment setting required for online programming software are completed and status is confirmed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity; 6. Safety operation specifications of computer systems.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	MAINTENANCE OF ANALOG-DIGITAL HYBRID CIRCUITS	DUTY NO.	603
TASK TITLE	SOFTWARE TESTING AND TROUBLESHOOTING	TASK NO.	6034
PERFORMANCE CRITERIA	The person performing this task must be able to complete software testing and troubleshooting in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Computers; 2. Software platforms; 3. The voltage supply; 4. Circuit boards to be burned; 5. Emulators; 6. Electrostatic protective equipment; 7. Auxiliary toolings; 8. The relevant standard operation procedures.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Carry out chip software programming operation in accordance with the requirements of standard operation procedures; 3. Complete the software test in accordance with the standard operation procedures; 4. Eliminate the abnormal phenomena in software testing and record them truthfully; 5. Observe the health and safety prevention measures during working; 6. Keep the workplace clean; 7. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Carry out chip software programming operation; 1.2 Test software in accordance with technical documents; 1.3 Record and troubleshoot software faults. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Specifications of software programming; 2.2 Software testing flow 2.3 Software troubleshooting process. 3.0 Theories The person performing this task must be able to explain the following: 3.1 Use software compiling platforms; 3.2 Write software codes; 3.3 Know software test and debugging technology. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills;	

	4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Ability to analyze problems.
DESCRIPTION OF THE END PRODUCT / SERVICE	Software testing and troubleshooting are completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity; 6. Safety operation specifications of computer systems.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DEBUGGING OF HIGH FREQUENCY CIRCUITS	DUTY NO.	604
TASK TITLE	ENVIRONMENT SETTING BEFORE DEBUGGING HIGH FREQUENCY CIRCUITS	TASK NO.	6041
PERFORMANCE CRITERIA	The person performing this task must be able to complete the environmental setting before high-frenquency circuit debugging in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Oscilloscopes; 2. Multimeters; 3. Signal generators; 4. The voltage supply; 5. Infrared thermal imagers; 6. Spectrum analyzers; 7. Commonly-used disassemble tools; 8. Shielding devices; 9. Wave filters; 10. Electrostatic protective equipment; 11. Personal protective equipment (such as gloves, work clothes, safety shoes, etc.). 12. Warning signs; 13. Safety protection fences.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Install and lay out indoor or outdoor safety protection equipment as required by technical documents properly; 3. Connect and debug the high frequency circuits correctly in accordance with the requirements of technical documents; 4. Set the parameters of debugging instruments, equipment and accessories in each channel; 5. Observe the health and safety prevention measures during working; 6. Keep the workplace clean; 7. Store the tools.		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Install and lay out indoor or outdoor safety protection equipment; 1.2 Connect to-be-debugged high frequency circuits; 1.3 Set the parameters of debugging instruments, equipment and accessories in each channel. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic principles of environment setting before debugging high frequency circuits. 3.0 Theories The person performing this task must be able to explain the following:	

	3.1 Parameter settings of equipment and instruments before debugging high frequency circuits. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The environmental settings before circuit debugging are completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	DEBUGGING OF HIGH FREQUENCY CIRCUITS	DUTY NO.	604
TASK TITLE	TESTING AND FAULT LOCATION OF HIGH FRENQUENCY CIRCUIT	TASK NO.	6042
PERFORMANCE CRITERIA	The person performing this task must be able to complete the high-frequency circuit debugging and fault localization in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of electronic equipment assembly and repair engineers. The tools and equipment to be used include: 1. Oscilloscopes; 2. Multimeters; 3. Signal generators; 4. The voltage supply; 5. Infrared thermal imagers; 6. Spectrum analyzers; 7. Commonly-used disassemble tools; 8. Shielding devices; 9. Wave filters; 10. Electrostatic protective equipment; 11. Personal protective equipment (such as gloves, work clothes, safety shoes, etc.). 12. Warning signs; 13. Safety protection fences.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Set up the debugging circuits of high frequency circuits, and deal with the abnormal situations when the high frequency circuits are interconnected; 3. Adjust the performance indicators of each segment in accordance with the matching requirements of high frequency circuits; 4. Debug the commonly-used high frequency amplifier circuits in accordance with the requirements of technical documents and match the characteristic curves pertinently; 5. Analyze the fault phenomena in the debugging process, determine the fault location and fault causes and		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Eliminate the abnormal interconnection of high frequency circuits; 1.2 Debug the high frequency circuits and complete the parameter matching; 1.3 Analyze the circuit fault causes of high frequency circuits and locate them. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic principles of high frequency circuits working; 2.2 Specifications for circuit fault diagnosis of high frequency circuits; 3.0 Theories The person performing this task must be able to explain	

