AUTOSTEP™200

ADVANCED LITHOGRAPHY SYSTEM

Operation Manual

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Rev. 4

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Revision Record

Number	Description	Date
1	Initial Release	9/89
2	Revised to include Version 7.0 software information	2/90
3	Revised to include Version 7.1 software information	3/91
4	Revised to include Version 7.3 software information	3/93

Safety Precautions

Introduction

Before starting any facility design preparations, maintenance procedures or system operation, review this section for all safety precautions to be observed on the AUTOSTEP 200 system.

Safety precautions as described on the following pages are identified within the text of this manual using three headers:

DANGER Danger indicates major hazardous situations, presenting an immediate threat of death or serious injury.

CAUTION Caution indicates hazardous situations where a potential hazard or unsafe practice could cause personal injury.

NOTICE Notice indicates that equipment could be damaged if the instructions that follow the notice are not strictly observed.

Overall System Precautions

When instructed to do so in a procedure, *always* power down the AUTOSTEP 200 system. To prevent damage to jobs and system files, *always* enter the command SHUTDN to shut down the AUTOSTEP 200 system safely (see Shutting Down the AUTOSTEP 200 System in Section 11 of this manual).

When powering down any subsystem or chassis, halt the computer by pressing the HALT button on the computer chassis. After the chassis has been powered down, system operation can be resumed by pressing the HALT button until it is no longer illuminated, then typing P.

Additional Safety Precautions

Additional safety precautions relevant only to particular subsystems of the AUTOSTEP 200 system are explained on the following pages.

Wafer Alignment System

DANGER

Do not remove the microscope illuminator cover unless the illuminator software is adjusted for minimum intensity. This is done using the "I" command during execution.

MAXIMUS

DANGER

The MAXIMUS lamp contains mercury, which is poisonous. *Always* adhere to the following rules when servicing or repairing the MAXIMUS illuminator:

- Exposure to high-intensity ultraviolet light and heat can cause serious eye damage and burns. *Always* wear special green filtered safety glasses.
- In the event of a mercury arc lamp explosion, *never* enter the environmental chamber or open the environmental chamber doors until it has been verified that no mercury vapor is present. Wear a face mask to prevent breathing of mercury vapors.
- *Never* handle the lamp when warm.
- *Always* wear heat-resistant safety gloves to prevent burns, and to prevent hand oils from contacting the lamp envelope, since contaminants on the lamp can cause lamp explosion during operation.
- *Always* handle the lamp with both hands to reduce the risk of lamp breakage.
- High-voltage levels are present in the arc lamp power supply. Failure to properly connect probes as specified can cause personal injury from electric shock, and damage the system.

Servo and Stages

DANGER

The computer interface chassis supplies power to operate the laser metering system. Failure to turn off the computer interface chassis can result in exposure to laser radiation.

Never look directly into the laser beam when servicing the laser transducer, or severe eye damage can occur.

Never aim the laser at anyone or anything.

Programmable Platen Control

DANGER

High-voltage (800VDC) is used in the operation of the programmable platen control (PPC). Do not touch the high-voltage connections when working with this equipment.

Reticle Rotation System

DANGER

High-voltage (1500VDC) is used in the operation of the AX-100 controller and the Reticle Rotation System. Do not touch the high-voltage connections when working with this equipment.

Section 1 - Introduction

Purpose

This manual contains all information required to operate the AUTOSTEP 200 Advanced Lithography System, equipped with GCA version 7.3 software.

How to Use This Manual

This manual provides the information required for AUTOSTEP 200 system operation, within the following twelve sections:

- **Section 1 - Introduction**, provides an introduction to the AUTOSTEP 200 system.
- **Section 2 - System Description**, provides system description of the AUTOSTEP 200 system organized into the following seven categories: environmental control, reticle transfer and alignment, wafer transfer and prealignment, wafer positioning, alignment and exposure, system control, system electronics and support facilities, and additional system features.
- **Section 3 - System Operation: An Overview**, provides the operator with an overview of the pre-system operation tasks in an easy-to-read flowchart format, and a description of the overall sequence of operation for the AUTOSTEP 200 system.
- **Section 4 - Before You Begin**, describes the location and function of the resources used in AUTOSTEP 200 system operation including: the operating system, system software, the VT340 keyboard, commands, prompts, defaults, filenames, and getting help. This section is intended to be used as a reference, or by operators unfamiliar with the AUTOSTEP 200 system.
- **Section 5 - Setting Up and Powering Up the System**, describes the procedures used to set up and power up the AUTOSTEP 200 system, such as powering up the system, setting up the VT340 terminal, and logging into and out of the system.
- **Section 6 - The MODE Command: Setting Parameters and Subsystems**, describes the menu and screen options and the procedures required to set the parameters and subsystems, that are used when operating the AUTOSTEP 200 system.
- **Section 7 - The JOB Command: Developing a Job Specification**, describes the menus and screens and the procedures required to develop a job specification file using the JOB command.

- **Section 8 - The SPEC Command: Developing a Job Specification**, describes the prompts and the procedures required to develop a job specification file using the SPEC command.

- **Section 9 - Setting the Process-Dependent Alignment Parameters**, describes the procedures required to create an AWA process parameter file, select a global target mask, determine global threshold, select a reference mask, choose a fine scale algorithm, test the process parameters, and determine an alignment offset.

- **Section 10 - Determining the Best System Focus**, describes the INSITU, FOCUS, EXPO, DEXPO, and AEXPO commands, which are used to test the newly created job specification to determine the best focus and exposure settings.

- **Section 11 - The SETUP Command: Preparing the System for Operation**, describes the SETUP command within the INSITU program that is used to automatically read focus, intrafield, and Micro DFAS baseline, then update the MODE program with the necessary corrections.

- **Section 12 - Operating the System**, describes the procedures required to prepare the AUTOSTEP 200 system for operation after all programming is complete, and the procedures that are used during AUTOSTEP 200 system operation to process wafers and to obtain processing status for analysis.

- **Section 13 - Achieving the Best System Performance**, describes the AUTOSTEP 200 system features that are used to achieve the best system performance, such as mapping, reading the DFAS or Micro DFAS alignment screen, illumination qualifier, atmospheric compensation system, and SMARTSET.

- **Section 14 - Additional System Functions**, describes general functions, and functions that are not specifically required for system operation, but are available for use with the AUTOSTEP 200 system, such as shutting down and booting the system, aborting a task, listing job information, printing text and screens, and changing the background and text colors.

- **Appendix A - System Commands**, provides an alphabetical list of all AUTOSTEP 200 system commands with brief descriptions of each.

- **Appendix B - Error Messages**, provides a list of all error messages displayed, with descriptions of their cause and recommended action.

- **Appendix C - ACS Error Codes and Messages**, provides a list of all error messages for the ACS with descriptions of their cause and recommended action.

- **Appendix D - Inspect Screen Commands**, provides a list of the commands displayed on the Inspect screen with brief descriptions of each.

Related Manuals

Refer to the following manuals for additional information related to the AUTOSTEP 200 system.

Manual Title	Part Number
GCA Wafer System Schematics	039658
AUTOSTEP 200 Advanced Lithography System Environmental Chamber/HVAC Installation and Operation	039688
AUTOSTEP 200 Advanced Lithography System Environmental Chamber Service	039669
AUTOSTEP 200 Advanced Lithography System Facility Design Requirements	069399
AUTOSTEP 200 Advanced Lithography System System Administrator's Supplement	069422
AUTOSTEP 200 Advanced Lithography System Service	069468
ACS Service Instructions	068828
Metrology System Operation Manual for Version 7.3 Software	082318

Section 2 - System Description

Introduction

This section describes the AUTOSTEP 200 system features and their sequence of operation.

The AUTOSTEP 200 system is a submicron microlithographic exposure system (Figure 2-1). The system automatically performs all wafer processing and handling operations, and is used to expose an array of images directly onto the surface of a wafer. Since not all AUTOSTEP 200 system configurations are the same, some of the features described may not apply to all systems.

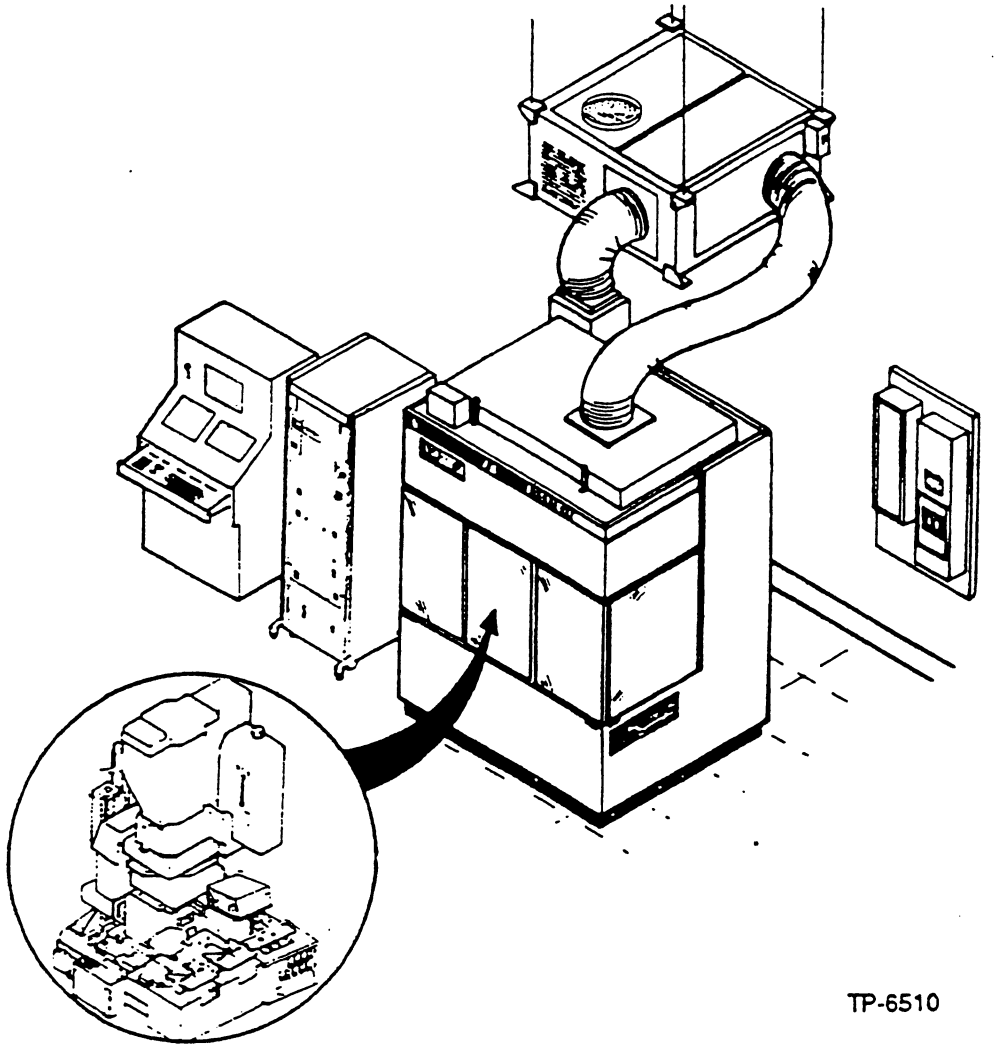


Figure 2-1
AUTOSTEP 200 System

The AUTOSTEP 200 system consists of the following:

- **Environmental Control,** which is provided by the 8860 environmental control chamber and the vibration isolation table
- **Reticle Transfer and Alignment,** which is provided by the reticle management system, programmable platen control, and the reticle rotation system
- **Wafer Transfer and Prealignment,** which is provided by the automatic wafer handler
- **Wafer Positioning, Alignment, and Exposure,** which is provided by the AWA/D, DFAS or Micro DFAS, stages, light source, automatic focus control, and atmospheric focus compensation systems
- **System Control,** which is accomplished with a MICROPDP-11/53 computer, and a VT340 terminal and keyboard
- **System Electronics and Support Facilities,** which house all electrical functions
- **Additional System Features,** which include features such as the programmable platen control, reticle rotation system, illumination qualifier, SMARTSET, INSITU, and the atmospheric compensation system.

Sequence of Operation

The exposure process begins when the operator enters the command EXEC and responds to the prompts (refer to **Section 12 - Operating the System** for the procedure). The Reticle Management System (RMS) selects the chosen reticle, and places it on the platen for use during exposure. Then the stages move the stage chuck to the load position to receive a wafer.

The Automatic Wafer Handler (AWH) carries the wafer from the send carrier to the prealign chuck, where it is prealigned. Then the AWH carries the wafer from the prealign chuck to the stage chuck.

The stages move to position the wafer under the reduction lens, and the wafer is leveled. The wafer is then globally aligned and field aligned. The system's grid is calibrated (using mapping software), which generates corrections to the system's linear grid parameters. The wafer is then exposed. Once the wafer is exposed, the stages move to the load position.

The AWH then carries the exposed wafer to the receive carrier, and simultaneously carries the next wafer from the send carrier to the prealign chuck.

Environmental Control

The AUTOSTEP 200 system provides environmental control for wafer processing using two features: the 8860 environmental chamber, and the vibration isolation table.

8860 Environmental Chamber

The 8860 environmental chamber maintains the clean room environment around the AUTOSTEP 200 system, which protects the system from any external contamination (Figure 2-2). The environmental chamber, once stabilized, maintains a constant temperature for wafer processing.

