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FCR Prima T Mobile Applications

The size, flexibility and speed of Fujifilm's FCR Prima T makes it ideally suited for mobile applications. Already popular throughout the world, digital x-ray has become the norm in the US as a practical and time-saving solution for mobile applications. To address this need, Fujifilm has developed a custom mobile kit for FCR Prima T readers.

Mobile kits

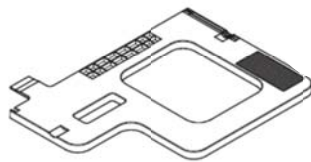
A mobile kit is required for any application or environment that would involve movement of the reader on a regular basis. The mobile mounting kit secures the reader to a flat table surface in the van or other vehicle, stabilizing the reader to prevent it from toppling over. An internal stabilizer is also provided to be inserted into the reader unit while not in use or during transport, protecting the optics from jolts or other movements that could impact image quality. The customer is responsible for acquiring the base, all site preparations for the vehicle and for mounting the mobile brackets to it inside the vehicle. Fujifilm's factory trained service engineer will make the CR reader and workstation operational once the vehicle has been prepared and brackets have been installed securely.

Mobile vehicle and base physical requirements

Type of Vehicle – the preferred vehicle is an air-ride mobile trailer designed by a recognized medical vehicle manufacturer. Conversion of a consumer-grade vehicle (such as a minivan) requires procurement of an experienced mobile conversion company, as site preparation is the responsibility of the customer.

Type of Base – The base supporting FCR Prima T should be stable, withstand a load of more than 331 lbs. (150kg) and provide surface space larger than 22"W x 21.3"D x .15.5"H.

FCR Prima T is compact and takes up only 3.5 sq. feet of surface area (an additional 7.75" of space is recommended on each side to accommodate servicing without removing the unit from its mobile brackets). CR cassettes are processed in an entry slot at the front of the reader (see graphic below) so an additional 17" is recommended to accommodate loading and unloading cassettes.



Internal Stabilizer



The Flash IIP console technologist workstation is a ruggedized laptop which also requires placement within the vehicle. Larger commercial vehicles may alternately prefer the full size desktop hardware platform and custom CR cart which houses the reader and secures the full size monitor and CPU, consolidating the system's overall footprint. The Flash IIP

is intended to be located with the reader and requires a network connection for communication with the CR reader. The laptop is not intended to be disconnected from the reader for regular use within the facility.

Environmental conditions requirements

Installation

(1) For installation of the CR reader, the mobile mounting kit includes a table mounting assembly to securely anchor the CR reader unit and an internal stabilizer to secure internal components to protect it from vibrations during transport. The vehicle manufacturer or customer shall assume responsibility for mounting the brackets securely onboard a vehicle. For your convenience, an experienced dealer who has worked with Fujifilm CR systems in a mobile environment has made available vehicle site preparation guidelines and recommendations for maintaining environmental conditions to assist you or your mobile vehicle conversion company with site preparations and can be made available upon request.

(2) The Flash IIP Mobile Laptop consists of a commercially available ruggedized laptop PC. The vehicle manufacturer or customer shall assume responsibility to mount the workstation components onboard the vehicle.

Vibration Test Conditions

Vertical:

5 ~ 20Hz 0.002 ~ PSD

20 ~ 30Hz 0.002 ~ 0.0001 PSD

30 ~ 500Hz 0.0001 ~ 0.0001 PSD

Total Energy: 0.3grms

Horizontal:

5 ~ 25Hz 0.0006 ~ 0.0006 PSD

25 ~ 30Hz 0.0006 ~ 0.00007 PSD

30 ~ 500Hz 0.00007 ~ 0.00007 PSD

Total Energy: 0.21grms

Duration:

24 hours each direction (simulates approximately 186,000 miles of driving)

PSD (Power Spectrum Density): g^2/Hz

Equipment Startup

Temperature and Application Environment

(1) The air conditioning system must be maintained to prevent temperature ranges from allowing dew condensation to occur on the equipment surface.

(2) Prolonged exposure to extreme temperatures can impact durability and lifetime of an IP. It is not recommended that the IPs and cassettes be stored in a vehicle overnight or for extended periods of time, unless they are to be maintained in an environment as described above. If an IP is stored under extreme temperature conditions, **below approximately 41°F 5°C or above 86°F (30°C)**, the user should not under any circumstances process an IP in the reader until it has reached room temperature, as it could introduce condensation to the optics which can degrade image quality or damage the reader. Additionally, cold temperatures could impact the flexibility of the IP. It is also recommended that the personnel inside the van refrain from smoking or any other environmental exposure that could impact the integrity of the system or its components.

Environmental Conditions

Temperature and humidity operating conditions for the CR reader and IPs should be the same as those specified for indoor environments.

Operating conditions:

Temperature: 59 to 86°F (15 to 30°C)
Relative humidity: 40 to 80% RH (no dew condensation)
Atmospheric pressure: 750 to 1060 hPa
Power consumption: 190 VA (operating)
100 VA (standby)

Non-Operating Conditions:

Temperature: 32 to 113°F (0 to 45°C)
Relative humidity: 10 to 90% RH (no dew condensation)
Atmospheric pressure: 750 to 1060 hPa

Power Requirements:

Input voltage: AC100 V±10%
Related current: 1.9A
Frequency: 50-60 Hz

Voltage & Conditioning:

The standard configuration with an FCR Prima T and Flash IIP workstation can be powered by a 12A, 600 watt 12VDC to 115VAC Pure Sine Wave Inverter. Customers are responsible for supplying adequate and stable 120 VAC power to the device as specified in the datasheet for each component. Power conditioning is also strongly recommended to isolate voltage noise and spikes or drops in voltage.