put forward repair opinions; 6. Observe the health and safety prevention measures during working; 7. Keep the workplace clean; 8. Store the tools.	the following: 3.1 Underpinning knowledge of high frequency electronic circuits; 3.2 Common faults of high frequency amplifier circuits; 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Ability to analyze problems.
DESCRIPTION OF THE END PRODUCT / SERVICE	High-voltage power supply testing and fault location are completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	FAULT LOCATION AND MAINTENANCE OF ELECTRONIC EQUIPMENT	DUTY NO.	605
TASK TITLE	FAULT LOCATION AND MAINTENANCE OF OFFICE ELECTRONIC EQUIPMENT	TASK NO.	6051
PERFORMANCE CRITERIA	The person performing this task must be able to locate faults and maintain office electronic equipment in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of the Electronic Equipment Assembly and Repair Engineers, and can also be performed at the user site. The tools and equipment to be used include: 1. Multimeters; 2. Oscilloscopes; 3. Current clamps; 4. The voltage supply; 5. Infrared thermal imagers; 6. Welding tools such as electric soldering irons and heat guns; 7. Electrostatic protective equipment; 8. Commonly-used disassemble tools; 9. Spare parts; 10. Technical data of related product maintenance services.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Get the fault causes through the indicator lights, screen notifications and alarm sound of office electronic equipment; 2. Obtain the tools and equipment required for performing this task; 3. Use accessory replacement method to locate faults; 4. Call the accessories or components of corresponding models and complete the replacement and debugging work in accordance with the fault location information of office electronic equipment; 5. Reassemble the office electronic equipment after replacing accessories or components and confirm that fault phenomena have been eliminated; 6. Troubleshooting software problems by upgrading drivers or application software at the user site;		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Disassemble and assemble office electronic equipment; 1.2 Judge fault causes preliminarily by observation; 1.3 Conduct fault location and maintenance by accessory replacement method; 1.4 Troubleshoot some software faults; 1.5 Fill in the electronic equipment maintenance service lists. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic working principles of office electronic equipment; 2.2 Specifications for troubleshooting and maintenance of office electronic equipment. 3.0 Theories The person performing this task must be able to explain	

7. Fill in the relevant contents in the maintenance lists in accordance with the test results; 8. Observe the health and safety prevention measures during working; 9. Keep the workplace clean; 10. Store the tools.	the following: 3.1 Disassembly and assembly of office electronic equipment; 3.2 Common faults and maintenance of office electronic equipment. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Competence to analyze problems.
DESCRIPTION OF THE END PRODUCT / SERVICE	The fault location and maintenance of office electronic equipment are completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity;

