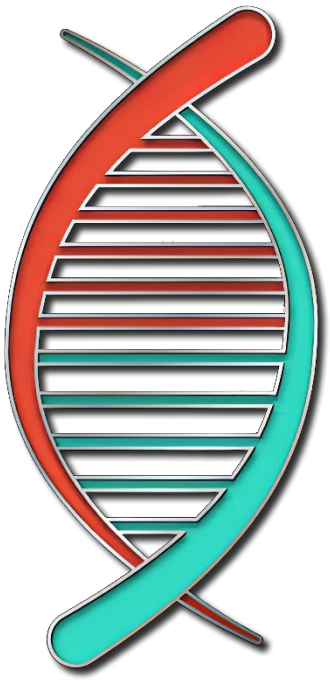
Oklahoma Rapid DNA Investigative Lead Program
Training Manual for Rapid DNA Operators
Revision 0
Effective December 1, 2024



RapidDNA
OKLAHOMA

ATTENTION:
If any portion(s) of this manual is/are unclear to any operator or if a circumstance arises outside the scope of this document, it is the responsibility of each individual to consult with the Rapid DNA Program Manager (or other OSBI Rapid DNA personnel in the event the program manager is unavailable) immediately to seek clarification/guidance regarding the issue before proceeding.

Oklahoma Rapid DNA Investigative Lead Program
Rapid DNA Operator Training Manual

Overview

Rapid DNA Sample Collection

Rapid DNA Operator Training

Training Manual Approval

1.1 Purpose (↑ Table of Contents)

1.1.1 The goal of Oklahoma's Rapid DNA Investigative Lead Program is to provide Oklahoma law enforcement agencies reliable investigative leads as quickly as possible without negatively impacting the integrity of the investigation or any associated physical or biological evidence.

1.1.2 The purpose of this document is to provide a training program for law enforcement personnel within the state of Oklahoma. This training program is intended to specifically address the operation of the RapidHIT ID instrument in an investigative lead capacity and act as a supplementary training to previous agency-specific training regarding biohazard precautions, proper chain of custody documentation, and evidence handling.

1.1.3 This program will provide introduction into the techniques and procedures presently used by the Oklahoma State Bureau of Investigation (OSBI) and Oklahoma Rapid DNA partner agencies. This training is focused on Oklahoma's Rapid DNA investigative lead workflow and will provide instruction and hands-on activities to develop and authorize proficient Rapid DNA operators across the state of Oklahoma.

1.1.4 This training will include detailed instructions, lecture, and demonstrations; a written examination; and a practical exercise related to Rapid DNA testing to ensure the trainee learns the appropriate skills necessary to perform independent Rapid DNA testing and show competence upon the conclusion of the training.

1.1.4.1 A minimum passing score for all graded assignments is 80%, unless otherwise documented and approved by the Rapid DNA program manager.

1.1.5 At the conclusion of this training program, the trainee should have the following:

1.1.5.1 Knowledge of proper Rapid DNA sample collection.

1.1.5.2 Knowledge of Rapid DNA instrument function and use.

1.1.5.3 The ability to independently perform Rapid DNA testing and complete the required Rapid DNA documentation.

1.1.6 The following documentation will be retained by the OSBI Rapid DNA program manager:

1.1.6.1 Completed assignment checklist

1.1.6.2 Graded quiz

1.1.6.3 Copy of approved operator completion certificate

1.2 OSBI Rapid DNA Personnel (↑ Table of Contents)

1.2.1 This section is intended to familiarize the trainee with relevant OSBI Rapid DNA personnel available to assist Rapid DNA operators.

1.2.2 OSBI Rapid DNA personnel include the following:

1.2.2.1 Forensic Biology Discipline technicians are trained in Rapid DNA testing. The technicians may be contacted for Rapid DNA questions. Additionally, if an approved Rapid DNA operator is not available, a technician may provide instrument access and guided instruction for Rapid DNA testing to be completed under limited circumstances.

1.2.2.2 OSBI Combined DNA Index System (CODIS) supervisor (or an alternate CODIS Unit criminalist designee) works with the Rapid DNA program manager to update the Rapid DNA database.