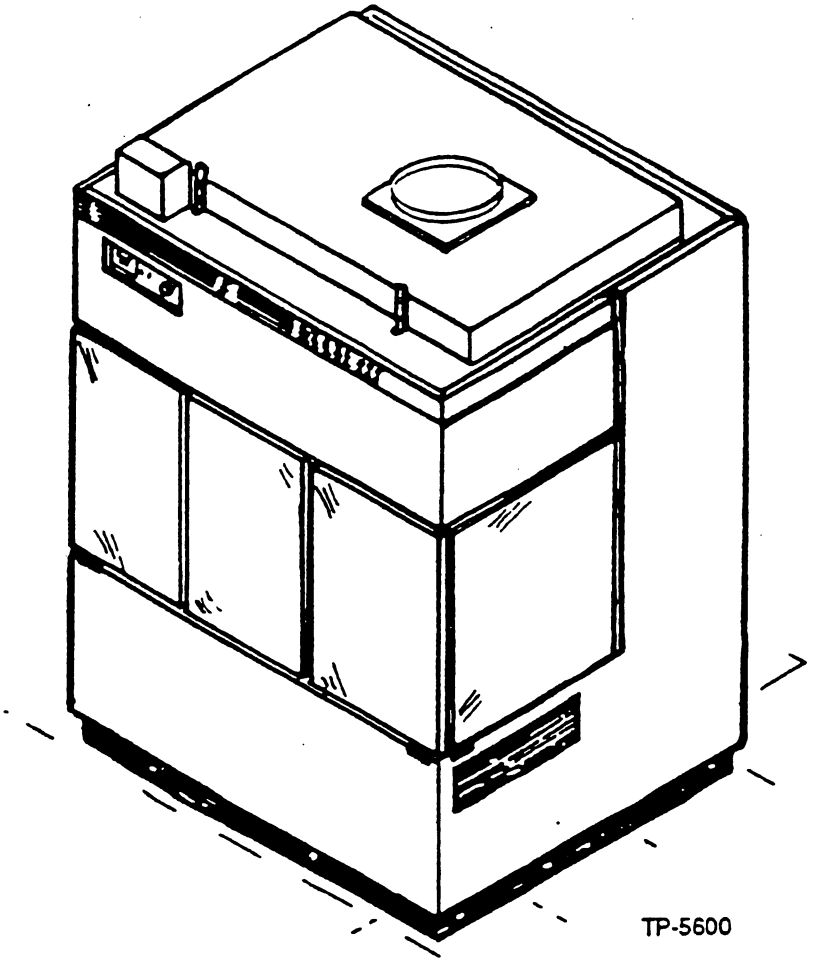


Figure 2-2
8860 Environmental Chamber

Vibration Isolation

The vibration isolation table (VIT) provides a means of leveling the AUTOSTEP 200 system and protecting it again external vibrations. The VIT consists of two major assemblies: the main base, and the isolators. The main base is suspended between the four isolators as shown in Figure 2-3. Air or nitrogen flows from a regulated source to the isolators to provide vibration protection and stability for the AUTOSTEP 200 system.

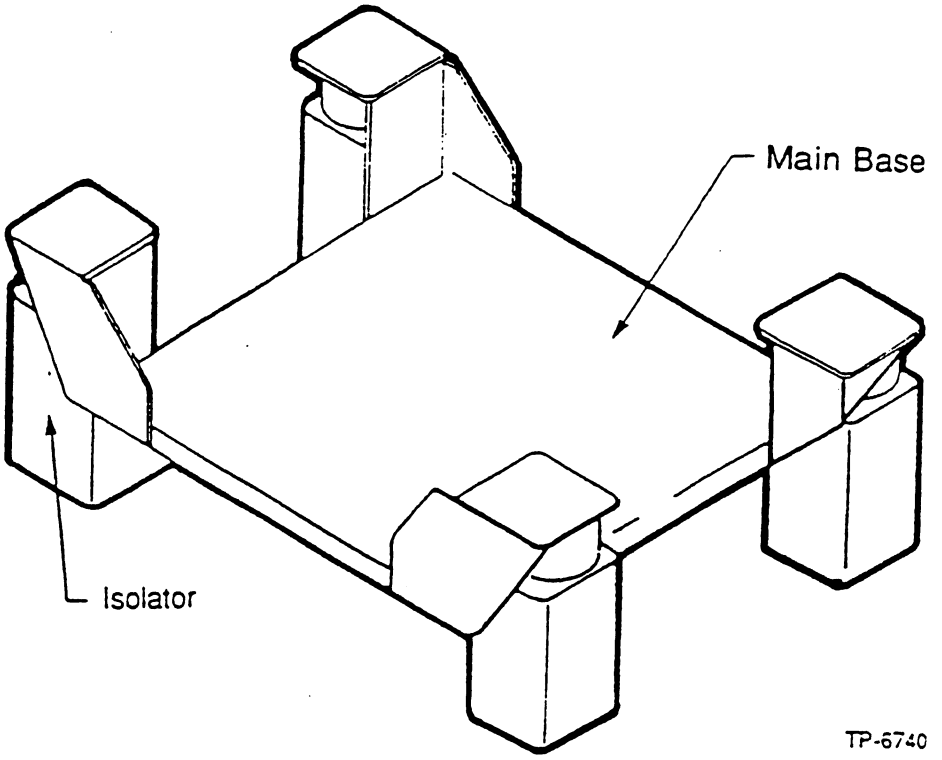


Figure 2-3
Vibration Isolation Table

Reticle Transfer and Alignment

Reticle transfer and alignment is accomplished using the Reticle Management System (RMS) (Figure 2-4). The RMS is a microprocessor-controlled subsystem that stores up to ten reticles enclosed in cassettes, then automatically selects a chosen reticle, transfers the reticle to the reticle platen, aligns the reticle on the platen, and then transfers the reticle back to the elevator for storage.

Commands entered from the VT340 keyboard and data entered in the job specification starts RMS operation. Once the user specifies the desired reticle, by entering the reticle identification (either alpha or numeric characters) on the monitor, a bar code reader (an electronic light-sensing system) identifies the reticle by the pattern encoded onto the reticle.

The RMS removes the chosen reticle from the elevator library, carries it to the reticle platen, then places the reticle on the platen. The reticle is automatically aligned by the automatic reticle aligner (a subsystem of the RMS), then masked using four independently software-adjustable masking aperture blades.

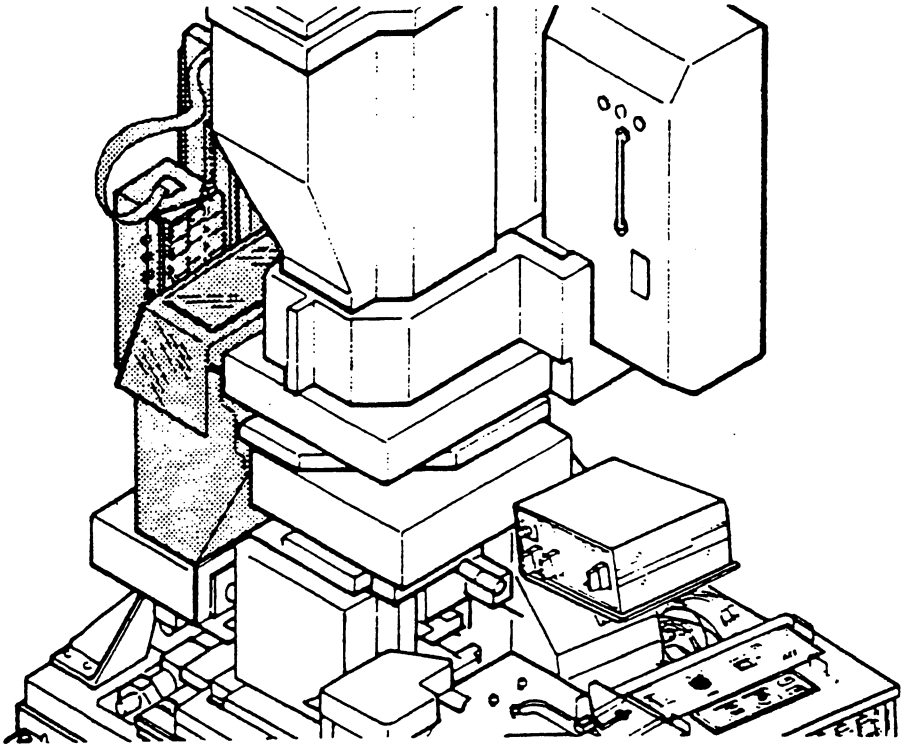


Figure 2-4
Reticle Management System

Wafer Transfer and Prealignment

The Automatic Wafer Handler III (AWH III) is a microprocessor-controlled subsystem that automates the wafer load/prealign/unload process, increasing system throughput capability and ensuring consistent cleanliness of the system (Figure 2-5).

All wafer transfer operations within the AWH III system are accomplished through *backside handling* where all vacuum and mechanical contact is on the bottom, uncoated side of the wafer. Backside handling ensures extremely low contamination and careful transfer of each wafer.

The three major components of the AWH III are: the main unit, the control chassis, and the subcontroller. The main unit is secured to the base assembly of the AUTOSTEP 200 system and consists of send and receive elevators and robots, a prealign assembly, and a transfer arm assembly. The control chassis is located in the central system control rack, and contains a set of boards that control the AWH III. The subcontroller is located inside the environmental chamber in front of the AUTOSTEP 200 system, and contains all air pressure and vacuum controls and motor control circuitry for the AWH III system.

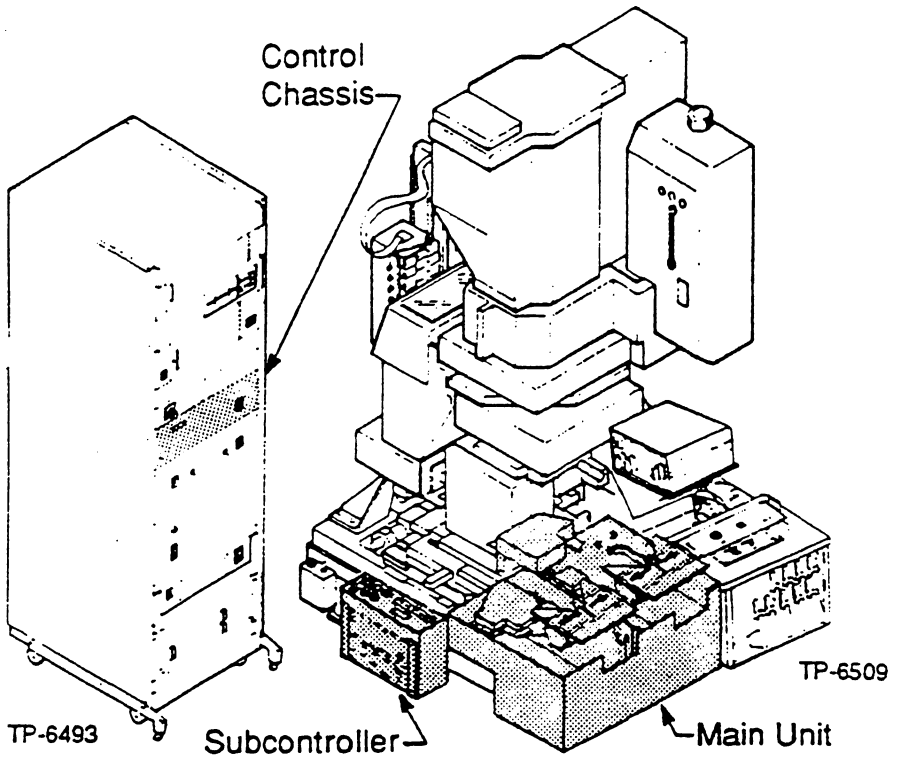


Figure 2-5
Automatic Wafer Handler III

The send robot picks up, then carries a wafer from the send elevator to the send holding station, then to the prealign chuck. The prealigner performs a prealignment on the wafer. Then the transfer arm assembly's send paddle carries the wafer to the stage chuck for exposure. Once exposure is complete, the transfer arm assembly's receive paddle carries the wafer to the receive holding station. Then the receive robot carries the exposed wafer to the receive elevator. (Simultaneously, the send robot picks up the next wafer for processing.)

Wafer Positioning, Alignment, and Exposure

Wafer Positioning

Once the wafer is placed on the stage chuck, the stages move to position the wafer under the lens for exposure. Five stages are used to position the wafer for alignment and exposure: X coarse and fine, Y coarse and fine, and theta (Figure 2-6).

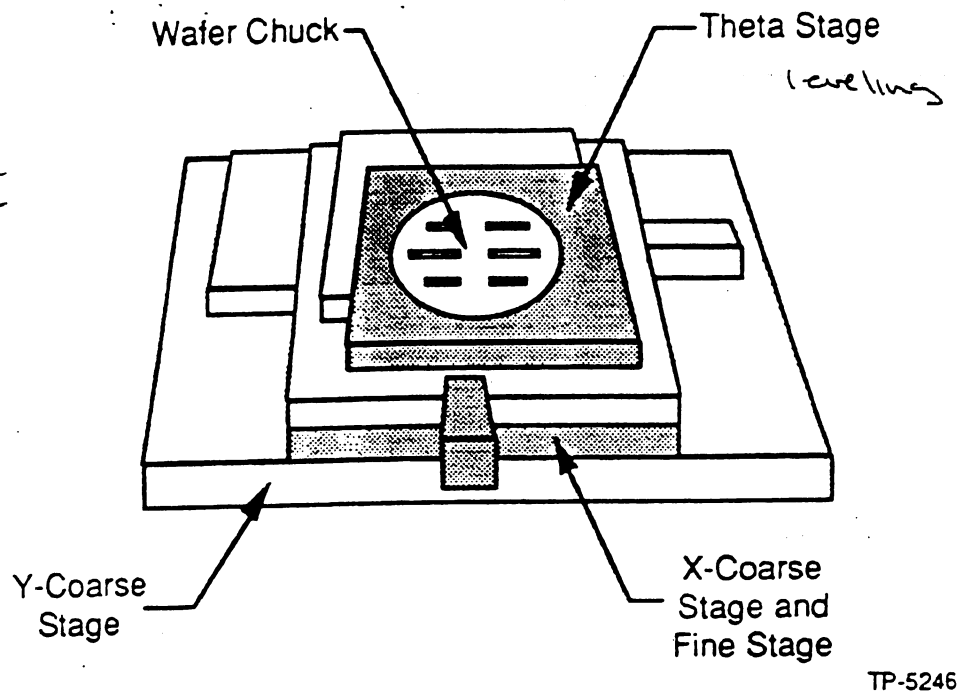


Figure 2-6
X, Y, and Theta Stages

Stage control on the AUTOSTEP 200 system is as follows:

- The X stages control side-to-side positioning of the wafer.
- The Y stages control forward-and-backward positioning of the wafer.
- The theta stage controls rotational positioning and global leveling of the wafer.

