

# NT100

## Service Manual



**Camtronics™**  
MEDICAL SYSTEMS

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# Introduction

The NT100 is a digital monochrome image acquisition module designed to transfer monochrome image data from video based medical imaging systems to printers and medical workstations.

Image information can be transferred to the printing device in two different ways:

- Via removable storage media (Magneto-Optical Disks or MOD), usually for mobile applications.
- Via network connections, usually for stationary applications.

The NT100 uses DICOM 3.0 standard protocol for network transfer applications.

## About This Manual

This manual contains the necessary instructions for installation and setup of the NT100.

It is divided in the following sections:

- *Introduction*: contains a description and an overview of the NT100. Please review the "Safety" section on page 2.
- *Operation*: contains instructions for the various functions during normal operation of the NT100, including acquisition, recall, delete functions.
- *Installation*: contains instructions on how to connect the NT100 to your ultrasound machine and network (optional).
- *Configuration*: explains the menu system for configuring the NT100.
- *Troubleshooting*: contains a list of error codes and messages, and recovery procedures.

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## Related Manuals

NT100 Operating Instructions are contained in *Camtronics "89999-0097, NT100 Operator's Manual."*

The Sync Parameters required for proper configuration are found in *Camtronics 89999-0103, "Sync Parameters for NT100/200 and CAM by Manufacturer."*

## Safety

Observe the following safety precautions when installing and using the NT100.



Dangerous voltages are present in many system assemblies. The unit should be used only in rooms that comply with recommendations concerning electrical safety when used for medical purposes (as stated in NEC, Title 21 CFR, and UL 2601-1).



Never use the equipment in the presence of flammable anesthetics, gasses or vapors. Some disinfectants and cleaning agents vaporize to form explosive mixtures, and if such agents are used, the vapor must be allowed to disperse before the equipment is returned to use.



Always disconnect the equipment from its electrical supply before cleaning or disinfecting in the near vicinity of the equipment. For routine cleaning, wipe the outside of the cabinet with a damp cloth. To disinfect, use a suitable germicidal disinfectant. Do not spray the cabinet, as this could allow water or other liquids to enter the equipment, causing short circuits or corrosion.



The use of accessory equipment not complying with the equivalent safety requirements of the NT100 may lead to a reduced level of safety of the resulting system. Any patient environment equipment connected to the NT100 must comply with UL2601-1 and IEC 601-1 requirements. Equipment outside the patient environment shall only be connected to the NT100 if it complies with the relevant UL and EN/IEC Standards.

The symbols marked on the equipment denote the following:



Consult accompanying documents. Give special consideration to the Operator's Manual and Service Manual information marked with this symbol.



Dangerous voltages are present within the cabinet. Never attempt to repair the unit. Only trained personnel may remove the cover of, or otherwise obtain access to the system components. There are no user serviceable parts.



Type B equipment.

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## Applications

The NT100 is designed for both fixed and portable applications. The images from the imaging equipment (image source) can be stored on a removable Magneto-Optical Disk (MOD) or transferred through a network.

The following are examples of the most common configurations:

- Images from the source are stored on a MOD. The MOD is then carried to a print server device for printing.
- The NT100 is connected to a print server via a network. Images are sent directly to the printer.
- One NT100 unit with a MOD drive and Network Option is connected to the print server via a network. Images are acquired and stored on MODs from portable NT100 units. The MODs from the portable units are then inserted in the networked NT100 which in turn transfers the images to the print server.
- A NT100 equipped with the Network Option can be used as a portable unit. The NT100 can be disconnected from the network and taken to a remote site to capture images. Image data is stored on the network hard drive. When the NT100 is re-connected to the network, images are transferred to the print server automatically.
- Images acquired by the NT100 can be transferred via network to a Review Station.

The NT100 has a second input that can be connected to an alternate image source (commonly a VCR). Either image source can be selected from the NT100 keypad.

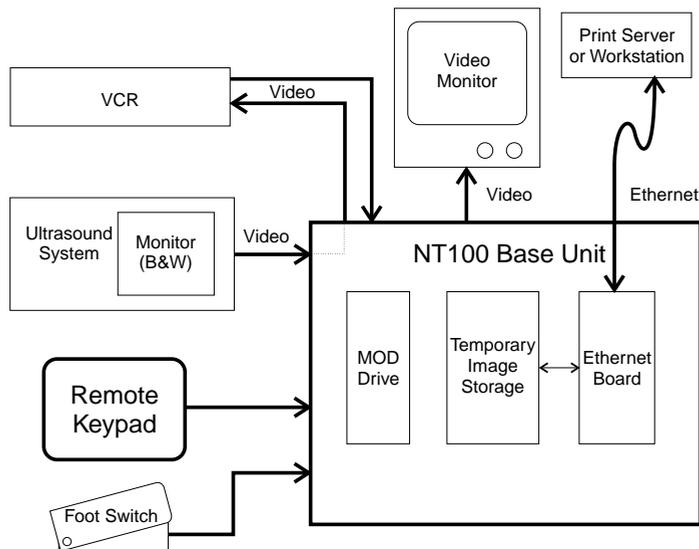
## System Overview

The standard NT100 includes the following hardware:

- **Base Unit**
- **Remote Keypad**
- **MOD Drive (Optional)**
- **Foot Switch (Optional)**
- **Network Option**

See Figure 1 for an Interconnect diagram showing the NT100 components.

**Figure 1 NT100 Interconnect Diagram**



### Base Unit

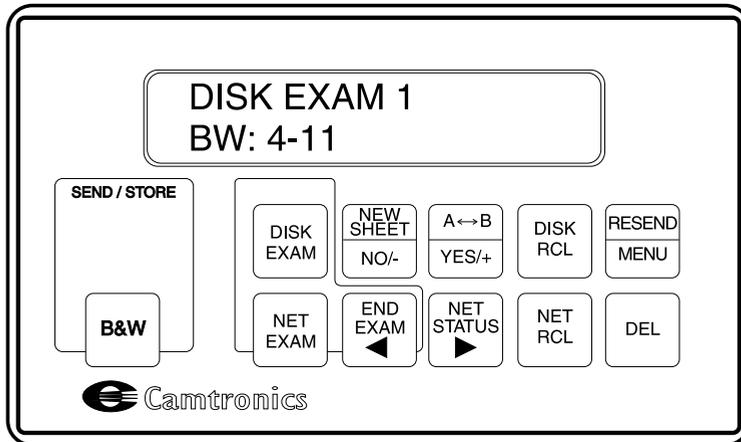
The Base unit is the box containing the main electronics of the NT100, including the CPU. The Base unit also houses the MOD Drive Option, and/or the Network Option.

## Remote Keypad

The Remote Keypad has 11 keys and a 2 lines x 20 character display. Most operations on the NT100 can be initiated from the Remote Keypad.

The display in the Keypad can show the current sheet information (exam number, sheet number, and image number on that sheet), setup menus and parameters, and system messages and errors. See Figure 2.

**Figure 2 NT100 Remote Keypad**



The keys have different functions depending on the current operation being performed. Keys that can affect the current operation or state will be illuminated (active keys). Pressing a key that is not illuminated has no effect.

A flashing key indicates an operation that is in progress (the last digit of the image being displayed on the remote keypad also flashes) such as Storing (the [STORE] key flashes) or Recalling (the [RECALL] key flashes) an image.

## **Magneto-Optical Disk (MOD) Drive Option**

An optional MOD drive can be installed in the NT100 as the image storage device.

The MOD drive supports both 128 MB and 230 MB MODs. The number of images that can be stored depends on the image resolution.

*NOTE: The use of 128 MB MODs is recommended for compatibility with other devices.*

## **Foot Switch Option**

The optional foot switch is used to trigger image capture operations.

## **Network Option**

The Network Option consists of an Ethernet Board and a network disk. The network hard drive holds the images en route to the network destination via image network.

## **Bar Code Reader Option**

The Bar Code Reader allows the operator to scan the patient ID from a bar code source. The Patient ID is then saved along with the image data on the MO disk (Disk Exam Acquisitions) or transferred along with the image data for network exams. If the Optical Character Recognition (OCR) feature is set up and enabled, the Bar Code Reader data overrides any data input via OCR.

## **Optical Character Recognition (OCR)**

The NT100 features an OCR function which can be trained to recognize the Patient Name and ID from the imaging equipment. The Patient Name and ID are then saved along with the image data on the MO disk (Disk Exam Acquisitions) or transferred along with the image data for network exams. OCR operates automatically once it has been properly set up and enabled.

## Functional Description

The NT100 can capture a single image from the imaging equipment at the command of the operator. The video information from the image is processed and stored either on a MOD or the internal network disk.

If the image is stored on a MOD (disk exam), the disk can then be hand carried to the appropriate print device or to another NT100 (or Color Acquisition Module). If the image is stored on the internal network disk (network exam), the NT100 transmits the image through the network as soon as the network is available.

The NT100 also provides a video output port for connecting a video monitor. If a video monitor is connected, it will show the same image that is in the NT100 input (Live Mode) or a stored image (Recall Mode).

A VCR (or similar device) can be connected to the Channel B input of the NT100. The SYS LOOP output from the NT100 can also be connected to the VCR input. Images coming through the Channel A input (from the imaging equipment) are also routed to the SYS LOOP output so they can be recorded by the VCR, even when the NT100 power is OFF.

An image can be captured from the imaging equipment and stored in the NT100 by pressing the STORE button on the keypad or by pressing the optional Foot Switch.

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# Installation

The installation of the NT100 depends on the options the unit is fitted with. In general, units can be connected directly to the Ultrasound equipment, since it will calibrate itself for optimum acquisition.

## Unpacking

Check that the following accessories were shipped with your NT100 unit. If any part is missing, contact your sales representative.

Part No.	Description	Qty
90029-0001	NT100 Main unit	1
06005-0039	6' RG59 coax cables	2
99999-0950 OR 99999-0951	Remote Keypad - U.S. version Remote Keypad - European version	
89999-0097	<i>NT100 Operator's Manual</i>	1
89999-0098	<i>NT100 Service Manual</i>	1
89999-0103	<i>Sync Parameters for NT100 and CAM by Manufacturer Manual</i>	1
<b>Optional Equipment</b>		
99999-0991	Foot Switch	1
99999-0919	MOD Drive Option (Already Installed) Includes 1 - 128 mByte MO Disk	1
99999-1000	Bar Code Reader Option (w/gender changer)	1
99999-0930	Network Option (Already Installed)	1

*NOTE: Additional cables for optional monitor or VCR connections can be ordered (see Spare Parts on "Repair and Maintenance" on page 107) or purchased locally. Consult your sales representative for details.*

## Connection

**NOTE:** The NT100 can be connected to 115V or 220 V, 60 Hz or 50 Hz without any additional configuration.

### System with Network Option

The network cabling should have been set up by your local network administrator. Two connectors are provided in the backplate of the NT100 for flexibility. **Only one of the Network Connectors should be used for connecting to the network.** See Figure 3.

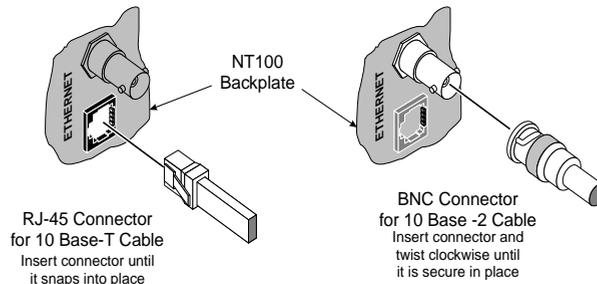
### Connector and Cable Specifications

**10 Base-T:** Requires RJ-45 connector and Unshielded, twisted-pair cable.

**10 Base-2:** Requires BNC connector and RG-58 A/U Type 50 Ohm Coaxial Cable with 50 ohm termination.

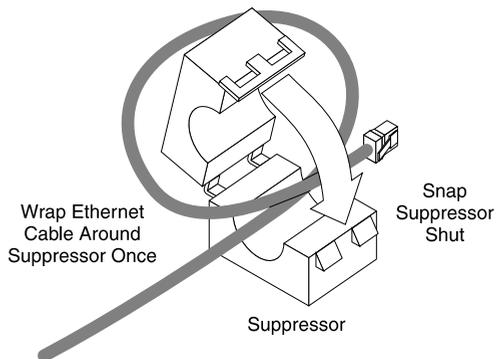
**Caution!** Do NOT use the video coaxial cable included with the NT100 for network connections.

**Figure 3 Network Connections**



If a 10 Base-T Ethernet cable is used (see Figure 3), make a loop in the cable close to the connector and attach the supplied suppressor around the loop. See Figure 4. The suppressor must be as close as possible to the rear panel of the NT100.

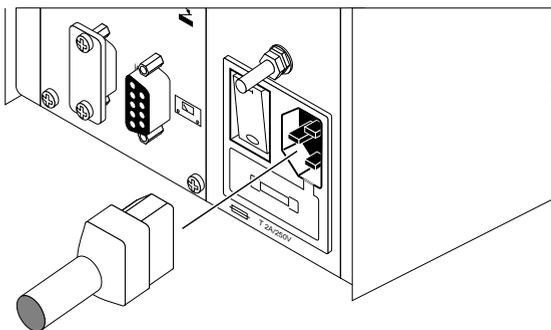
### Figure 4 Suppressor Installation Around Ethernet Cable



### All Systems

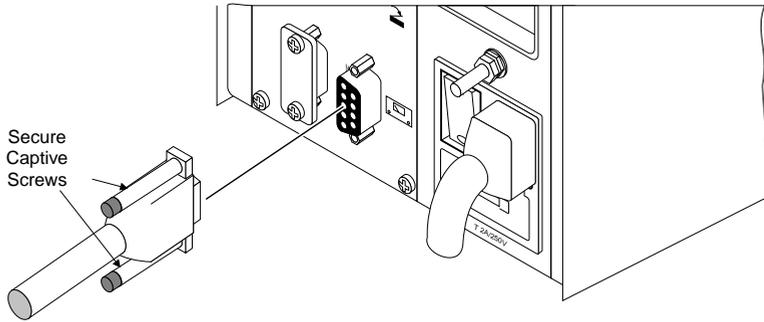
1. Connect the power cord to the NT100, and to an appropriate power outlet. See Figure 5.

### Figure 5 Power Cord Connection.



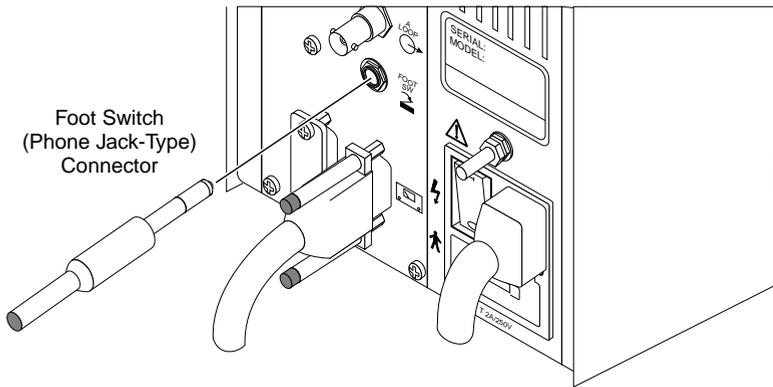
2. Connect the Remote Keypad to the NT100. Secure the connector with the two captive screws. See Figure 6.

**Figure 6 Keypad Connection**



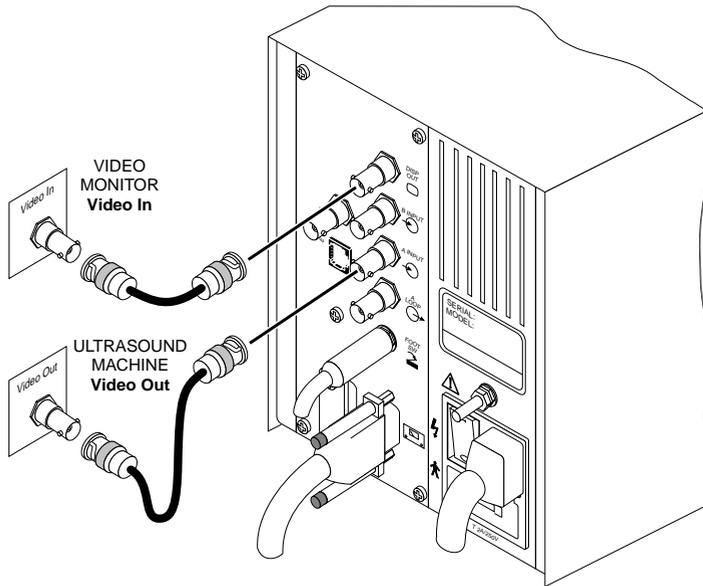
3. If the optional foot switch is present, connect it to the Foot Switch input in the NT100. See Figure 7.

**Figure 7 Foot Switch Connection**



4. Connect the Video Output of the imaging equipment to the Video Input of the NT100. See Figure 8.
5. Connect the Video Output of the NT100 to the Video Input of the external monitor. See Figure 8.

**Figure 8 Video In and Video Out Connections**



**NOTE:** If the imaging equipment has a Video Input connection, images recalled from the NT100 can be displayed in that monitor by connecting the NT100 Video Output to the imaging equipment Video Input.

If a VCR or similar equipment is present, it can be connected to the NT100.

6. Connect any alternative video source (i.e. a VCR) Video Output to the Channel B input of the NT100, labeled VCR. See Figure 9.

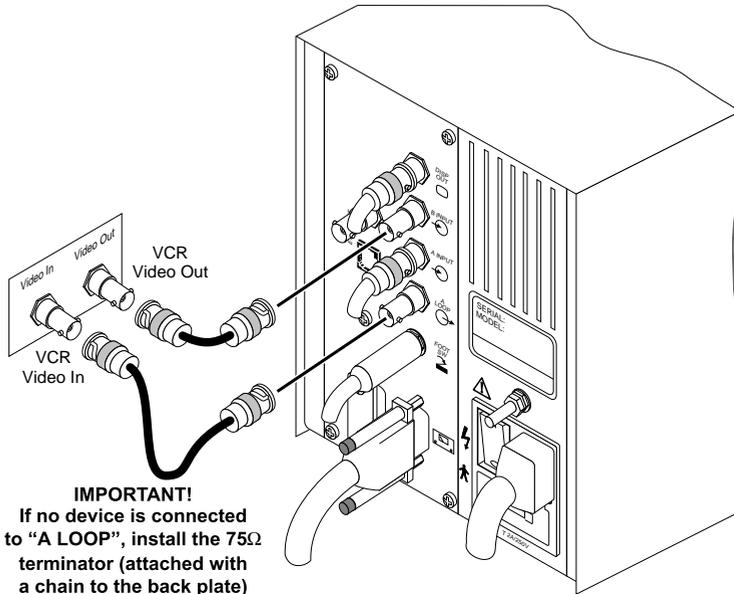
**NOTE:** The A LOOP connection at the NT100 is electrically connected to the A INPUT.

### **Important**

If you are *not* connecting a VCR to the NT100, make sure that the 75Ω Terminator is installed on the “A Loop” connector on the back panel of the NT100.

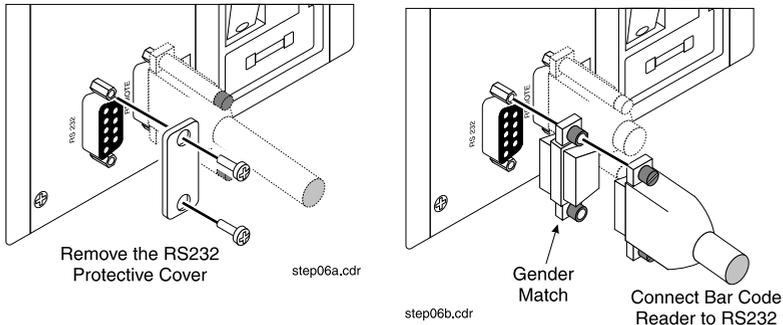
7. Connect the VCR Video Input to the A LOOP connector of the NT100. See Figure 9.

**Figure 9 VCR Connection (Channel B Input)**



8. If the optional Bar Code Reader is present, connect it to RS232 input in the NT100. See Figure 10.

**Figure 10 Bar Code Reader Connection**



See Table 1 for additional details on the NT100 connections.

**Table 1: NT100 Connection Details**

Connection	Type	Comments
Power Cord	Power	Connect to grounded power outlet (115/230 VAC, 60/50 Hz)
Remote	9-pin	Connect and secure with two captive screws.
Foot switch (Optional)	Phono	If foot switch is present, connect jack at this location.
Bar Code Reader (Option)	9-pin <sup>1</sup>	If a Bar Code Reader is present, connect to the RS-232 port. A gender match accessory might be required.
Display	BNC	Connect to Monitor Input.
A Input (Channel A)	BNC	Connect to the main Video Source. It is usually labeled Video out (or Vidout) at the connector panel of the medical imaging equipment.
B Input (Channel B)	BNC	Connect to a secondary Video Source (usually Video Out at the VCR machine).
A Loopback	BNC	Connect to VCR input. <i>If no VCR is connected, terminate this output with provided 75 ohms terminator (BNC plug attached to the NT100 with chain).</i>
Note 1: Connector on back plate is female. A Gender Match might be required.		
Network (Optional)	10 Base-2 or 10 Base-T	The network has been setup to use either 10-base-T (RJ-45 Connector and twisted-pair cable) or 10 Base-2 (BNC connector and round, coaxial cable). Connect the appropriate type of cable.

Configure the NT100. Refer to “Configuration” on page 35.

## System Configuration and Calibration

1. Refer to “*Configuration*” on page 35 for details on how to access various menu items and adjust settings.
2. Fill in the sync parameter values in Table of Appendix A. Look up the values in the “*Sync Parameter and Optional Equipment Compatibility for NT100/NT200 and Cam by Manufacturer*” document for the imaging equipment the NT100 is connected to.

If the imaging equipment is not listed, leave the sync parameters at their default values, and refer to “Manual Calibration” on page 31 for adjustment procedures.

3. For systems equipped with the Network Option, get all of the required information from the network administrator and write that information in Table of Appendix A.

This information allows the NT100 to properly identify itself on the network to allow data transfer to other network nodes.

4. Display an image on the imaging equipment that has a totally black area next to a totally white area. This is usually performed by recalling a test pattern or by having white text on black background. Refer to the imaging equipment manual for details.
5. Choose the following setup procedures according to the system configuration. Mark the check box after a procedure is complete.

Procedure For:	Starts on Page
Basic System Configuration	page 17
Configure the Network Option	page 20
Optical Character Recognition (OCR) Function	page 27

*NOTE: Each menu item is described in detail in “Configuration” on page 33.*

## Basic System Configuration

### Enter the Installation Menu

1. Press and hold [Menu] until system beeps.
2. Press [ ◀ ] once to reach the Installation Menu.
3. Press and hold [YES] until the system beeps to enter the Installation Menu.

### Enable or Disable NT100 Options

1. Make sure that any Option (listed below) that was shipped with the NT100 is set to ENABLED.  
Use the [+] key to toggle between ENABLED and DISABLED.  
Press [ ▶ ] to advance to the each subsequent menu item.
  - Enable the Network Option if the NT100 has the Network Option installed.
  - Enable the Removable Disk Option if the NT100 is equipped with a Removable (MOD) Disk.
  - Enable the Bar Code Option if a bar code reader is connected to the NT100.
  - Enable the OCR Option if the imaging source will support Optical Character Recognition for associated patient information. See “Optical Character Recognition (OCR) Function” on page 27.

### Configure Main Video Source input (Channel A)

1. Press [ ▶ ] to advance to the next menu: CHANNEL A SETUP.
2. Press [YES] to enter CHANNEL A setup menu.
3. Press [YES] to enter the LOAD SYNC GENERATOR menu.
4. Enter the HORZ START PIX, HORZ ACTIVE PIX, HORZ TOTAL PIX, VERT START PIX, VERT ACTIVE PIX, and VERT TOTAL PIX values from Table of Appendix A. Use [ ▶ ] and [ ◀ ] to move through the digits and [+] and [-] to change the digits.

*NOTE: The Sync parameters determine the area of the video image that is digitized. Improper values for the sync parameters result in images being cut off, extra black space at any edge or other image artifacts. The values entered will optimize the printed image area.*

5. Press [MENU] to return to the CHANNEL A setup menu.
6. Press [ ▶ ] to advance to the next menu: VIDEO FILTER.

7. Press [ + ] to set the Video Filter to ON or OFF.
8. Press [ ► ] to advance to the next menu: VIDEO: POSITIVE.
9. Select the polarity of the input images. Press [ + ] to toggle between POSITIVE and NEGATIVE.

**□ Calibrate the NT100 Main Video Source Input (Channel A)**

1. Press [ ► ] to advance to the next menu: AUTO CALIBRATE.

### **IMPORTANT!**

The video source must have both full white (frozen, not flashing) and full black areas for the correct calibration. This is usually accomplished by displaying some type of standard pattern. Refer to the imaging equipment's manual for details.

- a. Display an image containing full white and full black areas.
- b. Press [Yes] at the AUTOCALIBRATE? prompt.

When calibration is complete, the NT100 will beep indicating that the calibration is complete. Press [MENU] to exit from the Calibration Menu.

2. Press [ ► ] to advance to the next menu: MANUAL CALIBRATE.  
If you wish to calibrate the video input of the NT100 to override the black and white levels set during auto calibration, use this function to make those adjustments. For complete details, see "Manual Calibration" on page 31.
3. Press [ ► ] to advance to the next menu: VIDOUT CALIBRATE.