Network requirements:

110 volt (20 amp dedicated line).
Two (2) network drops for RJ-45 connections are required. 100 base-T network recommended
Network switch setting: #1 Full Duplex, #2 ½ Duplex

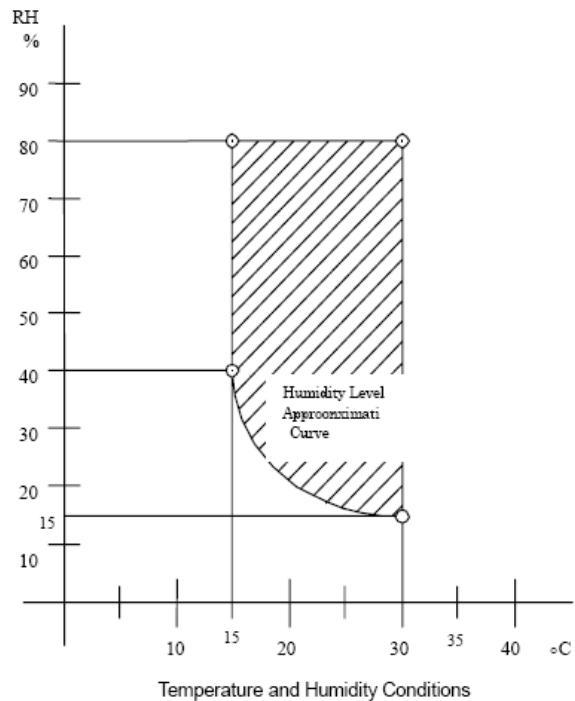
Workflow

Identification of images

Exposed IP cassettes are identified with the patient information using Fujifilm's Flash IIP console workstation, which is a standard component of an FCR Prima T purchase. The Flash IIP console is available in a laptop hardware platform or full size desktop PC & LCD monitor workstation. Either configuration performs patient ID, exam selection, image processing and image transmission. At the Flash IIP console, a patient's demographic information is registered with the exposed IP cassette.

Image and cassette processing

The IPs inside the cassettes that are used to record images are designed using an advanced phosphor composition which allows wide exposure latitude and higher sensitivity to scatter radiation than is typically expected with film/screen. IPs and cassettes should be handled carefully and cleaned regularly to maintain the lifetime and durability. Images are processed and presented optimally when IP cassettes are processed in the reader immediately following the exposure. In mobile or portable applications, however, access to a reader may be delayed and immediate processing may not be possible. Under these conditions, up to an 8-hour delay between exposure and processing is clinically acceptable,



however, it should be noted that temperature increases beyond acceptable limits can cause the image to fade more quickly.

Image fade is not a new condition and not limited to digital systems. Image fade is a function of time and temperature and has long been reported in film/screen imaging. Most papers report between 11 to 20% within the first 6 hours after exposure. The problem with film/screen systems is that image fade affects both the density and contrast of the image. FCR systems maintain the programmed contrast and density so that other than a slight increase of grain in the image because of fade, the image looks strikingly similar to the way it would look if it were processed immediately.

Image quality

The high quality that users have grown to expect with Fujifilm equipment is no different within the mobile environment, assuming that good practices are followed, such as regular care and handling of the IPs and cassettes, grid use, etc. and environmental requirements are met. Fujifilm provides a wide range of sophisticated technologies that enable images to be presented optimally and consistently for high diagnostic confidence. Fujifilm's Professional Services team or factory trained personnel will work with users to fine-tune anatomical menus and optimize image appearance to fit user preferences.

Image Transmission

Digital images can be transmitted from the Flash IIP console via DICOM protocols to nearly every PACS and image distribution systems in the industry. A minimum 100 Base T network should be employed for optimal performance.

Several FCR mobile users have conducted image transmission through a secure wireless broadband router, such as those sold by Verizon or AT&T. The routers are equipped to wirelessly transmit images in a secure, encrypted format and are currently the only recommended wireless transmission option from the Flash IIP laptop.

The Digi ConnectPort Wan VPN router supplied by AT&T was evaluated by Fujifilm and showed to be a good device for a wireless connection. The router has 4 Ethernet ports which allow both the Flash IIP laptop and the CR reader to be connected to it, eliminating the need for a second switch to connect the reader and IIP. The Router also provides the means to assign fixed IP addresses (via the MAC address) to the Reader and IIP. The VPN is provided via the router, eliminating the need for additional VPN software on the Flash IIP laptop. Tests were performed sending images as standard uncompressed and also as jpeg compressed. By using the lossless jpeg compression transmission time was decreased by an average of 50%.

Wireless routers can be purchased directly from the vendor and an account will need to be activated and retained by the customer for service. Network integrity and maintenance is the responsibility of the customer. Wireless cards that would enable transmission directly from the laptop are not validated or supported by Fujifilm at this time.

Images can also be recorded to a DVD or CD with Fujifilm's DICOM CD burning software feature. This software allows users to record images onto DVD or CD via the built-in DVDRW drive, either in a DICOM Removable Media format without a DICOM viewer.

Printing Film

The Flash IIP console can also send images to DICOM Print-compatible imagers for film output. Fujifilm sells a line of imagers, including the DryPix 2000 tabletop thermal imager, which can optionally be deployed in a mobile environment.