The **X and Y stages** perform a coarse positioning using the coarse stages. Then the fine stages position the wafer to within GCA's standard precision specification, and maintains this position. A servo chassis, located in the central system control rack, controls the X and Y stage movement. The stage movement is constantly monitored for position accuracy, using a laser metering system.

The **theta stage**, mounted on top of the X and Y stages, controls the rotational position of the wafer, then globally levels the wafer on the chuck. Globally leveling the wafer on the chuck allows for even focus across the surface of the wafer. Leveling is performed by raising or lowering the wafer chuck at two points in reference to a fixed point on the wafer plane.

Wafer Alignment

The alignment of wafers to the AUTOSTEP 200 system is a very important part of the lithography process. Proper alignment of the wafer *before* exposure ensures that the layers of an integrated circuit line up with each other to perform necessary circuit functions.

Two types of alignment are used to align a wafer to the system, after the AWH has prealigned the wafer and then placed it on the wafer chuck:

- **Global alignment** aligns the entire wafer to the system. Global alignment aligns the wafer in the system's X, Y and theta (or rotational) alignment. The Automatic Wafer Aligner/Digital (AWA/D) automatically performs global alignment, or global alignment can be performed manually. Refer to Section **12 - Operating the System** for the procedure to manually perform global alignment.

- **Local alignment** aligns individual die or exposure locations before the die is exposed. Local alignment occurs after global alignment has taken place. Local alignment is performed using the Dark Field Alignment System (DFAS), or the Micro Dark Field Alignment System (Micro DFAS).

Automatic Wafer Aligner/Digital

The AWA/D is a digitized automatic wafer alignment system that analyzes a digitized video picture to perform global alignment of a wafer. The AWA/D aligns a wafer by using global, reference, and fine scans of the wafer. These scans are controlled by algorithms, or mathematical kernels contained in the process file, that adjust the methods and calculations the AWA/D performs to align the wafer. The AWA/D is controlled from the VT340 keyboard.

Micro Dark Field Alignment System

Micro DFAS is a local alignment system which uses a combination of hardware and metrology software used to receive alignment data to automatically determine system focus, intrafield, and baseline. Micro DFAS obtains data with an off-axis method, eliminating the restriction in the field from the DFAS wand assembly.

The metrology software is a menu-driven set of programs that allow the user to operate the local alignment system, store files and alignment pictures, set alignment defaults, perform calibration, and create files for analysis by the SMARTSET software package. Refer to the Metrology System Operation Manual (P/N 069062) for detailed information on the Micro DFAS function.

Dark Field Alignment System

DFAS is a through-the-lens local alignment system found on some AUTOSTEP 200 systems which locally aligns each die before it is exposed. DFAS increases the registration accuracy of the AUTOSTEP 200 system, allowing the customer to maintain crucial overlay specifications for smaller geometries.

The DFAS locally aligns a die on the wafer with the reticle that is on the platen chuck. The DFAS uses an optical path of light and detection electronics that indicate the error between the placement of the wafer on the stages and a window

on the reticle. Therefore, the circuit device on the wafer is directly aligned to the image that is about to be exposed on the wafer's surface.

Wafer Exposure

Light Source and Light Source Controller

The MAXIMUS 2000 illuminator is a high-intensity, uniform light source for the AUTOSTEP 200 system. During operation, the mercury arc lamp emits a particular wavelength of light that is designed to expose the photoresist on the wafer. The light created by the MAXIMUS illuminator is focused by the condenser to the reduction lens, which is housed in the optical column (Figure 2-7). A reticle is placed on the reticle platen, located between the condenser and reduction lens. The MAXIMUS illuminator filters out all but the specified wavelength of light. The MAXIMUS illuminator uses its own power supply that supplies the current to the lamp, and an ignitor box that ignites the lamp.

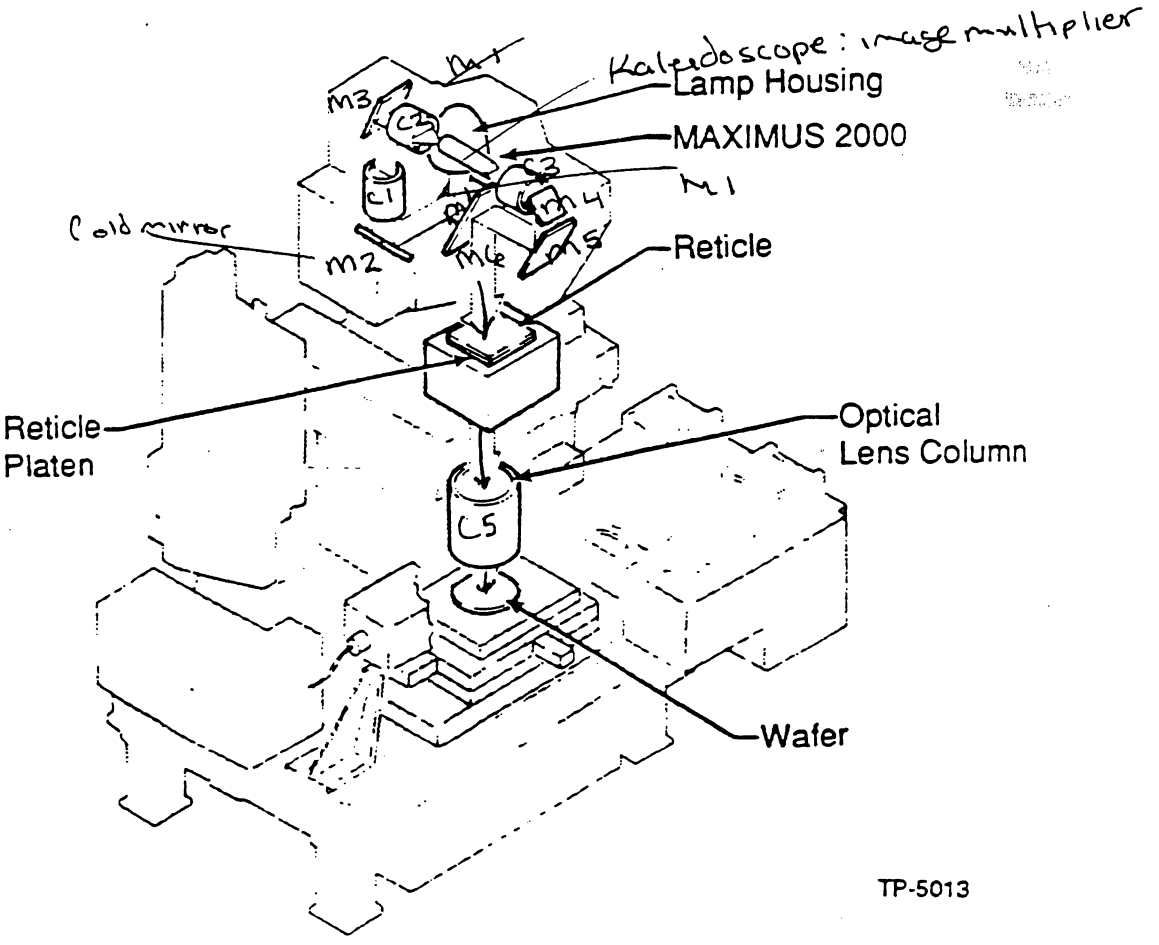


Figure 2-7
MAXIMUS Light Path

The Mimir 4105 is the light source controller for the AUTOSTEP 200 system. The Mimir 4105 powers either the g-line or i-line mercury arc lamp. The Mimir 4105 can be used to either pulse the lamp power from 700 watts to 1000 watts for a specified amount of time during AUTOSTEP 200 system operation, or provide a continuous source of lamp power. The lamp is controlled by a personality card. The power on/off circuit breaker powers the housekeeping voltages and the raw power to the driver (lamp control). The driver is inhibited by the lamp start/stop circuit until the LAMP START/STOP button is pressed the first time. A platinum temperature sensing element, called a resistive temperature detector (RTD) probe, senses the temperature of the lamp anode.

Automatic Focus Control

The **Automatic Focus System (AFS-100)** maintains focus on the AUTOSTEP 200 system. System focus can be set automatically using either INSITU or the local alignment system. System focus can also be set manually by the operator by adjusting the distance between the lens and the surface of the wafer, by raising or lowering the optical column. Once focus is set, this distance remains constant as long as a wafer is detected on the chuck. The AFS-100 sets and maintains the distance from the lens to the wafer for the best focus, by imaging a small illuminated rectangle diagonally on the wafer plane and measuring the position of the reflected image, to detect and maintain this lens-to-wafer distance.

Two subsystems compensate for atmospheric effects on focus:

- The **Atmospheric Compensation System (ACS)** maintains focus and magnification of the AUTOSTEP 200 system. The ACS controls focus by calculating the effects of weather variations, pressurizing the lens accordingly, and correcting for these effects with the column's servo electronics.

- The **Automatic Focus Compensator (AFC)** automatically calculates any changes in air temperature, pressure or humidity, and activates an offset for the optical column's height (focus setting). AFC is transparent during system operation, except during system setup and during exposure.

System Control

Most mechanical operations of the AUTOSTEP 200 system are centrally controlled from the Digital Equipment Corporation's MICROPDP-11/53 computer.

All specifications and parameters necessary for control of mechanical operation, history data relevant to system performance and exposure processing, system configuration, and other data are stored on fixed Winchester disks. The floppy disk drive or optional tape drive is used for backups and loading of new data.

System Electronics and Support Facilities

The AUTOSTEP 200 system includes two racks that house most of the system's electronics:

- The User Interface Rack (A1 Rack)
- The Central System Control Rack (A2 Rack)

From these racks, all automated mechanical operations are controlled and monitored, and data and commands used during system operation are entered.

The User Interface Rack (A1 Rack)

The user interface rack is the workstation for the AUTOSTEP 200 system. Figure 2-8 shows the user interface rack and its components.

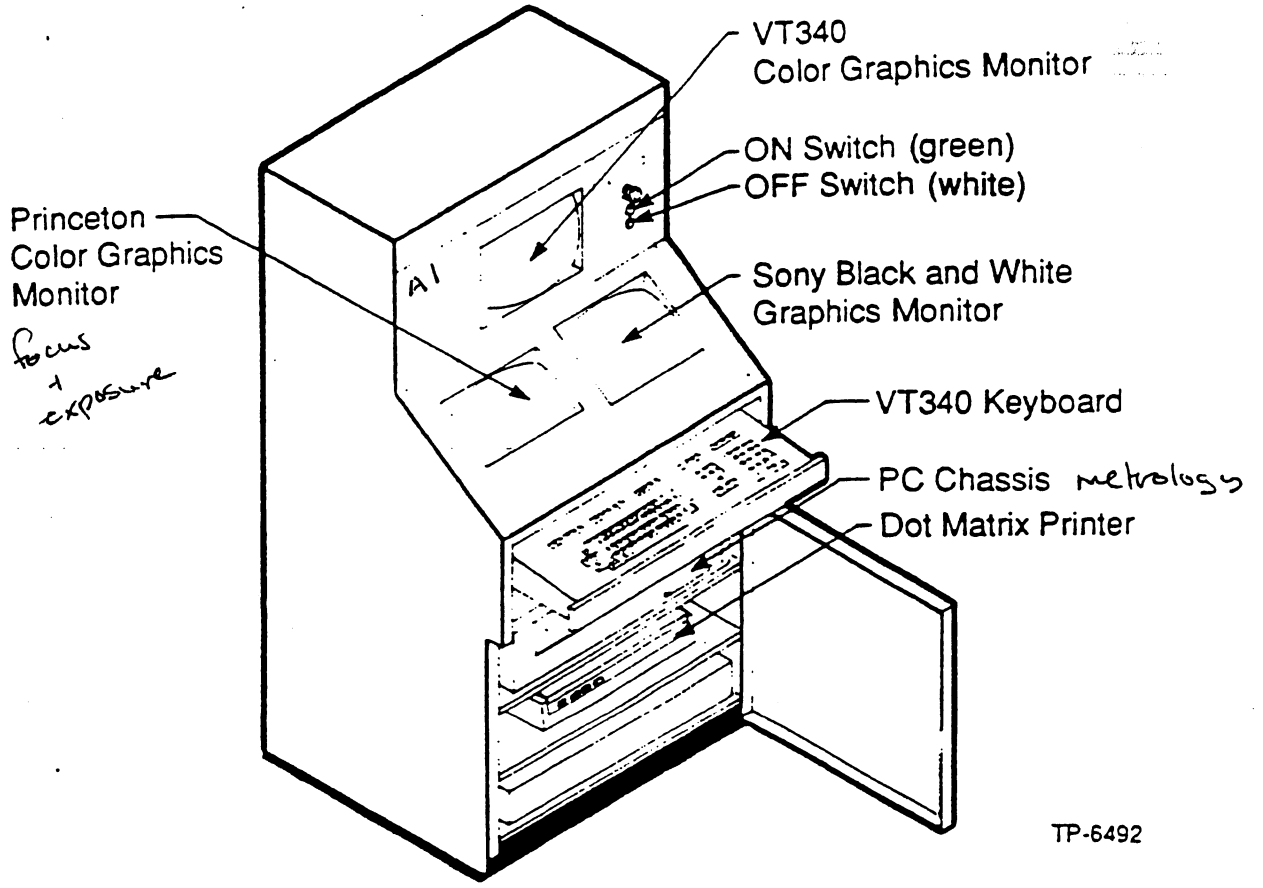


Figure 2-8
User Interface Rack (A1 Rack)

The user interface rack houses the following components:

- **High-Resolution Digital VT340 Color Graphics Monitor**, which is used as the MOP and ACS monitor.
- **High-Resolution Princeton Color Graphics Monitor**, which is used for viewing SMARTSET, DFAS or Micro DFAS, and mapping displays, and for controlling SMARTSET and DFAS or Micro DFAS.
- **Sony Black and White Graphics Monitor**, which is used as the global alignment monitor.
- **Digital VT340 Keyboard**, which is used to perform all operational functions. The VT340 keyboard is capable of dual sessions, serving both the MICROPDP-11/53 and the PC/AST. The keyboard is also used to perform manual global alignments and AWH commands, replacing the joysticks and button box.
- **PC Chassis**, which houses the personal computer that is used for DFAS, Micro DFAS, IQ, and SMARTSET. used for metrology
- **Dot Matrix Printer**, which is used for hardcopy of the Princeton color graphics monitor displays as required.