1.2.2.3 Forensic Biology Discipline technical manager oversees the technical operation of the program, in collaboration with the Rapid DNA program manager and administrator.

1.2.2.4 Rapid DNA program manager is available to provide instruction, operator training, and provides program management to ensure operation across the state. The program manager will assist partner agencies in instrument and consumable quality control needs, including instrument performance checks and sample cartridges and primary cartridge quality control checks prior to use on case samples. The program manager will be responsible for Rapid DNA profile evaluation and Rapid DNA database management. Database search results of Rapid DNA generated profiles will be communicated with investigating agency via a search notification.

1.2.2.5 OSBI administrator is responsible for oversight and direction of the statewide Rapid DNA Investigative Lead Program and can serve in place of the Rapid DNA program manager to provide assistance to Rapid DNA operators and Rapid DNA partner agencies, as necessary.

1.2.2.6 The OSBI's Rapid DNA team organizational chart is available as an attachment to this training manual.

1.3 Training Program (↑ Table of Contents)

1.3.1 Approved Rapid DNA operator training will include the following:

1.3.1.1 Facilities and security of Rapid DNA workspace locations.

1.3.1.1.1 Trainees will be given a tour of the Rapid DNA workspace at the training site with clear emphasis on resource locations (i.e., location of PPE, sample cartridges, and fume hood, as applicable).

1.3.1.1.2 Trainees will be introduced to the training site's security measures in place and hours of operation. Depending on the location of a Rapid DNA workspace, Rapid DNA instrument availability may have limited hours of accessibility. Personnel access to the Rapid DNA instrument and associated supplies should be limited to authorized personnel only. The Rapid DNA instrument and associated evidence must not be accessible to the general public.

1.3.1.2 Understanding proper evidence handling and limitations of Rapid DNA testing.

1.3.1.3 Sample types suitable for Rapid DNA testing.

1.3.1.4 Sample types NOT suitable for Rapid DNA testing.

1.3.1.5 Observation of Rapid DNA testing performed by an approved Rapid DNA operator.

1.3.1.6 Rapid DNA workflow overview.

1.3.1.7 Sample cartridges and primary cartridge overview.

1.3.1.8 Rapid DNA policy and procedure review.

1.3.1.9 Trainees will have hands on practice for Rapid DNA sample preparation with proper evidence handling techniques. This may include performing the A/B swabbing method or cigarette butt processing for Rapid DNA testing.

1.3.1.10 Completion of a competency test which will include:

1.3.1.10.1 A written competency evaluation with a passing score of 80%.

1.3.1.10.2 A practical competency test performed by the trainee and observed by the OSBI Rapid DNA program manager (or designee). The trainee must correctly demonstrate each step of the Rapid DNA testing process.

1.3.2 Training documentation will be reviewed and retained by the Rapid DNA program manager for all trainees and will include the following, at a minimum:

1.3.2.1 Completed Training Checklist.

1.3.2.2 Graded Rapid DNA Quiz.

1.3.2.3 Approved Rapid DNA Operator certificate issued by the Rapid DNA program manager following successful completion of the training program.

1.4 Proficiency Testing (↑ Table of Contents)

1.4.1 Proficiency testing is required annually for all approved Rapid DNA operators to maintain their operator certification status.

1.4.1 Approved Rapid DNA operators will be proficiency tested once per calendar year.

1.4.2.1 Rapid DNA operator will be required to enter the proficiency test cycle within 12 months of their initial certification.

1.4.2 Proficiency testing will be provided by the OSBI Rapid DNA program manager (or designee).

1.4.3 Proficiency tests will be prepared by the Rapid DNA program manager and provided to the approved operator.

1.4.3.1 Approved operators may perform a Rapid DNA sample run for a case sample under the observation of the Rapid DNA program manager (or designee) in lieu of a prepared proficiency test.