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	FAULTS AND MAINTENANCE OF ELECTRONIC EQUIPMENT	DUTY NO.	605
TASK TITLE	FAULT LOCATION AND MAINTENANCE OF DIGITAL ELECTRONIC EQUIPMENT	TASK NO.	6052
PERFORMANCE CRITERIA	The person performing this task must be able to locate faults and maintain office electronic equipment in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of the Electronic Equipment Assembly and Repair Engineers, and can also be performed at the user site. The tools and equipment to be used include: 1. Multimeters; 2. Oscilloscopes; 3. Current clamps; 4. The voltage supply; 5. Infrared thermal imagers; 6. Welding tools such as electric soldering irons and heat guns; 7. Electrostatic protective equipment; 8. Commonly-used disassemble tools; 9. Spare parts; 10. Technical data of related product maintenance services.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Get the fault causes through the indicator lights, screen notifications and alarm sound of digital electronic equipment; 2. Obtain the tools and equipment required for performing this task; 3. Use accessory replacement method to locate faults; 4. Call the accessories or components of corresponding models and complete the replacement and debugging work in accordance with the fault location information of digital electronic equipment; 5. Reassemble the digital electronic equipment after replacing accessories or components and confirm that fault phenomena have been eliminated; 6. Troubleshooting software problems by upgrading drivers or application software at the user site;		Detailed knowledge about: 1.0 Methods: The person performing this task must be able to explain how to: 1.1 Disassemble and assemble digital electronic equipment; 1.2 Judge fault causes preliminarily by observation; 1.3 Conduct fault location and maintenance by accessory replacement method; 1.4 Troubleshoot some software faults; 1.5 Fill in the electronic equipment maintenance service lists. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic working principles of digital electronic equipment; 2.2 Specifications for troubleshooting and maintenance of digital electronic equipment. 3.0 Theories: The person performing this task must be able to explain	

7. Fill in the relevant contents in the maintenance lists in accordance with the test results; 8. Observe the health and safety prevention measures during working; 9. Keep the workplace clean; 10. Store the tools.	the following: 3.1 Disassembly and assembly of digital electronic equipment; 3.2 Common faults and maintenance of digital electronic equipment. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Ability to analyze problems.
DESCRIPTION OF THE END PRODUCT / SERVICE	Digital electronic equipment troubleshooting and maintenance are completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	QUALITY INSPECTION AND ACCEPTANCE OF ELECTRONIC EQUIPMENT REPAIR	DUTY NO.	606
TASK TITLE	INSPECTION OF THE MAINTENANCE QUALITY OF OFFICE AND DIGITAL ELECTRONIC EQUIPMENT	TASK NO.	6061
PERFORMANCE CRITERIA	The person performing this task must be able to check the maintenance quality of office and digital electronic equipment in accordance with technical requirements and industry standards.		
RANGE STATEMENT	The task can be performed in the workshop under the supervision of the Electronic Equipment Assembly and Repair Engineers, and can also be performed at the user site. The tools and equipment to be used include: 1. Computer and professional testing software; 2. Multimeters; 3. Oscilloscopes; 4. Current clamps; 5. Electrostatic protective equipment; 6. Commonly-used disassemble tools; 7. Technical data of related products;		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Check the completeness of appearance, assembly and function of repaired office and digital electronic equipment; 3. Check the drivers and application programs of office and digital electronic equipment and complete the upgrade, setup operations and so on; 4. Observe the health and safety prevention measures during working; 5. Keep the workplace clean; 6. Store the tools.		Detailed knowledge about: 1.0 Methods: The person performing this task must be able to explain how to: 1.1 Check the appearance, assembly and functional completeness of repaired office and digital electronic equipment; 1.2 Check the software version and upgrade, test and set up the software. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Specifications of the maintenance quality of electronic equipment. 3.0 Theories: The person performing this task must be able to explain the following: 3.1 Key points of maintenance quality inspection of office and digital electronic equipment; 3.2 Software upgrade and setup of office and digital electronic equipment.	