The Central System Control Rack (A2 Rack)

The central system control rack replaces the large electronics rack used in earlier AUTOSTEP 200 systems. Figure 2-9 shows the central system control rack and its components.

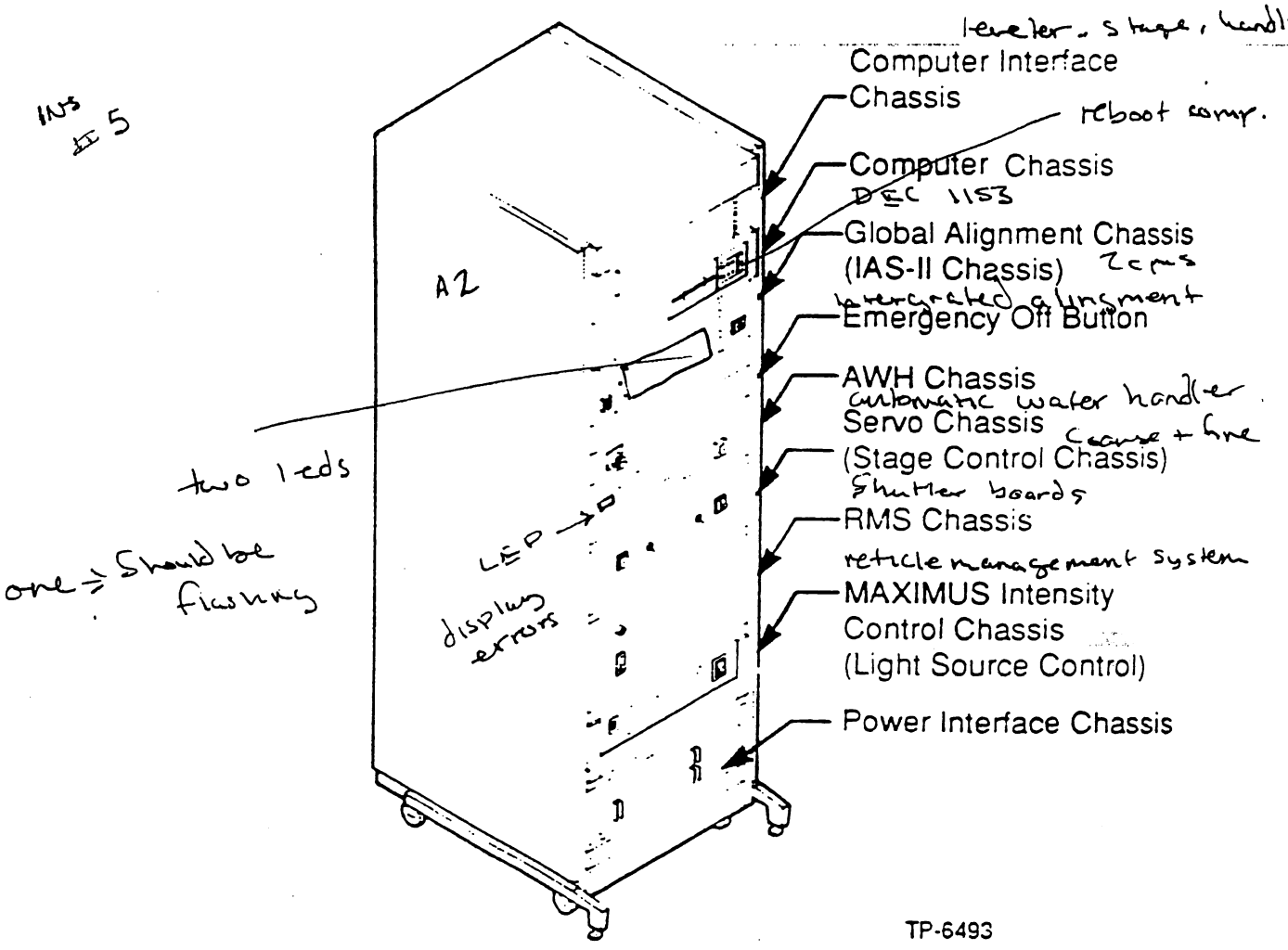


Figure 2-9
Central System Control Rack (A2 Rack)

The central system control rack houses the following components:

- **Computer Interface Chassis**, which houses the stage laser metering system, wafer leveling and theta motion control electronics, and stage positioning interface.
- **Computer Chassis**, which houses the system computer, the fixed Winchester drives, and floppy disk drive.
- **Global Alignment Chassis** (IAS-II Chassis), which houses all controls and electronics for the global alignment system.
- **Emergency OFF Button**, which is used to shut off the system power.
- **AWH Chassis**, which houses all control electronics for the AWH.

- **Servo Chassis** (Stage Control Chassis), which houses the electronics for the stages, autofocus, and shutter.
- **RMS Chassis**, which houses the control electronics for the RMS.
- **MAXIMUS Intensity Control Chassis** (Light Source Control Chassis), which houses the MAXIMUS power supply and control electronics.
- **Power Interface Chassis**, which distributes AC power to the A1 and A2 racks, and the AUTOSTEP 200 system. This unit is designed to suppress AC line transients.
- **Various Power Supplies**, which include the AFS-100, PPC, preamp chassis, and DFAS or Micro DFAS power supplies.

1000 watt lamp run at 700

Additional System Features

10 min. lamp warm-up

The following paragraphs provide a basic explanation of the AUTOSTEP 200 system's additional features.

45 min. for stabilization

Mapping

Mapping combines system setup, measurement, and adjustment into a single-step process, which is performed using production wafers which significantly shortens system setup and alignment time. The mapping process allows calibration for each wafer exposed on the system and eliminates the need for send-ahead wafers. Refer to the Metrology System Operation Manual (P/N 069062) for more information on mapping.

Reticle Rotation System

The Reticle Rotation System (RRS) enhances reticle positioning, but does not replace existing reticle offsets or adjustments. The RRS consists of a rotational flexure stage, digital piezo translator (DPT) that drives the rotational flexure, and an AX-100 control unit. The control unit is located behind the AWH III system, and receives its input from the MICROPDP-11/53 computer.

Fine reticle rotation is corrected by rotating the entire platen casting and PPC assemblies on a flexure stage that replaces the coarse reduction stage. The rotational flexure stage has limited range and is highly accurate. Coarse reduction adjustments are retained in the RRS with slight modification to the adjustment algorithm.

Manual RRS Operation

Initial manual operation of the RRS is through the RRS command, which allows the user to set the rotator to a home position, or some offset from its current

position as determined through SMARTSET, DFAS or Micro DFAS. The metrology system is then modified to display rotation corrections in microradians. The system MOP contains software that controls the RRS.

Automatic RRS Operation

Initial automated use of the AX-100 control unit is through the SETUP command, where the rotator is set to home or mid-travel while setup utilities are carried out. Later use of the rotator is the dynamic matching of systems where small rotation discrepancies are removed through the use of the AX-100 rotator assembly. This application is transparent to the user.

Illumination Qualifier

The Illumination Qualifier (IQ) system is a menu-driven system that collects data on MAXIMUS 2000 peaking and uniformity and analyzes the data based on intensity readings taken within the exposure field. Field uniformity and light intensity can then be evaluated by IQ. Refer to **Section 13 - Achieving the Best System Performance** for more information on IQ.

INSITU

INSITU is a local alignment system that is made up of a combination hardware and software package that automates the calibration process of the system in the following areas: system focus, intrafield analysis, and Micro DFAS baseline. INSITU frees the operator or process engineer from manually performing these tasks and saves a great deal of time when calibrating the system for the next batch of wafers. The system MOP contains software that controls the INSITU local alignment system. **See Section 10 - Determining the Best System Focus** and **Section 13 - Achieving the Best System Performance** for more information on INSITU.

Atmospheric Compensation System

The Atmospheric Compensation System (ACS) is a microcomputer-controlled subsystem of the AUTOSTEP 200 system. The ACS maintains the focus and magnification to compensate for atmospheric effects (barometric pressure, temperature, and humidity) on the lens imaging properties and the expansion and contraction of the optical column. The ACS automatically adjusts the Programmable Offset Control (POC) to maintain best focus of the optical column and adjusts the internal pressure of the main objective lens to compensate for changes in magnification. **See Section 13 - Achieving the Best System Performance** for more information on ACS.

Programmable Platen Control

The Programmable Platen Control (PPC) system allows the user to make reduction adjustments to the system electronically, which eliminates costly downtime from mechanical adjustments to the optical column. After using DFAS or Micro DFAS and SMARTSET to determine the necessary amount of calibration to the optical column, the user adjusts the platen position using PPC to calibrate the optical column. The system MOP contains software that controls the PPC system.

SMARTSET

SMARTSET is a menu-driven software program for optimizing and characterizing the performance of the AUTOSTEP 200 system. SMARTSET uses the metrology capabilities of the AUTOSTEP 200 system to perform three types of analysis:

- Image placement within an exposure field on a wafer (intrafield)
- Image placement from field to field over a wafer (grid)

Data on intrafield and grid image placement is obtained using the DFAS or Micro DFAS local alignment system, and the laser-metered servo-controlled stages on the AUTOSTEP 200 system. The intrafield and grid image placement data is displayed in a variety of formats including tables of coefficients, vector maps, and histograms. See **Section 13 - Achieving the Best System Performance** for more information on SMARTSET.

Section 3 - System Operation: An Overview

This section provides the new operator with an overview of the pre-system operation tasks in an easy-to-read flowchart format, and a description of the overall sequence of operation for the AUTOSTEP 200 system.

Pre-System Operation Tasks

Before the system can be used to expose wafers, certain tasks must be performed. The tasks required prior to system operation (listed in the order in which they should occur) are as follows:

- Stabilize the system environment
- Power up the system
- Set up the terminal
- Log into the system
- Enter a configuration for the system with the appropriate features
- Set the parameters and subsystems
- Develop a job specification file
- Set all the process-dependent parameters
- Determine the best system focus, intrafield, and local aligner baseline numbers and enter the corrections into the MODE file
- Initialize the appropriate subsystems of the wafer stepper system
- Load the RMS

NOTE: The above tasks assume that the system has been installed, and all required subsystems have been set up and calibrated.

Figure 3-1 shows a flowchart of the tasks that are required to prepare the system for operation. For detailed information on the procedural steps required to perform these tasks, refer to the section and page numbers noted within the flowchart. This flowchart can be used as a reference, or pre-operation checklist to make sure that the system is ready to expose wafers.

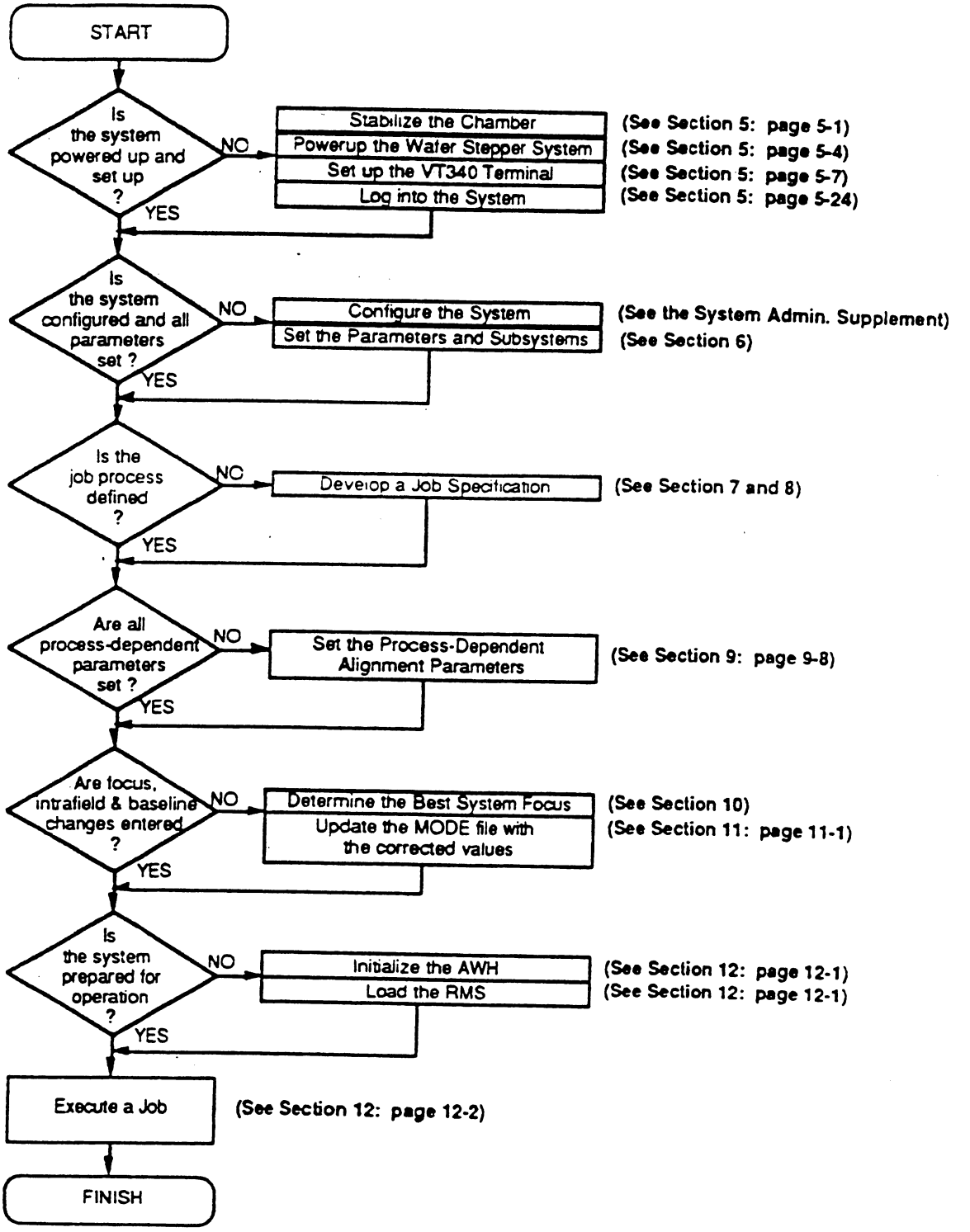


Figure 3-1
Flowchart of Pre-System Operation Tasks

Sequence of Operation

Once the system has been properly prepared for operation, the exposure process begins when the operator enters the command EXEC and responds to the series of prompts displayed on the monitor (refer to **Section 12 - Operating the System** for the procedure). The Reticle Management System (RMS) selects the chosen reticle, and places it on the platen for use during exposure. Then the stages move the stage chuck to the load position to receive a wafer.