1.4.4 The following documentation will be retained by the OSBI Rapid DNA program manager:

1.4.4.1 Annual proficiency test documentation for all operators

1.5 Safety and Contamination Prevention (↑ Table of Contents)

1.5.1 This section is intended to be a brief review of appropriate precautions necessary to prevent evidence contamination and to review universal precautions to ensure the health and safety of all personnel within the Rapid DNA workspace environment.

1.5.2 All Rapid DNA operators should have access to the appropriate personal protective equipment (PPE) necessary for Rapid DNA sample preparation and testing. All PPE used in Rapid DNA testing should fit properly and be suitable to prevent evidence contamination and protection from bloodborne pathogens.

1.5.3 Hazards potentially encountered during evidence handling of a biological nature include but are not limited to the following:

1.5.3.1 Hepatitis

1.5.3.2 AIDS

1.5.3.3 Sexually Transmitted Diseases

1.5.3.4 Parasites

1.5.3.5 Bacterial Infections

1.5.4 Personal protection:

1.5.4.1 Gloves, masks, safety glasses, and other protective clothing should fit appropriately and be used as applicable during Rapid DNA testing.

1.5.4.2 Follow the appropriate procedure for cleaning yourself, the work area, and applicable equipment following handling of biological evidence.

1.5.4.3 Work areas should be appropriately cleaned and decontaminated before evidence handling and again after evidence handling. Any waste created during Rapid DNA testing should be disposed of in the biohazard waste.

1.5.5 “Universal Precautions” refer to the practice of avoiding contact with bodily fluids by means of wearing the appropriate PPE. Under universal precautions, all body fluids are considered to be potentially infectious as a means of preventing disease transmission. Universal precautions should be implemented for all Rapid DNA testing.

1.6 Evidence Handling (↑ Table of Contents)

1.6.1 This section is intended to be a brief review of appropriate precautions necessary to prevent evidence contamination. Trainees will be instructed on how to handle evidence in a manner to prevent cross contamination between evidence samples. Trainees will also be instructed on how to avoid the unintentional introduction of foreign DNA onto evidence items.

1.6.2 Contamination is the unintentional transfer of material to the evidence samples from another source. Routine quality control practices are employed to reduce the risk of contamination. The following are types of contamination that may occur during evidence handling for the purposes of Rapid DNA testing:

1.6.2.1 Sample contamination from the environment. This type of contamination could occur at various stages of an investigation including stain collection/swabbing.

1.6.2.2 Sample to sample contamination. This type of contamination occurs when one sample is introduced into another sample. This can occur during sample collection/swabbing.

1.6.3 Each biological sample should be handled on a clean sheet of butcher paper or benchkote-like material to minimize the potential for work surface contamination.

1.6.4 Only one item of evidence should be opened and handled at a time.

1.6.5 When handling evidence, considerations should be made as to what other potential forensic analysis will or may be conducted. For example, if an item is potentially going to be analyzed for latent print evidence, it should be handled with caution to prevent potential destructive actions.

1.7 Swabbing for Rapid DNA Testing (↑ Table of Contents)

1.7.1 The purpose of this section is to instruct the trainee on the proper technique for swabbing a stain or evidence item for the purpose of Rapid DNA testing. It should be clear, that not all items will be suitable for Rapid DNA testing and this swabbing method may not be the best approach for all items depending on the staining present, the item type, and the type(s) of forensic analysis to be performed.

1.7.1.1 Rapid DNA operators should contact any OSBI Rapid DNA personnel if they are unsure whether to swab something for Rapid DNA testing prior to doing so.

1.7.2 Rapid DNA testing is currently only suitable for cotton swabs and filter paper cuttings from cigarette butts. If a stain is not suitable to be collected onto at least 2 cotton swabs, it must not be subjected to Rapid DNA testing.

1.7.3 If Rapid DNA testing is desired, the area/staining must be collected on at least 2 swabs using the A/B swabbing method. This will ensure that sufficient staining is collected for conventional DNA testing upon submittal to the forensic DNA crime lab (OSBI, Oklahoma City Police Department, or Tulsa Police Department).

1.7.4 Care should be taken to avoid the inadvertent combination of separate stains on an item potentially creating a mixture profile (e.g., swabbing a knife handle and blade onto one set of swabs).