	4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Ability to analyze problems.
DESCRIPTION OF THE END PRODUCT / SERVICE	The maintenance quality of office and digital electronic equipment is checked in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity; 6. Safety operation specifications of computer systems.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	QUALITY INSPECTION AND ACCEPTANCE OF ELECTRONIC EQUIPMENT REPAIR	DUTY NO.	606
TASK TITLE	SUMMARIZATION, SORTING, COUNTING AND ANALYSIS OF MAINTENANCE INFORMATION REGULARLY	TASK NO.	6062
PERFORMANCE CRITERIA	The person performing this task must be able to summarize, sort, count and analyze the maintenance information regularly in accordance with technical requirements and industry standards.		
RANGE STATEMENT	This task can be performed in the office environment under the supervision of Electronic Equipment Assembly and Repair Engineers. The tools and equipment to be used include: 1. Computer 2. Relevant technical documents,		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Obtain the tools and equipment required for performing this task; 2. Collect documents of maintenance service, spare parts and materials collection and recovery and so on regularly, and summarize and sort out maintenance information (date information, product information and fault information); 3. Count and analyze the collected maintenance information by using office software; 4. Keep the workplace clean; 5. Store the tools.		Detailed knowledge about: 1.0 Methods: The person performing this task must be able to explain how to: 1.1 Summarize and sort out maintenance information regularly; 1.2 Count, analyze and summarize maintenance information; 2.0 Principles: The person performing this task must be able to explain the following principles: 2.1 Principles of collecting and sorting out maintenance information; 2.2 Specifications for count and analyze maintenance information. 3.0 Theories: The person performing this task must be able to explain the following: 3.1 Information processing specifications; 3.2 Theories and methods of fault analysis. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Ability to analyze problems.	

DESCRIPTION OF THE END PRODUCT / SERVICE	The maintenance information is summarized, sorted, counted and analyzed regularly in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safety operation specifications of computer systems. 2. Safe and civilized production.

OCCUPATION	ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN	OCCUPATION CODE	
DUTY TITLE	QUALITY INSPECTION AND ACCEPTANCE OF ELECTRONIC EQUIPMENT REPAIR	DUTY NO.	606
TASK TITLE	ON-SITE SERVICE FOR ASSEMBLY AND MAINTENANCE OF OFFICE AND DIGITAL ELECTRONIC EQUIPMENT	TASK NO.	6063
PERFORMANCE CRITERIA	The person performing this task must be able to complete on-site service for assembling and maintaining office and digital electronic equipment in accordance with technical requirements and industry standards		
RANGE STATEMENT	This task can be performed at the user site under the supervision of Electronic Equipment Assembly and Repair Engineers. The tools and equipment to be used include: 1. Computers; 2. Commonly-used electrical performance testing instruments such as multimeters; 3. Infrared thermal imagers; 4. The voltage supply; 5. Current clamps; 6. Electrostatic protective equipment; 7. Commonly-used disassemble tools; 8. Related technical manuals.		
EVIDENCE REQUIREMENT			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Test and report the parts of office and digital electronic equipment needed to be repaired under the user environment and record the fault phenomena descriptions on the maintenance documents; 2. Obtain the tools and equipment required for performing this task; 3. Inform the user of the repair and maintenance plan at the user's site in accordance with the preliminary test results of electronic equipment; 4. Inform the user the precautions of equipment operations before equipment repair, and the measures to be taken at the user site to ensure the safety of property and data; 5. Answer common complaints about office and digital electronic equipment in		Detailed knowledge about: 1.0 Methods The person performing this task must be able to explain how to: 1.1 Detect user's on-site electronic equipment Preliminary; 1.2 Record the fault phenomena of electronic equipment at the user's site; 1.3 Determine customer's on-site electronic equipment repair and maintenance plans; 1.4 Answer common complaints about office and digital electronic equipment. 2.0 Principles The person performing this task must be able to explain the following principles: 2.1 Basic principles of on-site service for electronic equipment assembly and maintenance; 2.2 Specifications for on-site acceptance of common questions and solutions. 3.0 Theories The person performing this task must be able to explain the following:	

accordance with technical data; 6. Observe the health and safety prevention measures during working; 7. Keep the workplace clean; 8. Store the tools.	3.1 Detections of office and digital electronic equipment; 3.2 Common faults and solutions of office and digital electronic equipment. 4.0 Essential Skills 4.1 Communication skills; 4.2 Customer service skills; 4.3 Solidarity and cooperation skills; 4.4 Report writing skills; 4.5 Analysis competence.
DESCRIPTION OF THE END PRODUCT / SERVICE	Office and digital electronic equipment assembly and maintenance site services are completed in accordance with technical requirements and industry standards.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Electrostatic protection; 2. Occupational health and safety; 3. Waste disposal; 4. Safe and civilized production; 5. Safe use of electricity; 6. Safety operations of computer systems.