The Automatic Wafer Handler (AWH) carries the wafer from the send carrier to the prealign chuck, where it is prealigned. Then the AWH carries the wafer from the prealign chuck to the stage chuck.

The stages move to position the wafer under the reduction lens, and the wafer is leveled. The wafer is then globally aligned and field aligned. The system's grid is calibrated (using mapping software), which generates corrections to the system's linear grid parameters. The wafer is then exposed. Once the wafer is exposed, the stages move to the load position.

The AWH then carries the exposed wafer to the receive carrier, and simultaneously carries the next wafer from the send carrier to the prealign chuck.

Section 4 - Before You Begin

Those unfamiliar with the AUTOSTEP 200 system should read the following information about the operating system and entering commands before continuing on with other sections of this manual. The following topics are covered in this section:

- The operating system
- System software
- The VT340 keyboard
- Entering commands from the terminal
- Prompts
- Defaults
- Filenames
- Getting HELP

The Operating System

The AUTOSTEP 200 system uses Digital Equipment Corporation's RSX-11M-PLUS operating system. Unlike single-user systems that allow only one activity to be performed at a time, the RSX operating system is a multi-user, multi-tasking system that enables several activities to be performed at the same time. This means that more than one terminal could be connected to the AUTOSTEP 200 system, to allow more than one individual to control and perform these system activities.

Each individual using a terminal to perform a system activity is called a *user*. Users inform the system that the terminal will be used by *logging in* to the system. Logging in allows the AUTOSTEP 200 system to accept and process all commands and information sent from the terminal. In addition, logging in to the system also gives the user access to a particular storage area on the system that is designated for the user. This storage area is specified by an *account*, and holds any data that the user creates.

When a user no longer requires access to the system from the terminal, the user *logs out* of the system: this closes the account until the user logs back in to the system. Logging out also enables the terminal to be accessed by other users, to log in to their respective accounts.

System Software

The AUTOSTEP 200 system software lies on top of the RSX operating system, as shown in Figure 4-1. As shown in this figure, most of the AUTOSTEP 200 system's functions are controlled using commands that are entered from the system prompt. However, some subsystems are controlled using a series of menus:

- SMARTSET software resides in the user interface rack's PC/AST computer. While the AUTOSTEP 200 system can communicate *to* SMARTSET (to send

data). SMARTSET does not communicate to the AUTOSTEP 200 system: therefore, SMARTSET is controlled using a series of menus displayed on the PC monitor by using the VT340 keyboard.

- DFAS or Micro DFAS software also resides in the user interface rack's PC/AST computer. DFAS or Micro DFAS *can* communicate to the AUTOSTEP 200 system, to send and retrieve alignment data. Like SMARTSET, DFAS or Micro DFAS is controlled from the user interface rack's PC monitor and VT340 keyboard.

- Mapping software resides in the AUTOSTEP 200 system and is accessed from the DFAS or Micro DFAS menu-driven software (although mapping parameters are set using menu options that are accessed from the user interface rack's terminal).

- PPC is controlled using a series of menus displayed on the system monitor that are accessed using the command **PPC**, entered at the system prompt from the VT340 keyboard.

- ACS is controlled using a series of menus displayed on the system monitor that are accessed using the command **ACS**, entered at the system prompt from the VT340 keyboard.

- RRS is controlled using the Rotation Option menu displayed on the system monitor that is accessed using the command **RRS**, entered at the system prompt from the VT340 keyboard.

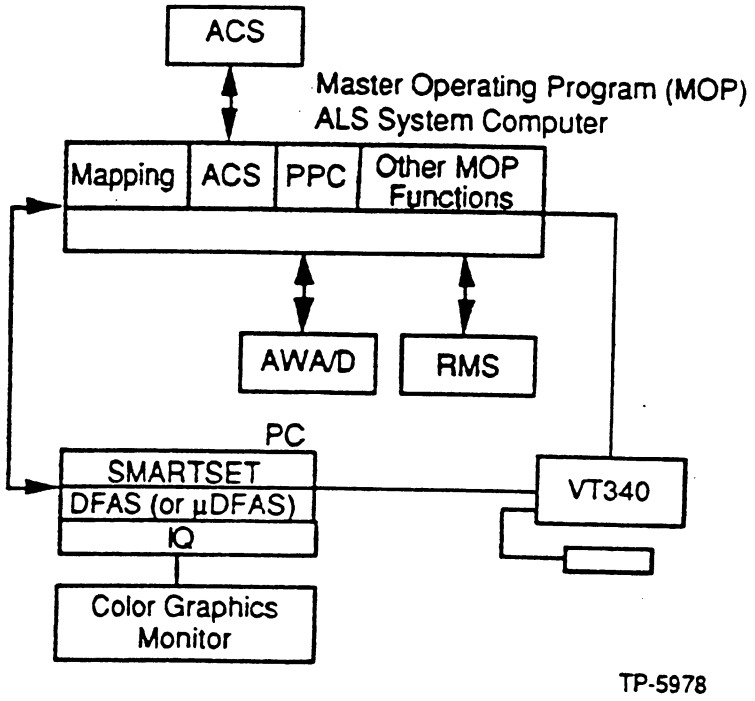


Figure 4-1
AUTOSTEP 200 System Operating System and Software

The VT340 Keyboard

The VT340 keyboard contains multiple keypads, a set of indicator lights, and two audible indicators (Figure 4-2). The keys are described within four functional groups:

- Main keypad
- AWH operation and menu function keypad
- Numeric and alignment keypad
- Special function keypad

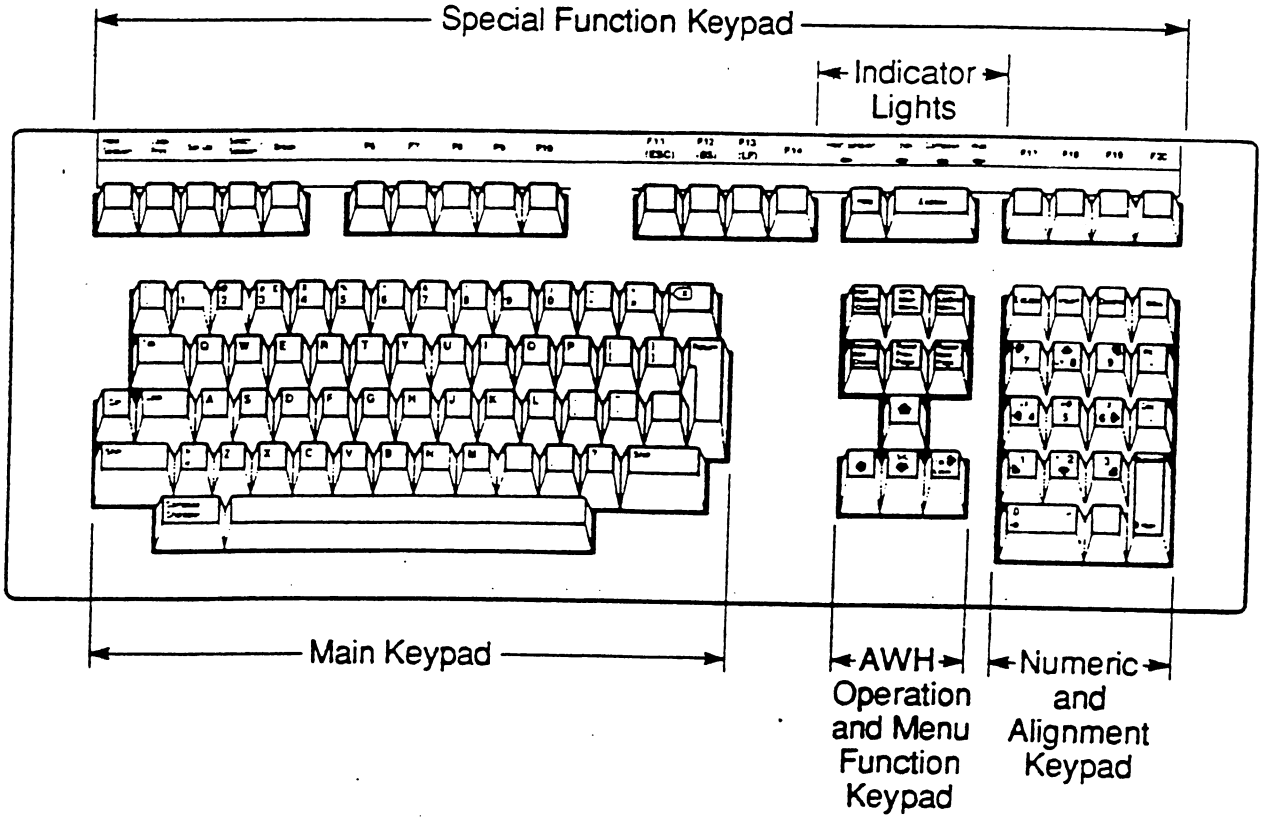


Figure 4-2
VT340 Keyboard

The Main Keypad

The main keypad is similar to a standard typewriter keypad, containing alphanumeric characters, punctuation marks, and function keys (Figure 4-3).

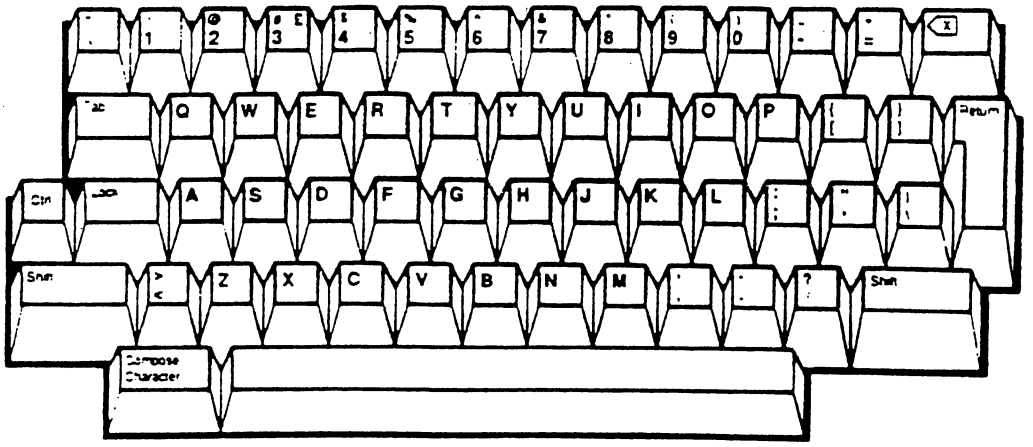
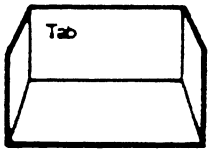
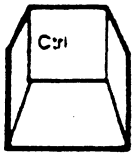


Figure 4-3
VT340 Main Keypad

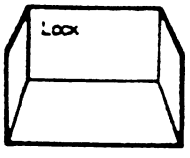
The main keypad keys and functions are:



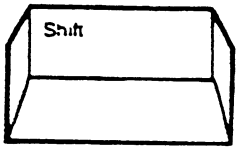
Tab moves the cursor to the next tab stop.



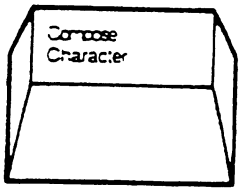
Ctrl sends control messages to the system when holding down Ctrl while pressing another key.



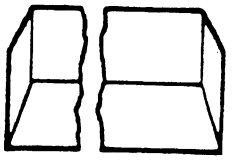
Lock locks the alphanumeric keys in their uppercase characters.



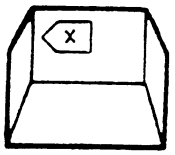
Shift initiates a user-defined function, when held down while pressing the user-defined function key; starts a predefined control function, when held down while pressing another key; accesses the uppercase characters on the numeric keys.



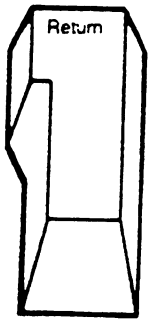
Compose Character is not currently used with the AUTOSTEP 200 system.



Space bar inserts spaces when typing words or characters.



<x] deletes one character to the left of the cursor.



Return moves the cursor to the beginning of the next line, or sends a carriage return.

Alphanumeric Keys enter the data similar to a typewriter keyboard.

AWH Operation and Menu Function Keypad

The AWH operation and menu function keypad is shown in Figure 4-4.