*NOTE: This parameter should be changed as a result of further experience with your system. Increasing the Vidout Gain results in a brighter image in the output monitor. Use this parameter to compensate for any difference between the original image displayed in the imaging equipment monitor and the displayed image from the output of the NT100 in the output monitor.*

*NOTE: Press [ ► ] to advance past HORIZONTAL PROFILE. This menu item is a troubleshooting tool, and will be explained further in "Troubleshooting" on page 79.*

**□ Configure Channel A Optical Character Recognition (OCR) functions. See "Optical Character Recognition (OCR) Function" on page 27.**

1. After OCR is configured, press [MENU] to return to the Installation Menu.
2. Press [ ► ] to advance to the next menu: CHANNEL B SETUP.

If a VCR or any other video source device is connected to the NT100 via the Channel B, perform Channel B setup. See “Channel B Setup” on page 24.

**Configure Channel B Optical Character Recognition (OCR) functions. See “Optical Character Recognition (OCR) Function” on page 27.**

1. After OCR is configured, press [MENU] to return to the Installation Menu.

**Adjust Recall Sync**

1. Press [▶] to advance to the next menu: RECALL SYNC.  
Leave the Recall Sync at the default value (INTERNAL). For more information, see “Installation Menu” on page 56.

**Adjust Recall Mode**

1. Press [▶] to advance to ADJUST RECALL MODE.
2. Leave the Recall Sync at the default value (INTERNAL). For more information, see “Installation Menu” on page 56.

**Record the unit Serial Number**

1. Press [▶] until EDIT SERIAL NUMBER? is displayed.
2. Record in Appendix A at the back of this manual.
3. Check the Serial Number in the display against the number on the label on the NT100 back panel.

**Edit Aspect Ratio**

1. Press [▶] until EDIT ASPECT RATIO is displayed.

Commonly, the aspect ratio for printed images is 1333 (or 4 units wide by 3 units tall). Use this parameter to change the aspect ratio of the images.

2. Press [MENU] to exit to the Setup Menu.

**Adjust Modality**

1. Press [▶] until MODALITY: ULTRASOUND is displayed.
2. If the image source equipment is an ultrasound machine, leave this parameter at the default setting. If the image source is something other than an ultrasound machine, press [Yes] to change the parameter to OTHER.

**If the NT100 is equipped with the Network Option, go on to “Configure the Network Option” on page 20.**

## Configure the Network Option

*NOTE: Skip this section if the NT100 was not shipped with the Network Option.*

1. Enter the Installation Menu and press [▶] to advance to NETWORK SETUP.
2. Press [YES] to enter the Network Setup Menu (the first menu is EDIT LOCAL IP ADDR?).
3. Press [YES] to enter the Local IP Address Menu.
4. Enter the Local IP Address as recorded in Table of Appendix A. Use [▶] and [◀] to move to the next and previous digit, and [+] and [-] to change any digit.
5. Press [MENU] to return to the Network Setup Menu.
6. Press [▶] to advance to the next menu: EDIT LOCAL ETH MENU.
7. Press [YES] to enter the Local Ethernet Menu.

*NOTE: Record the Local Ethernet Address in Table of Appendix A. DO NOT CHANGE THE LOCAL ETHERNET VALUE.*

8. Press [MENU] to return to the Network Setup Menu.
9. Press [▶] to advance to the next menu: EDIT GATEWAY ADDR.
10. Press [YES] to enter the Local Gateway Address menu.
11. Enter the Gateway IP Address as recorded in Table of Appendix A. Use [▶] and [◀] to move to the next and previous digit, and [+] and [-] to change any digit.
12. Press [MENU] to return to the Network Setup Menu.
13. Press [▶] to advance to the next menu: EDIT SUBNET MASK.
14. Press [YES] to enter the Subnet Mask menu.
15. Enter the Subnet Mask number as recorded in Table of Appendix A. Use [▶] and [◀] to move to the next and previous digit, and [+] and [-] to change any digit.
16. Press [MENU] to return to the Network Setup Menu.
17. Press [▶] to advance to the next menu: EDIT LOCAL AE TITLE.
18. Press [YES] to enter the Local AE Title menu.
19. Enter the Local AE Title as recorded in Table of Appendix A. Use [▶] and [◀] to move to the next and previous digit, and [+] and [-] to change any digit.

20. Press [MENU] to return to the Network Setup Menu.
21. Press [▶] to advance to the next menu: ADD NETWORK DEST.

## □ Add a Network Destination

1. Press [YES] to enter the Network Destination definition menu (the first menu is NETWORK DEST NAME).
2. Press [YES] to enter the Network Dest Name menu
3. Enter a name of the first destination up to 8 characters. Use the [+] and [-] keys to change a character, and [▶] and [◀] to move through the different characters. The following parameters are related to the current network destination name.
4. Press [MENU] to return to the Network Destination Menu.
5. Press [▶] to advance to the next menu: EDIT DEST IP ADDR.
6. Press [YES] to enter the Dest IP Address Menu.
7. Enter the Network Destination IP Address as recorded in Table in Appendix A. Use the [+] and [-] keys to change a digit, and [▶] and [◀] to move through the different digits.
8. Press [MENU] to return to the Network Destination Menu.
9. Press [▶] to advance to the next menu item: PROTOCOL.
10. Press [▶] to advance to the next menu item: DEVICE TYPE.
11. Press [+] to toggle between GENERIC STORE, GENERIC PRINT and 3M PRINT. Select 3M PRINT if you have a 3M print server connected to the NT100. Otherwise, select GENERIC PRINT for any other print server or GENERIC STORE for any Workstation.
12. Press [▶] to advance to the next menu: EDIT DEST PORT.
13. Press [YES] to enter the Destination Port menu
14. Enter the Network Destination Port as recorded in Table in Appendix A. Use the [+] and [-] keys to change a digit, and [▶] and [◀] to move through the different digits.
15. Press [MENU] to return to the Network Destination Menu.
16. Press [▶] to advance to the next menu: EDIT DEST AE TITLE?
17. Press [YES] to enter the Destination AE Title menu.
18. Enter the Destination AE Title as recorded in Table in Appendix A. Use the [+] and [-] keys to change a digit, and [▶] and [◀] to move through the different digits.

19. Press [MENU] to return to the Network Destination Menu.

The following parameters will appear depending on whether GENERIC PRINT, 3M PRINT OR GENERIC STORE was selected as device type:

- a. PRIORITY (*ALL*): Use [+] to toggle among LOW, MEDIUM, and HIGH. Consult your network administration for advice. Otherwise leave at default.
  - b. FILM DEST (*3M & GENERIC PRINT*): Determine where in the printer will the images from the NT100 be sent to. Use [+] and [-] to toggle among PROCESSOR1, MAGAZINE1 (for 3M server, PROCESSOR2, and MAGAZINE2 also).
  - c. LUT GROUP (*3M Only*): Use [+] and [-] to select the LUT group (0-10) to be sent with the images.
  - d. LUT NUMBER (*3M Only*): Use [+] and [-] to select the LUT number (0-16) to be sent with the images.
  - e. MAG TYPE (*3M & GENERIC PRINT*): Use [+] and [-] to select magnification algorithm among REPLICATE, BILINEAR, CUBIC, and NONE (*GENERIC PRINT only*). The default is CUBIC.
  - f. SMOOTH TYPE (*3M & GENERIC PRINT*): If the Mag Type is cubic, use [+] and [-] to select smoothing type between 0 and 15. If the Mag Type is not cubic, this parameter is ignored.
  - g. MAXIMUM DENSITY (*3M & GENERIC PRINT*): Select the desired density of the print image. The range is from 170 - 320. The Default is 200 (2.0 Optical Density Units).
  - h. POLARITY (*3M & GENERIC PRINT*): Select the polarity of the printed image. Use [-] to toggle between POSITIVE and NEGATIVE.
20. Press [MENU] to exit to the Network Destination Menu.
21. Press [MENU] to return to the Network Setup Menu
22. Repeat previous steps 1 through 21 for every network destination desired for the NT100.
23. Press [▶] to advance to the next menu: MODIFY NETWORK DEST. Select this menu only to make changes to the setup of any of the already entered network destination.
24. Press [▶] to advance to the next menu: DELETE NETWORK DEST. Select this menu to delete a previously entered network destination.
25. Press [MENU] to exit to the Installation Menu.

## □ Final Setup

1. Press [▶] to advance to the next menu: ERASE NETWORK DISK. (This is a troubleshooting feature. Skip for now).
2. Press [▶] to advance to the next menu: FORMAT NETWORK DISK. (This is a troubleshooting feature. Skip for now).
3. Press [▶] to advance to the next menu: BEGIN DEMO. *NOTE: This item will appear only if the NT100 is equipped with the Removable Disk Option.*
4. Press [MENU] to exit to the Setup Menu.
5. Press [▶] to advance to BW DEST.
  - a. Press [+] or [-] to select a destination for future network exams.
6. Set Up the Operating Parameters for the user functions:
  - a. Press [▶] to step through each item. Show the user how to:
    - Press [▶] and [◀] to move through the different menu items.
    - Press [+] or [-] to change the digits in entries such as TIME and DATE.
    - Explain to the user how to select different network destinations and how to change the print parameters to get the desired results.
    - Show the user how to adjust the Remote Keypad display and speaker volume to his or her liking.
    - Explain the concept of the CONFIRMATION menu item. This menu item Selects whether the NT100 will prompt for confirmation before deleting data: ERASE ALL, FORMAT DISK, or DELETE ERROR LOG.
  - b. Check the TIME and DATE and make sure that they are correct for your time zone.
  - c. Press [MENU] to exit to normal operating mode.
  - d. **IMPORTANT:** Turn the NT100 OFF and then ON to initialize the network.

The NT100 is ready for image acquisition. Refer to *Camtronics 89999-0097, NT100 Operator's Manual* for operation instructions.

## Channel B Setup

Channel B must be set up only if a VCR (or any other secondary video source) is connected to the NT100 VCR Input.

### □ Setup Procedure

1. Enter the Installation Menu and press [▶] to advance to CHANNEL B SETUP.
2. Press [YES] to enter the Channel B Setup Menu.
3. Press [YES] to enter the LOAD SYNC GENERATOR menu.
4. Enter the HORZ START PIX, HORZ ACTIVE PIX, HORZ TOTAL PIX, VERT START PIX, VERT ACTIVE PIX, and VERT TOTAL PIX values from Table of Appendix A. Use [▶] and [◀] to move through the digits and [+] and [-] to change the digits.

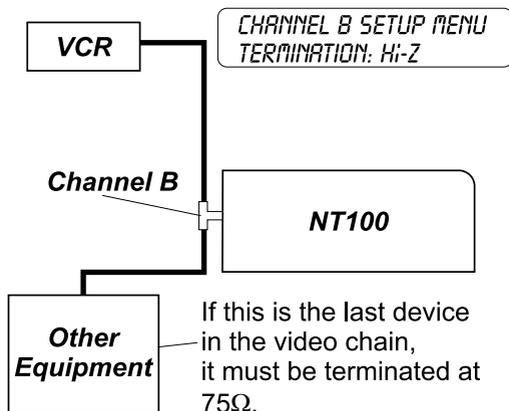
*NOTE: The Sync parameters determine the area of the video image that is digitized. Improper values for the sync parameters result in images being cut off, extra black space at any edge or other image artifacts. The values entered will optimize the printed image area.*

5. Press [MENU] to return to the CHANNEL B setup menu.
6. Press [▶] to advance to the next menu: VIDEO FILTER.
7. Press [+] to set the Video Filter to ON or OFF.
8. Press [▶] to advance to the next menu: VIDEO: POSITIVE.
9. Select the polarity of the input images. Press [+] to toggle between POSITIVE and NEGATIVE.
10. Press [▶] to advance to the next menu: TERMINATION.

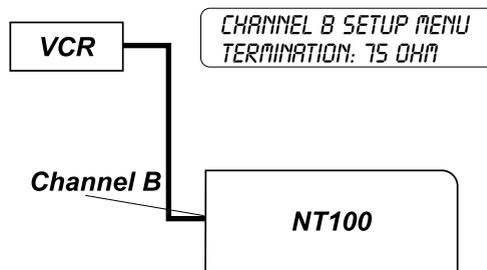
- Check Figure 11 below. Determine the configuration of the video chain and set the TERMINATION Parameter correctly.

**Figure 11 Channel B Termination Settings**

*For Installations where the NT100 is not the last device along the video chain, set Channel B Termination to Hi-Z.*



*If the NT100 is the last device along the video chain, set Channel B Termination to 75 OHM.*



c098001.cdr

**Calibrate the NT100 Secondary Video Source Input (Channel B)**

- Press [▶] to advance to the next menu: AUTO CALIBRATE.

**IMPORTANT!**

The video source must have both full white (frozen, not flashing) and full black areas for the correct calibration. For a VCR, record two minutes of an image that has fully white and fully black areas and play them back at this time.

- Display an image containing full white and full black areas.
- Press [Yes] at the AUTOCALIBRATE? prompt.

When calibration is complete, the NT100 will beep indicating that the calibration is complete. Press [MENU] to exit from the Calibration Menu.

- Press [▶] to advance to the next menu: MANUAL CALIBRATE.  
If you wish to calibrate the video input of the NT100 to override the black

and white levels set during auto calibration, use this function to make those adjustments. For complete details, see “Manual Calibration” on page 31.

3. Press [▶] to advance to the next menu: VIDOUT CALIBRATE.

*NOTE: This parameter should be changed as a result of further experience with your system. Increasing the Vidout Gain results in a brighter image in the output monitor. Use this parameter to compensate for any difference between the original image displayed in the imaging equipment monitor and the displayed image from the output of the NT100 in the output monitor.*

*NOTE: Press [▶] to advance past HORIZONTAL PROFILE. This menu item is a troubleshooting tool, and will be explained further in “Troubleshooting” on page 79.*

**Configure Channel B Optical Character Recognition (OCR) functions. See “Optical Character Recognition (OCR) Function” on page 27.**

1. After OCR is configured, press [MENU] to return to the Installation Menu.

## Optical Character Recognition (OCR) Function

The NT100 can be set up to read the patient name and patient ID from the image at the video inputs. The Optical Character Recognition or OCR must be enabled for the function to work. OCR must also be “trained” in recognizing the type face and the information location.

The OCR Function requires the *all* of the following conditions for proper operation:

- OCR will recognize white characters on a black background only
- OCR will read fixed character spacing only (will not read proportionately spaced characters)
- The font in each field to be read by OCR must be the same size
- The field position of each field to be read by OCR must be fixed
- OCR will work on systems with landscape orientations only
- OCR will work on systems running with synchronous sampling
- Previous to training, the NT100 must be properly calibrated.

Connect a good quality monitor to the NT100 video output.

## OCR Training

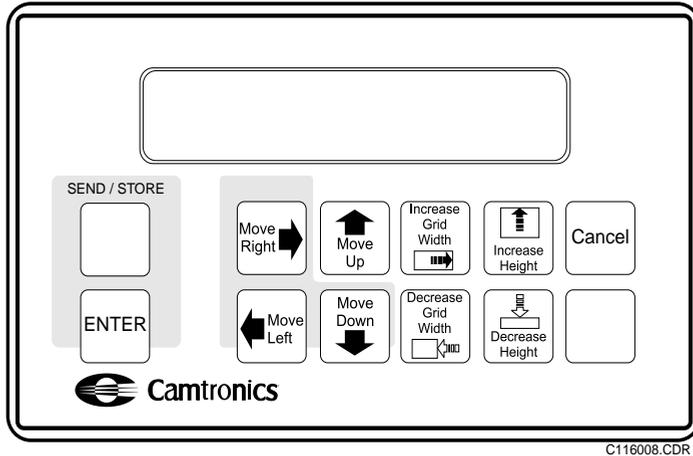
### Learn OCR Font

At the remote,

1. Press and hold [MENU] until the unit beeps.
2. Press [◀] until INSTALLATION is displayed.
3. Press and hold [YES] until unit beeps.
4. Press [▶] to advance to either CHANNEL A SETUP OR CHANNEL B SETUP.
5. Press [YES] to enter the video Channel Setup menu.
6. Press [◀] until the LEARN OCR FONT is displayed.
7. Press [YES] to start the OCR learning process. ENTER TEXT IN VIDEO should be displayed.

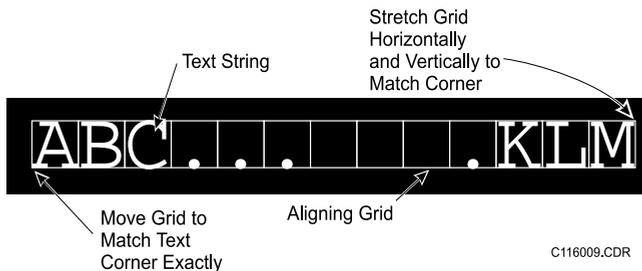
8. At the Imaging Equipment (Ultrasound) console, enter the text string displayed in the bottom line of the remote display (i.e. ABCDEFGHIJKLM) in the exact order they appear, without spaces in between. Position the cursor (at the imaging equipment) on a black background.
9. Press [STORE B&W] when ready (or [MENU] to cancel).
10. ALIGN GRID ON TEXT will be displayed on the remote with the required string in the second line.  
A grid is displayed on the output monitor, and must be moved to the location of the text string. Use the following template to move the OCR grid.

**Figure 12 Learn OCR Fonts Keypad Functions**



11. Move the OCR box until the lower-left corner of the grid matches the lower-left corner of the text string (see Figure 13). *Do not overlap the grid on the string.* Use the moving keys as shown in Figure 12.

**Figure 13 Generated Text and Alignment Grid**



12. Size the OCR box using the sizing keys as shown in Figure 12. Match the string to the OCR grid.

13. Press [STORE B&W] to accept the operation.
14. After a short delay, the NT100 will prompt for the next group of characters. Repeat steps 8 through 13 for each character string shown in the remote.

*NOTE: Use the backspace key on the imaging equipment console to erase the previous group of characters and then enter the new group in the same screen position to avoid the need for OCR grid realignment.*

## Learn OCR Fields

Two fields are supported by the NT100 OCR function, Patient Name and Patient ID. The actual location of these (or either one of them) fields must be specified. Both Patient Name and Patient ID can be scanned or Patient Name only as desired.

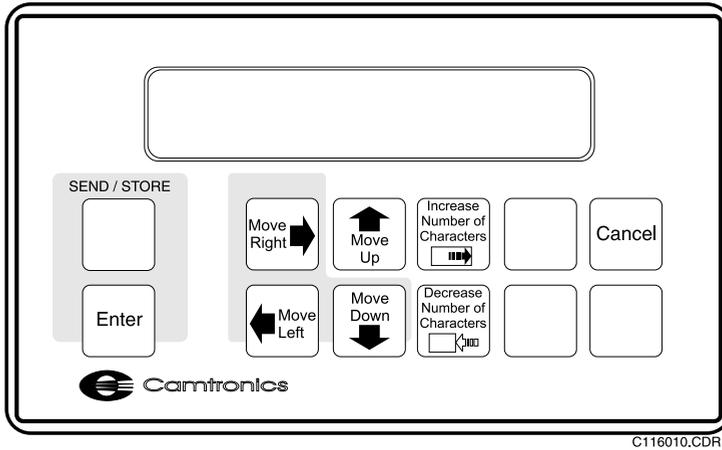
*NOTE: Complete the Learn OCR Font training procedure before completing the Learn OCR Fields procedure.*

At the remote,

1. Press and hold [MENU] until the unit beeps.
2. Press [◀] until INSTALLATION is displayed.
3. Press and hold [YES] until unit beeps.
4. Press [▶] to advance to either CHANNEL A SETUP OR CHANNEL B SETUP.
5. Press [YES] to enter the video Channel Setup menu.
6. Press [◀] until LEARN OCR FIELDS is displayed.
7. Press [YES] to start the OCR learning process. ENTER TEXT IN VIDEO PATIENT NAME should be displayed.
8. Using the keyboard at the Imaging Equipment, enter an example of the field prompted for on the second line of the remote keypad. For example, enter "John Doe" in the field in the position on the Imaging Equipment screen reserved for the patient name entry.
9. Press [STORE B&W] when ready (or [MENU] to cancel).
10. Use the keypad template as shown in Figure 14 to move the grid, and increase or decrease the number of characters until the largest required character string fits exactly inside the grid.

*NOTE: The grid must allow for the largest number of characters that may appear in the field.*

**Figure 14 Learn OCR Fields Keypad Functions**



11. Press [STORE B&W] when ready.

The unit will perform OCR on the string, and the remote display will prompt "Is This Correct?"

12. Press [YES] if the OCR procedure was successful. If the OCR procedure was not successful, press [NO]. Repeat steps 10 and 11. If the OCR procedure fails again, the imaging equipment may not meet the requirements listed on page 27. Make sure the NT200 meets the system requirements listed and is calibrated properly.

13. Repeat steps 8 through 12 for the next OCR Field shown in the display.

*NOTE: If a field will not be used, reduce the width of the field to zero characters by pressing [NET STATUS] on the remote until the field boxes shown on the imaging equipment monitor turn to a straight line (zero characters).*

14. Press [MENU] repeatedly to exit the menus.

## Manual Calibration

The NT100 will be calibrated automatically most of the time. Use manual calibration if autocalibration fails, or to set up the unit for video values other than totally black and totally white.

Before starting manual calibration, display in the imaging equipment an image that contains totally black and totally white regions. Usually test patterns are adequate for this task. (Or display an image that contains the most white and the most black regions desired.)

Enter the manual calibration menu. From Live mode:

1. Press [MENU] until unit beeps.
2. Press [◀] to advance to Installation menu.
3. Press [YES] until the unit beeps to enter the Installation menu.
4. Press [▶] repeatedly until CHANNEL A SETUP is displayed in the second line of the remote display.

*NOTE: This calibration procedure also applies to Channel B, Manual Calibration.*

5. Press [YES] to enter the Channel A Setup menu.
6. Press [▶] repeatedly until MANUAL CALIBRATE is displayed in the second line of the remote display.
7. Press [YES] to enter the Manual Calibration menu.

The NT100 will scan the image. The display reads:

```
MANUAL CALIBRATION
SCANNING IMAGE +
```

After the NT100 completes the scan, the display should read as follows:

```
MANUAL CALIBRATION
BLACK:==>XXX/XXX
```

The arrow points at the lower level which is black. The higher level is shown for reference, since both numbers are interactive.

8. Press [+] or [-] to increase or decrease the black level. It should be between set to 1 (Ideally, it should be set between 0 and 1).
9. Press [▶] to advance to White setup.

The display should read as follows:

```
MANUAL CALIBRATION  
WHITE:XXX/XXX<==
```

The arrow points at the higher level which is white. The lower level is shown for reference, since both numbers are interactive.

10. Press [+] or [-] to increase or decrease the white level. It should be between set to 254 (Ideally, it should be set between 254 and 255).

The black level might have changed also. If necessary, press [◀] and re-adjust the black level. Repeat this cycle until black and white levels are very close to 1 and 254 respectively.

11. Press [▶] to advance to Phase setup.

12. The display should read as follows:

```
MANUAL CALIBRATION  
PHASE: XXX
```

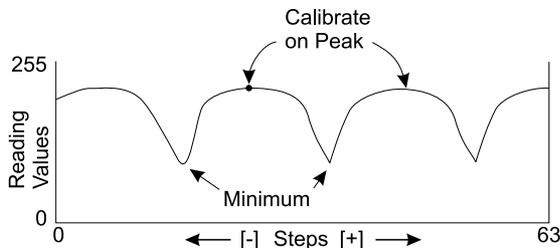
Calibrate the phase to its maximum number. Pressing [-] and [+] steps the phase between peaks and valleys.

## Phase Calibration

1. Press and hold [-] until the NT100 beeps.

*NOTE: There are 64 possible steps. Reaching the end of the adjustment range (step No. 0 or step No. 63) makes the unit beep.*

2. Press [+] repeatedly until the phase (in the display) reaches a minimum value (note when the number in the display reaches a minimum and then starts to increase).



3. Press [+] and count the number of presses, until the phase value reaches a low again (that is, when the number reaches a minimum and then starts to increase).
4. Divide the count by 2, and press [-] that number of times. The phase should be calibrated.
5. Press [▶] and check that the black level and white levels are still close to 1 and 254. Repeat calibration process if necessary.

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# Configuration

The NT100 must be configured at installation and can be re-configured at any time. The configuration is accomplished from the remote keypad.

## Navigating the Configuration Menus

### Key Actions

The following keys are used for configuration:

Key	Used to:
 or [MENU]	<ul style="list-style-type: none"> <li>enter the menu system</li> <li>exit the current menu level and return to the previous menu level</li> <li>exit the menu system from the top menu level</li> </ul>
 or [ ◀ ]	<ul style="list-style-type: none"> <li>return to previous menu option in current menu level (menu option will wrap around all the available menu items)</li> </ul>
 or [ ▶ ]	<ul style="list-style-type: none"> <li>advance to next menu option in current menu level (menu option will wrap around all the available menu items)</li> </ul>
 or [Yes/+]	<ul style="list-style-type: none"> <li>give affirmative answer to question on the display (questions have a blinking question mark)</li> <li>change (increase) the selection on the display</li> </ul>
 or [No/-]	<ul style="list-style-type: none"> <li>give negative answer to question on the display (questions have a blinking question mark)</li> <li>change (decrease) the value of displayed selection</li> </ul>

## Menu Display Options

The menu system has different types of messages that require different actions. Except where noted, key press sequences are generally the same.