1.7.5 A/B swab method will be used when swabbing items of evidence for Rapid DNA testing:

1.7.5.1 Swabbing of a dry stain often requires the swabs to be moistened with a small amount of sterile water prior to swabbing.

1.7.5.2 Take two swabs (A/B swabs) and hold them together in a “bouquet” with the swab heads together as if the swab heads were a single large swab. If necessary, moisten the swabs prior to swabbing.

1.7.5.3 Swab the stain/area with both swabs, simultaneously. Be sure to rotate the swab heads so that the staining is evenly distributed across the swab heads. The staining should be primarily collected on the top area of the swab heads.

1.7.5.3.1 **Swab A** should always be repackaged for future submittal to the appropriate forensic DNA laboratory.

1.7.5.3.2 **Swab B** may be used for Rapid DNA testing.

1.7.5.4 After the swabs are taken, allow sufficient time to dry before packaging. If the swabs require drying, ensure that appropriate precautions are taken during drying to prevent potential contamination.

1.8 Rapid DNA Introduction (↑ Table of Contents)

1.8.1 Rapid DNA, or Rapid DNA analysis, is a fully automated process of developing a DNA profile within 1-2 hours without the need for any human interpretation or review.

1.8.2 Rapid DNA technology was originally designed for use with known DNA reference samples which contain large amounts of high quantity and high-quality DNA that is from one single donor.

1.8.3 HB 3568 is an amendment to *Okla. Statute Title 74, § 150.27*. This bill directs that the OSBI will promulgate policies, procedures, and forms for a statewide Rapid DNA program. HB 3568 was received and signed by the Governor on April 30, 2024.

1.8.4 Rapid DNA may not be suitable for all crime scene samples due to their high variability. Some of the factors that could prevent the use of Rapid DNA on crime scene samples include:

1.8.4.1 Crime scene samples may present degradation due to age or exposure to the elements.

1.8.4.2 Crime scene samples may contain inhibitors which the Rapid DNA instrument does not sufficiently remove.

1.8.4.3 Crime scene samples may present a mixture profile which is not suitable for entry into the Rapid DNA database.

1.8.5 Rapid DNA can be applied for law enforcement purposes in a number of ways:

1.8.5.1 Booking stations in which a Rapid DNA profile is obtained from a known DNA reference sample from an arrestee. Once the profile is obtained it is automatically search in a database as part of the booking process.

1.8.5.2 Accredited laboratory use, in which a Rapid DNA instrument (s) is used under the laboratory's scope of accreditation to process known DNA buccal swabs for entry into the FBI's CODIS/NDIS database.

1.8.5.3 Unidentified remains or mass disaster victim identification.

1.8.5.4 Rapid DNA law enforcement lead programs, such as the Oklahoma Rapid DNA Investigative Lead Program, utilize Rapid DNA instruments for use on crime scene samples. If an eligible profile is developed, it can be searched in an appropriate Rapid DNA database for the purposes of providing investigative leads.

1.8.6 Rapid DNA benefits / limitations

1.8.6.1 Benefits include:

1.8.6.1.1 Investigative information such as an investigative lead through database search, donor sex, indication of single or multiple contributors.

1.8.6.1.2 Accurate and reliable DNA profiles can be developed in ~ 90 minutes.

1.8.6.1.3 DNA screening with Rapid DNA can assist in evidence prioritization for crime laboratory analysis.

1.8.6.1.4 Rapid DNA instruments have the potential for mobile capabilities.

1.8.6.2 Limitations include:

1.8.6.2.1 Rapid DNA is only suitable for the purpose of providing investigative leads. Profiles obtained through Rapid DNA instrumentation cannot be used for direct comparison for court or testimony purposes.

1.8.6.2.2 DNA profiles developed through a Rapid DNA instrument must be single source in order to be eligible for entry into the Rapid DNA database for searching. Mixture profiles are suitable for database searches.