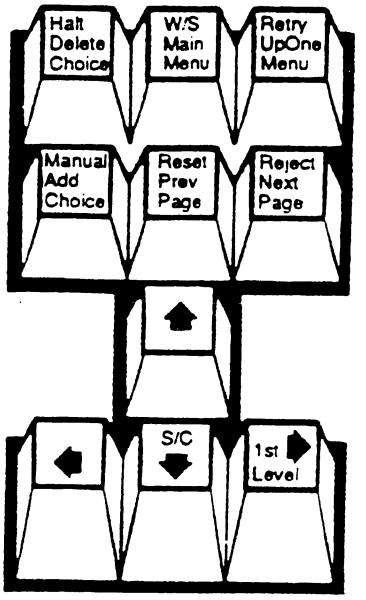
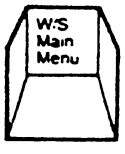


Figure 4-4
VT340 AWH Operation and Menu Function Keypad

The red labelled keys indicate the AWH system operation functions. The black labelled keys indicate the menu functions. The AWH operation and menu function keypad keys and functions are:

Halt stops the AWH during operation without interrupting wafer exposure. Press HALT only when required, to adjust a wafer in the carrier, or to remove a wafer from the AWH. Press S/C to restart AWH operation.

Delete Choice moves the cursor to the beginning of the current field when using the menus and screens within JOB, MODE, and ACS. If RETURN is pressed, either the original value is restored, or the user can input a new value.

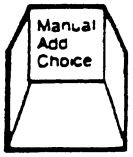


W/S is used after manual alignment of the wafer. Make sure that the sensor switch on the laser compensator's front panel is OFF. Press W/S and use the arrow keys on the *numeric and alignment keypad* to align the left wafer alignment key in the X direction only. After completing the alignment, press EXP.

Main Menu displays the main menu, when using the menus and screens within JOB, MODE, or ACS.

Retry is used when sufficient vacuum cannot be maintained on the stage chuck, or when the wafer alignment key is not visible on the monitor. Press RETRY to return the wafer to the prealign chuck for coarse realignment. The wafer is then automatically placed back on the stage chuck.

Up One Menu returns to the previous menu, when using the menus and screens within JOB, MODE, or ACS.



Manual overrides the AWH operation to manually load a wafer onto the chuck. After executing a job, press MANUAL to move the stages to the load position. Place a wafer on the chuck and press MANUAL again to move the wafer to the align position. Press EXP to start exposure.

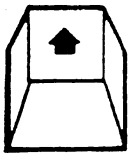
Add Choice displays the Set-Up Directory screen when in the set-up mode.

Reset resets the AWH. RESET is available anytime that a wafer is not being leveled or exposed. Pressing RESET displays the prompt **AWH Reset In Progress**. RESET will occur when the AWH reaches its next station.

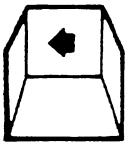
Prev Page moves backward to the previous screen, when using the menus and screens within JOB, MODE, or ACS.

Reject rejects a wafer that cannot be aligned. The wafer then returns to the prealign chuck for manual removal. Press REJECT only when the prealign chuck and transfer arm are in their home positions.

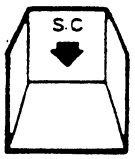
Next Page moves forward to the next screen, when using the menus and screens within JOB, MODE, or ACS.



(up-arrow) moves the cursor up one line, when using the menus and screens within JOB, MODE, or ACS.



(left-arrow) moves the cursor one position to the left, when using the menus and screens within JOB, MODE, or ACS.



S/C starts or resumes AWH operation after pressing HALT or RESET. The primary function of the S/C key is to start non-first level jobs.

(**down-arrow**) moves the cursor down one line, when using the menus and screens within JOB, MODE, or ACS.

1st Level bypasses local alignment of wafers for first-level exposures. Press 1st L to expose the wafers at the first level. All wafers in the carrier will then be exposed automatically.

(**right-arrow**) moves the cursor one position to the right, when using the menus and screens within JOB, MODE, or ACS.

The Numeric and Alignment Keypad

The numeric and alignment keypad is shown in Figure 4-5.

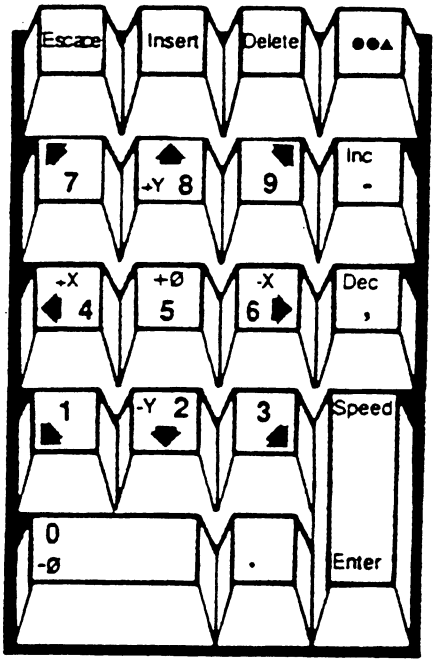
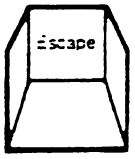
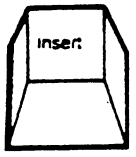


Figure 4-5
VT340 Numeric and Alignment Keypad

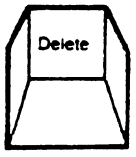
The red labelled keys indicate job control functions. The black labelled keys indicate standard numeric keypad functions. The numeric and alignment keypad keys and functions are:



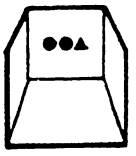
Escape steps among the menus when the VT340 terminal is talking with the PC.



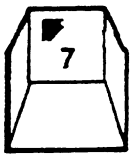
Insert inserts data when the VT340 terminal is talking with the PC.



Delete deletes data when the VT340 terminal is talking with the PC.

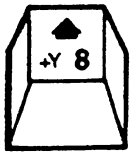


(GCA symbol) prints non-graphic metrology screens, and reboots the PC/AST when pressed along with the **Ctrl** and **A** keys.



(upper left-corner arrow) is used for alignment when running a job.

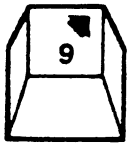
7 enters the number 7 when not running a job.



(up-arrow) is used for alignment when running a job.

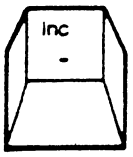
8 enters the number 8 when not running a job.

+Y is used for alignment when running a job.



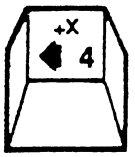
(upper right-corner arrow) is used for alignment when running a job.

9 enters the number 9 when not running a job.



Inc increments for microscope focus or illumination.

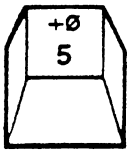
- enters a dash when not executing a job.



+X is used for alignment when running a job.

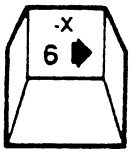
(left-arrow) is used for alignment when running a job.

4 enters the number 4 when not running a job.



+Ø is used for alignment when running a job.

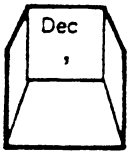
5 enters the number 5 when not running a job.



-X is used for alignment when running a job.

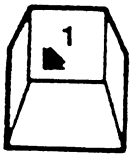
6 enters the number 6 when not running a job.

(right-arrow) is used for alignment when running a job.



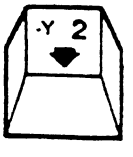
DEC decrements for microscope focus or illumination.

, enters a comma when not executing a job.



1 enters the number 1 when not running a job.

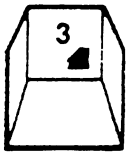
(lower left-corner arrow) is used for alignment when running a job.



-Y is used for alignment when running a job.

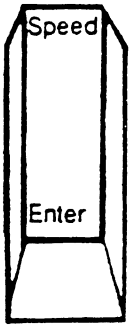
2 enters the number 2 when not running a job.

(down-arrow) is used for alignment when running a job.



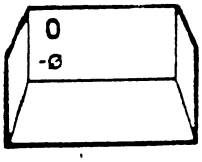
3 enters the number 3 when not running a job.

(lower right-corner) is used for alignment when running a job.



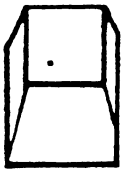
Speed toggles between fast and slow speeds when using the alignment cursors while running a job. Press the key to switch speeds between fast and slow. The system beeps when the speed is changed.

Enter enters the data after it is typed when not executing a job.



0 enters the number 0 when not running a job.

-Ø is used for alignment when running a job.



. toggles between microscope focus and illumination.

The Special Function Keypad

The special function keypad is shown in Figure 4-6.

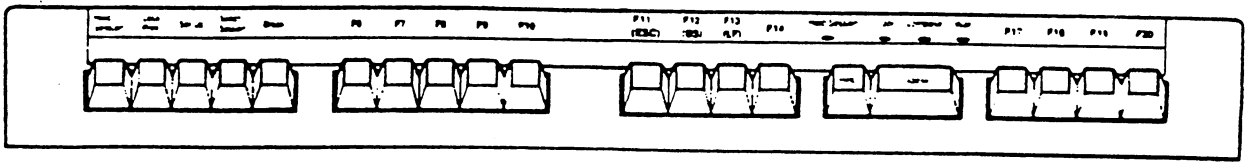


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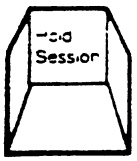
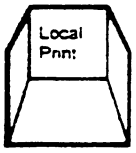
Figure 4-6
VT340 Special Function Keypad

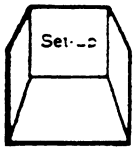
The first five keys have predefined functions. These keys cannot be redefined. The special function keypad keys and functions are:



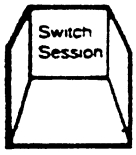
Hold Session stops the screen from scrolling. Pressing HOLD SESSION again starts the screen scrolling again.



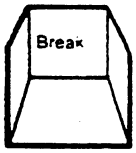
Local Print sends the text from page memory (including the text on the screen) to an optional DEC LA75 or LJ250 printer. Pressing SHIFT-LOCAL PRINT prints the full screen. Pressing CTRL-LOCAL PRINT turns the auto print mode on and off. Auto print mode prints each line of text as it is received from the host system.



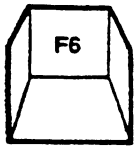
Set-Up enters or leaves the VT340 Set-Up screen program. Pressing CTRL-SET-UP resets many system features within sessions 1 and 2 to their saved settings.



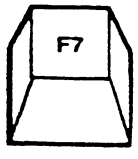
Switch Session changes the active session between session 1 (the MICROPDP-11/53), and session 2 (the PC). SWITCH SESSION does not work within the Set-Up program. Pressing CTRL-SWITCH SESSION divides the screen into two windows (allowing display of two sessions at a time). Press once for vertical windows, twice for horizontal windows, and three times to return to a full screen display. When displaying 2 windows, only 1 window can receive input from the keyboard. Use the SWITCH SESSION key to select the active session.



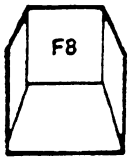
Break immediately ends communication with a session. When the BREAK key is pressed while session 1 (MICROPDP-11/53) is active, the computer may halt.



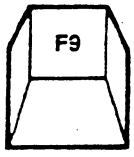
F6 is an available user-defined key.



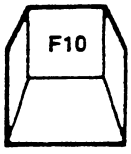
F7 is an available user-defined key.



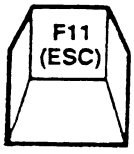
F8 is an available user-defined key.



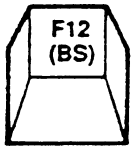
F9 is an available user-defined key.



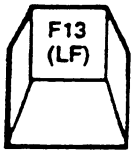
F10 is an available user-defined key.



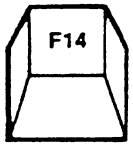
F11 (ESC) is an available user-defined key.



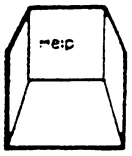
F12 (BS) is an available user-defined key.



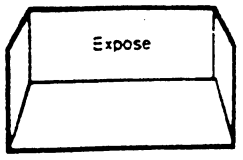
F13 (LF) is an available user-defined key.



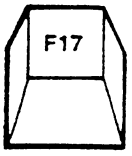
F14 is an available user-defined key.



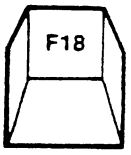
Help displays the help screens when using the menus and screens within JOB, MODE, and ACS.



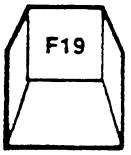
Expose exposes a wafer during system operation.



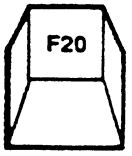
F17 is an available user-defined key.



F18 is an available user-defined key.



F19 is an available user-defined key.



F20 is an available user-defined key.

Indicator Lights

There are four indicator lights across the top of the VT340 keyboard (Figure 4-7):

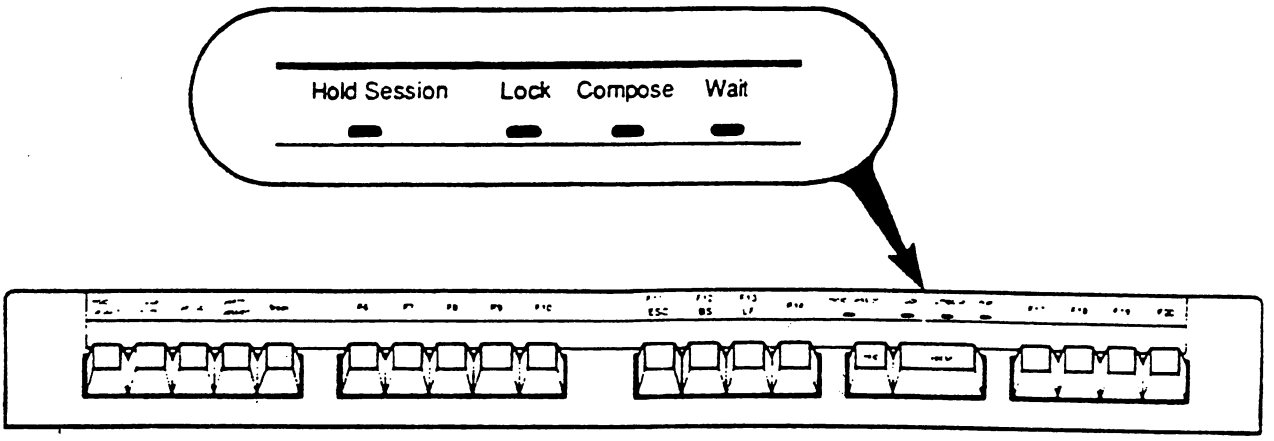


Figure 4-7
VT340 Keyboard Indicator Lights

Hold Session indicates that the screen display has stopped scrolling. This light turns on when the HOLD SESSION key on the special function keypad is pressed. stopping the screen from scrolling.