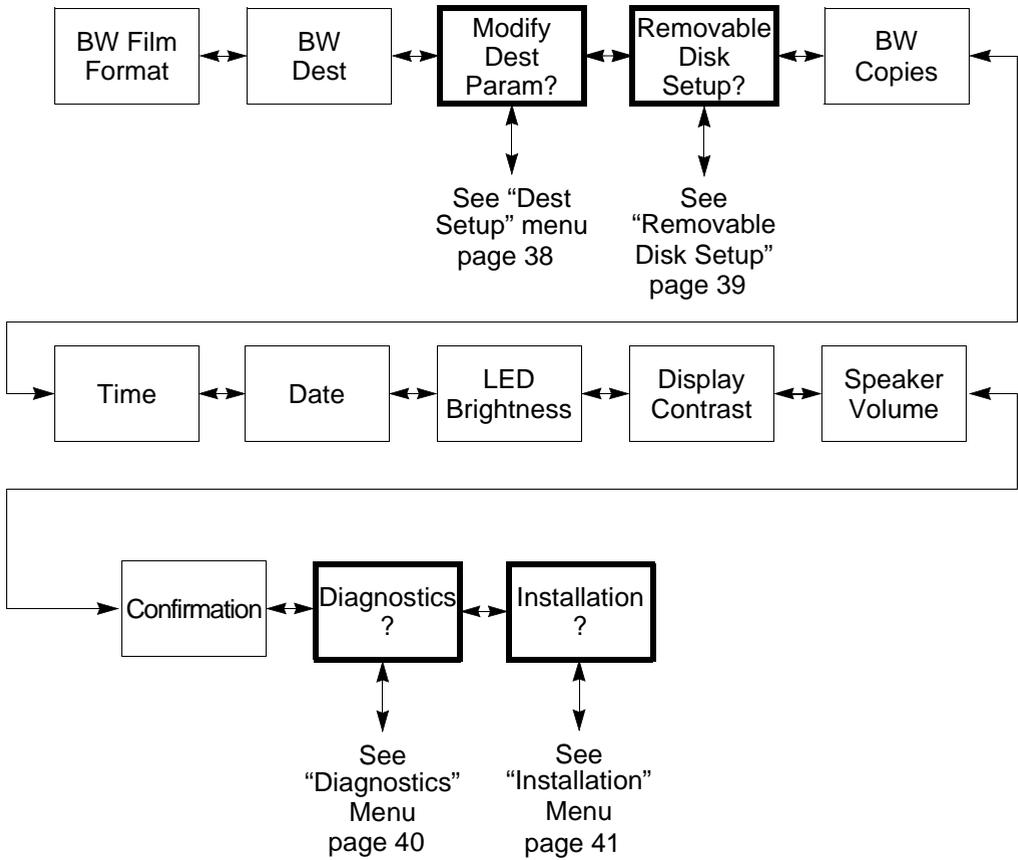
Display Message	Action
Questions requiring Yes or No answer: “?” flashes on the display.	<ul style="list-style-type: none"> <li>• Press ◀ to display the previous menu option</li> <li>• Press ▶ or [No/-] to display the next menu option</li> <li>• Press [Yes/+] to perform the displayed action</li> </ul>
Selection of 1 item out of a limited number of choices (i.e. ON/OFF or any one or two digit number)	<ul style="list-style-type: none"> <li>• Press ◀ to display the previous menu option</li> <li>• Press ▶ to display the next menu option</li> <li>• Press [Yes/+] to display the next choice</li> <li>• Press [No/-] to display the previous choice</li> </ul>
A numeric value with 3 or more digits or an alpha-numeric field.	<ul style="list-style-type: none"> <li>• Press ◀ to select the previous digit to edit (the digit blinks)</li> <li>• Press ▶ to select the next digit to edit (the digit blinks)</li> <li>• Press [Yes/+] to increase the selected digit</li> <li>• Press [No/-] to decrease the selected digit</li> <li>• Press [MENU] when done</li> </ul>

Figure 15 is a map of all the menus and menu items for the NT100. Some of the menus and menu items are available only when certain options are installed (i.e. MOD drive or Network) and configured properly.

A box with a thick outline denotes a menu (an entry point to a sub-menu). Boxes with thin outlines denote menu items.

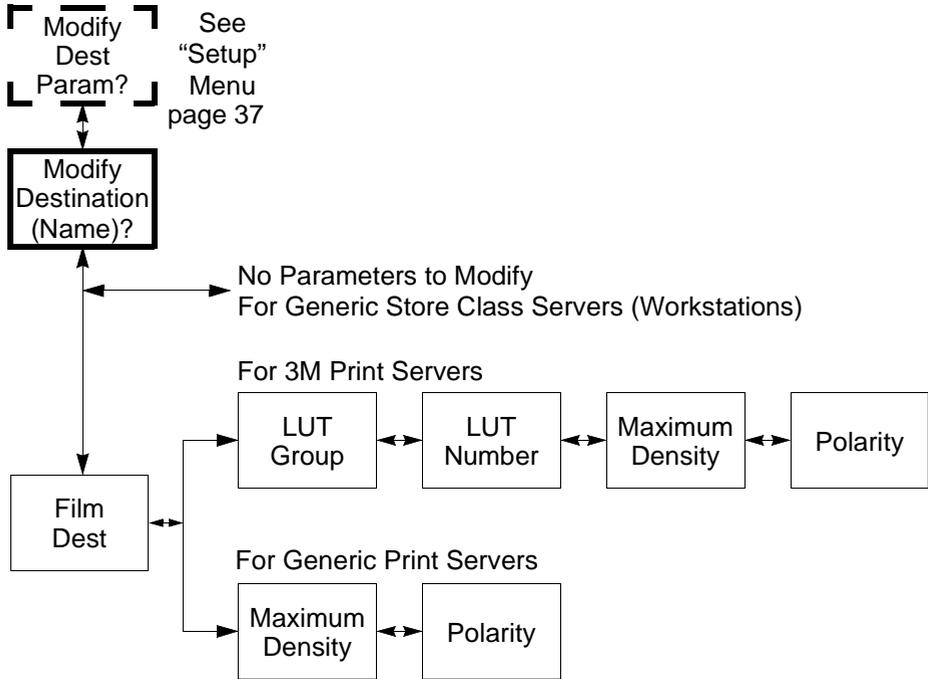
Note that the map is a general guide. (Following the illustrations of the map, the “Details” section has all the information pertaining to each menu and menu item.)

**Figure 15 Setup Menu Map**



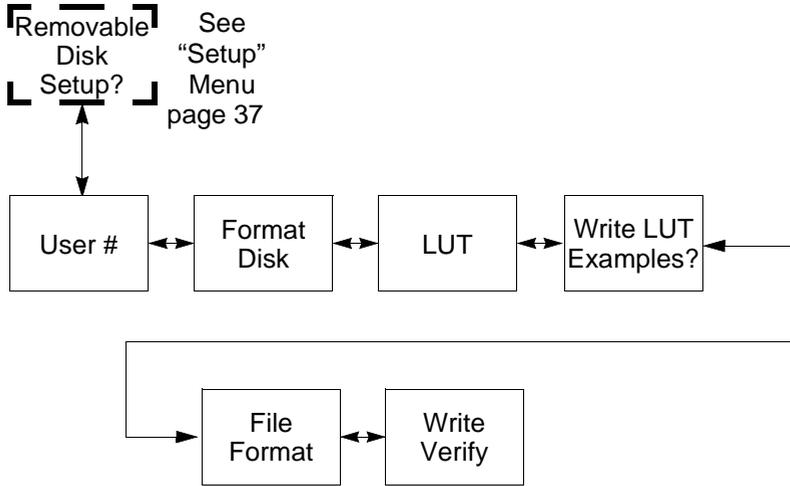
### Figure 16 Network Destination Setup Menu

NOTE: This menu will only appear if the Network Option is enabled.

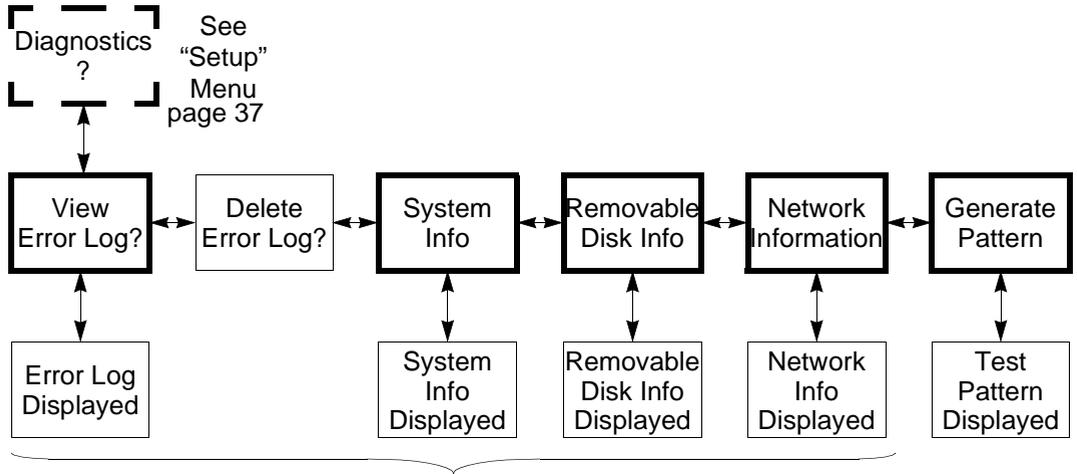


### Figure 17 Removable Disk Setup Menu

*NOTE: This menu will only appear if the Removable Disk Option is enabled.*

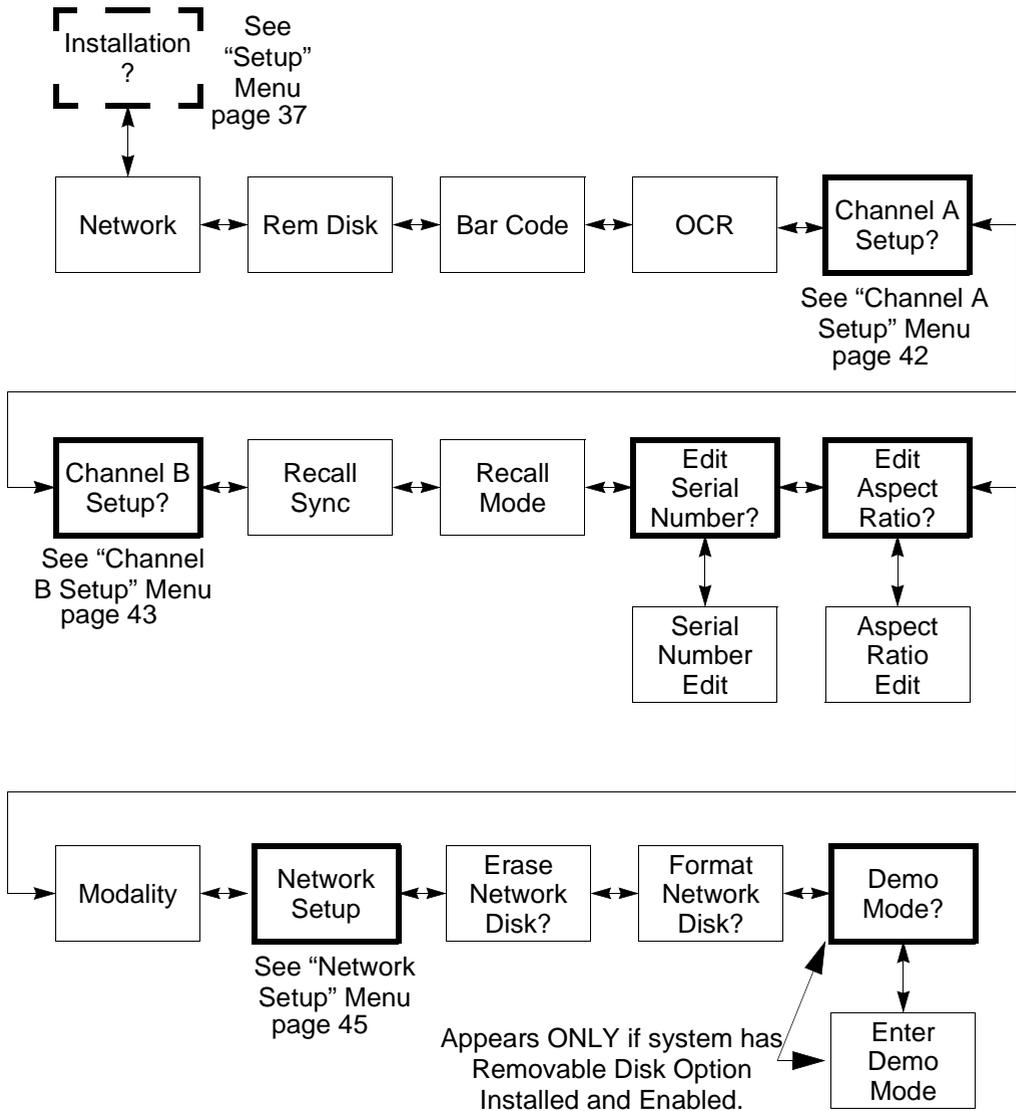


**Figure 18 Diagnostics Menu**

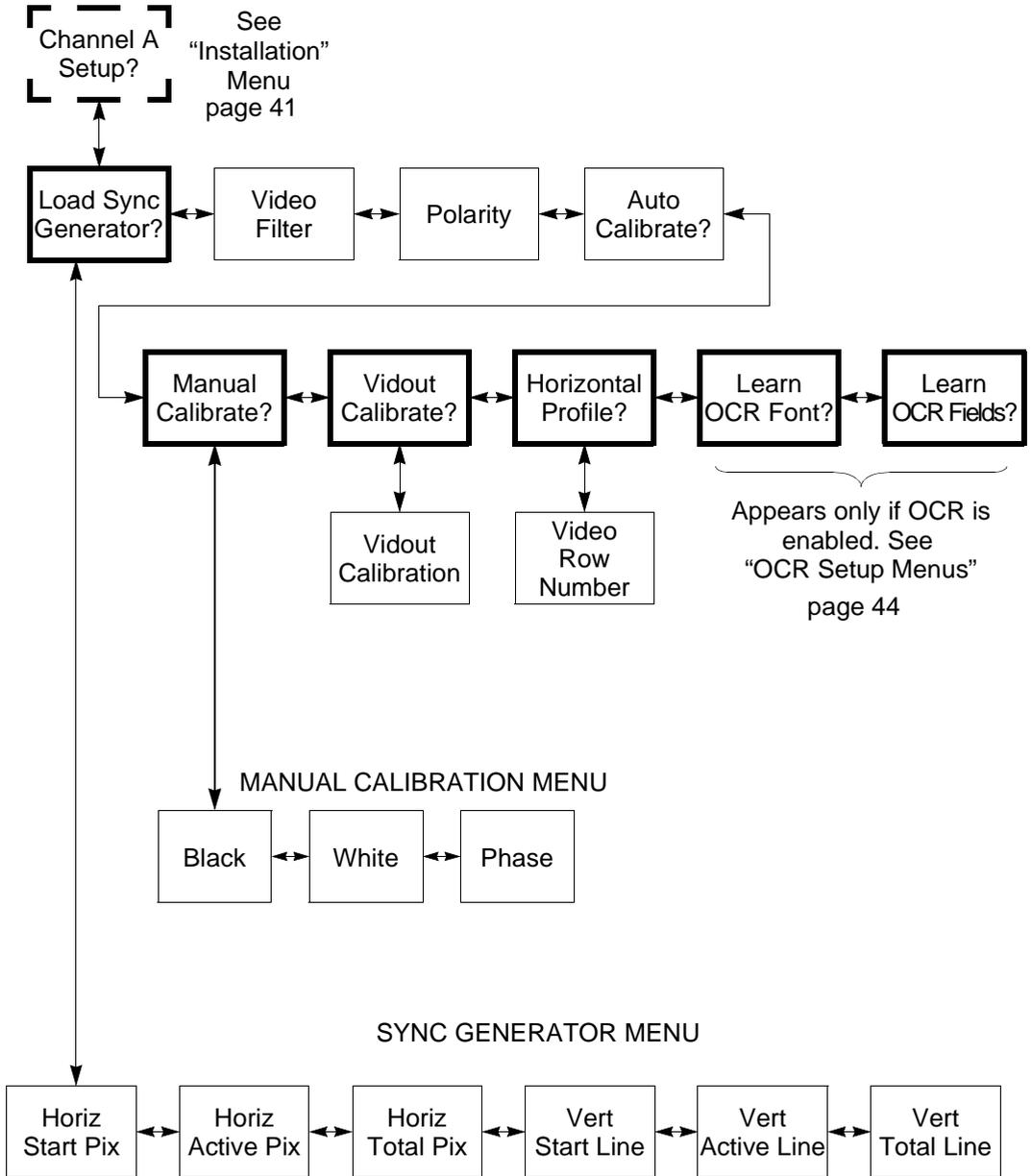


For Systems Equipped with MOD Drive: Start a Disk Exam, then enter the menus in order to record these parameters on a disk.

**Figure 19 Installation Menu**



**Figure 20 Channel A Setup Menu**



**Figure 21 Channel B Setup Menu**

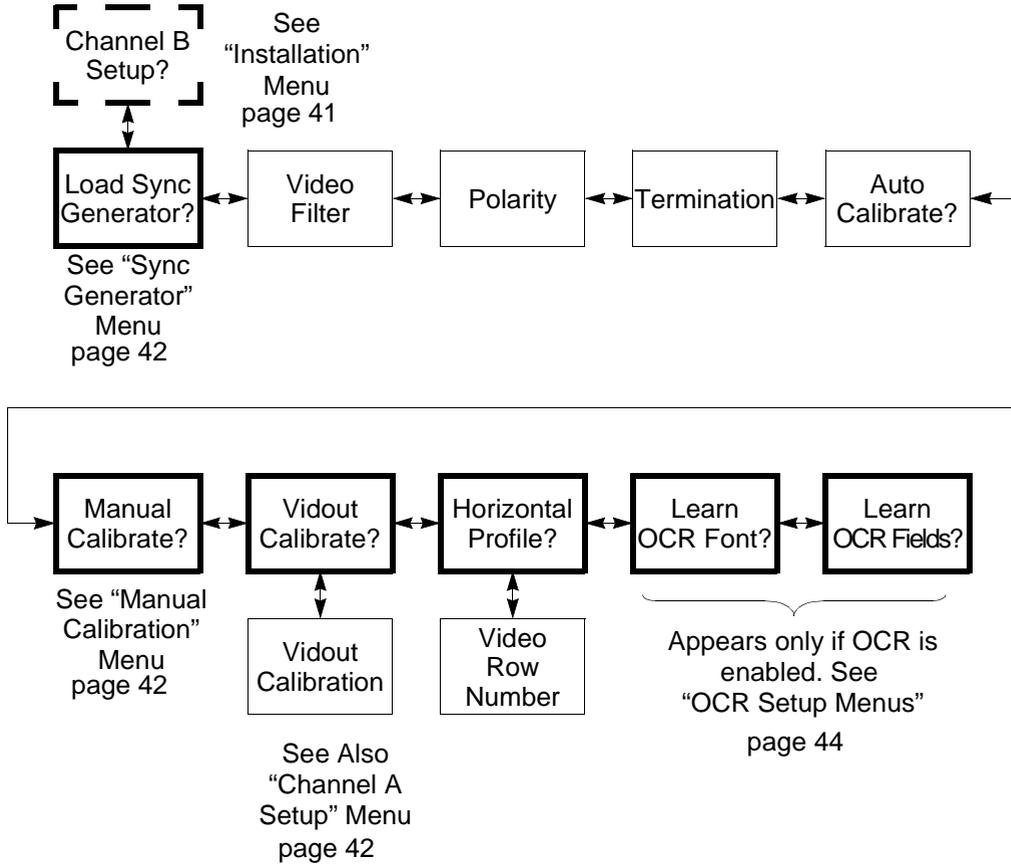
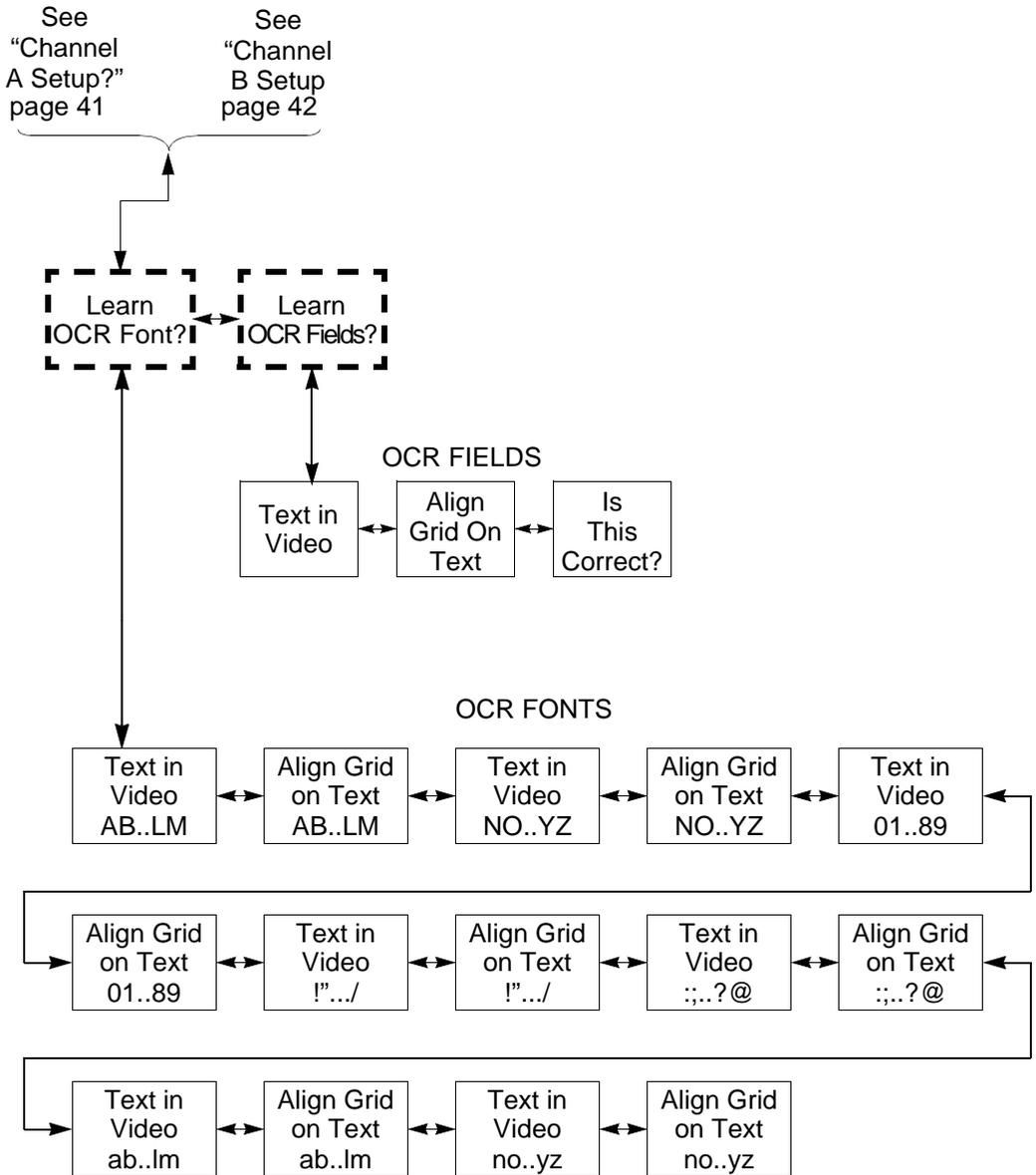


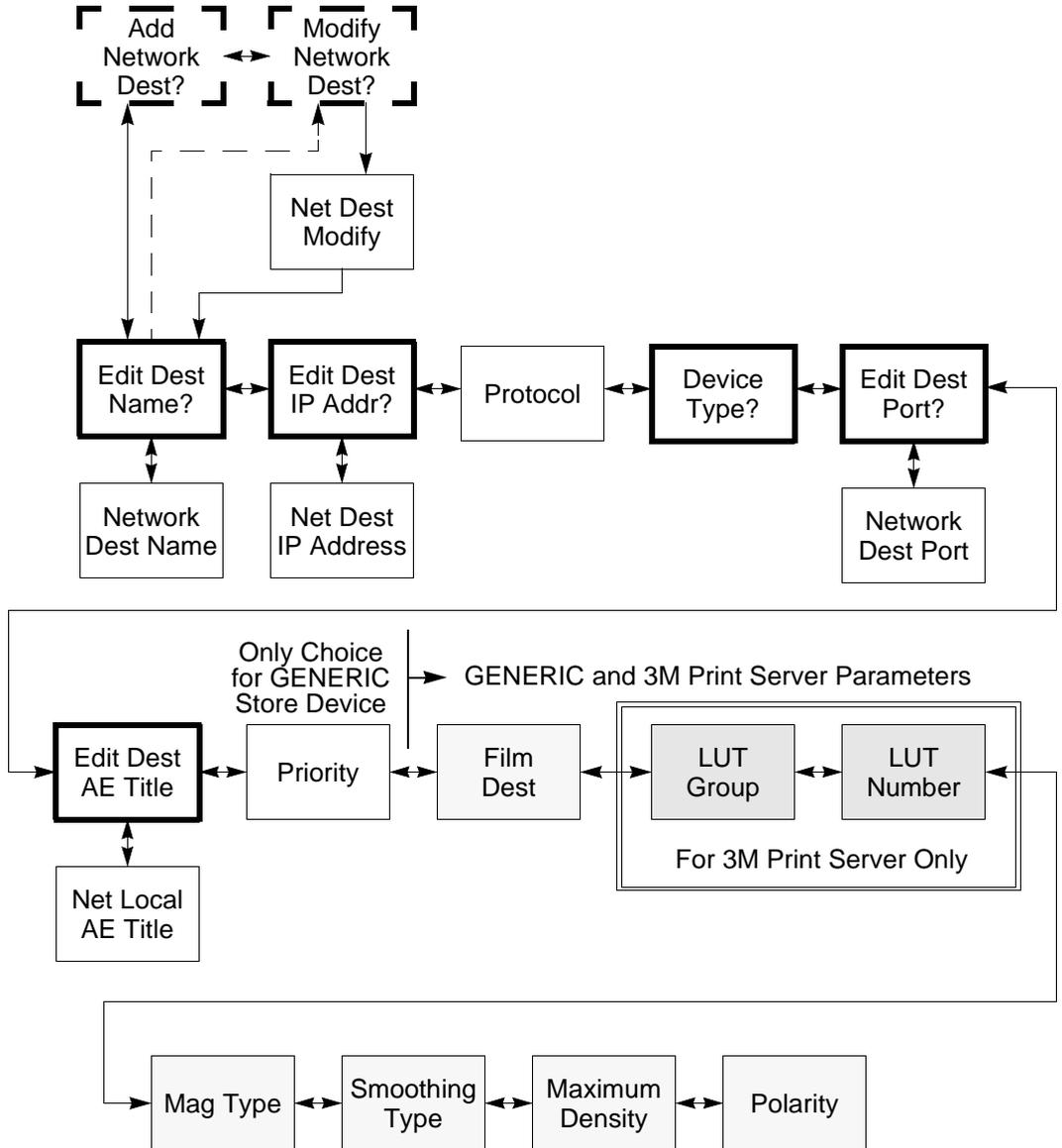
Figure 22 OCR Setup Menus





**Figure 24 Network Destination Menu**

See "Network Setup" Menu page 45



## Configuration Menu Details

The following section shows a table with the configuration menus in order of appearance on the display. Refer to “Key Actions” on page 35 for a description of the navigation keys.