TABLE 1: DACUM CHARTS FOR ELECTRONIC EQUIPMENT ASSEMBLY AND REPAIR TECHNICIAN - NTA 6

DUTIES	TASKS	ENABLERS
1.0 Automatic mixing assembly of PCB	1.1 Assembly of PCB.	General skills and knowledge • Cooperating with others using communication skills and reporting to the superiors • Using of commonly-used tools • Interpreting technical documents • Knowledge of safe and civilized production • Circumstantial Knowledge and skills related to electronic equipment assembly Tools and equipment • Personal protective equipment such as gloves, work clothes, safety shoes and so on • Welding tools such as electric soldering irons and heat guns • Commonly-used tools such as tweezers, diagonal pliers and so on • Commonly-used testing instruments and apparatus such as multimeters • Lead forming equipment • Wave soldering equipment • Automatic optical testers • Solder suckers • Special welding removal tools • Electrostatic protective equipment • Pneumatic tangent equipment • Semi-rigid cable forming equipment • Semi-rigid cable forming equipment
	1.2 Cable processing.	
	1.3 Cabling.	

DUTIES	TASKS	ENABLERS
		• Semi-rigid cable straightening equipment or fixtures • Optical fiber thermal stripping machines • Optical fiber cutting knives • Optical fiber joint grinding discs • Optical fiber welding equipment • Soldering irons • Wire stripping tools • Pressure welding tools • Cable reel support • Cable testers • Wiring harness maintenance tools and protective tools Materials • Solders, fluxes, alcohol, wiping cloth • Various kinds of insulating tapes • Various kinds of nylon ties • Optical fiber cleaning rods; • Heat-shrink tubes • Marker pens • Electronic components • Cables • PCB Requirements for employees • Teamwork spirit • Honesty and trustworthiness • Time management
2.0 Debugging of high-voltage power supply	2.1 Building of debugging systems for various power supply components.	General skills and knowledge • Cooperating with others using communication skills and reporting to the superiors • Underpinning knowledge of power circuits • Underpinning knowledge of electronics and electricity • The use of commonly-used
	2.2 Connectivity inspection and insulation resistance measurement of high-voltage power supply components.	
	2.3 Testing and fault location of high-voltage power supply.	

DUTIES	TASKS	ENABLERS
		electronic detect instrument • Interpreting technical documents • Knowledge of safe and civilized production Tools and equipment • Personal protective equipment such as gloves, work clothes, safety shoes and so on • Oscilloscopes • Multimeters • Continuously adjustable input voltage source • Isolation transformers • Electronic load machines • Power instruments • Insulation resistance testers • Commonly-used disassemble tools Materials • Various kinds of insulating tapes • Various kinds of nylon ties • Wiring terminals • Heat-shrink tubes • Marker pens • Cables Requirements for employees • Teamwork spirit • Honesty and trustworthiness • Time management
3.0 Maintenance of analog-digital hybrid circuits	3.1 Fault analysis and location of low frequency analog circuits and digital circuits.	General skills and knowledge • Cooperating with others using communication skills and reporting to the superiors • Software and hardware underpinning knowledge of circuits maintenance • The use of commonly-used electronic detect instrument
	3.2 The whole process record of circuit debugging and abnormal situations disposal.	
	3.3 Environment settings and status confirmation of software and hardware required for online	