1.8.6.2.3 Rapid DNA is not as sensitive as conventional DNA testing performed in an accredited crime laboratory.

1.8.6.2.4 Rapid DNA testing requires a large amount of sample.

1.8.6.2.5 The RapidHIT ID Rapid DNA system can only perform testing on one sample at a time.

1.8.7 Rapid DNA is suitable for use on suspected single source samples from robust sources such as blood, saliva (e.g., mouth area of can, bottle, pipe), or wearer DNA (e.g., swab of clothing, mask, hat).

1.8.8 Rapid DNA is NOT suitable on typical contact or brief contact DNA sources, stains suspected to have mixed DNA profiles, or samples with limited staining present.

1.9 Rapid DNA Equipment (↑ Table of Contents)

1.9.1 OSBI's Rapid DNA system includes the following validated components:

1.9.1.1 Applied Biosystems RapidHIT ID™ System v2.0

1.9.1.2 Applied Biosystems RapidHIT ID™ primary cartridge and gel cartridge

1.9.1.3 Applied Biosystems RapidINTEL Plus sample cartridge

1.9.1.4 Applied Biosystems RapidHIT ID™ RapidLINK Software v2.0

1.9.1.5 SmallPond database management software

1.9.2 The RapidHIT ID™ System is a "Swab in – Profile out" system with no sample manipulation required for profile development. Once the swab/sample is placed in the instrument, a profile is obtained in ~ 90 minutes. Following profile development, the profile may be eligible for entry and search in the Rapid DNA database.

1.9.3 See Figure 1-1 to review the main components of the RapidHIT ID™ instrument.

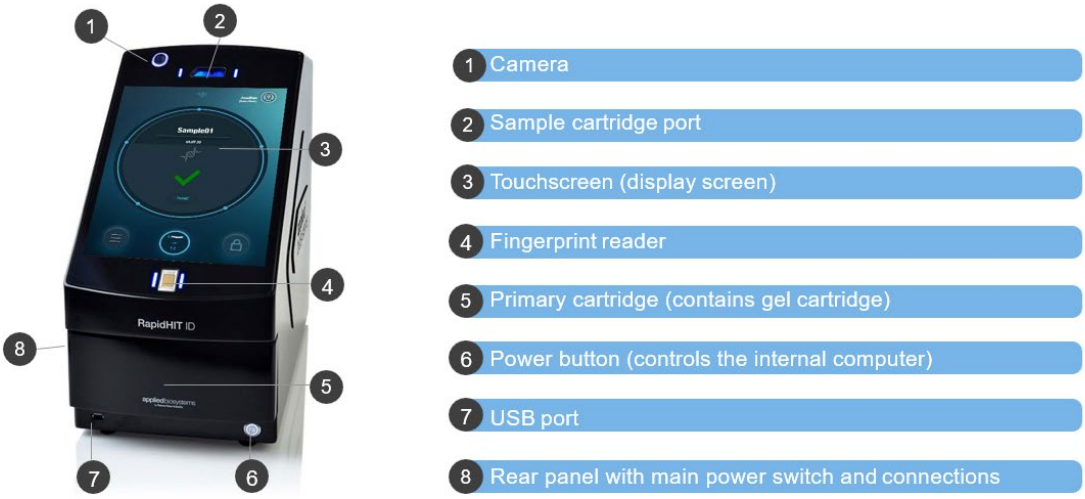


Figure 1-1: Diagram the main components of the RapidHIT ID™ instrument.

1.9.4 The reagents necessary to perform the various steps of the DNA process within the RapidHIT ID™ instrument are contained in the RapidINTEL Plus sample cartridge and the instrument primary cartridge.

1.9.5 The RapidINTEL Plus sample cartridge (see Figure 1-2) contains the necessary components to perform cell lysis, DNA solid-phase capture, and DNA amplification. This cartridge must be stored refrigerated. After a run is completed, the sample cartridge and the swab will be discarded in the biohazard waste.

Figure 1-2: RapidINTEL Plus sample cartridge.

1.9.6 The primary contains the necessary components for capillary electrophoresis. After amplification has occurred, molecular separation and detection occur in the primary cartridge. After testing, the RapidLINK software automatically analyzes the data and generates the DNA profile.