Some menu items are related to the physical configuration of the NT100. Network related menus will not be displayed unless the Network Option is installed. Likewise, Removable Disk related menus will not be displayed unless the MOD Drive Option is installed.

For each menu item shown in the display, the top line identifies the menu (Setup Menu, Installation Menu, etc.) and the bottom line identifies the menu item or parameter.

The X's in the display messages are modifiable characters (numbers or letters). The underscored character in the display will flash when the menu is accessed.

The following table has a description of each menu, including the range of possible values, the default and the physical configuration for the menu item to be displayed.

- To enter the Menu system, press and hold the [MENU] button until the NT100 beeps.

# Configuration Menus

## Setup Menu

<p>SETUP MENU BW FILM FORMAT:XX</p>	<p>Selects the printing format (number of images on a sheet).</p> <p>Range: For Generic Store: 1-25, based on currently selected BW destination. For 3M and Generic print server: 1, 2, 4, 6, 9, 12, 15, 16, 20</p> <p>Default: 6</p> <p>Press [Yes] or [No] to increase or decrease the number of images per sheet. Press [▶] to advance to the next menu item.</p>
<p>SETUP MENU BW DEST:XXXXXXXX</p>	<p>Determines the network destination for transfers. The allowable names were entered from the Installation menu (See "Installation Menu" on page 56)</p> <p>Range: Based upon the network destinations added in the installation menu.</p> <p>Default: none</p> <p>Notes: <i>This entry appears <b>only</b> if the <b>Network Option</b> is <b>installed</b> and <b>enabled</b>.</i></p>
<p>SETUP MENU MODIFY DEST PARAMP</p>	<p>Press [YES] to enter the Network Destination Setup menu (See "Modify Destination Parameter Menu" on page 51).</p> <p>Range: YES, NO</p> <p>Notes: <i>This entry appears <b>only</b> if the <b>Network Option</b> is <b>installed</b> and <b>enabled</b>.</i></p>
<p>SETUP MENU REMOVABLE DSK SETUPP</p>	<p>Press [YES] to enter the Removable Disk Setup menu (See "Removable Disk Setup Menu" on page 53).</p> <p>Range: Yes, No</p> <p>Notes: <i>This entry appears <b>only</b> if the <b>MOD Drive Option</b> is <b>installed</b> and <b>enabled</b>.</i></p>

## Setup Menu (Continued)

<p>SETUP MENU BW COPIES: XX</p>	<p>Enter the number of copies of each B&amp;W sheet to be printed.</p> <p>Range: 1 - 99</p> <p>Default: 1</p> <p>Notes: <i>This entry appears <b>only</b> if the <b>Network Option</b> is <b>installed</b> and <b>enabled</b>. If the Network Destination Device is set to <b>GENERIC STORE</b> (page 72), BW Copies cannot be changed, since the system would never need to send more than one copy to a workstation.</i></p>
<p>SETUP MENU TIME:XX:XX:XX</p>	<p>Enter the current time in 24 hour format (hh:mm:ss).</p> <p>Range: Valid values for Hour (00-23), minutes (00-59) and seconds (00-59)</p> <p>Press [▶] or [◀] to move the cursor to the hours, minutes and second. Press [Yes] or [No] to increase or decrease the value. Press [▶] while the cursor is at the seconds, to advance to the Date menu.</p>
<p>SETUP MENU DATE:XX/XX/XX</p>	<p>Enter the current date (mm/dd/yy).</p> <p>Range: Valid values for month (00-12), day (00-31) and year (00-99)</p> <p>Press [▶] or [◀] to move the cursor to the months, days and years. Press [Yes] or [No] to increase or decrease the value. Press [▶] while the cursor is at the years, to advance to the next menu.</p>
<p>SETUP MENU LED BRIGHTNESS:X</p>	<p>Setup the Remote Display brightness.</p> <p>Range: 1-7 (1=dim, 7=bright)</p> <p>Default: 7</p> <p>Press [Yes] or [No] to increase or decrease display brightness. Press [▶] to advance to the next menu.</p>

## Setup Menu (Continued)

<p>SETUP MENU DISPLAY CONTRAST:XXX</p> <p>Range: 0 (=minimum contrast)-20(=maximum contrast) Default: 15</p>	<p>Setup the LCD display contrast.</p> <p>Press [Yes] or [No] to increase or decrease the display contrast. Press [▶] to advance to the next menu.</p>
<p>SETUP MENU SPEAKER VOLUME:XX</p> <p>Range: 1-10 (1=soft, 10=loud) Default: 10</p>	<p>Set the NT100 speaker volume.</p>
<p>SETUP MENU CONFIRMATION:XXX</p> <p>Range: ON, OFF Default: ON</p>	<p>Selects whether the NT100 will prompt for confirmation before proceeding with operations that have potentially severe effects, such as ERASE DISK, SEND DISK, DELETE EXAM, etc.</p> <p>Confirmation ON is recommended. Press [Yes] or [No] to toggle between On and OFF. Press [▶] to advance to the next menu.</p>
<p>SETUP MENU DIAGNOSTICS?</p> <p>Range: Yes, No</p> <p><b>Note:</b> <i>Diagnostics menu should be accessed by Service Engineer only.</i></p>	<p>Press [YES] to enter the Diagnostics menu.</p> <p>Press [▶] or [No] to advance to the next menu.</p>
<p>SETUP MENU INSTALLATION?</p> <p>Range: Yes, No</p> <p><b>Note:</b> <i>Installation menu should be accessed by Service Engineer only.</i></p>	<p>Press and hold [Yes] until the system beeps to enter the Installation menu.</p> <p>Press [▶] or [No] to return to the first menu item.</p>

**NOTE:** The menu below appears **only** if the **Network Option** is **installed** and **enabled**.

### Modify Destination Parameter Menu

<p><i>DEST PARAMETER MENU</i> <i>MODIFY XXXXXXXXX?</i></p>	<p>Select the network destination to be modified. The allowable names were entered from the Installation menu (See "Installation Menu" on page 56).</p> <p>Range: Based upon the network destinations added in the installation menu</p> <p>Default: First BW network destination added</p> <p>Note: Use [<b>▶</b>], [<b>◀</b>], or [<b>NO</b>] to select a new destination. Press [<b>YES</b>] to edit a destination.</p>
<p><i>DEST SETUP MENU</i> <i>FILE DEST:XXXXXXXXXX</i></p>	<p>Select where the images will be printed to.</p> <p>Range: PROCESSOR, MAGAZINE For 3M Print Server Setups <i>only</i>: MAGAZINE1, PROCESSOR1, MAGAZINE2, PROCESSOR2</p> <p>Default: PROCESSOR</p>
<p><i>DEST SETUP MENU</i> <i>LUT GROUP:XX</i></p>	<p>Select what LUT group is assigned to transmitted images (refer to your printer manual for LUT definitions).</p> <p>Range: 0-10</p> <p>Default: 0 (none)</p>
<p><i>DEST SETUP MENU</i> <i>LUT NUMBER:XX</i></p>	<p>Select what LUT number is assigned to transmitted images (refer to your printer manual for LUT definitions).</p> <p>Range: 0-16</p> <p>Default: 4</p> <p>Note: <i>LUT GROUP:</i> and <i>LUT NUMBER</i> items appear <i>only</i> if a <b>3M Printer Server</b> was <b>installed</b> and <b>enabled</b> in the NT100 Network section of the Installation menu.</p>

**Modify Destination Parameter Menu (Continued)**

<p><i>DEST SETUP MENU</i> <i>MAXIMUM DENSITY:XXX</i></p>	<p>Select the maximum density of images transmitted to the print server.</p> <p>Range: 170-320</p> <p>Default: 200</p> <p><i>Notes: A value of 200 equals 2.0 Optical Density Units.</i></p>
<p><i>DEST SETUP MENU</i> <i>POLARITY:XXXXXXXX</i></p>	<p>Select the print polarity of the images transmitted to the print server.</p> <p>Range: POSITIVE, NEGATIVE</p> <p>Default: POSITIVE</p>

**NOTE:** The menu below appears **only** if the **MOD Drive Option** is **installed and enabled**.

### Removable Disk Setup Menu

<p><i>REM DISK SETUP MENU</i> <i>USER:XX</i></p>	<p>Select a predefined setup for the current disk. User number is stored with the image and is used by some printing devices to set up the print parameters. Refer to the printing device manual for user definitions.</p> <p>Range: 1-20 Default: 1</p>
<p><i>SETUP MENU</i> <i>FAT REMOVABLE DISK?</i></p>	<p>Answer is YES to format the inserted disk. Use this function to format a new MOD or recertify a used one.</p> <p>Range: YES, NO</p> <p><b>CAUTION! Formatting a removable disk will destroy the disk contents. Use this feature carefully.</b></p> <p>Press [Yes] to format the current inserted disk. Press [▶] or [No] to advance to the next menu item.</p> <p><i>Note: Formatting an MOD may take more than 10 minutes.</i></p>
<p><i>REM DISK SETUP MENU</i> <i>LUT:XXX</i></p>	<p>Select LUT number to be assigned to printed images (refer to printer manual for LUT definitions).</p> <p>Range: 0-17 Default: 0</p>

### Removable Disk Setup Menu (Continued)

<p>REM DISK SETUP MENU WRITE LUT EXAMPLES?</p> <p>Range: YES, NO</p> <p>Notes: A disk exam must be active previous to entering this menu. If no disk exam was active:</p> <ul style="list-style-type: none"> <li>• Press [Menu] repeatedly until display reads READY.</li> <li>• Press [Disk Exam] and answer [No] to append images to last exam.</li> <li>• Re-enter the menu system and navigate to "Write LUT Examples."</li> <li>• Press [Yes]</li> </ul>	<p>Press [Yes] to write the image on the NT100 video input to disk 18 times, each one with a different LUT number. (For disks with CTX format only.)</p>
<p>REM DISK SETUP MENU FILE FORMAT:XXXXX</p> <p>Range: CTX, DEFF</p> <p>Default: CTX</p>	<p>Select image storage format.</p>
<p>Note: This parameter determines compatibility of a disk recorded in the NT100 with other systems. Normally this parameter should not change after installation.</p>	<p>Press [Yes] or [No] to toggle between CTX and DEFF. Press [▶] to advance to the next menu.</p>
<p>REM DISK SETUP MENU WRITE VERIFY:XXX</p> <p>Range: ON, OFF</p> <p>Default: OFF</p>	<p>Select whether or not images written to disk are validated for accuracy. <b>Write Verify increases the write time but minimizes any write errors.</b></p> <p>Press [Yes] or [No] to turn Write Verify On or OFF. Press [▶] to return to the first menu item.</p>

## Diagnostics Menu

<p><i>DIAGNOSTICS MENU VIEW ERROR LOG?</i></p>	<p>Press [YES] to display the error log in the monitor connected to the output and in the Remote Key-pad.</p> <p>Range: YES, NO</p> <p><i>Note:</i> When YES is selected, the error log is immediately displayed in the monitor. Press [+] and [-] to scroll the error log in the Remote Display. Press [MENU] to exit.</p>
<p><i>DIAGNOSTICS MENU DELETE ERROR LOG?</i></p>	<p>Press [YES] to delete the current error log.</p> <p>Range: YES, NO</p>
<p><i>DIAGNOSTICS MENU SYSTEM INFO?</i></p>	<p>Press [YES] to display the system configuration and statistics on the monitor connected to the output.</p> <p>Range: YES, NO</p> <p>See "System Information" on page 79.</p>
<p><i>DIAGNOSTICS MENU REMOVABLE DISK INFO?</i></p>	<p>Press [YES] to display the MOD configuration and statistics on the monitor connected to the output.</p> <p>Range: YES, NO</p> <p><i>Notes:</i> This entry appears <b>only</b> if the <b>Removable Disk Option</b> is <b>installed</b> and <b>enabled</b>. See "Removable Disk Information" on page 80</p>
<p><i>DIAGNOSTICS MENU NETWORK INFORMATION?</i></p>	<p>Press [YES] to display the network configuration values and statistics on the monitor connected to the output.</p> <p>Range: YES, NO</p> <p><i>Notes:</i> This entry appears <b>only</b> if the <b>Network Option</b> is <b>installed</b> and <b>enabled</b>.</p>
<p><i>DIAGNOSTICS MENU GENERATE PATTERN?</i></p>	<p>Press [YES] to display a test pattern in the monitor connected to the output.</p> <p>Range: YES, NO</p> <p><i>Note:</i> Press [+] and [-] to select from among the different patterns. <b>Press [MENU] to exit.</b></p>

## Installation Menu

<p><i>INSTALLATION MENU</i> <i>NETWORK:XXXXXXXX</i></p>	<p>Enable or disable the network. Enable this parameter if the NT100 has the Network option installed.</p> <p>Range: ENABLED, DISABLED</p> <p>Default: DISABLED</p>
<p><i>INSTALLATION MENU</i> <i>REM DISK:XXXXXXXX</i></p>	<p>Enable or disable the MOD drive. Enable this parameter if the NT100 has the MOD option installed.</p> <p>Range: ENABLED, DISABLED</p> <p>Default: DISABLED</p>
<p><i>INSTALLATION MENU</i> <i>BAR CODE:XXXXXXXX</i></p>	<p>Enable or disable the Bar Code reader. Enable this parameter if a bar code reader option is installed.</p> <p>Range: ENABLED, DISABLED</p> <p>Default: DISABLED</p>
<p><i>INSTALLATION MENU</i> <i>OCR:XXXXXXXX</i></p>	<p>Enable or disable Optical Character Recognition (OCR).</p> <p>Range: ENABLED, DISABLED</p> <p>Default: DISABLED</p>
<p><i>INSTALLATION MENU</i> <i>CHANNEL A SETUP?</i></p>	<p>Press [YES] to enter the Channel A setup menu (See "Channel A Setup" on page 59).</p> <p>Range: YES, NO</p>
<p><i>INSTALLATION MENU</i> <i>CHANNEL B SETUP?</i></p>	<p>Press [YES] to enter the Channel B setup menu (See "Channel B Setup" on page 60).</p> <p>Range: YES, NO</p>
<p><i>INSTALLATION MENU</i> <i>RECALL SYNC:XXXXXXXX</i></p>	<p>Select the source of video input Sync during Recall Mode.</p> <p>Range: <b>INTERNAL</b>: The sync is generated internally <b>AUTO</b>: the NT100, uses an external Sync if present, otherwise it generates the Sync internally.</p> <p>Default: INTERNAL</p>

## Installation Menu (Continued)

<p><i>INSTALLATION MENU</i> <i>RECALL MODE:XXXXX</i></p>	<p>Select the timing parameters used to load the sync generator prior to recalling image.</p> <p>Range: <b>RS170</b> Calculate RS170 timing parameters based on the image size. <b>ACQ</b> Use timing parameter stored with image.</p> <p>Default: ACQ</p>
<p><i>INSTALLATION MENU</i> <i>EDIT SERIAL NUMBER?</i></p>	<p>Press [YES] to enter the serial number setup menu (See “Serial Number” on page 58).</p> <p>Range: YES, NO</p> <p>Note: <i>The serial number displayed on the Remote Keypad should match the number on the NT100 back panel.</i> <i>This feature should <b>only</b> be used when the serial number has been changed after a CPU board replacement.</i></p>
<p><i>INSTALLATION MENU</i> <i>EDIT ASPECT RATIO?</i></p>	<p>Press [YES] to enter the Aspect Ratio setup menu (See “Aspect Ratio” on page 58).</p> <p>Range: YES, NO</p> <p>Default: The default aspect ratio is 1333. This parameter should only be changed if the desired image aspect ratio to be printed is other than 4:3.</p> <p>Note: Aspect Ratio = <math>\frac{x}{y} \cdot 1000</math></p>
<p><i>INSTALLATION MENU</i> <i>MODALITY: XXXXXXXXXXXXX</i></p>	<p>Describes the imaging modality value embedded in the Modality Field for network transfers.</p> <p>Range: Ultrasound, Other</p> <p>Default: Ultrasound. Change this parameter to OTHER if the NT100 is connected to any device other than an ultrasound machine.</p>
<p><i>INSTALLATION MENU</i> <i>NETWORK SETUP?</i></p>	<p>Press [YES] to enter the network configuration menu (See “Network Setup Menu” on page 69).</p> <p>Range: YES, NO</p>

### Installation Menu (Continued)

<p><i>INSTALLATION MENU</i> <i>ERASE NETWORK DISK?</i></p> <p>Range: YES, NO</p> <p><b>CAUTION!</b></p>	<p>Press [YES] to delete all the images stored in the network drive.</p> <p><b>Images on the network drive may not have been sent over the network to the network destination. Those images will be lost! Use this feature carefully.</b></p>
<p><i>INSTALLATION MENU</i> <i>FORMAT NETWORK DISK?</i></p> <p>Range: YES, NO</p> <p><b>CAUTION!</b></p>	<p>Press [YES] to re-format the NT100 hard drive.</p> <p><b>This feature should be used only if the hard drive becomes unreadable. All information stored will be lost! Use this feature carefully.</b></p>
<p><i>INSTALLATION MENU</i> <i>BEGIN DEMO?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to start the NT100 demo. In DEMO mode, all images in the inserted MOD are displayed one every 10 seconds.</p> <p><i>Press [MENU] to exit from demo mode.</i></p>

### Serial Number

<p><i>SERIAL NUMBER</i> <i>XXXXX</i></p> <p>Range: 00000-99999</p> <p>Default: Number entered at factory.</p>	<p>Change recorded Serial Number for the NT100.</p>
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### Aspect Ratio

<p><i>ASPECT RATIO</i> <i>XXXX</i></p> <p>Range: 0500-3000</p> <p>Default: 1333</p>	<p>Change the aspect ratio for printed images</p>
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## Channel A Setup

<p><i>CHANNEL A SETUP MENU</i> <i>LOAD SYNC GENERATOR?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the Sync Generator setup menu (See “Load Sync Generator Menu” on page 62).</p>
<p><i>CHANNEL A SETUP MENU</i> <i>VIDEO FILTER:XXX</i></p> <p>Range: ON, OFF</p> <p>Default: OFF</p>	<p>Turn ON and OFF the low pass video input filter. The low pass video filter is sometimes used to eliminate noise from a video source.</p>
<p><i>CHANNEL A SETUP MENU</i> <i>POLARITY:XXXXXXXX</i></p> <p>Range: POSITIVE, NEGATIVE</p> <p>Default: POSITIVE</p>	<p>Select the polarity of the input video.</p>
<p><i>CHANNEL A SETUP MENU</i> <i>AUTO CALIBRATE?</i></p> <p>Range: YES, NO</p> <p><b>Caution!</b></p>	<p>Perform automatic calibration on the input signal.</p> <p>For proper calibration, the video input must have components of maximum (totally white) and minimum (totally black) levels.</p>
<p><i>CHANNEL A SETUP MENU</i> <i>MANUAL CALIBRATE?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the Manual Calibration menu (See “Manual Calibration Menu” on page 63).</p>
<p><i>CHANNEL A SETUP MENU</i> <i>VIDOUT CALIBRATE?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the Video Output Calibration menu (See “Video Output Calibration” on page 64).</p>
<p><i>CHANNEL A SETUP MENU</i> <i>HORIZONTAL PROFILE?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the Horizontal Profile menu (See “Horizontal Profile” on page 64).</p>

### Channel A Setup (Continued)

<p>CHANNEL A SETUP MENU LEARN OCR FONT?</p>	<p>Press [YES] to enter the OCR Font training (See “Learn OCR Font” on page 65).</p>
<p>Range: YES, NO</p>	
<p>CHANNEL A SETUP MENU LEARN OCR FIELDS?</p>	<p>Press [YES] to enter the OCR Field training (See “Learn OCR Fields” on page 68).</p>
<p>Range: YES, NO</p>	

### Channel B Setup

<p>CHANNEL B SETUP MENU LOAD SYNC GENERATOR?</p>	<p>Press [YES] to enter the Sync Generator setup menu.</p>
<p>Range: YES, NO</p>	
<p>CHANNEL B SETUP MENU VIDEO FILTER:XXX</p>	<p>Turn ON and OFF the low pass video input filter. The low pass video filter is sometimes used to eliminate noise from a VCR video source.</p>
<p>Range: ON, OFF</p>	
<p>Default: OFF</p>	
<p>CHANNEL B SETUP MENU POLARITY:XXXXXXXX</p>	<p>Select the polarity of the input video.</p>
<p>Range: POSITIVE, NEGATIVE</p>	
<p>Default: POSITIVE</p>	
<p>CHANNEL B SETUP MENU TERMINATION:XXXXXX</p>	<p>Select the impedance termination of Channel B.</p>
<p>Range: 75 OHM, Hi-Z</p>	
<p>Default: 75 OHM</p>	
	<p><i>Note:</i> Configure to Hi-Z only if the NT100 is <b>not</b> the last device in the video chain connected to Channel B.</p>

## Channel B Setup (Continued)

<p><i>CHANNEL B SETUP MENU</i> <i>AUTO CALIBRATE?</i></p> <p>Range: YES, NO</p> <p><b>Caution!</b></p>	<p>Perform automatic calibration on the input signal.</p> <p>For proper calibration, the video input must have components of maximum (totally white) and minimum (totally black) levels.</p>
<p><i>CHANNEL B SETUP MENU</i> <i>MANUAL CALIBRATE?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the Manual Calibration menu (See “Manual Calibration Menu” on page 63).</p>
<p><i>CHANNEL B SETUP MENU</i> <i>VIDEO CALIBRATE?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the Video Output Calibration menu (See “Video Output Calibration” on page 64).</p>
<p><i>CHANNEL B SETUP MENU</i> <i>HORIZONTAL PROFILE?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the Horizontal Profile menu (See “Horizontal Profile” on page 64).</p>
<p><i>CHANNEL B SETUP MENU</i> <i>LEARN OCR FONT?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the OCR Font training (See “Learn OCR Font” on page 65).</p>
<p><i>CHANNEL B SETUP MENU</i> <i>LEARN OCR FIELDS?</i></p> <p>Range: YES, NO</p>	<p>Press [YES] to enter the OCR Field training (See “Learn OCR Fields” on page 68).</p>

## Load Sync Generator Menu

### ***Important***

This menu has very technical information and should only be accessed by qualified personnel. Refer to Camtronics 89999-0103 "Sync Parameter and Optional Equipment Compatibility for NT100, NT200 and CAM by Manufacturer."

### **Load Sync Generator Menu**

<p><i>LOAD SYNC GEN MENU HORZ START PIX:XXX</i></p> <p>Range: 60-500 Default: 136</p>	Select the horizontal start pixel.
<p><i>LOAD SYNC GEN MENU HORZ ACTIVE PIX:XXXX</i></p> <p>Range: 450-1024 Default: 754</p>	Select the number of visible horizontal pixels.
<p><i>LOAD SYNC GEN MENU HORZ TOTAL PIX:XXXX</i></p> <p>Range: 560-1280 Default: 908</p>	Select the total horizontal pixels.
<p><i>LOAD SYNC GEN MENU VERT START LINE:XXX</i></p> <p>Range: 8-100 Default: 16</p>	Select the vertical start line.
<p><i>LOAD SYNC GEN MENU VERT ACTIVE LINE:XXX</i></p> <p>Range: 350-590 Default: 484</p>	Select the number of visible vertical lines.

## Load Sync Generator Menu (Continued)

LOAD SYNC GEN MENU VERT TOTAL LINE:XXX	Select the total number of lines.
	Range: 525, 625
	Default: 525

## Manual Calibration

### **Important**

This menu has very technical information and should only be accessed by qualified personnel. Use the [+] and [-] keys to modify the values.

## Manual Calibration Menu

MANUAL CALIBRATION BLACK:==>XXX/XXX	Displays the actual video input level values (0-255/0-255).  Optimal value is 1
MANUAL CALIBRATION WHITE:XXX/XXX<==	Displays the actual video input gain values (0-255/0-255).  Optimal value is 254
MANUAL CALIBRATION PHASE:XXX	Read Only. Displays the actual video input phase value (0-255).  Optimal value largest number.

## Video Output Calibration

Use the Video Output Calibration menu to adjust the output gain. This parameter changes the intensity of the image in the output monitor.