Lock indicates that only uppercase characters are being sent from the terminal. This light turns on when the LOCK key on the main keypad is pressed, locking in the uppercase characters.

Compose indicates that the keyboard is being used to compose a character. This light should not turn on, since the COMPOSE CHARACTER key on the main keypad is not currently used with the AUTOSTEP 200 system.

Wait indicates that the keyboard cannot send data, *typically* due to a locked keyboard. If the WAIT light stays on, perform the following:

1. Display the Set-Up Directory screen by pressing the SET-UP key.
2. Select **Clear Communications** by using the up and down arrow keys to highlight the name, then press ENTER.
3. If the WAIT light is still on, contact an authorized GCA field service representative.

Entering Commands from the Terminal

The AUTOSTEP 200 system uses commands to activate and control tasks during system operation. Commands and other data relevant to system operation are typed on the system's keyboard.

Commands and other data are displayed on the system monitor as they are typed. However, anything typed (except control characters) is not recognized by the system until the RETURN key on the keyboard is pressed. Pressing the RETURN key *enters* the data typed, allowing the AUTOSTEP 200 system to recognize and use the data to perform the activity requested.

Before data is entered, any data typed and displayed on the monitor can be changed using the *backspace* (<x]) key on the keyboard (see Figure 4-2). Each time it is pressed, the backspace key moves the cursor one character backwards, to remove the data typed. The backspace key only works for commands and other data that is typed, but not yet entered.

Most commands that are used on the AUTOSTEP 200 system have abbreviated forms. Refer to **Appendix A - System Commands** for a list of these shortened commands. Only the characters within the command name that appear in uppercase within the command description are required when entering the command: they need not, however, be entered in capital letters.

Prompts

Commands and other data relevant to AUTOSTEP 200 system operation are entered into the system either when the system requests specific data or when the system can accept commands and any other data. In either case, the system uses a *prompt* to notify the user that data is required, or that data can be entered.

During normal operation, the prompt displayed to notify the user of these situations is a colon (:). Any information displayed to the left of the prompt indicates the data required. When nothing appears to the left of the prompt, the system is ready to accept commands entered by the user.

Table 4-1 shows two examples of prompts:

Table 4-1
Examples of Prompts

System Monitor Display	Explanation
FOCUS SETTING:	Requires focus setting, and waits until this information is entered.
:	The user can enter any system command to access the desired activity.

Defaults

During system operation, prompts are often accompanied by information in parentheses. This may provide information regarding:

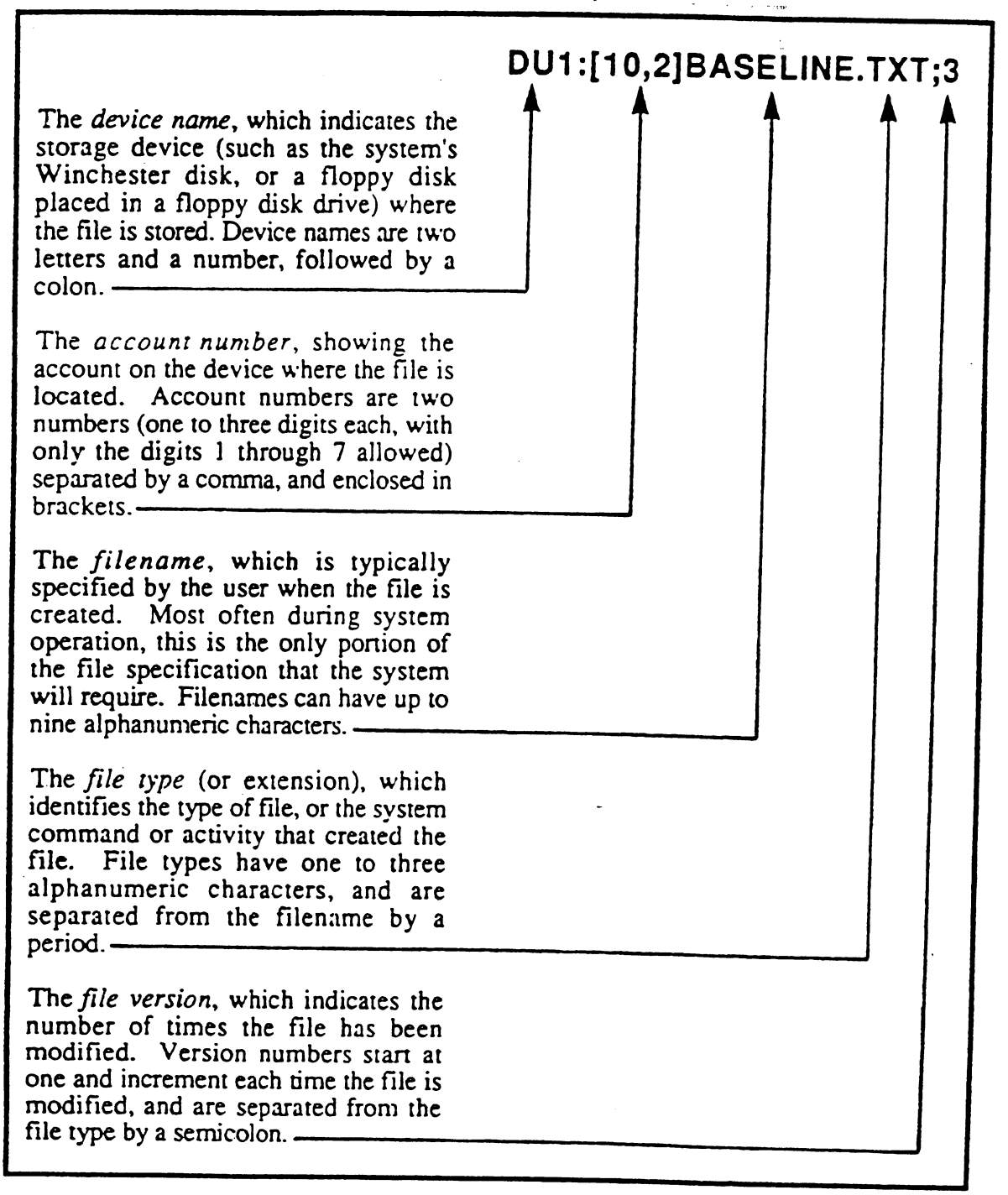
- The acceptable range for the parameter (for example, 1-125)
- The units of measurement for the parameter (for example, ppm, µm)
- The allowable responses to the prompt (for example, Y/N)

A *default* response is marked by an asterisk. If no data is typed at the prompt before the RETURN key is pressed, the system automatically enters the default value. For example, the default response for **UNITS (*M/E)** would be M for metric.

Most defaults used during system operation are fixed in the software, although some defaults are determined by other parameters set elsewhere in the system or by the previous response entered to the prompt.

Filenames

The AUTOSTEP 200 operating system stores system data and other information specified in files. Files stored on the AUTOSTEP 200 system are identified by their *file specification*. A full file specification includes the following:



Most often during system operation, only the filename is required by the AUTOSTEP 200 system.

Getting Help

The HELP Commands

The AUTOSTEP 200 system software includes HELP commands used to display additional information regarding the system commands available. There are three forms of the HELP command:

- **HELP** displays the first half of the available command list
- **HELP MORE** displays the second half of the available command list
- **HELP** *<topic>* displays information on the specific topic that was entered

During system operation, the HELP command is used to display the first half of a list of commands for which additional help information is available. To display the HELP screen, from the system prompt, enter **HELP** then press RETURN. The system then displays a screen similar to the following example (as the software versions change, topics may be added or deleted):

HELP!

Help is available on the following topics:

@	ABORT	ACNT	ACS	AEXPO
ALIGN	AWACONT	AWAEDIT	AWALIVE	AWAMACH
AWAOFFSET	AWAPIXEL	AWASAVE	AWASPEC	AWATHETA
AWAVIDEO	AWLCAL	AWLT	BACKUP	BASIC
CHANGEBL	CHANGEFZP	CHANGEORTH	CHANGEROT	CHANGEWS
CLOSEH	COLORS	COMP	CONFIG	COPY
DELETE	DEXPO	EDIT	EXECUTE	EXPO
FOCUS	GCABSC	HELP	HISREC	IASCOMMAND
IASBACKUP	IASINIT	IASLOAD	IASRESET	IASRESTORE
INSITU				

For a list of more topics, type in HELP MORE <CR>.

For more information on the topics listed above, simply enter HELP <topic>. For instance, HELP ACNT <CR> gives details on ACNT.

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Figure 4-8
HELP Command Screen

Since the list of available commands is too long to be completely displayed on one screen, view the remaining commands available by entering **HELP MORE** then pressing RETURN. The system then displays the remaining commands similar to the following example:

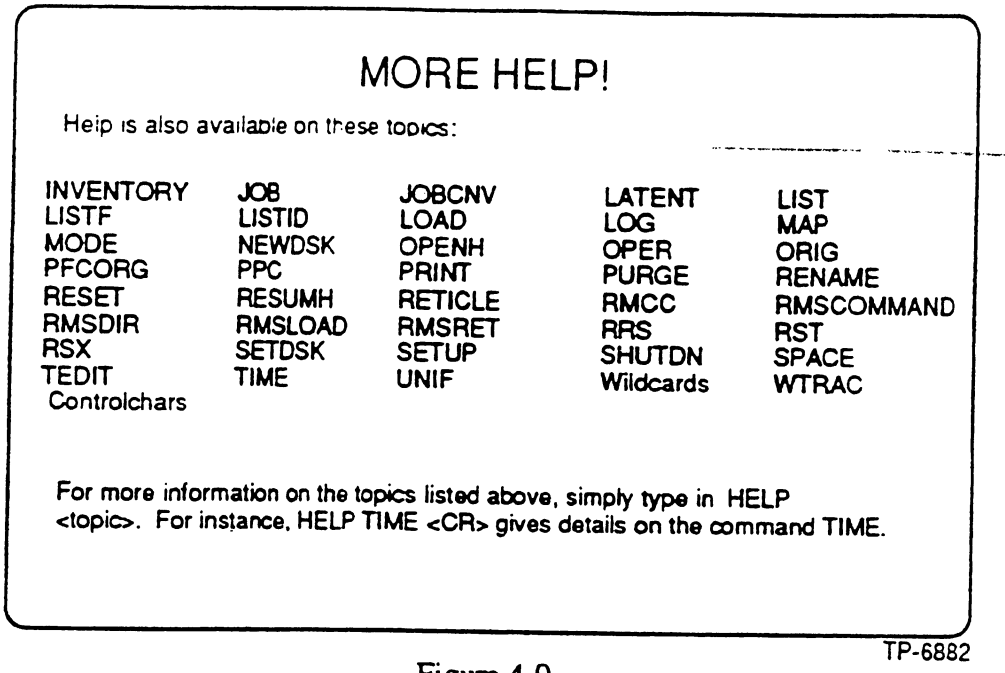

Figure 4-9
HELP MORE Command Screen

To display help information for a specific topic, at the system prompt enter **HELP** ***<topic>*** then press RETURN. The system then displays text that explains the command and its use. For example, entering **HELP LOG** at the system prompt displays a help screen for the command LOG similar to the following:

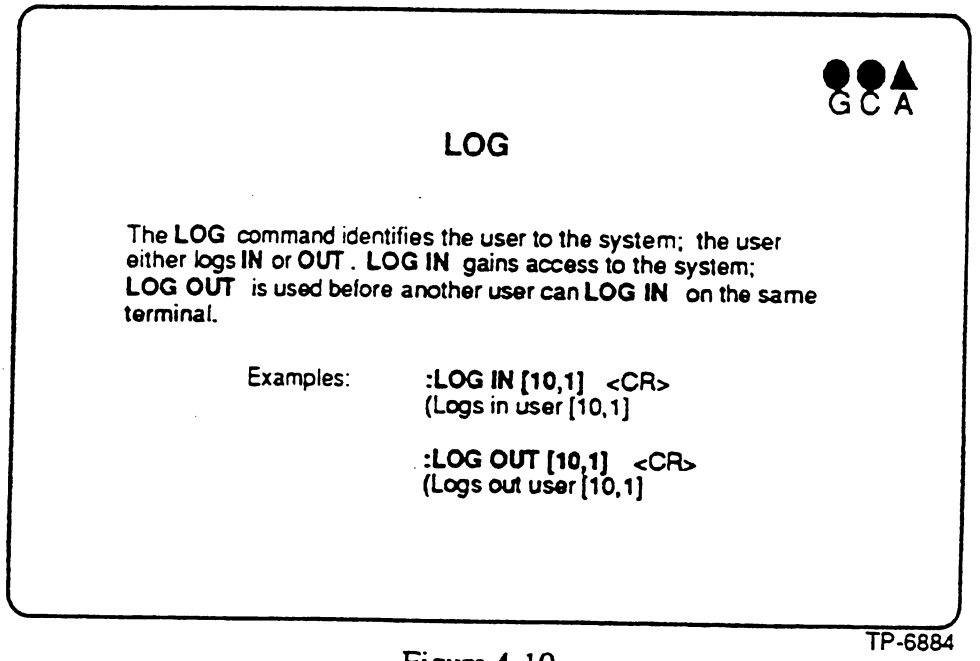

Figure 4-10
HELP LOG Command Screen

The HELP Key

When using the AUTOSTEP 200 system, information required for user input within various program commands can be requested by pressing the HELP key. HELP screens are available whenever user input is required within the following programs:

- ACS
- JOB
- LASER
- MODE
- PPC

To display a screen that contains information about the current data being input, press the HELP key. For example, pressing the HELP key at the Job Main Menu displays the following:

