Servicing the OEC Elite CFD & Mini CFD (CMOS Flat Detector) FPD C-Arm

RADIOLOGICAL SERVICE TRAINING INSTITUTE

Introduction

This course is designed to provide the advanced service professional with the skills and knowledge to maintain the OEC Elite CFD & OEC Mini (CMOS Flat Detector) flat panel detector C-Arm systems. All adjustments will be discussed to establish optimum performance criteria. Theory and hands-on sessions will develop the skills necessary to troubleshoot system failures and restore it to operation.

While RSTI may or may not have an OEM Mini CFD training unit during class, students will be able to effectively service the mini following the OEC CFD course due to:

- OEC Mini CFD is a simplified version of the OEC CFD
- OEC Mini CFD & OEC CFD Service key access is the same
- OEC Mini CFD Service Documentation is downloaded and reviewed
- OEC Mini CFD Component Identification lab reviews the Mini C-Arm and compares against the OEC CFD training unit
- OEC Mini calibration are comparable to the OEC CFD

Prerequisites

To attend this course, the service professional must have good fundamental knowledge and understanding of the principles gained through attendance at our Phase I, Phase II, and Phase III X-ray courses or equivalent field experience.

Objectives

At the completion of this course participants will be able to:

- Operate the OEC Elite CFD
- Identify all systems, subsystems and components of the OEC Elite CFD & OEC Mini CFD
- Verify power supplies for accuracy and function
- Service and calibrate system batteries and charger circuits
- Utilize all communication interfaces to calibrate and evaluate the system
- Evaluate the performance of the X-ray generator, imaging, and workstation sections of each system
- Calibrate and adjust all components of the X-ray generator, imaging chain and workstation
- Restore the system to proper functional state following a system failure
- Evaluate and repair mechanical systems

Course Outline

Day 1

- Introduction
  - Course objectives
  - System
    - Major components
    - Configurations
    - Documentation
- Service Access
  - AIAT
  - GESAK Service Key levels
  - Service key ordering and installation
- System operation
  - C-arm controls
    - X-ray subsystem
    - Collimator and FPD controls
    - Mechanical systems
  - Workstation controls
- Physical layout and component identification
  - Workstation
    - 2K Monitor & 4K Monitor
    - EBox Computer
    - Workstation PION
    - Power PION
  - C-Arm
- AC power distribution
- DC power distribution
- Batteries and charger
- Lab Activities
  - System operation
    - Fluoroscopic modes
      - ☐ Low dose
      - ☐ High dose
      - ☐ Boost
    - Radiographic mode
    - Patient data input
    - Recall stored images
    - Collimator controls
    - FPD
  - Physical layout and component ID
    - Covers and panels
    - Power supplies
    - Circuit boards
    - Battery removal
    - X-Ray tube removal and installation
    - FPD removal and replacement
    - Mechanical systems

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Hands-On Training Course
Course Length: 1 Weeks
CEU's Awarded: 4 CEU's
State of Ohio Registration No. 93-09-1377T

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- Power supply verifications
- Battery charger calibration
- Battery charger test points and waveforms

Day 2

- System communications
- Interlocks
- SUI (Service User Interface)
  - Service Key access
- Required Tools & Test Equipment
- X-ray generator
  - Stator power and control
  - Pre-charge
  - X-ray on, x-ray disable
  - High voltage control
  - Filament/ mA control
- Lab Activities
  - Verify communication busses
  - Initialize calibration mode
    - Calibration screens
    - Calibration process
  - Verify stator operation
  - Pre-charge test
  - Verify x-ray enable signals
  - Calibrate x-ray generator
  - High voltage test points and waveforms
  - Filament/mA control test points and waveforms
  - Max "R" adjustment
  - FPD Calibration

Day 3

- Imaging system components
  - X-ray tube
    - Central ray adjustment
    - Filtration
  - Image/Fluoro functions control PCB's
    - Collimator control
      - Collimator iris size and center
      - Semi-transparent leafs
        - Width
        - Rotation
    - FPD
    - Thermoelectric cooling
- Dose/ brightness control
  - Video path
  - Brightness control processing
  - Iris adjustment
- Lab Activities
  - Central ray adjustment
  - Collimator centering
  - Collimator size tracking calibration
  - FPD Beam Alignment
  - FPD Dose

Day 4

- Image display
  - Image processor
    - Image manipulation
      - Window/level
      - Subtraction
    - Noise suppression
      - Motion artifact suppression
  - Video distribution board
    - Video input
    - High resolution video output
    - Standard resolution video output
  - Monitors
  - Touch screen
- Image storage
  - Single disk
- Mechanical systems
  - Flip flop
  - Orbital motion
  - Wig-wag motion
  - Horizontal cross arm motion
  - L-Arm
  - Vertical lift
  - Steering and breaking
- Motion Calibrations
- PM
  - PM Procedure
  - PM Activities
- Lab Activities
  - Monitor adjustments
  - Image centering
  - Vertical lift drive tests
  - Wig-wag adjustment
  - Mechanical evaluation
  - Motion Calibrations
  - PM

Day 5

- Troubleshooting
  - System Diagrams
  - Error messages
  - LED displays
  - Seven segment displays
  - Status monitor
  - Status/error logs
- System Software
  - Backup/Restore
- Lab Activities
  - Evaluate for diagnosis
    - LED functions
    - Bar graphs
    - Seven segment displays
  - Use service mode to verify system operation
  - View status logs
  - View error logs
  - Reload system software
  - System troubleshooting
  - System review
  - Course evaluation

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