### Video Output Calibration

<i>VIDEO CALIBRATE OUTPUT GAIN: XXX</i>	Change the value to adjust the video output gain.
Range:	0-255
Default:	128
	<i>Use the [+] and [-] to change the value of the output gain. Press [Menu] to exit.</i>

## Horizontal Profile

Use this menu to select a horizontal line to sample. This function displays the selected line on the screen in a graph similar to an oscilloscope trace.

### Horizontal Profile

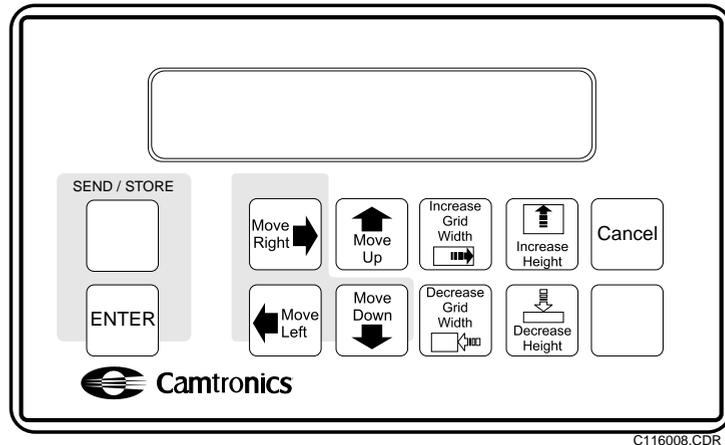
<i>VIDEO ROW NUMBER XXX</i>	Change the value to select the horizontal line to be displayed on the monitor.
Range:	1 - 478 (Number of Vertical Active Lines minus 2). Depends on the Active Lines set up in Load Sync Generator Menu.
Default:	200
	Press [▶] or [◀] to select the row number digit to modify. Press [+] or [-] to change the digit value. Press [Menu] to exit.

## Learn OCR Font

**NOTE:** The Learn OCR Font and Learn OCR Field menus appear **only** if the **OCR Option** is **enabled**.

Use this menu to guide the NT100 in the recognition of the fonts used by the imaging equipment.

Use the following diagram as template on the remote to align grid on text.



**NOTE:** The alignment grid will be positioned once, after entering ABCDEFGHIJKLM. The moving keys (see diagram above) are disabled during the remaining of the process.

## Learn OCR Font

<p><i>ENTER TEXT IN VIDEO</i> RBCDEFGHIJKLM</p>	<p>Enter the text shown in the second line of the display in the imaging system.</p> <p>Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>
<p><i>ALIGN GRID ON TEXT</i> RBCDEFGHIJKLM</p>	<p>Adjust grid position and size to cover the text entered at the imaging system.</p> <p>Use the template above to move the grid. Press [STORE B&amp;W] when ready.</p>
<p><i>ENTER TEXT IN VIDEO</i> NOPQRSTUVWXYZ</p>	<p>Enter the text shown in the second line of the display in the imaging system.</p> <p>Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>

### Learn OCR Font (Continued)

<p><i>ALIGN GRID ON TEXT</i> <i>NOPQRSTUVWXYZ</i></p>	<p>Adjust grid position and size to cover the text entered at the imaging system.</p> <p>Use the template above to move the grid. Press [STORE B&amp;W] when ready.</p>
<p><i>ENTER TEXT IN VIDEO</i> <i>0123456789</i></p>	<p>Enter the text shown in the second line of the display in the imaging system.</p> <p>Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>
<p><i>ALIGN GRID ON TEXT</i> <i>0123456789</i></p>	<p>Adjust grid position and size to cover the text entered at the imaging system.</p> <p>Use the template above to move the grid. Press [STORE B&amp;W] when ready.</p>
<p><i>ENTER TEXT IN VIDEO</i> <i>!"#\$%&amp;'()*+,-./</i></p>	<p>Enter the text shown in the second line of the display in the imaging system.</p> <p>Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>
<p><i>ALIGN GRID ON TEXT</i> <i>!"#\$%&amp;'()*+,-./</i></p>	<p>Adjust grid position and size to cover the text entered at the imaging system.</p> <p>Use the template above to move the grid. Press [STORE B&amp;W] when ready.</p>
<p><i>ENTER TEXT IN VIDEO</i> <i>::&lt;=&gt;?@</i></p>	<p>Enter the text shown in the second line of the display in the imaging system.</p> <p>Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>
<p><i>ALIGN GRID ON TEXT</i> <i>::&lt;=&gt;?@</i></p>	<p>Adjust grid position and size to cover the text entered at the imaging system.</p> <p>Use the template above to move the grid. Press STORE B&amp;W when ready.</p>
<p><i>ENTER TEXT IN VIDEO</i> <i>abcdefghijklm</i></p>	<p>Enter the text shown in the second line of the display in the imaging system.</p> <p>Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>

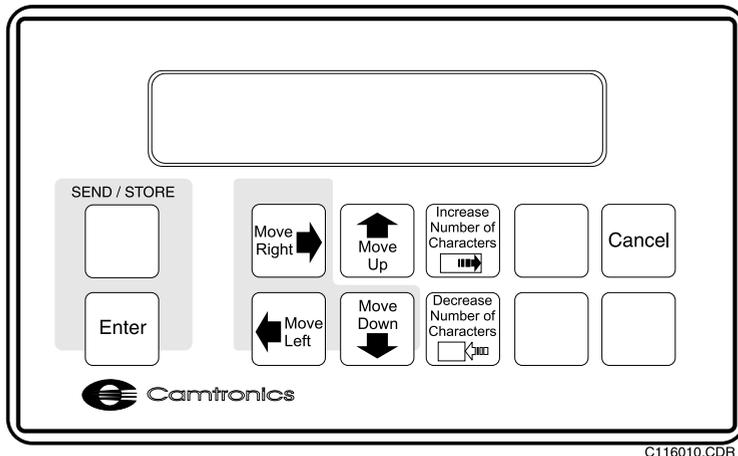
### Learn OCR Font (Continued)

<p><i>ALIGN GRID ON TEXT</i> <i>abcdefghijklm</i></p>	<p>Adjust grid position and size to cover the text entered at the imaging system.</p> <p>Use the template above to move the grid. Press [STORE B&amp;W] when ready.</p>
<p><i>ENTER TEXT IN VIDEO</i> <i>nopqrstuvwxyz</i></p>	<p>Enter the text shown in the second line of the display in the imaging system.</p> <p>Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>
<p><i>ALIGN GRID ON TEXT</i> <i>nopqrstuvwxyz</i></p>	<p>Adjust grid position and size to cover the text entered at the imaging system.</p> <p>Use the template above to move the grid. Press [STORE B&amp;W] when ready.</p>

### Learn OCR Fields

The following menu is used to define the location of the fields within the image such as Patient Name and Patient ID.

Use the following diagram as a template on the remote to align and size the grid on the field containing the text to be recognized.



**NOTE:** The grid must allow for the largest number of characters that may appear in the field.

### Learn OCR Fields

<p><i>ENTER TEXT IN VIDEO</i> XXXXXXXXXXXXXXXX</p>	<p>Enter the identification of the field at the current location.</p> <p>Press [▶] or [◀] to select field. Press [STORE B&amp;W] when ready. Press [Menu] to cancel.</p>
<p><i>ALIGN GRID ON TEXT</i> XXXXXXXXXXXXXXXX</p>	<p>Change the value to adjust number of characters in the field.</p> <p>Press</p> <ul style="list-style-type: none"> <li>• [DISK EXAM] to move right</li> <li>• [NET EXAM] to move left</li> <li>• [NO] to move up</li> <li>• [◀] to move down</li> <li>• YES to increase the number of characters</li> <li>• [▶] to decrease the number of characters</li> <li>• [STORE B&amp;W] when ready</li> <li>• [MENU] to cancel.</li> </ul>
<p><i>IS THIS CORRECT?</i> XXXXXXXXXXXXXXXX</p>	<p>Answer [YES] if characters have been OCR'd correctly.</p> <p>Range: YES, NO</p>

## Network Setup Menus

Use the menus below to set up the network.

**NOTE:** The menus below appear **only** if the **Network Option** is **installed** and **enabled**.

### Network Setup Menu

<i>NETWORK SETUP MENU EDIT LOCAL IP ADDR?</i>	Enter the Edit local IP Address menu (See "Local IP Address" on page 70).  Range: YES, NO
<i>NETWORK SETUP MENU EDIT LOCAL ETH ADDR?</i>	Enter the Edit local Ethernet Address menu (See "Local Ethernet Address" on page 70).  Range: YES, NO
<i>NETWORK SETUP MENU EDIT GATEWAY ADDR?</i>	Enter the Edit Gateway Address menu (See "Gateway Address" on page 70).  Range: YES, NO
<i>NETWORK SETUP MENU EDIT SUBNET MASK?</i>	Enter the Edit Subnet Mask menu (See "Subnet Mask" on page 71).  Range: YES, NO
<i>NETWORK SETUP MENU EDIT LOCAL AE TITLE</i>	Change the DICOM Local AE Title entry.(See "Local AE Title" on page 71.)  Range: YES, NO
<i>NETWORK SETUP MENU ADD NETWORK DEST?</i>	Enter the Network Destination Add menu (See "Network Destination Name" on page 75).  Range: YES, NO
<i>NETWORK SETUP MENU MODIFY NETWORK DEST?</i>	Enter the Modify Network Destination menu (See "Network Destination Menu" on page 72).  Range: YES, NO
<i>NETWORK SETUP MENU DELETE NETWORK DEST?</i>	Enter the Delete Network Destination menu (See "Delete Network Destination" on page 77).  Range: YES, NO

### Local IP Address

<p><i>LOCAL IP ADDRESS</i> XXX.XXX.XXX.XXX</p>	<p>Enter the Local IP address. Consult your network administrator for proper number.</p>
Range:	N/A
Default:	000.000.000.000
<b>CAUTION!</b>	<b>Entering an incorrect IP address can prevent the NT100 from communicating with the network destination. Use this feature carefully.</b>

### Local Ethernet Address

<p><i>LOCAL ETH ADDRESS</i> XX XX XX XX XX XX</p>	<p>Enter the Local Ethernet address. This value is setup for each NT100 unit during manufacturing.</p>
Range:	N/A
Default:	Set at factory. The number should match the ethernet address printed on the Ethernet Board inside the NT100.
<b>CAUTION!</b>	<b>Entering an incorrect Ethernet address can prevent the NT100 from communicating with the network destination. Use this feature carefully.</b>

### Gateway Address

<p><i>GATEWAY IP ADDR</i> XXX.XXX.XXX.XXX</p>	<p>Enter the Gateway address supplied by Network Administrator. This is the IP Address of the gateway machine.</p>
Range:	N/A
Default:	000.000.000.000
<b>CAUTION!</b>	<b>Entering an incorrect Gateway address can prevent the NT100 from communicating with extended network.</b>

## Subnet Mask

*SUBNET MASK*  
XXX.XXX.XXX.XXX

Enter the Subnet Mask supplied by Network Administrator. This is the mask to direct communication with an extended network.

Range: N/A

Default: 255.255.255.000

**CAUTION!** Entering an incorrect Subnet Mask can prevent the NT100 from communicating with an extended network.  
The Subnet Mask must be identical at all nodes in the local subnet.

## Local AE Title

*LOCAL AE TITLE*  
XXXXXXXXXXXXXXXXXX

Enter the local DICOM Application Title to use for DICOM communication. Some network destinations require that this field be selectable. See the Destination Operator's Manual for details.

Range: 16 Alphanumeric characters

Default: CTX\_NT

Press [▶] or [◀] to select the character to edit.  
Press [Yes] or [No] to change the character.  
Press [MENU] to return to the Network Setup Menu

### Network Destination Menu

<p><i>NETWORK DEST MENU</i> <i>EDIT DEST NAME?</i></p>	<p>Enter the Destination Name menu (See “Network Destination Name” on page 75).</p> <p>Range: YES, NO</p>
<p><i>NETWORK DEST MENU</i> <i>EDIT DEST IP ADDR?</i></p>	<p>Enter the Destination IP Address menu (See “Network Destination IP Address Menu” on page 76).</p> <p>Range: YES, NO</p>
<p><i>NETWORK DEST MENU</i> <i>PROTOCOL:XXXXX</i></p>	<p>Select the destination protocol (only DICOM is supported at this time).</p> <p>Range: DICOM</p> <p>Default: DICOM</p>
<p><i>NETWORK DEST MENU</i> <i>DEVICE: XXXXXXXXXXX</i></p>	<p>Select the type of device to send images to. Use <b>GENERIC STORE</b> to send images to DICOM workstations. Use <b>GENERIC PRINT</b> to send images to DICOM print servers. Use <b>3M PRINT</b> to send images to 3M DICOM print servers.</p> <p>Range: 3M PRINT, GENERIC PRINT, GENERIC STORE</p> <p>Default: GENERIC STORE</p>
<p><i>NETWORK DEST MENU</i> <i>EDIT DEST PORT?</i></p>	<p>Press [YES] to enter the Network Destination Port Modification menu (See “Network Destination Port” on page 76).</p> <p>Range: YES, NO</p>
<p><i>NETWORK DEST MENU</i> <i>EDIT DEST RE TITLE?</i></p>	<p>Press [YES] to edit the DICOM AE title.</p> <p>Default: DICOM_PRINT_MGMT for Generic print server, 3M_PrintServer for 3M print server DICOM_STORAGE for Generic store</p>

## Network Destination Menu (Continued)

**NOTE:** The following parameter setup information is specific for the **3M print server**

<p><i>NETWORK DEST MENU</i> <i>PRIORITY:XXXXXX</i></p>	<p>Select the priority of the print job at the print server.</p> <p>Range: LOW, MEDIUM, HIGH</p> <p>Default: LOW</p>
<p><i>NETWORK DEST MENU</i> <i>FILM DEST:XXXXXXXXXX</i></p>	<p>Select the destination within the print device (3M).</p> <p>Range: MAGAZINE 1, PROCESSOR1, MAGAZINE 2, PROCESSOR2</p> <p>Default: PROCESSOR1</p>
<p><i>NETWORK DEST MENU</i> <i>LUT GROUP:XX</i></p>	<p>Select the LUT group to be used. Refer to the printer manual for the definition of each LUT group.</p> <p>Range: 0-10</p> <p>Default: 0</p>
<p><i>NETWORK DEST MENU</i> <i>LUT NUMBER:XX</i></p>	<p>Select the LUT number to be used. Refer to the printer manual for the definition of each LUT number.</p> <p>Range: 0-15</p> <p>Default: 4</p>
<p><i>NETWORK DEST MENU</i> <i>MAG TYPE:XXXXXXXXXX</i></p>	<p>Select the Image Magnification Algorithm to be used.</p> <p>Range: REPLICATE, BILINEAR, CUBIC</p> <p>Default: CUBIC</p>
<p><i>NETWORK DEST MENU</i> <i>SMOOTHING TYPE:XX</i></p>	<p>Select the Image Smoothing Factor.</p> <p>Range: 0-15</p> <p>Default: 3</p> <p><i>Note: This parameter is ignored if Magnification type is not CUBIC.</i></p>

**Network Destination Menu (Continued)**

<p><i>NETWORK DEST MENU</i> <i>MAXIMUM DENSITY:XXX</i></p>	<p>Select the desired density of the printed image.</p> <p>Range: 170-320</p> <p>Default: 200</p> <p><i>Notes: A value of 200 equals 2.0 Optical Density Units.</i></p>
<p><i>NETWORK DEST MENU</i> <i>POLARITY:XXXXXXXX</i></p>	<p>Select the Polarity of the printed image.</p> <p>Range: POSITIVE, NEGATIVE</p> <p>Default: POSITIVE</p>

**NOTE:** The following parameter setup information is specific for the **GENERIC PRINT** server.

<p><i>NETWORK DEST MENU</i> <i>PRIORITY:XXXXXX</i></p>	<p>Select the priority of the print job at the print server.</p> <p>Range: LOW, MEDIUM, HIGH</p> <p>Default: LOW</p>
<p><i>NETWORK DEST MENU</i> <i>FILM DEST:XXXXXXXXXX</i></p>	<p>Select the destination within the print device (3M).</p> <p>Range: MAGAZINE, PROCESSOR</p> <p>Default: PROCESSOR</p>
<p><i>NETWORK DEST MENU</i> <i>MAG TYPE:XXXXXXXXXX</i></p>	<p>Select the Image Magnification Algorithm to be used.</p> <p>Range: REPLICATE, BILINEAR, CUBIC, NONE</p> <p>Default: CUBIC</p>
<p><i>NETWORK DEST MENU</i> <i>SMOOTHING TYPE:XX</i></p>	<p>Select the Image Smoothing Factor.</p> <p>Range: 0-15</p> <p>Default: 3</p> <p><i>Note: This parameter is ignored if Magnification type is not CUBIC.</i></p>

## Network Destination Menu (Continued)

<p><i>NETWORK DEST MENU</i> <i>MAXIMUM DENSITY:XXX</i></p>	<p>Select the desired density of the printed image.</p> <p>Range: 170-320</p> <p>Default: 200</p> <p><i>Notes: A value of 200 equals 2.0 Optical Density Units.</i></p>
<p><i>NETWORK DEST MENU</i> <i>POLARITY:XXXXXXXX</i></p>	<p>Select the Polarity of the printed image.</p> <p>Range: POSITIVE, NEGATIVE</p> <p>Default: POSITIVE</p>

**NOTE:** The following parameter setup information is specific for **GENERIC store** device.

<p><i>NETWORK DEST MENU</i> <i>PRIORITY:XXXXXX</i></p>	<p>Select the priority of the image at the workstation.</p> <p>Range: LOW, MEDIUM, HIGH</p> <p>Default: LOW</p>
------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------

## Network Destination Name

<p><i>NETWORK DEST NAME</i> <i>XXXXXXXX</i></p>	<p>Use this menu to enter the network destination names. Repeat this for each possible destination (up to 20).</p> <p>Range: 8 Alphanumeric characters</p> <p>Default: AAAAAAAA</p> <p><i>Note</i> <i>These names are aliases. Enter any 8 characters that will help you identify the desired network destinations.</i></p> <p>Press [▶] or [◀] to select the character position to modify. Press [+] or [-] to change the character. Press [Menu] to exit.</p>
-----------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### Network Destination IP Address Menu

<p><i>NET DEST IP ADDRESS</i> <i>XXX.XXX.XXX.XXX</i></p>	<p>Use this menu to enter the network destination IP address. Repeat this for each possible destination.</p>
Range:	N/A
Default:	000.000.000.000

### Network Destination Port

<p><i>NETWORK DEST PORT</i> <i>XXXXX</i></p>	<p>Select the TCP/IP communication port number for DICOM device. Consult your network administrator for the proper number.</p>
Range:	00001-65535
Default:	00104 For GENERIC STORE and GENERIC PRINT devices. 01024 For 3M PRINT devices.

### Network Destination AE Title

<p><i>NET DEST AE TITLE</i> <i>XXXXXXXXXXXXXXXXXX</i></p>	<p>Enter the DICOM AE Title of the application to communicate with at this destination. Some network destinations require that this field be selectable. See the destination Operator's Manual for details.</p>
Range:	16 Alphanumeric characters
Default:	DICOM_STORAGE for GENERIC STORE devices. DICOM_PRINT for GENERIC PRINT devices. 3M_PrintServer for 3M PRINT devices.
<i>Notes:</i>	Press [▶] or [◀] to select the character position to modify. Press [+] or [-] to change the character. Press [Menu] to exit.

## Modify Network Destination Menu

*NET DEST MODIFY MENU  
MODIFY DEST NAME?*

Press [YES] to enter the Network Destination Modify Menu. Changes will affect the selected destination only.

Range: YES, NO

*Note: Use [▶], [◀], or [NO] to select a new destination. Press [YES] to edit a Destination. (See "Network Destination Menu" on page 72.)*

## Delete Network Destination

*NET DEST MODIFY MENU  
DELETE DEST NAME?*

Press [YES] to delete the selected Destination from the list of available destinations.

Range: YES, NO

*Note: Use [▶], [◀], or [NO] to select a destination. Press [YES] to delete a Destination.*

(Blank Page)

# Troubleshooting

## System Information

The System Info menu displays an image on the output monitor of the current system settings.

*NOTE: To store the system configuration on the disk as an image, a disk exam must be started previous to entering the menus.*

From the Diagnostics menu, press [Yes] to "System Information?" The following image is shown on the monitor:

```

                                SYSTEM INFORMATION

VID  START  ACTIVE  TOTAL  START  ACTIVE  TOTAL
CHAN PIX    PIX    PIX    LINE  LINES  LINES  POLARITY  FILTER  TERM
  A   136    754    908    16    484    525    POSITIVE  OFF    EXT
  B   136    754    908    16    484    525    POSITIVE  ON     75 OHM

VID  VIDIN  VIDIN  VIDOUT
CHAN LEVEL  GAIN  GAIN  PHASE
  A   128    128    128    32
  B   128    128    128    32

NETWORK OPTION:  DISABLED          REMOVABLE DISK OPTION:  ENABLED
OCR:  ENABLED                    BAR CODE:  ENABLED
ASPECT RATIO:  1333              SERIAL NUMBER:  00000

MODALITY:  ULTRASOUND

RECALL SYNC:  INTERNAL            RECALL MODE:  ACQUISITION
CONFIRMATION:  OFF                BEEP VOLUME:  3
KEYPAD LED INTENSITY:  7          KEYPAD LCD CONTRAST:  10

BW FILM FORMAT:  6

CURRENT VIDEO CHANNEL:  A

```

sysinfo.cdr

Press [Menu] to exit.

## Removable Disk Information

The removable disk info menu displays an image on the output monitor with information on the current inserted disk.

*NOTE: To store the Removable Disk Information page on the disk as an image, start a disk exam previous to entering the menus.*

From the Diagnostics menu, press [Yes] to "Removable Disk Info?" The following image is shown in the monitor:

```

                                CTX DISK INFORMATION

REMOVABLE DISK GENERAL INFORMATION
USER NUMBER:                    1
LUT NUMBER:                      0
DEFAULT FILE SYSTEM: CTX
WRITE VERIFY:                     ON

REMOVABLE DISK SPECIFIC INFORMATION (CTX)
DISK INSERTION COUNTER:          8
DISK INITIALIZATION COUNTER:    2
DISK FORMAT COUNTER:            2
FILE SYSTEM VERSION NUMBER:     14
CLUSTER SIZE INBLOCKS:         4
NUMBER OF DIRECTORY ENTRIES ON DISK: 514
LOGICAL BLOCK ADDRESS OF START OF FAT: 258
NUMBER OF CLUSTERS AVAILABLE ON DISK: 61955
LOGICAL BLOCK OF FILE SPACE:    501
LOGICAL BLOCK OF START OF SECOND FAT: 248580
LOGICAL BLOCK OF START OF SECOND DIRECTORY: 248323
TOTAL CLUST: 61955   MARGIN CLUST: 0   FREE CLUST: 53515
NUMBER OF REDUNDANT ACCESSES:    0
FILE FORMAT ON DISK:            CTX

```

diskinfo.cdr

Press [Menu] to exit.

## Network Information

The network info menu displays an image on the output monitor with information on the network status.

*NOTE: To store the Network Information page as an image, start a disk or network exam previous to entering the menus.*

From the Diagnostics menu, press [Yes] to "Network Info?" The following image is shown in the monitor:

```

NETWORK INFORMATION

BW      CURRENT DEST: MP      FILM FORMAT: 6    COPIES: 1
IP ADDR: 156.046.125.170    ETHERNET ADDR: 00 20 12 00 01 02
GATEWAY ADDR: 000.000.000.000  SUBNET MASK: 255.255.255.000
LOCAL AE TITLE: <local ae title>
TOTAL CLUST: 32469  MARGIN CLUST: 1000  FREE CLUST: 31784

  DEST      IP ADDR      PORT  TYPE  PROTOCOL  DEVICE TYPE
1) MMM_TJH  156.046.125.052 1024  BW    DICOM     3M      PRINT
2) MP      156.046.125.188 104   BW    DICOM     GENERIC STORE
3) DEFAULTA 000.000.000.000 1     COLOR  DICOM     GENERIC STORE
4) DEFAULTB 000.000.000.000 104   BW    DICOM     GENERIC STORE
5) DEFAULTC 000.000.000.000 65535 BW    DICOM     GENERIC STORE
6) DEFAULTD 000.000.000.000 104   BW    DICOM     GENERIC STORE
7) DEFAULTE 000.000.000.000 104   BW    DICOM     GENERIC STORE
8) DEFAULTF 000.000.000.000 104   BW    DICOM     GENERIC STORE
9) DEFAULTG 000.000.000.000 104   BW    DICOM     GENERIC STORE
10) DEFAULTH 000.000.000.000 104   BW    DICOM     GENERIC STORE
11) DEFAULTI 000.000.000.000 104   BW    DICOM     GENERIC STORE
12) DEFAULTJ 000.000.000.000 104   BW    DICOM     GENERIC STORE

```

netinfo.cdr

Press [Menu] to exit.

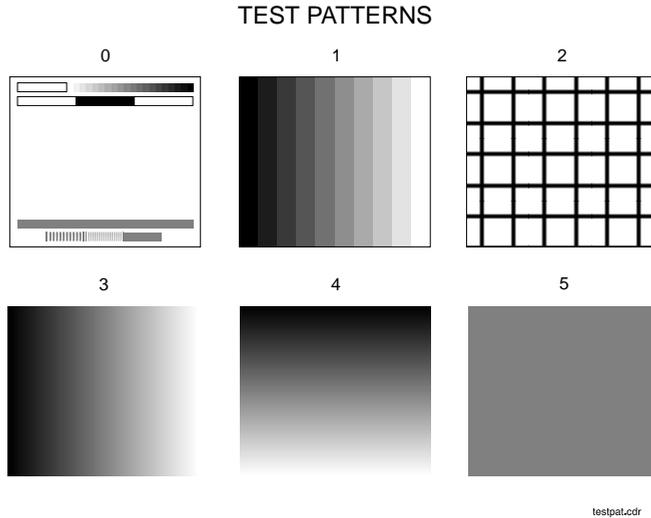
## Test Patterns

The NT100 can generate six test patterns that may be used for video troubleshooting.