1.10 Required Documentation (↑ Table of Contents)

1.10.1 When a Rapid DNA test is performed, the sample run must be documented and provided to the Rapid DNA program manager for item review and case retention. The following forms must be completed **before** a Rapid DNA test is performed:

1.10.1.1 Maintenance and Sample Run Log – the run log is located in a binder in the Rapid DNA workspace. Each RapidHIT ID™ instrument will have a separate run log. The run log must include sample information including date, operator initials, and Sample ID.

1.10.1.1.1 Each sample run for Rapid DNA must be named with the Sample ID. Each Sample ID must follow the format:

Agency Code_Case #_Item #

Example: 7382_25-1234_1A

1.10.1.2 Case Summary Form – the first two sections of the case summary form must be completed by the operator and submitted to the Rapid DNA program manager. This form can be submitted via email (RapidDNA@osbi.ok.gov). Alternatively, if the Rapid DNA workspace is located at an OSBI evidence acceptance facility, the form may be submitted to the evidence technician(s) to be forwarded on to the program manager.

1.10.1.2.1 The case summary form must be submitted as notification that a Rapid DNA profile requires further action after the run is complete. Timely submittal of the case summary form will ensure efficiency and timely communication of database search results.

1.10.2 The following will be retained on the appropriate OSBI network server for each Rapid DNA tested sample.

1.10.2.1 Case Summary Form

1.10.2.2 Rapid DNA results notification (including Rapid DNA database entry and database search results, as applicable)

1.10.2.3 Evidence Transfer Form (when applicable)

1.11 Rapid DNA Workflow (↑ Table of Contents)

1.11.1 Complete the **Rapid_Case_Summary_Form.** This form should be emailed to RapidDNA@osbi.ok.gov, given to an OSBI physical evidence technician, or provided directly to the Rapid DNA program manager. This form serves as notification to the Rapid DNA program manager of the sample run and pending database entry.

1.11.2 Obtain a RapidINTEL Plus sample cartridge from the refrigerator.

1.11.3 Staining should be collected on swabs for Rapid DNA testing. If necessary, collect the evidence swabs according to the steps provided below (using the A/B swab method). If evidence swabs have already been collected, proceed to Step 1.11.5 below.

1.11.3.1 Moisten two swabs with deionized water.

1.11.3.2 Using both swabs simultaneously, swab the area by turning the swabs ensuring all sides come in contact with area / staining.

1.11.3.3 Swab A will be packaged appropriately for laboratory submission or agency retention.

1.11.3.4 Swab B may be run with the RapidHIT™ ID System. For this swab, proceed to Step 1.11.5 below.

1.11.4 For cigarette butts, a cutting of the cigarette butt paper should be taken for Rapid DNA testing. If Rapid DNA testing is desired on a cigarette butt, sample the item according to the steps below:

1.11.4.1 Obtain a clean razor blade and forceps/tweezers.

1.11.4.2 Place the cigarette butt on a clean piece of butcher paper on a decontaminated work surface.

1.11.4.3 Cut the end of the filter (with paper) off and split this portion in half to be used for rapid DNA testing.

1.11.4.4 Repackage the other half and the remainder of the cigarette butt to be submitted to the laboratory.

1.11.4.5 For the cutting to be used for Rapid, use forceps and remove peel the paper off of the remaining filter material. The filter cannot be placed in the RapidINTEL Plus sample cartridge.

1.11.4.6 Place the paper into the RapidINTEL Plus sample cartridge. Anchor the paper to the bottom of the cartridge by inserting a swab backwards into the cartridge (stick end should be holding the paper in place).

1.11.4.7 Close the cartridge lid, proceed to Step 1.11.5 below (for additional instructions and images, refer to the Cigarette Butt Processing attachment).

1.11.5 Insert **one** swab into the RapidINTEL Plus sample cartridge (see Figure 1-3 below). Swabs longer than 3 inches will need to be cut or broken to fit into the cartridge. Once the swab is inserted, close the sample cartridge.

Figure 1-3: RapidINTEL Plus sample cartridge.