DUTIES	TASKS	ENABLERS
	programming software.	- Interpreting technical documents - Knowledge of safe and civilized production Tools and equipment - Personal protective equipment such as gloves, work clothes, safety shoes and so on - Multimeters - Oscilloscopes - Current clamps - Signal generators - Infrared thermal imagers - Logic analyzers - The voltage supply - Soldering irons - Electrostatic protective equipment - Commonly-used disassemble tools - Computers - Emulators Materials - Solders, fluxes, alcohol, wiping cloth - Cables - Spare parts for maintenance Requirements for employees - Teamwork spirit - Honesty and trustworthiness - Time management
	3.4 Software testing and troubleshooting.	
4.0 Debugging of high frequency circuits	4.1 Environment setting before debugging high frequency circuits.	General skills and knowledge - Cooperating with others using communication skills and reporting to the superiors - Underpinning knowledge of high frequency electronic circuits - Underpinning knowledge of electromagnetic
	4.2 Testing and fault location of high frequency circuits.	

DUTIES	TASKS	ENABLERS
		compatibility • The use of commonly-used electronic detect instrument • Interpreting technical documents • Knowledge of safe and civilized production Tools and equipment • Personal protective equipment such as gloves, work clothes, safety shoes and so on • Multimeters • Oscilloscopes • Signal generators • The voltage supply • Infrared thermal imagers • Spectrum analyzers • Network analyzers • Commonly-used tools such as screwdrivers, wrenches and so on • Electrostatic protective equipment • Commonly-used disassemble tools Materials • Solders, fluxes, alcohol, wiping cloth • Various kinds of insulating tapes • Various kinds of nylon ties • Circumstantial knowledge of computer • Cables Requirements for employees • Teamwork spirit • Honesty and trustworthiness • Time management
5.0 Fault location and maintenance of digital electronic equipment	5.1 Faults location and maintenance of office electronic equipment.	General skills and knowledge • Cooperating with others using communication skills
	5.2 Fault location and	

DUTIES	TASKS	ENABLERS
	maintenance of digital electronic equipment.	and reporting to the superiors • Underpinning knowledge of analog circuits • Underpinning knowledge of digital circuits • Circumstantial knowledge of computer • The use of commonly-used electronic detect instrument • Interpreting technical documents • Knowledge of safe and civilized production Tools and equipment • Personal protective equipment such as gloves, work clothes, safety shoes and so on • Multimeters • Oscilloscopes • Signal generators • The voltage supply • Computers • Infrared thermal imagers • Welding tools such as electric soldering irons and heat guns • Electrostatic protective equipment • Commonly-used disassemble tools Materials • Solders, fluxes, wiping cloth, alcohol • Various kinds of insulating tapes • Cables • Hot-melt adhesive • Spare parts for maintenance Requirements for employees • Teamwork spirit • Honesty and trustworthiness

DUTIES	TASKS	ENABLERS
		Time management
6.0 Quality inspection and acceptance of electronic equipment repair	6.1 Inspection of the maintenance quality of office and digital electronic equipment.	General skills and knowledge - Cooperating with others using communication skills and reporting to the superiors - Circumstantial knowledge of computer - Detection and maintenance of office and digital electronic equipment - Interpreting technical documents - Knowledge of safe and civilized production Tools and equipment - Personal protective equipment such as gloves, work clothes, safety shoes and so on - Multimeters - Oscilloscopes - Signal generators - The voltage supply - Current clamps - Computers - Infrared thermal imagers - Welding tools such as electric soldering irons and heat guns - Electrostatic protective equipment - Commonly-used disassemble tools Materials - Solders, fluxes, wiping cloth, alcohol - Various kinds of insulating tapes - Various kinds of nylon ties - Cables - Hot-melt adhesive - Spare parts for maintenance
	6.2 Summarization, sorting, counting and analysis of maintenance information regularly.	
	6.3 On-site service for assembly and maintenance of office and digital electronic equipment.	

DUTIES	TASKS	ENABLERS
		Requirements for employees • Teamwork spirit • Honesty and trustworthiness • Time management