*NOTE: To store the test pattern as an image, start a disk or network exam previous to entering the menus.*

From the Diagnostics menu, press [Yes] to “Generate Pattern?” Pattern #0 is displayed. Press [+] or [-] to display the next or previous pattern. See Figure 25.

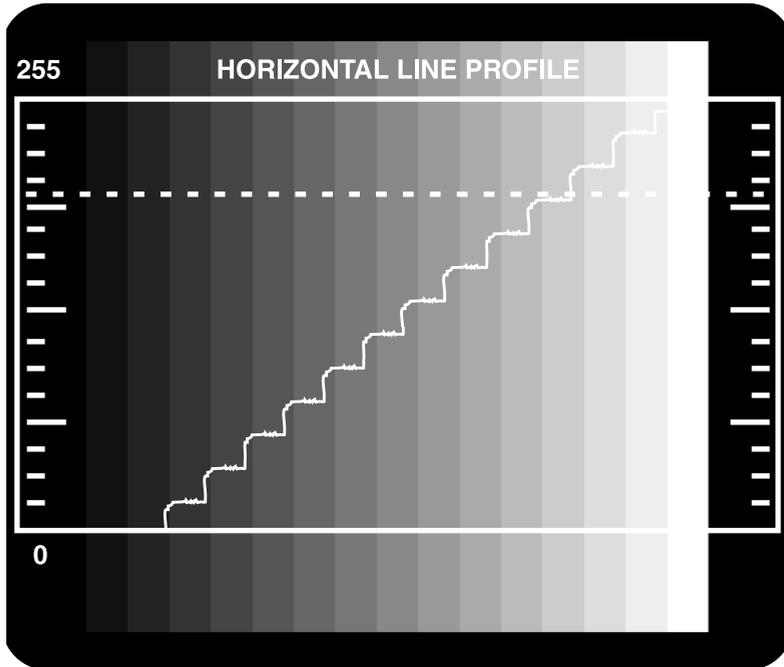
**Figure 25 Test Patterns**



## Horizontal Profile

The HORIZONTAL PROFILE samples a selected line of video and displays a graph of the values on the screen, similar to an oscilloscope trace.

**Figure 26 Horizontal Profile Screen**



horzprof.cdr

Use the HORIZONTAL PROFILE menu item to :

- Check the noise level
- Check pixel values to make sure that black is near or at 0 and white is at or near 255
- Check bandwidth

To access this function:

- Enter the Installation Menu
  1. Press and hold [Menu] until system beeps.
  2. Press [◀] once to reach the Installation Menu.

3. Press and hold [YES] until the system beeps to enter the Installation Menu.
4. Press [▶] to advance to: CHANNEL A SETUP.
5. Press [YES] to enter CHANNEL A setup menu.
6. Press [▶] to advance to: HORIZONTAL PROFILE.
7. Press [YES] to enter the HORIZONTAL PROFILE menu.
8. Select the video line to sample. Use [▶] and [◀] to move through the digits and [+] and [-] to change the digits.
9. Press [MENU] to display the data on the monitor.
10. Press [MENU] four times to return to normal operation.

## Troubleshooting Recall Mode Problems

Problem	Cause	Solution
A recalled image is wavy or distorted.	If the ultrasound system has side-by-side monitors, the image recalled from the NT100 will have a different video sync.	Go to INSTALLATION MENU/RECALL SYNC and change the sync from INTERNAL to AUTO. This may not always work if the video is looped through the ultrasound machine and back to the NT100 Input.
When trying to print a recalled image to some printers, the image is clipped.	The recalled image video sync is not compatible with the printer.	Go to INSTALLATION MENU/RECALL MODE and change the mode from ACQ to RS170. This will adjust the size of the image on the sheet. The image may print slightly smaller than normal, but the entire image will be visible.

## Sync Parameter Adjustment

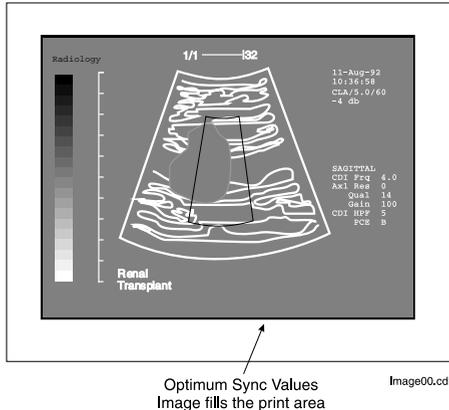
The sync parameters determine how the images are printed.

*NOTE: The monitor connected to the NT100 output might compensate for a less than optimum sync parameter value. Adjust the sync parameters using printed images rather than recalled images.*

The sync values for the horizontal parameters are in pixels. The sync values for the vertical parameters are in number of lines. Improper sync numbers can cause unstable images, images cropped at any edge, excessive blank space at any edge, or characters with fuzzy edges.

The *Camtronics 89999-0103, "Sync Parameters and Optional Equipment Compatibility for NT100/NT200 and CAM by Manufacturer"* document contains sync parameter values for many manufacturers. Use these numbers. If necessary adjust the proper value to optimize the image. If the manufacturer and/or model of the imaging equipment is not listed, follow the adjustment procedure using the default values as a starting point. See Figure 27.

**Figure 27 Optimum Image**



## Horizontal Sync Parameters

### Total Horizontal Pixels (HT)

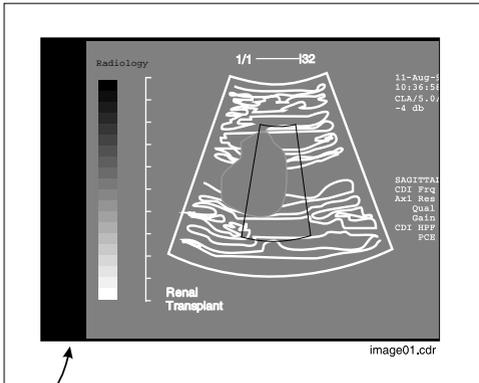
Adjust HT if the image is unstable (decrease the value for HT) or if the character edges appear fuzzy. The value for HT is slightly larger than HS+HA (HT can never be smaller than HS+HA).

Re-adjust HT after HS and HA if necessary.

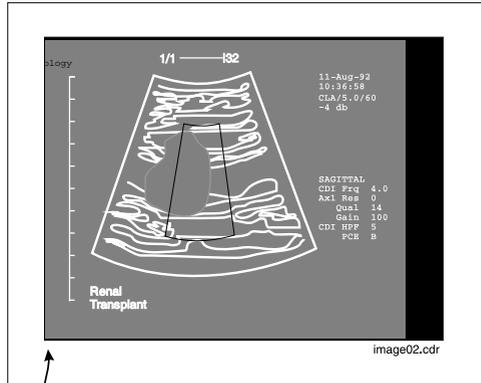
## Horizontal Start Pixel (HS)

This parameter defines the left edge of the image. See Figure 28.

**Figure 28 HS Adjustments**



**Problem:** Excessive black area at the left edge  
**Solution:** increase HS



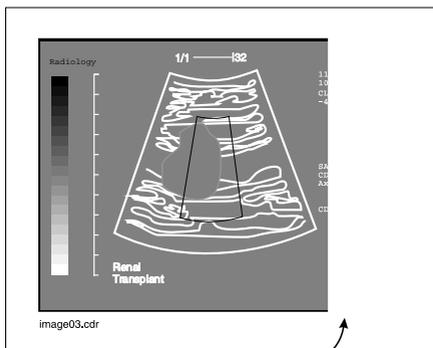
**Problem:** Image cropped at the left edge  
**Solution:** decrease HS

*NOTE: Changes to HS also affect the right edge. Adjust HA accordingly.*

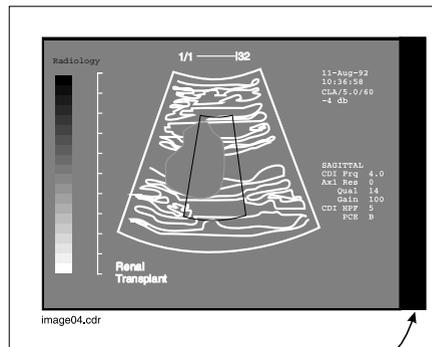
## Horizontal Active Pixels (HA)

This parameter determines the image width. Adjust HA after having adjusted HS to define the image right edge. See Figure 29.

**Figure 29 HA Adjustment**



**Problem:** Image cropped at the right edge  
**Solution:** Increase HA



**Problem:** Excessive black area at the right edge  
**Solution:** decrease HA

## Vertical Sync Parameters

### Total Lines (VT)

This parameter defines the number of lines on the monitor. There are two standards for the number of lines:

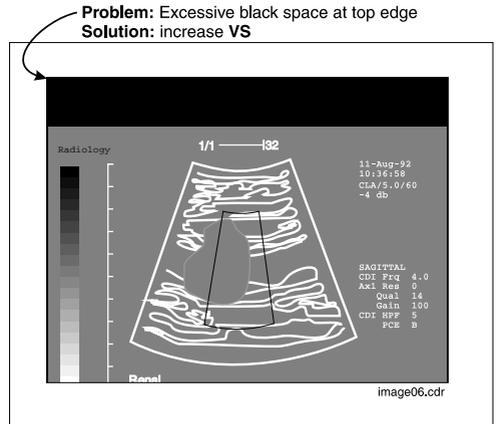
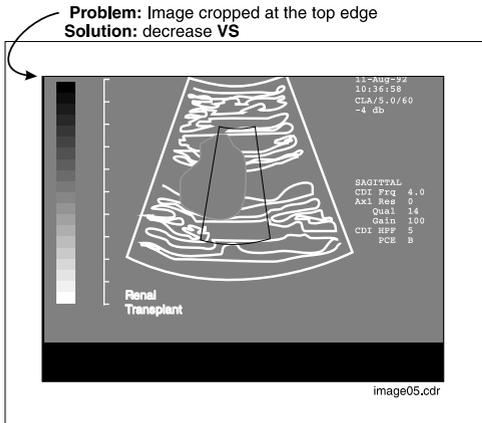
- USA systems, which operate at 525 lines (HT=525). This standard usually applies to any country where electric current is at 60 Hz.
- European systems, which operate at 625 lines (HT=625). This standard usually applies to any country where electric current is at 50 Hz.

The relationship is:  $(2 \cdot V_S) + V_A + 8 < V_T$ .

### Starting Line (VS)

This parameter defines the top edge of the image. The default values (factory setup) is usually appropriate. Adjust VS if necessary. See Figure 30.

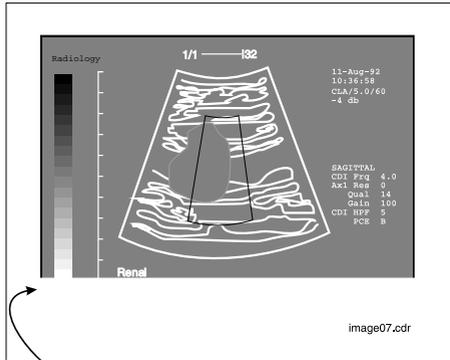
**Figure 30 VS Adjustment**



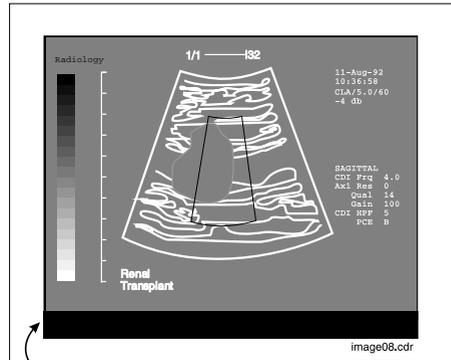
## Active lines (VA)

This parameter defines the bottom edge of the image. The default values (factory setup) is usually appropriate. Adjust VA if necessary. See Figure 31.

### Figure 31 VA Adjustment



**Problem:** Cropping at bottom edge  
**Solution:** increase VA



**Problem:** Excessive black area at bottom edge  
**Solution:** Decrease VA

## Network Error Handling and Disk Management

### Network Error Handling

Network exams are processed in the order that they were created. Network transfers occur in the background unless they are turned off-line with the NETWORK STATUS key.

If an error occurs during a network transfer then the network connection is released, the error is logged and the operator is notified via the Remote Keypad with a message as follows:

```
NET TRANSFER ERROR:  
2024, CONFIRM?
```

When the operator presses [YES] to confirm the error message then the transfer is retried.

If the error continues to be encountered then the error is not logged again but the operator is notified again after every 10 retries. Retries will continue in this fashion until one of the following occurs:

- The error condition is corrected (e.g., If the error was due to a lack of disk space at the destination, the error will go away when more disk space is made available at the destination.)
- The image or exam experiencing the network transfer error is deleted from the network disk.
- The exam experiencing the network transfer error is resent “using current parameters” where the parameters were changed in a way that corrects the problem. (e.g., The destination was originally configured with the wrong IP address. The operator enters the correct IP address for the destination and then resends the exam using the current parameters, then the exam will be removed from the network queue and requeued using the new, correct IP address.)
- The network transfer task is placed off-line using the NETWORK STATUS feature.

## Network Disk Management

As exams are stored on the network disk, they are marked as “Unsent” until they have been transferred to a destination.

After an exam has been transferred to a destination, that exam is marked as “Sent.” “Sent Exams” remain on the disk until the amount of free space on the disk falls below 20%. At this point the NT100 automatically deletes the oldest exam that is marked “Sent.”

## Error Codes

The following list shows the possible error codes that can be displayed by the NT100, a description of the error and the corrective action.

Code	Error Message	Description/Possible Causes	Corrective Action
0101	SERIAL ERROR - ILLEGAL PORT	Internal software error.	Replace CPU board.
0102	SERIAL ERROR - BAD BAUD RATE	Internal software error.	Replace CPU board.
0103	SERIAL ERROR - PORTA LOOPBACK	The serial communications hardware for port A (labeled RS-232) on the CPU board has failed the power-up loopback test.	Replace CPU board.
0104	SERIAL ERROR - PORTB LOOPBACK	The serial communications hardware for port B (labeled REMOTE KEYPAD) on the CPU board has failed the power-up loopback test.	Replace CPU board.
0201	SCSI ERROR - BUS PARITY	A parity error was detected during a SCSI bus transfer. Possible causes include a defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.
0202	SCSI ERROR - SELECT TIMEOUT	Time-out waiting for disk drive to respond to SCSI bus selection. Possible causes include a defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary. Verify that the SCSI ID setting on the disk drives are properly set. (Refer to Figure 35 or Figure 36).
0203	SCSI ERROR - CHECK CONDITION	Internal software error.	Replace CPU board.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0204	SCSI ERROR - TARGET BUSY	Disk drive is reporting BUSY for longer than expected time. Possible causes include a defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.
0205	SCSI ERROR - RESERV CONFLICT	Internal software error.	Replace CPU board.
0206	SCSI ERROR - NON-SPECIFIC	Non-specific error. Possible causes include defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.
0207	SCSI ERROR - BUS TIMEOUT	Time-out waiting for disk drive to complete operation. Possible causes include a defective disk, disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.
0208	SCSI ERROR - SELF TEST FAIL	The SCSI bus controller chip has failed the power-up self-test.	Cycle the power on the unit. If the error reoccurs, replace the CPU board.
0209	SCSI ERROR - BUS RESET	The SCSI bus reset line was activated. Possible causes include a defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.
0210	SCSI ERROR - HARDWARE FAIL	A gross error was reported by the SCSI bus controller chip.	Cycle the power on the unit. If the error reoccurs, replace the CPU board.
0211	SCSI ERROR - IMAGE BOUNDARY	Internal software error.	Replace CPU board.
0212	SCSI ERROR - BUS DISCONNECTED	Internal software error	Replace CPU Board
0213	SCSI ERROR - DATA OUT ILLEG	The disk drive incorrectly requested a SCSI data out bus phase when the NT100 was not expecting it. Possible causes include a defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0214	SCSI ERROR - DATA IN ILLEGAL	The disk drive incorrectly requested a SCSI data in bus phase when the NT100 was not expecting it. Possible causes include a defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.
0300	VIDEO ERROR - INVALID MODE	Internal software error.	Replace CPU board.
0301	VIDEO ERROR - MODE TIMED OUT	Could not change video mode.	Replace CPU board.
0302	VIDEO ERROR - INVALID FORMAT	Internal software error.	Replace CPU board.
0303	VIDEO ERROR - BAD ARGUMENT	Internal software error.	Replace CPU board.
0304	VIDEO ERROR - NO VIDEO	No video input signal detected. Possible causes include missing or bad video input signal and defective video cable, and CPU board.	Check the suspected hardware and replace if necessary.
0401	KEYPAD ERROR - INVALID KEYCODE	Invalid key press detected. Possible causes include defective Remote Keypad, keypad cable, and CPU board.	Check the suspected hardware and replace if necessary.
0402	KEYPAD ERROR - NO KEYPAD	The Remote Keypad was not detected during power-up initialization. Possible causes include defective Remote Keypad, keypad cable, and CPU board.	Check the suspected hardware and replace if necessary.
0403	BAR CODE ERROR - OVERFLOW	Too many digits were read by the Bar Code Reader. Possible causes include a bar code with too many digits and a defective bar code, Bar Code Reader, cable, and CPU board.	Check the suspected hardware and replace if necessary.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0404	BAR CODE ERROR - TIMEOUT	The Bar Code Reader timed out. Possible causes include operator didn't scan bar code and a defective bar code, Bar Code Reader, cable, and CPU board.	Check the suspected hardware and replace if necessary.
0405	KEYPAD ERROR - INCORRECT KEY	Unexpected key press/release detected. Possible causes include operator pressed incorrect key and defective Remote Keypad, keypad cable, and CPU board.	Check the suspected hardware and replace if necessary.
0501	DISK ERROR - BAD DISK HANDLE	Internal software error.	Replace CPU board.
0502	DISK ERROR - UNRECOVERABLE	A disk operation failed. Possible causes include a corrupted disk and a defective disk drive and disk drive cable.	Reformat and re-initialize the disk. Check the suspected hardware and replace if necessary.
0503	DISK ERROR - WRITE PROTECTED	The write-protect tab of the disk is set to the PROTECT position which prevented writing to the disk.	Set the write-protect tab on the disk to the WRITE position.
0504	DISK ERROR - NO DISK	A disk operation was attempted when there was no disk in the drive.	No action - disk removed by user.
0505	DISK ERROR - MEDIA ERROR	A read or write operation from the disk failed. Possible causes include a defective disk, disk drive or disk drive cable.	Reformat and re-initialize the disk. Check the suspected hardware and replace if necessary.
0506	DISK ERROR - MEDIA CHANGED	A disk operation was attempted while the disk was being replaced.	No action - disk removed and another inserted by user.
0507	DISK ERROR - DRIVE RESET	A disk drive reported that it was reset due to a power reset or SCSI bus reset. Possible causes include a defective disk drive, disk drive cable, and CPU board.	Check the suspected hardware and replace if necessary.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0508	DISK ERROR - NO MOD DRIVE	No MOD drive was detected. Possible causes include missing disk drive, incorrect SCSI ID or LUN setting on disk drive and defective disk drive, disk drive cable, and CPU board.	Check that the disk drive is set to the proper SCSI ID and LUN. Check the suspected hardware and replace if necessary.
0509	DISK ERROR - NO INT DRIVE	No internal disk drive was detected. Possible causes include missing disk drive, incorrect SCSI ID or LUN setting on disk drive and defective disk drive, disk drive cable, and CPU board.	Check that the disk drive is set to the proper SCSI ID and LUN. Check the suspected hardware and replace if necessary.
0601	FILE SYS ERROR - DISK IS FULL	A image storage to disk failed because the disk is full.	No action - disk is full.
0602	FILE SYS ERROR - FILE NOT FOUND	A file is missing from the disk. Possible causes include a corrupted disk.	Re-initialize the disk.
0603	FILE SYS ERROR - EOF NOT FOUND	The end of file marker was not found in the FAT area of a disk. Possible causes include a corrupted disk.	Re-initialize the disk.
0604	FILE SYS ERROR - CORRUPT DATA	A file on disk is corrupt.	Re-initialize the disk.
0605	FILE SYS ERROR - END OF RECORDS	An expected record was not found in a disk file. Possible causes include a corrupted disk.	Re-initialize the disk.
0606	FILE SYS ERROR - INCOMPATIBLE FS	An operation was attempted on an incompatible file system. Possible causes include a corrupted disk.	Re-initialize the disk.
0607	FILE SYS ERROR - BAD FILE SYSTEM	An unrecognizable file system is on the disk. Possible causes include a corrupted disk.	Re-initialize the disk.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0608	FILE SYS ERROR - BAD FILE FORMAT	An unrecognizable file format was found on the disk. Possible causes include a corrupted disk.	Re-initialize the disk.
0609	FILE SYS ERROR - EOF FOUND	Attempted to read beyond the end of a file. Possible causes include a corrupted disk.	Re-initialize the disk.
0610	FILE SYS ERROR - DIR NOT FOUND	A directory is missing from the disk. Possible causes include a corrupted disk.	Re-initialize the disk.
0611	FILE SYS ERROR - NOT LOADED	A file system is not loaded. A file system operation was attempted when no file system was loaded. This is an internal software error.	Replace CPU board.
0612	FILE SYS ERROR - ALREADY LOADED	An attempt was made to load a file system when a file system was already loaded. This is an internal software error.	Replace CPU board.
0613	FILE SYS ERROR - NO FD AVAILABLE	Too many files are opened. This is an internal software error.	Replace CPU board.
0614	FILE SYS ERROR - FILE NOT LOCKED	A file unlock was attempted on a file that was not locked. This is an internal software error.	Replace CPU board.
0615	FILE SYS ERROR - BAD ARGUMENT	Internal software error.	Replace CPU board.
0616	FILE SYS ERROR - FILE DELETED	A file was unexpectedly deleted. This is an internal software error.	Replace CPU board.
0617	FILE SYS ERROR - FD NOT IN USE	A file operation was attempted on a file that is not open. This is an internal software error.	Replace CPU board.
0618	FILE SYS ERROR - BAD FILE NAME	An illegal file or path name was encountered. Possible causes include a corrupted disk.	Re-initialize the disk.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0619	FILE SYS ERROR - END OF PLANE	An attempt was made to read or write beyond the end of a plane of data in an image file. Possible causes include a corrupted disk.	Re-initialize the disk.
0620	FILE SYS ERROR - FILE EXISTS	An attempt was made to create a file or directory that already exists. Possible causes include a corrupted disk.	Re-initialize the disk.
0621	FILE SYS ERROR - BAD DIR ENTRY	A corrupted directory entry was found on disk. Possible causes include a corrupted disk.	Re-initialize the disk.
0622	FILE SYS ERROR - INVALID CLUSTER	An invalid cluster was referenced by the file system. Possible causes include a corrupted disk.	Re-initialize the disk.
0623	FILE SYS ERROR - FILE IS DIR	A file was expected but a directory with the same name was found. Possible causes include a corrupted disk.	Re-initialize the disk.
0624	FILE SYS ERROR - DIR IS FILE	A directory was expected but a file with the same name was found. Possible causes include a corrupted disk.	Re-initialize the disk.
0625	FILE SYS ERROR - BAD FAT ENTRY	An invalid entry was found in the FAT. Possible causes include a corrupted disk.	Re-initialize the disk.
0626	FILE SYS ERROR - ROOT DIR FULL	The root directory on the disk is full. Possible causes include a corrupted disk.	Re-initialize the disk.
0627	FILE SYS ERROR - REQ TAG MISSING	A required tag in a file was missing. Possible causes include a corrupted disk.	Re-initialize the disk.
0628	FILE SYS ERROR - UNSUP TAG VALUE	An unsupported tag value was found in a file. Possible causes include a corrupted disk.	Re-initialize the disk.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0629	FILE SYS ERROR - UNSUP IMAGE FMT	An unsupported image format was found on disk.	No action - disk contains image formats that are not supported in this product.
0630	FILE SYS ERROR - APPL INFO FULL	No room was available in the application information field of a file on a DEFF disk. This is an internal software error.	Replace the CPU board.
0631	FILE SYS ERROR - READ ONLY FILE	An attempt was made to write to or delete a READ-ONLY file. Possible causes include a corrupted disk.	Re-initialize the disk.
0632	FILE SYS ERROR - DIR NOT EMPTY	A directory delete operation failed because the directory was not empty. Possible causes include a corrupted disk.	Re-initialize the disk.
0633	FILE SYS ERROR - CAN'T FORM FEED	A NEW SHEET operation failed because the file format does not support FORM FEED.	No action - operation not allowed.
0633	FILE SYS ERROR - CAN'T FORM FEED	A NEW SHEET operation failed because the file format does not support FORM FEED.	No action - operation not allowed.
0634	FILE SYS ERROR - CAN'T DELETE	An image delete operation is temporarily not allowed.	Retry operation.
0635	FILE SYS ERROR - EXAM NOT FOUND	An exam is missing from the internal disk drive.	Cycle power and do not cancel the power-up tests which attempt to correct inconsistencies on the internal disk drive.
0636	FILE SYS ERROR - GROUP NOT FOUND	A group is missing from the internal disk drive.	Cycle power and do not cancel the power-up tests which attempt to correct inconsistencies on the internal disk drive.
0637	FILE SYS ERROR - IDD REV OLD	The internal disk drive has an old revision of the file system. This can occur when software is upgraded.	Reinitialize (erase) the internal disk drive.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0638	FILE SYS ERROR - NETWORK DISK DB	The internal disk drive has an inconsistency in its database. This can be caused by error 0637 or by a corrupt database file on the internal disk drive.	Turn unit off then on to allow the internal disk drive initialization a chance to correct the problem. Reinitialize (erase) the internal disk drive.
0701	CALIBRATE ERROR - BLACK (LEVEL)	An autocalibration failed to adjust the voltage level to calibrate a black pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.
0702	CALIBRATE ERROR - WHITE (GAIN)	An autocalibration failed to adjust the voltage gain to calibrate the white pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.
0703	CALIBRATE ERROR - RED (LEVEL)	An auto-calibration failed to adjust the voltage level to calibrate a red pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.
0704	CALIBRATE ERROR - RED (GAIN)	An auto-calibration failed to adjust the voltage gain to calibrate the red pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0705	CALIBRATE ERROR - GRN (LEVEL)	An auto-calibration failed to adjust the voltage level to calibrate a green pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.
0706	CALIBRATE ERROR - GRN (GAIN)	An auto-calibration failed to adjust the voltage gain to calibrate the green pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.
0707	CALIBRATE ERROR - BLUE (LEVEL)	An auto-calibration failed to adjust the voltage level to calibrate a blue pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.
0708	CALIBRATE ERROR - BLUE (GAIN)	An auto-calibration failed to adjust the voltage gain to calibrate the blue pixel value. Possible causes include an unsuitable video input signal and a defective video input signal, video cable, and CPU board.	Check that the video signal contains the full range of pixel values necessary for a calibration. Check the suspected hardware and replace if necessary.
0801	EEPROM ERROR - WRITE TIMEOUT	A write operation to the EEPROM timed out. Possible causes include a defective EEPROM on the CPU board.	Replace CPU board.
0802	EEPROM ERROR - FAILED TO CLEAR	A clear operation on the EEPROM failed. Possible causes include a defective EEPROM on the CPU board.	Replace CPU board.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>	<b>Corrective Action</b>
0901	SYSTEM ERROR - SYS TABLE RESET	The configuration parameter table was found to be corrupt and was reset to default values. Possible causes include a defective EEPROM on the CPU board.	Cycle the power on the unit. If the error reoccurs, replace the CPU board.
0902	SYSTEM ERROR - INCOMPLETE DMA	A DMA operation to/from the disk drive did not execute properly usually due to a media error. Possible causes include a defective disk, disk drive, disk drive cable, and CPU board.	Reformat and Re-initialize the disk. Check the suspected hardware and replace if necessary.
0903	PROM ERROR - CHECKSUM FAIL	The EPROM memory has failed the power-up self-test.	Replace the system EPROMs or CPU board.
0904	SYSTEM ERROR - USER CANCELED	The operator canceled an operation.	No action - operator canceled operation.
0905	SYSTEM ERROR - DRAM FAULT	The DRAM image memory has failed the power-up self-test.	Replace the CPU board.
0906	SYSTEM ERROR - SRAM FAULT	The static RAM memory has failed the power-up self-test.	Replace the CPU board.
0907	SYSTEM ERROR - INTERNAL ERROR	Invalid data was passed to an internal software function. This is an internal software error.	Replace the CPU board.
0908	SYSTEM ERROR - MAX ASSOC	Too many DICOM associations were opened. This is an internal software error.	Replace the CPU board.
0909	SYSTEM ERROR - MAX SESSIONS	Too many DICOM sessions were created. This is an internal software error.	Replace the CPU board.