1.11.6 Running the RapidHIT™ ID System:

1.11.6.1 Complete the **Rapid_Maint_Sample_Run_Log** for each sample run on the RapidHIT™ ID System. This form should be available in a binder next to the Rapid DNA instrument. The Sample ID should follow the format:

Agency Code_Case#_Sample#

1.11.6.2 Touch the center of the Lock screen to unlock the instrument (see Figure 1-4 below).
Note: It is important the instrument be unlocked before the sample cartridge is inserted to prevent system error.

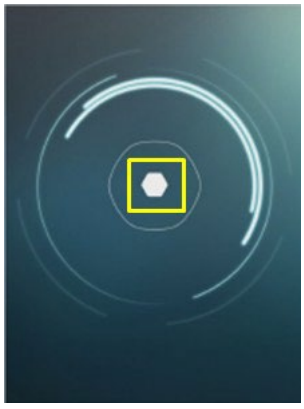


Figure 1-4: RapidHIT ID lock screen.

1.11.6.3 Touch the fingerprint reader located on bottom of the instrument below the display screen.

1.11.6.4 When prompted, enter the corresponding user pin.

1.11.6.5 If another sample cartridge or red utility cartridge is in the instrument, remove the cartridge.
Note: A red utility cartridge should NOT be discarded. The red utility cartridge may be placed next to the instrument to be reinserted into the

instrument once the Rapid DNA run is complete. A previously run sample cartridge should be discarded in the biohazard waste.

1.11.6.6 Insert the sample cartridge with the loaded sample.

1.11.6.6.1 Using the keypad (see Figure 1-5 below), enter the Sample ID using the format: AgencyCode_Case#_Sample#
NOTE: The instrument defaults to capital letters.

Figure 1-5: RapidHIT ID keypad.

1.11.6.6.2 Press “ENTER” on the touch screen.

1.11.6.6.3 From the dropdown menu, select the appropriate sample type. Typically, “Forensic Unknown” should be selected.

1.11.6.6.4 Review that the Sample ID has been entered correctly.

1.11.6.6.5 Press the Triangle / “Play” icon at the bottom of the touch screen to begin the run. The run will take ~ 90 minutes.

1.11.6.7 After the run is complete (the following steps do not have to be completed immediately following the Rapid DNA run or by the same operator; however, the following steps should be completed within 24 hours of run completion):

1.11.6.7.1 Unlock the instrument by logging in with fingerprint and pin.

1.11.6.7.2 Before removing the cartridge, review the sample status (see Figure 1-5 and Table 1-1 below). Indicate the sample status on the **Rapid_Maint_Sample_Run_Log**. Database entry status and any database search results will be communicated to the operator.

Figure 1-6: RapidHIT ID run completion and sample status display.

Status	DNA profile is generated	Action
Green 	Yes	The DNA profile does not contain quality score flags. The DNA profile is ready for analysis by the RapidLink™ Software. No further action is needed on the instrument.
Yellow 	Yes	The DNA profile generated contains quality score flags. The DNA profile is available for review in the RapidLink™ Software.
Red 	No	The sample failed and no profile was generated.

Table 1-1: RapidHIT ID sample status table.

1.11.6.7.3 Remove the sample cartridge as prompted and discard the entire sample cartridge, including swab, in the biohazard waste. **NOTE: ensure the instrument is unlocked and prompting cartridge removal.**

1.11.6.7.4 Lock the instrument by pressing the Lock icon on the lower, right of the touchscreen.

1.11.6.7.5 With the instrument locked, re-insert the red utility cartridge.

Approval

This document and related attachments and references will be approved by the OSBI's Rapid DNA Program Manager, Forensic Biology Discipline technical manager, and the OSBI CSD director, or designee.

Beth A. Deen, **Rapid DNA Program Manager,** **Forensic Biology Discipline**	 Signature	11/08/2024 Date
Joe Orcutt, **Technical Manager,** **Forensic Biology Discipline**	 Signature	11/08/2024 Date
J. Janice Joslin, **Laboratory Director,** **OSBI CSD**	 Signature	11/08/2024 Date

(↑ **Table of Contents**)