Code	Error Message	Description/Possible Causes	Corrective Action
0910	SYSTEM ERROR - MAX FILM BOXES	Too many DICOM film boxes were created. This is an internal software error.	Replace the CPU board.
1001	NETWORK ERROR - INIT FAILED	The network hardware initialization failed. Possible causes include defective network hardware.	<i>NT100:</i> Check the connection between the CPU board and the network board. Replace the network board. Replace the CPU board. <i>NT200:</i> Replace the CPU board.
1002	NETWORK ERROR - NO DESTINATION	Selected network operation not allowed because no network destination has been selected.	Select a network destination using the Setup Menu.
1200-2499	DICOM ERROR - <DESCRIPTION>	An error occurred during a DICOM operation. Possible causes include configuration entered in the Network Setup Menu, defective DICOM print server, network, Ethernet board, and CPU board.	Check and correct the Network Setup menu configuration. Check the suspected hardware and replace if necessary.

## Operating System Errors

The following is a list of errors that may be reported by the operating system of the NT100. The corrective action for all of these is to replace the CPU board.

Code	Error Message	Description/Possible Causes
-1	SYSTEM ERROR - INVALID TASK ID	No such task.
-2	SYSTEM ERROR - NO ENVELOPE	No free message envelope.
-3	SYSTEM ERROR - NO MAILBOX	No mailbox defined.
-4	SYSTEM ERROR - MAILBOX FULL	Mailbox is full.
-5	SYSTEM ERROR - EARLY WAKE	Wakened before timeout.
-6	SYSTEM ERROR - TASK WAITING	Task not waiting (after 2nd wake).
-7	SYSTEM ERROR - CALL WAITING	Calling task not waiting.
-8	SYSTEM ERROR - NOT FROM TASK	Message not from task call.
-12	SYSTEM ERROR - RESOURCE OWNER	Resource not owned by you (caller).
-13	SYSTEM ERROR - INVALID POOL ID	Invalid buffer pool id.
-14	SYSTEM ERROR - SMALL BUFFER	Buffer too small.
-15	SYSTEM ERROR - BUFFER NOT USED	Buffer not in use.
-16	SYSTEM ERROR - BUFFER COUNT	Buffer use count overflow.
-17	SYSTEM ERROR - TASK PRIORITY	Invalid task priority.
-18	SYSTEM ERROR - NO CONTROL BLK	No free Task Control Block.
-19	SYSTEM ERROR - NO FREE TIMER	No free Timer Block.
-20	SYSTEM ERROR - NO STOP ALLOWED	Task abort (stop, kill, delete) not allowed.
-21	SYSTEM ERROR - INTERRUPT PTR	Cannot install interrupt pointer in ROM.
-22	SYSTEM ERROR - NO SEMAPHORE	No such semaphore (invalid id).
-23	SYSTEM ERROR - SEMAPHORE USED	Semaphore in use.
-24	SYSTEM ERROR - SEMAPHORE VALUE	Invalid semaphore value.
-27	SYSTEM ERROR - TIMED OUT	Timed out.
-28	SYSTEM ERROR - NO MESSAGE	No message waiting for task.
-29	SYSTEM ERROR - TASK WAITING	Calling task still waiting.

<b>Code</b>	<b>Error Message</b>	<b>Description/Possible Causes</b>
-30	SYSTEM ERROR - NO BUFFERS	No buffers defined.
-31	SYSTEM ERROR - NO FREE POOL	No free buffer pool.
-32	SYSTEM ERROR - NO EVENT GROUP	No free event group.
-33	SYSTEM ERROR - EVENT IN USE	Event group in use.
-37	SYSTEM ERROR - NO MEMORY FREE	Memory not available.
-38	SYSTEM ERROR - MEMORY POINTER	Invalid memory block pointer.
-39	SYSTEM ERROR - MEMORY UNUSED	Memory block not in use.
-40	SYSTEM ERROR - MEMORY COUNT	Memory block use count overflow.
-41	SYSTEM ERROR - NO SUCH MESSAGE	No such message exchange (invalid id).
-42	SYSTEM ERROR - NO FREE MESSAGE	No free message exchange.
-43	SYSTEM ERROR - MESSAGE IS USED	Message exchange in use.
-44	SYSTEM ERROR - MAILBOX SIZE	Invalid mailbox size.
-45	SYSTEM ERROR - NO RESOURCE ID	No free resource identifier.
-46	SYSTEM ERROR - NO EVENT GROUP	No such event group.
-47	SYSTEM ERROR - NO TIMER	No such internal timer.
-48	SYSTEM ERROR - TIMING INTERVAL	Invalid timing interval.
-49	SYSTEM ERROR - RESULT STATUS	Invalid result status (AAWAKCS).
-50	SYSTEM ERROR - MEMORY LIMIT	Memory fill exceeds limit.
-51	SYSTEM ERROR - SEMAPHORE BUSY	Semaphore is busy.
-52	SYSTEM ERROR - BAD TASK TRAP	Invalid task trap type.
0001	SYSTEM ERROR - NO BUFFER FREE	AMX WARNING - No buffer available.
0002	SYSTEM ERROR - TASK WON'T WAIT	AMX WARNING - Task not waiting; wake is pending.
0003	SYSTEM ERROR - TASK WAITING	AMX WARNING - Task is still waiting

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# Repair and Maintenance

## Spare Parts

Description	Part Number	CTX ID No.
NT100 CPU PCB	99999-0925	50167-0001
Power Supply	99999-0649	08110-0013
3.5" MOD Drive, 230/128 MB	99999-0927	0901-0049
Remote keypad	99999-0928	80051-0001
Cooling fan	99999-0971	65323-0001
BNC-BNC Video Cable, 6ft.	99999-0506	06005-0019
Internal Hard Drive (For Ethernet Option)	99999-0970	09101-0040
Ethernet Board	99999-0926	20134-0001

## Upgrade Kits

The list below shows all of the available upgrades and accessories available for the NT100. Order these kits from your local representative.

Description	Part Number
Bar Code Reader	99999-1006
Magneto-Optical Disk (MOD) Drive	99999-0940
Network Option	99999-0939
Footswitch	99999-0992
6' BNC-BNC Video Cable	99999-1067
128 mByte Magneto-Optical Disk	99999-0984

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## Disassembly/Re-assembly

This section shows the replacement procedures for the parts listed in the Spare Parts section.

**WARNING! Avoid data loss! Wait for any process to complete before shutting down power to the NT100.**

### Power Down

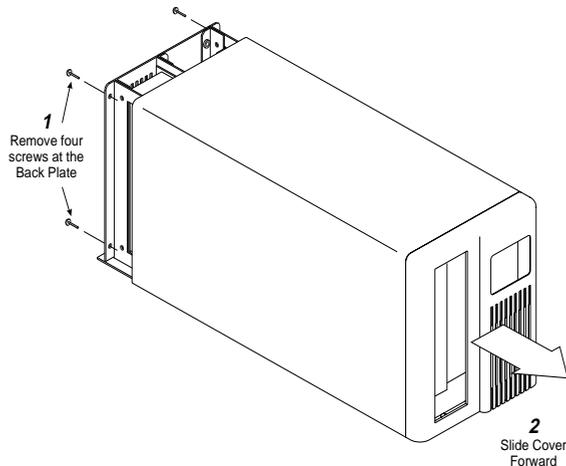
1. **For system with MOD Option:** Eject any inserted MOD.  
**For system with Network Option:** Ensure that any network transmission has been completed (check network status).
2. Turn power OFF. Disconnect the power cord from the NT100.

### Removing External Cover

To remove the external cover:

1. Remove four screws that attach the cover to the back plate. See Figure 32.
2. Slide the cover towards the front of the unit.

**Figure 32 NT100 Cover Removal**



Re-install the cover by reversing the removal procedure.

## Remote Keypad

The remote keypad is not serviceable. To replace the remote keypad:

1. Power down the NT100.
2. Disconnect the failed remote keypad from the Remote connector at the back of the NT100.
3. Connect the new remote keypad to the Remote connector at the back of the NT100.

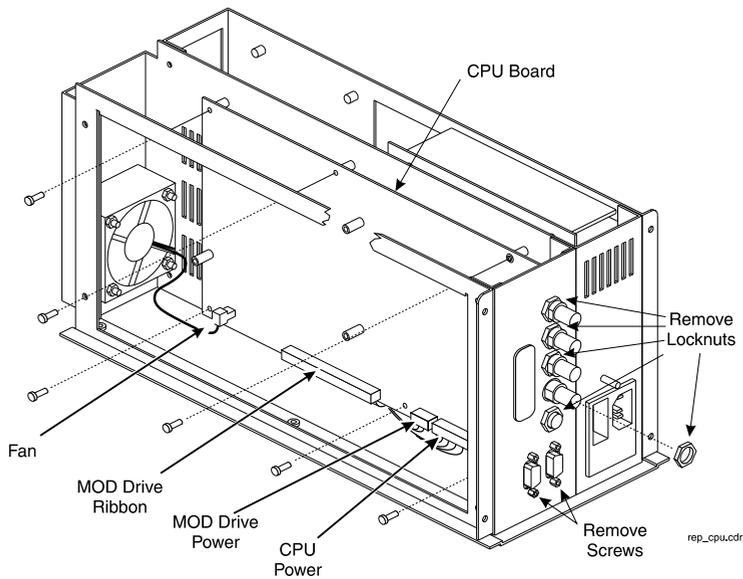
## CPU

1. Power down and disconnect all cables from the back of the unit (including the power cord and the termination plug for the Loop connection).

*NOTE: Label each cable before disconnecting them.*

2. Remove external cover.
3. Remove the nuts that secure the BNC and foot switch connectors to the back panel. See Figure 33.

**Figure 33 CPU Replacement**



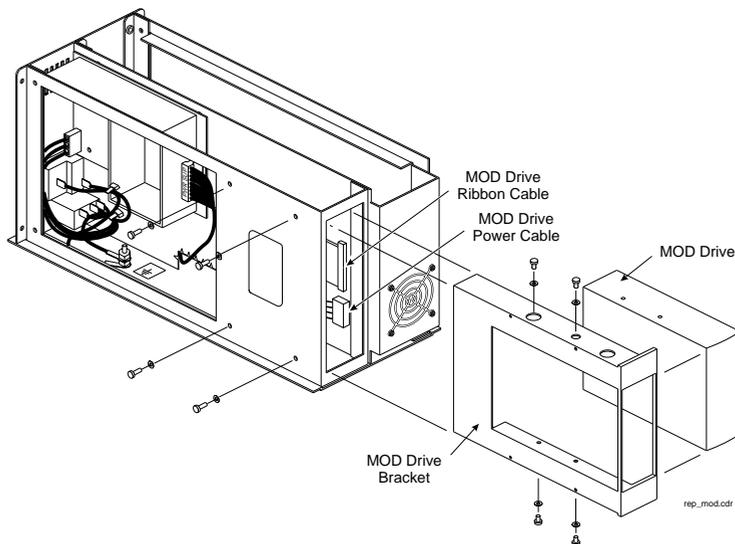
4. Remove the cover to the RS-232 (not necessary if a bar code reader was disconnected in step 1).

5. Remove the captive screws that secure the two 9-pin connectors to the back panel.
6. Disconnect the fan (J10), the MOD Ribbon cable (J12), the MOD power harness (J13) and the CPU power harness (J11) from the CPU board.
7. Remove 6 screws that secure the CPU board to the NT100 chassis.
8. Remove the failed CPU board.
9. Install the new CPU board by reversing steps 1 through 7.
10. Re-configure the unit per user needs.

## MOD Drive

1. Power down and disconnect the power cord from the back of the unit (label any other cable that will be disconnected before disconnecting them).
2. Remove external cover.
3. Remove four screws that secure the MOD drive assembly to the chassis. See Figure 34.

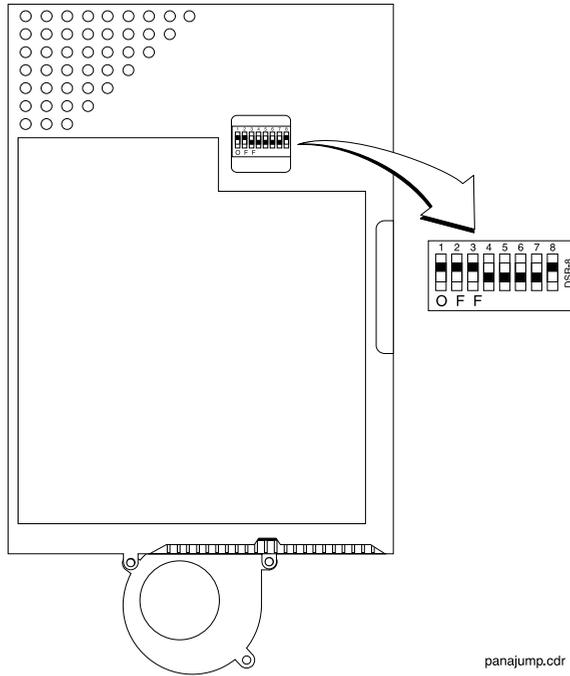
**Figure 34 MOD Replacement**



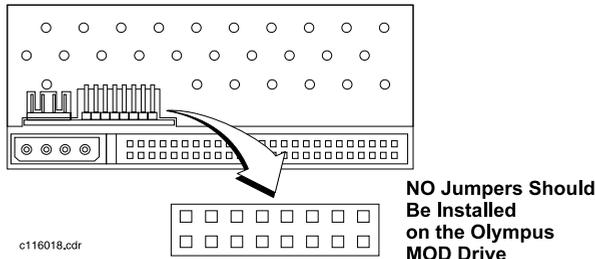
4. Pull the MOD drive assembly forward enough to make room for disconnecting the cables.
5. Disconnect the power harness and the ribbon cable from the rear of the MOD drive and remove the drive assembly.

- Configure the new MOD switches or jumpers. See Figure 35 for Panasonic LT3294 MOD drive, and Figure 36 for Olympus MOS320E MOD drive.

**Figure 35 Switch Setup for Panasonic MOD Drive**



**Figure 36 Jumper Setup for Olympus MOD Drive**



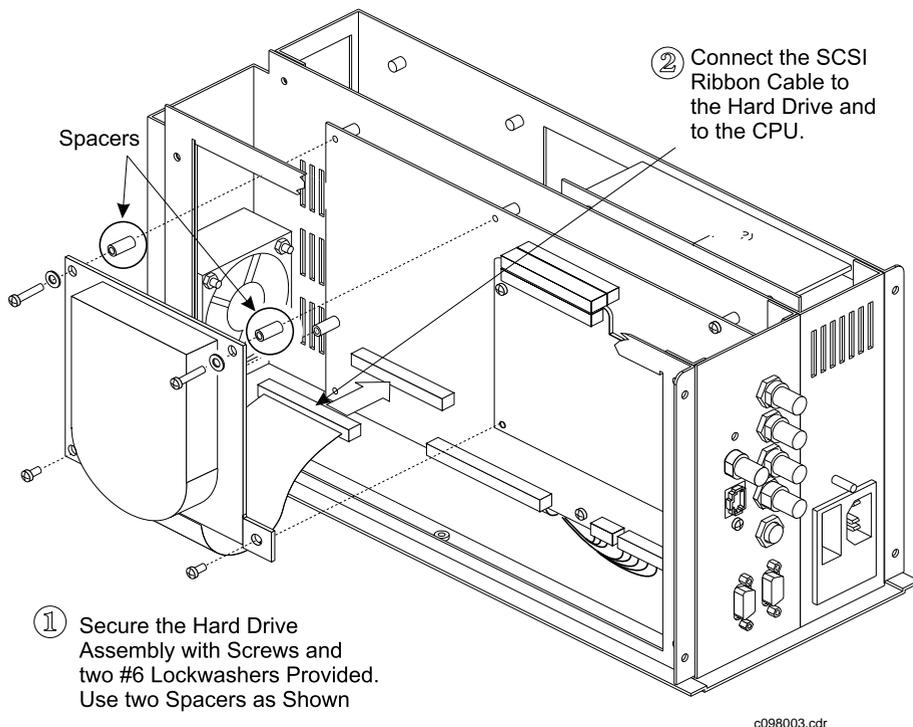
- Replace the failed MOD drive on the bracket. Ensure that the faceplate of the new MOD drive is flush with the drive bracket.
- Reverse steps 1 through 5 to re-install the MOD drive assembly.

## Ethernet Board/Network Drive Assembly

### Network Drive

1. Power down and disconnect the power cord from the back of the unit (label any other cable that will be disconnected before disconnecting them).
2. Remove external cover.
3. Remove the Network Drive from the CPU board. Reverse the steps shown in Figure 37.

**Figure 37 Hard Drive Installation**



4. Install the new Network Drive on the CPU board. See Figure 37.
5. Replace the covers and cables. Connect the NT100 to a power source and turn the NT100 ON.
6. The Remote Keypad display may show an error (637). Press [MENU] to acknowledge the error message and clear the Remote Keypad display.
7. Press and hold [MENU] until the unit beeps.

8. Press [ ◀ ] once to reach the Installation Menu.
9. Press and hold [YES] until the system beeps to enter the Installation Menu.
10. Press [ ▶ ] to advance to ERASE NETWORK DISK?
11. Press [YES] to erase the disk.
12. Press [MENU] twice to return to Live Mode (display reads READY).
13. Power the NT100 OFF and then ON to initialize the network.

## Network Drive Jumper Settings

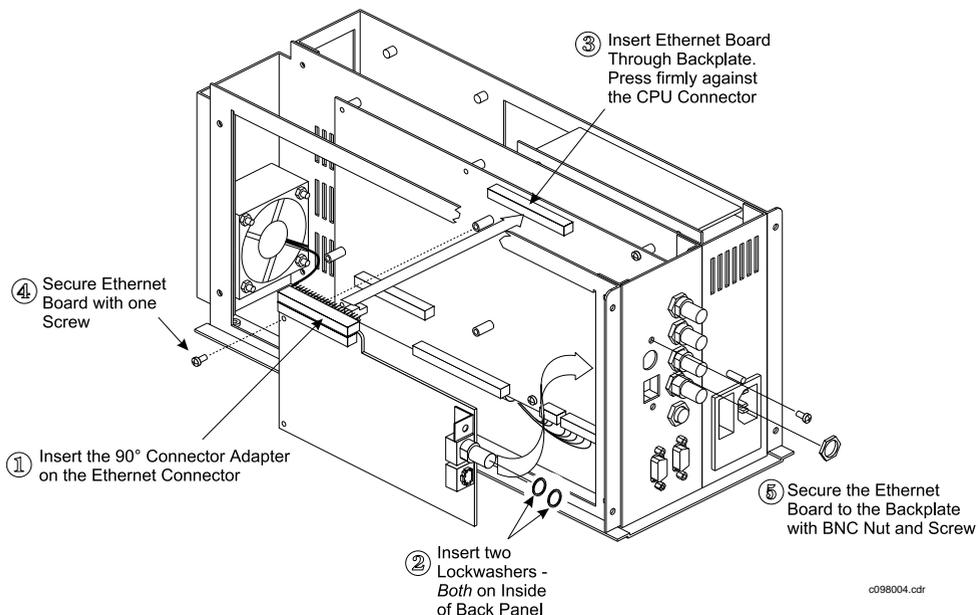
Drive	
Fujitsu M2637A jumpers	Fujitsu M2706SAM switches
JP1 OFF	SW1 OFF
JP2 ON	SW2 ON
JP3 ON	SW3 OFF
JP4 ON	SW4 ON
JP5 OFF	SW5 ON
JP6 ON	SW6 ON
JP7 OFF	SW7 ON
	SW8 OFF

## Ethernet Board

1. Power down and disconnect the power cord from the back of the unit (label any other cables that will be disconnected before disconnecting them).
2. Remove external cover.
3. Remove the Network Drive from the CPU board.
4. Remove the BNC nut and lockwasher from the Ethernet BNC connector. Refer to Figure 38.
5. Remove the Ethernet Board mounting screw from the NT100 back panel. See Figure 38.
6. Remove the Ethernet Board mounting screw underneath the 90° connector.

7. Carefully disconnect the Ethernet Board from the CPU Board and slide the board out of the backplane.

**Figure 38 Ethernet Board Installation**



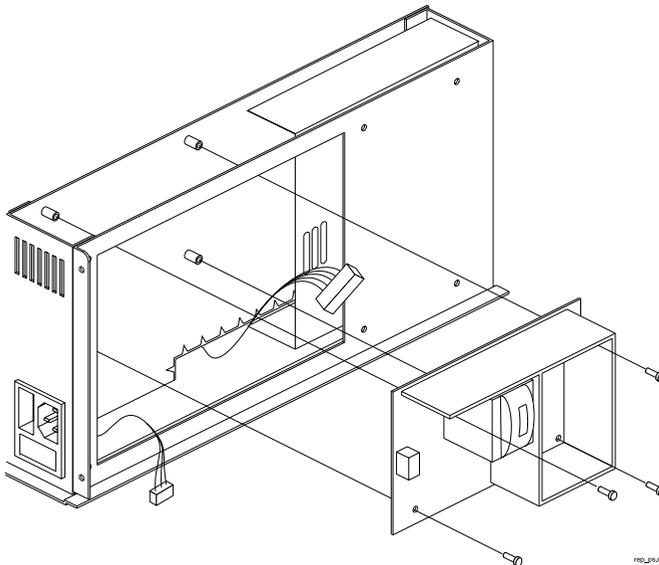
8. Write the Ethernet Address of the replacement board in the “NT100 Network Information” table in Appendix A.
9. Follow steps 1 through 7 above in reverse order to install the new Ethernet Board. Use care when installing and connecting the Ethernet Board to the CPU board with the 90° connector.
10. Replace the Network Drive. Follow steps 4 through 13 under “Network Drive” on page 112 to complete the hardware installation and re-start the NT100.
11. Press and hold [MENU] until the NT100 beeps
12. Press [◀] to advance to INSTALLATION.
13. Press and hold [YES] until the NT100 beeps.
14. Press [▶] to advance to NETWORK SETUP.
15. Press [YES] to enter the Network Setup Menu (the first menu is EDIT LOCAL IP ADDR?).
16. Press [▶] to advance to EDIT LOCAL ETH ADDR.

17. Press [YES] enter the Local Ethernet Address Menu.
18. Enter the Local Ethernet Address as recorded in the “NT100 Network Information” table in Appendix A. Use [▶] and [◀] to move to the next or previous digit, and [+] and [-] to change any digit.
19. Press [MENU] four (4) times to return to Live Mode (the ready prompt appears in the Remote Keypad display).
20. Power the NT100 OFF and then ON to initialize the network.

## Power Supply

1. Power down and disconnect the power cord from the back of the unit (label any other cable that will be disconnected before disconnecting them).
2. Remove the external cover.
3. Disconnect the input and output harnesses from the power supply (J1 and J2 respectively).
4. Remove four screws that secure the power supply to the chassis. Move the power supply to access both harness connectors. See Figure 39.

**Figure 39 Power Supply Replacement**

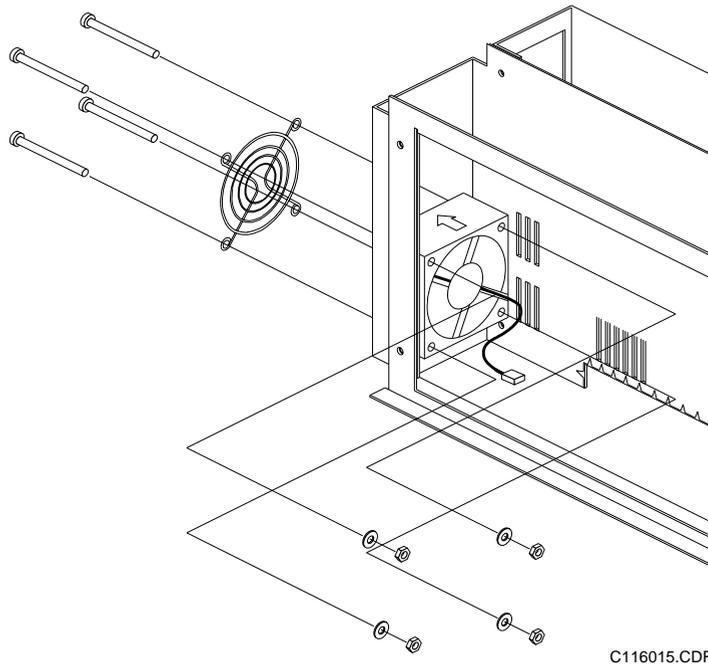


5. Reverse steps 1 through 3 to install the new power supply.

## Cooling Fan

1. Power down and disconnect the power cord from the back of the unit (label any other cable that will be disconnected before disconnecting them).
2. Remove the external cover.
3. Disconnect the fan harness from the CPU board (J10).
4. Remove four screws that secure the fan assembly to the chassis. Save the front grill. See Figure 40 for assembly.

**Figure 40 Cooling Fan Replacement**



5. Install the new fan with air flow arrow pointing towards the front of the NT100.
6. Connect the fan to the CPU board J10.
7. Re-install the external cover.
8. Re-connect the power cord (and any other cable previously disconnected from the back plate of the unit). After turning the NT100 ON, make sure that there is air flow out of the front of the unit.

# Theory of Operation

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## Introduction

The NT100 is a digital monochrome image acquisition module designed to transfer monochrome image data from video based imaging systems to printers and workstations.

Image information can be transferred to the printing device in two different ways:

- Via removable storage media (Magneto-Optical Disks or MOD), usually for mobile applications.
- Via network connections, usually for stationary applications.

The NT100 uses DICOM 3.0 standard protocol for network transfer applications.

The following areas will be discussed in this section:

- Video Acquisition
- Video Memory
- CPU

## Theory of Operation

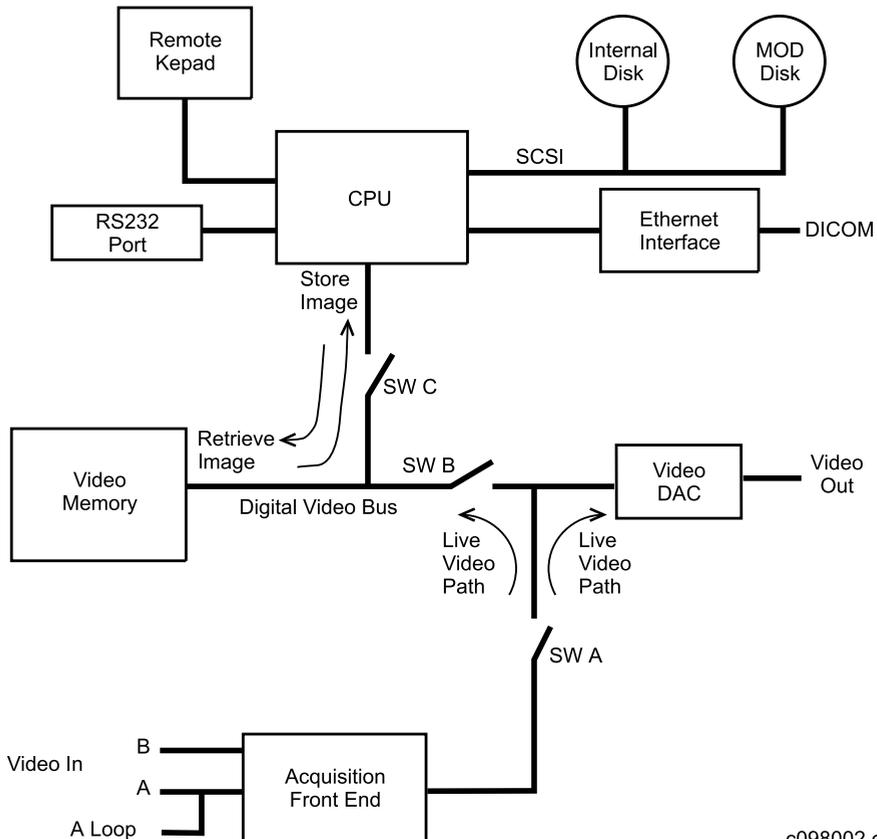
An Analog video signal supplied to the acquisition front end is converted to digital data. The digital data is supplied to both a Video DAC and Video Memory simultaneously.

If the system is in “Live” mode, the CPU directs the data to either the internal disk (if the system is equipped with the Network Option) or the MOD drive (if the system is equipped with the Removable Disk Option).

If the system is equipped with the Network Option, image data is transferred across the network in the background, as soon as the network is available.

If the system is in “Recall” mode, the CPU will transfer the digital image from the MOD drive or internal disk to Video Memory. The digital image in Video Memory will then be routed to the Video DAC where it will be converted to analog video and sent to the Video Out for display.

**Figure 41 NT100 Simplified Block Diagram**



c098002.cdr

## Video Acquisition

### Analog Input

The analog input 4x1 multiplexer (MUX) of the NT100, selects between Channel A input, Channel A system input, Channel B input, and Channel B filtered input. The filtered inputs are used to filter out unwanted noise. The input channel selection is controlled by the DUART.

The output of the MUX drives an adjustable gain current amplifier. The gain is adjustable via a voltage control pin. The voltage on this pin is adjusted by using a digital pot.

The output of this stage feeds a black level auto calibration circuit. This circuit clamps the back porch of the video signal. The auto gain calibration and the auto black level calibration results in a video input to the ADC of 3V to 5V.

A PLL locks the system clocks to the incoming horizontal frequency producing a synchronous sampling system. The ADC is clocked at the pixel clock frequency of the analog input.

### Sync Input

The video input circuit strips the horizontal, vertical and burst sync signals. The Horizontal Sync is used to control the PLL and logic to store a line of video into image memory. The Vertical Sync is used to control the acquisition of a field of video into image memory. The Burst is used to generate a clamp signal for black level auto calibration.

### Phase Lock Loop

The video clocks and the pixel clocks are generated by the phase lock loop (PLL). The PLL uses the horizontal sync input (external or internal from the DUART) and horizontal sync generator output to control the clock rate. All inputs must be in sync with the output of this circuit. A digital delay line delays the horizontal sync generator input thus changing the phase of the pixel clock so that the input can be sampled at the optimum position with respect to the pixel (center). This is called synchronous sampling.

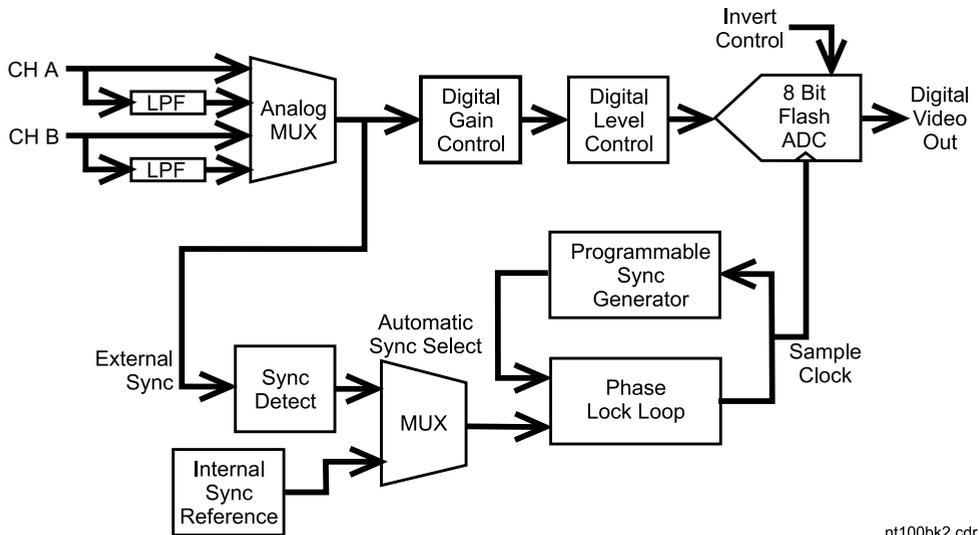
### Sync Generator

The programmable sync generator controls the image format, usually set at installation. The parameters necessary to load the sync generator at power up are stored in non-volatile memory. The sync generator outputs are disabled by the CPU any time the sync generator is loaded. By making the system

programmable, different sync tables can be loaded at various times so a machine can be reconnected to different video formats without re-configuring any hardware. The signals out of the sync generator control the video memory, the PLL, the DAC, and various other circuits which need sync information.

Any horizontal format from 450 to 1024 acquired pixels is possible. Vertical formats of 525 and 625 lines are supported.

**Figure 42 Video Acquisition Simplified Block Diagram**



nt100bk2.cdr

## Video Memory

Normal size of the video memory is 1 Mbyte. The memory is sufficient to handle a 1024 x 1024 image format. The unit can then be used with both US and international imaging systems without memory re-configuration.

Image memory is available to the CPU when the NT100 is in CPU mode. Video mode is selected, when video data is acquired into or displayed from the image memory. A frame of video data may be acquired into or displayed from video memory every 1/30th second at 525 lines or every 1/25th second at 626 lines. CPU and Video mode are exclusive, therefore memory data cannot be displayed while the CPU is transferring an image to or from disk. It is possible though to display "Live" data while the system is in CPU mode.

The image memory is controlled by a EPLD which creates all memory control signals and addresses for the video image memory.

## CPU

The NT100 CPU is an 80C186. The data bus is 16 bits, while the address bus is 20 bits. The CPU is the central control for all CPU board functions.

### Time of Day (TOD) Clock

The CPU interfaces to a time of day clock with an accuracy better than  $\pm 1$  minute/month at 25°C. The TOD clock also contains 50 bytes of non-volatile ram. The TOD clock is battery backed up by the lithium battery.

### Speaker

The CPU drives a piezo speaker to generate audible prompts/alarms to the operator.

### DUART

A DUART provides 2 serial interfaces to the NT100 board.

Port A can be connected to an IBM compatible RS-232 port, normally operating at 9600 baud. EIA signal levels are supported. Port A is used for an optional Bar Code Reader (It contains a +5V signal for a Bar Code Reader power) and for diagnostics.

Port B is dedicated to the a remote keypad. This connection allows communication to occur between the CPU board and the keypad.

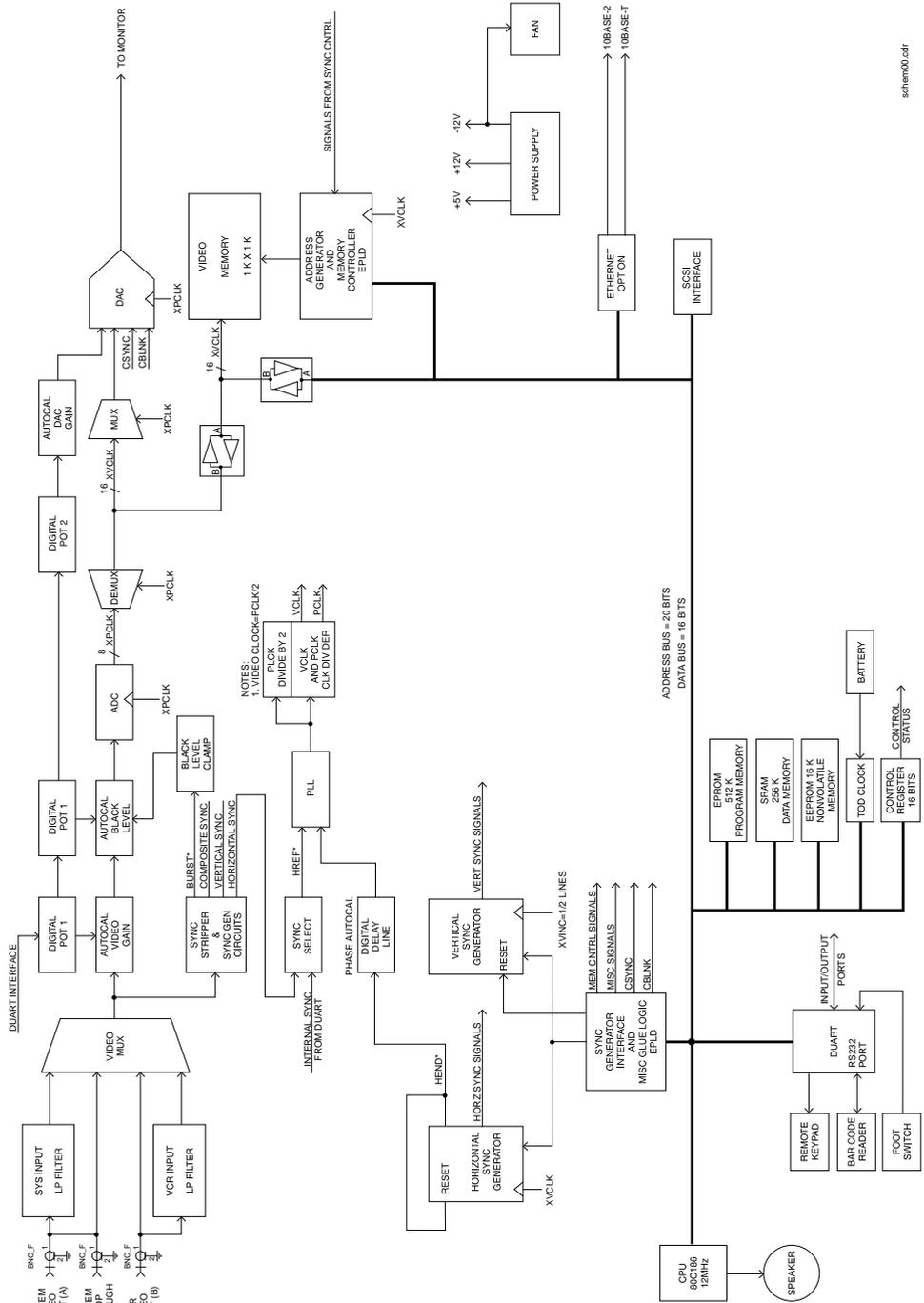
The DUART supplies several input and output port signals used to control the CPU board. The foot switch connector interfaces with the input port of the DUART.

### SCSI

The SCSI interface connects the CPU to the internal disk drive or MO disk drive. The SCSI bus supports data transfers of up to 5 MB/second.

Figure 43 is a simplified block diagram for the NT100 CPU board. Refer to Figure 43 for a visual representation of the CPU board functions.

Figure 43 NT100 CPU Board Block Diagram



schem00.cdr

# Appendix: A - Setup Tables

## Sync Values (for Channel A)

Register the following information from the *Camtronics 89999-0103, "Sync Parameters and Optional Equipment Compatibility for the NT100/NT200 and CAM by Manufacturer."* Use these numbers for sync calibration.

Horizontal Sync Values		Vertical Sync Values	
Start Pixel (HS):		Start Pixel (VS):	
Active Pixels (HA):		Active Pixels (VA):	
Total Pixels (HT):		Total Pixels (VT):	

## Sync Values (for Channel B)

Register the following information from the *Camtronics 89999-0103, 03, "Sync Parameters and Optional Equipment Compatibility for the NT100/NT200 and CAM by Manufacturer."* Use these numbers for sync calibration.

Horizontal Sync Values		Vertical Sync Values	
Start Pixel (HS):		Start Pixel (VS):	
Active Pixels (HA):		Active Pixels (VA):	
Total Pixels (HT):		Total Pixels (VT):	

*NOTE: The NT100 can be connected to up to 20 different nodes. If your system will be connected to more than two nodes, make a copy of Table to allow room for more nodes.*

### Network Destination Setup Information

Parameter	Node 1	Node 2
Destination Name		
Destination IP Address		
Protocol		
Device Type		
Destination Port		
Destination AE Title		
Print Server Parameters:		
Priority		
Film Destination		
LUT Group (3M Only)		
LUT Number (3M Only)		
Mag Type		
Smoothing Type		
Maximum Density		
Polarity		
Generic Store Parameters		
Priority		

*NOTE: Copy the parameters listed in the tables below, to make reconfiguring the system after a software upgrade or major replacement easier.*

### **NT100 Network Information**

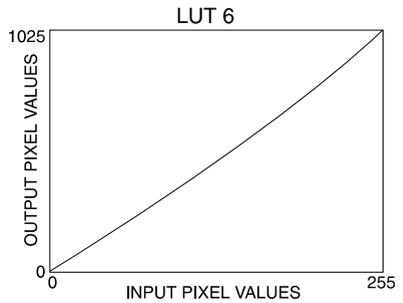
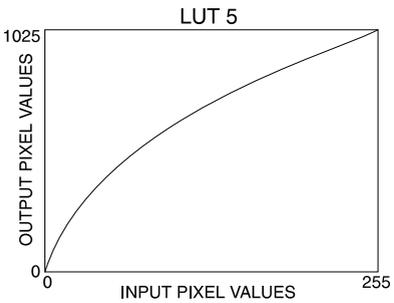
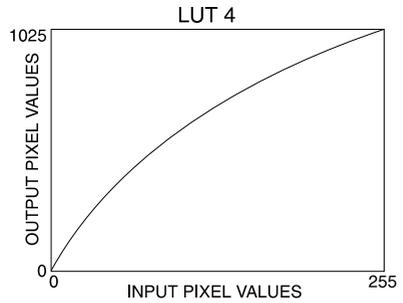
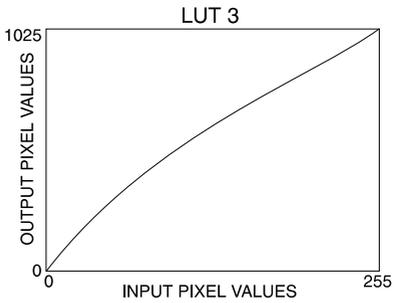
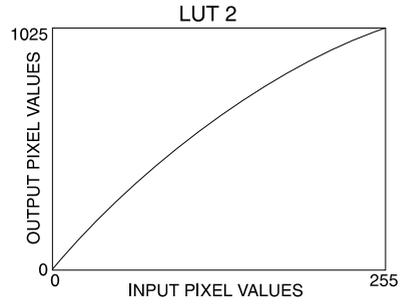
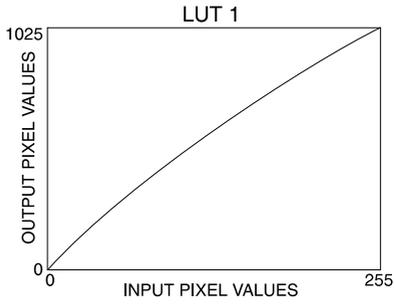
<b>Parameter</b>	<b>Current Value</b>
Local IP Address	
Local Ethernet Address	
Gateway IP Address	
Subnet Mask	
Local AE Title	

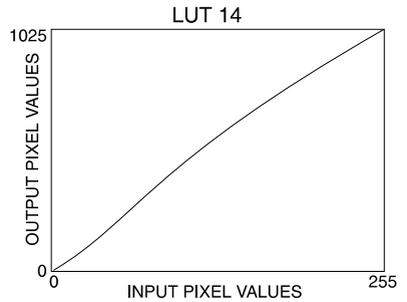
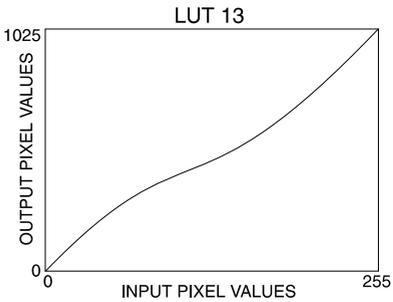
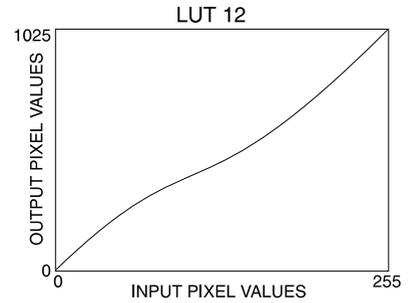
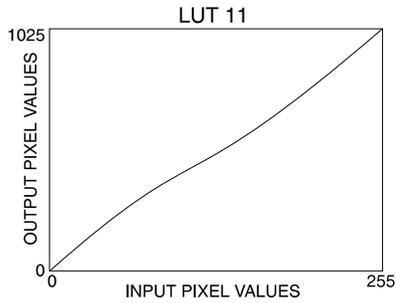
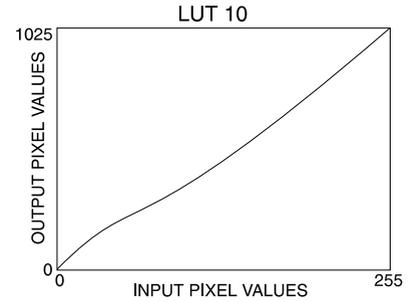
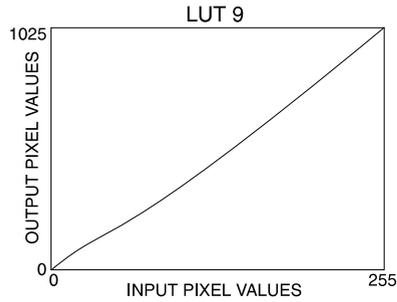
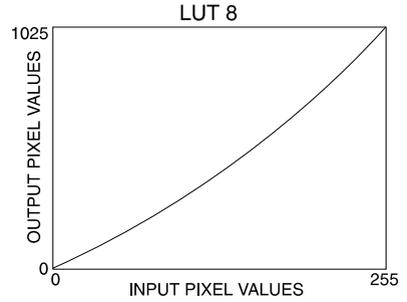
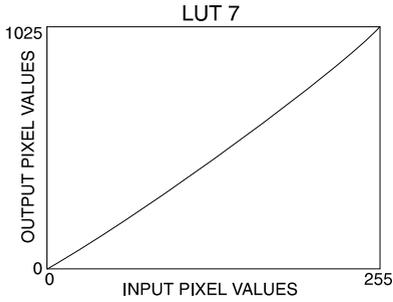
### **NT100 General Setup Record**

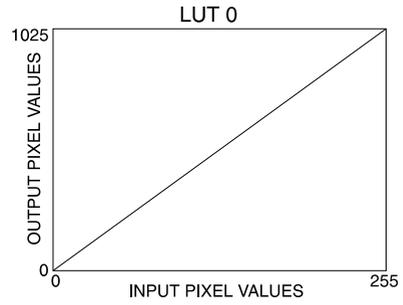
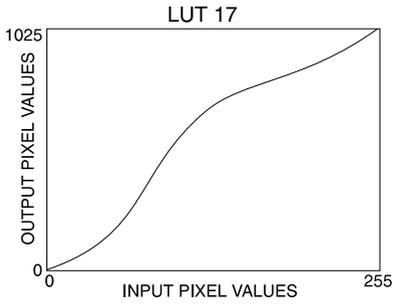
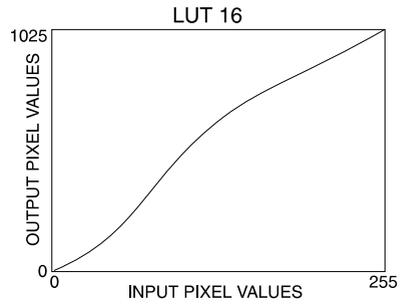
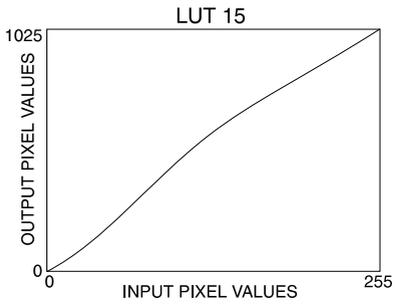
<b>Parameter</b>	<b>Current Value</b>
Bar Code (enabled/disabled)	
OCR (enabled/disabled)	
Recall Mode	
Serial Number	
Aspect Ratio	
Modality	
Removable Disk Setup Information	
User	
Send Disk	
File Format	
Write Verify	

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# Appendix: B - Lookup Table Plots







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 Align grid on text ABCDEFGHIJKLM ..... 65  
 Align grid on text NOPQRSTUVWXYZ ... 66  
 Enter text in video !"#%&'()\*+,-./ ..... 66  
 Enter text in video 0123456789 ..... 66  
 Enter text in video ABCDEFGHIJKLM .... 65  
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