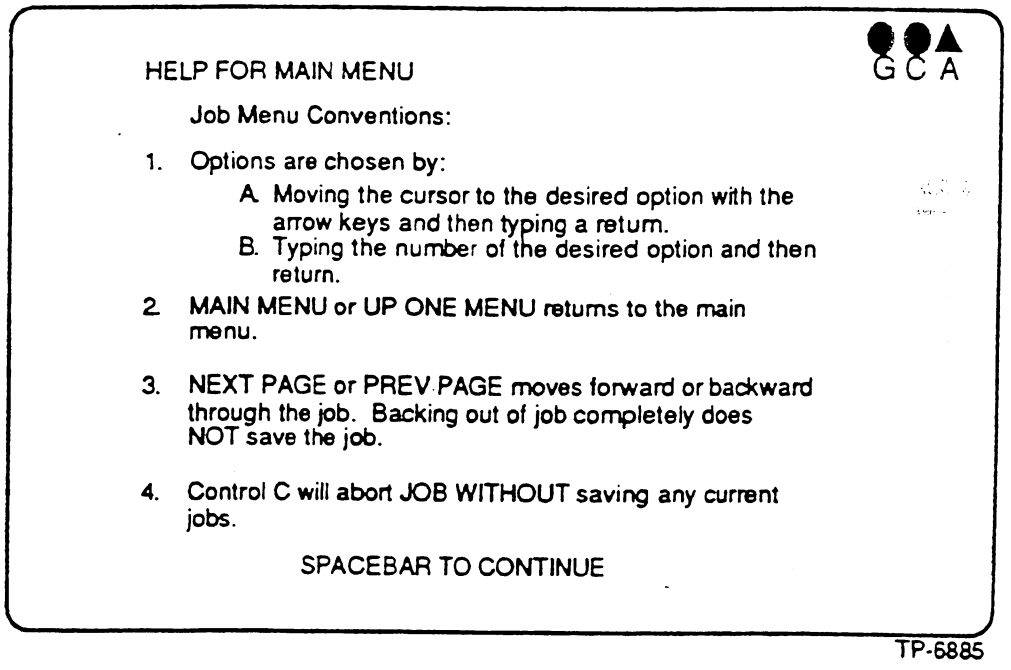

Figure 4-11
Job Main Menu Help Screen

Section 5 - Setting Up and Powering Up the System

System setup tasks are used to prepare the system to accept commands relevant to both job specification and job execution. These tasks include:

- Powering up and stabilizing the environmental chamber
- Powering up the AUTOSTEP 200 system
- Setting up the VT340 terminal
- Logging into and out of the AUTOSTEP 200 system

Typically during system operation, most of these tasks needn't always be performed, since the AUTOSTEP 200 system is usually powered up and ready for use. The following pages describe the procedures used to perform the tasks listed above.

Powering Up and Stabilizing the Environmental Chamber

Before operating the AUTOSTEP 200 system, the environmental chamber must be powered up and the chamber temperature must be set between 20.0°C and 26.7°C (68°F and 80°F). All controls and indicators used to power up and stabilize the chamber temperature are located on either the power control center (PCC) or the temperature control chassis (TCC) (Figure 5-1).

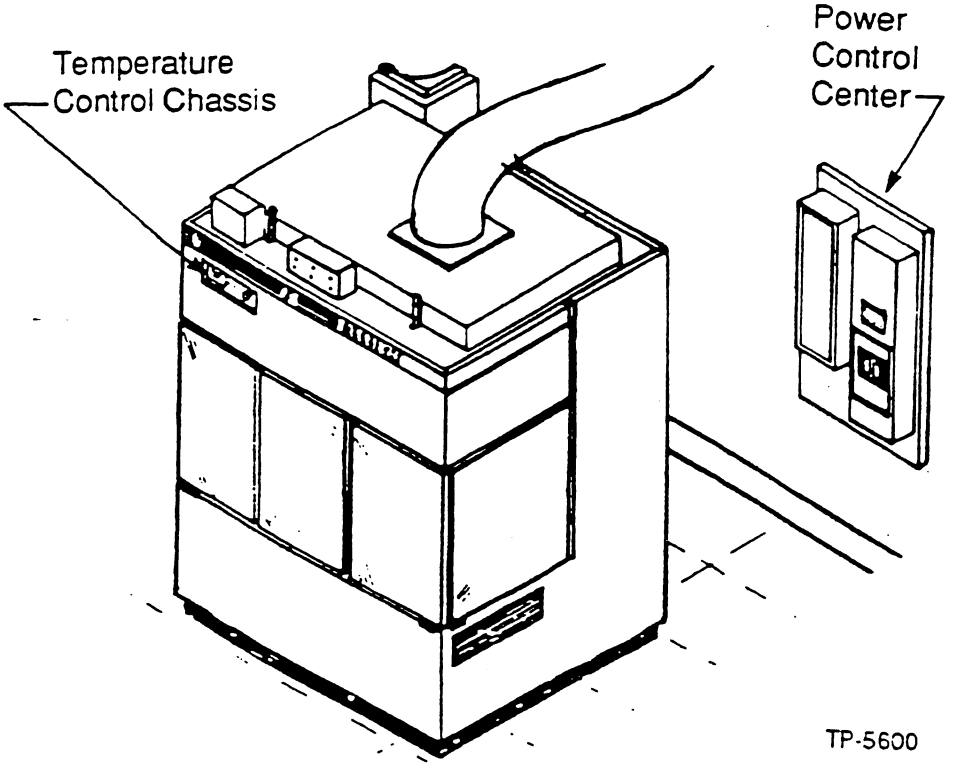

Figure 5-1
AUTOSTEP 200 System Environmental Chamber and Controls

Refer to Figure 5-2 and 5-3 for the location of the controls and indicators used to power up and stabilize the environmental chamber.

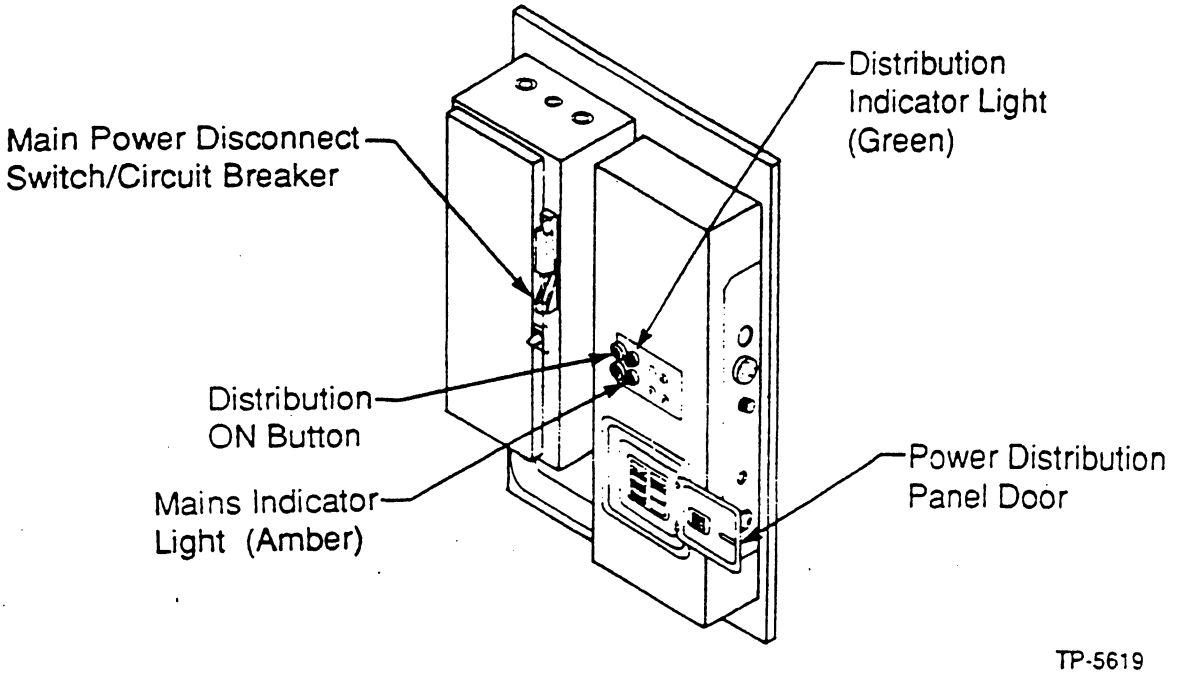

Figure 5-2
Power Control Center

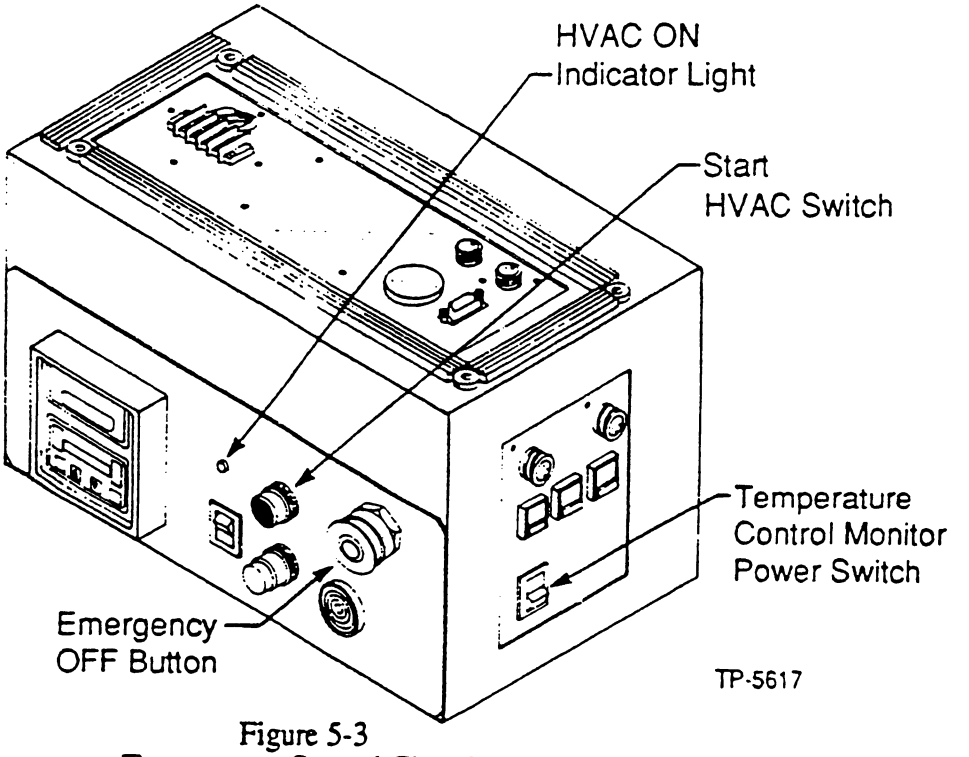

Figure 5-3
Temperature Control Chassis

Power up and stabilize the environmental chamber as follows:

1. If the chamber is water-cooled, turn on the water supply to the HVAC condenser coil.
2. Make sure that the PCC main power disconnect switch/circuit breaker is in the OFF position (down).
3. Pull out the EMERGENCY OFF button, located on the right side of the HVAC module.
4. Pull out the EMERGENCY OFF button on the temperature control chassis.
5. Switch the TCC temperature control monitor power switch to the OFF position (down).
6. Switch the PCC main power disconnect switch/circuit breaker to the ON position (up). The amber MAINS indicator light then turns ON.
7. Press the DISTRIBUTION ON button, located on the PCC. The green DISTRIBUTION indicator light then turns ON.
8. Open the PCC power distribution panel door and turn ON all circuit breakers.
9. Switch the TCC temperature control monitor power switch to the ON position (up).
10. Press and hold the START HVAC switch on the TCC front panel for 2 to 3 seconds. The HVAC ON indicator light then turns ON.

Allow approximately five hours for the environmental chamber temperature to stabilize to the set point temperature. The set point temperature for the chamber is preset to a recommended normal operating temperature of 21.1°C (70°F) at the factory at the time of manufacture.

If a different operating temperature is desired, change the set point temperature by performing the following:

1. Press the STOP HVAC button.
2. Turn OFF the TCM POWER switch.
3. Turn the 90° locking screw at the bottom of the TCM front panel CCW.
4. Remove the TCM from its case by pulling firmly but gently.
5. Set DIP switch #1 to ON (down).
6. Replace the TCM in its case.
7. Turn ON the TCM POWER switch.
8. Press the MODE key until LOC appears on the SETPOINT display.
9. Press the DOWN key to change the lock value from 3 to 0.
10. Press the ENTER key to store the selected (flashing) lock value in the microprocessor memory.
11. Turn OFF the TCM POWER switch.
12. Remove the TCM from its case.
13. Set DIP switch #1 to OFF (up).
14. Replace the TCM in its case.
15. Turn ON the TCM POWER switch.
16. Press the MODE key until SP1 appears on the SETPOINT display.
17. Perform one of the following:

    - To increase the set point temperature, press the UP key.
    - To decrease the set point temperature, press the DOWN key.

18. Press the ENTER key to store the selected (flashing) set point temperature value in the microprocessor memory.
19. Turn OFF the TCM POWER switch.
20. Remove the TCM from its case.
21. Set DIP switch #1 to ON.
22. Replace the TCM in its case.
23. Turn ON the TCM POWER switch.
24. Press the MODE key until LOC appears on the SETPOINT display.
25. Press the UP key to change the lock value from 0 to 3.
26. Press the ENTER key to store the selected (flashing) lock value in the microprocessor memory.
27. Turn OFF the TCM POWER switch.
28. Remove the TCM from its case.
29 Set DIP switch #1 to OFF.
30. Replace the TCM in its case.
31. Turn ON the TCM POWER switch.
32. Press and hold the HVAC START button for 2 to 3sec. to power up the HVAC module.

Powering Up the AUTOSTEP 200 System

Power up the AUTOSTEP 200 system as follows:

1. Turn the power on to the power interface using the main circuit breakers located on the power interface front panel in the central system control rack.
2. Verify that the MAXIMUS mercury arc lamp is powered up. If the arc lamp is not powered up, perform the following:

   a. Turn on the power to the arc lamp using the POWER switch located in the MAXIMUS intensity control chassis in the central system control rack (Figure 5-4).

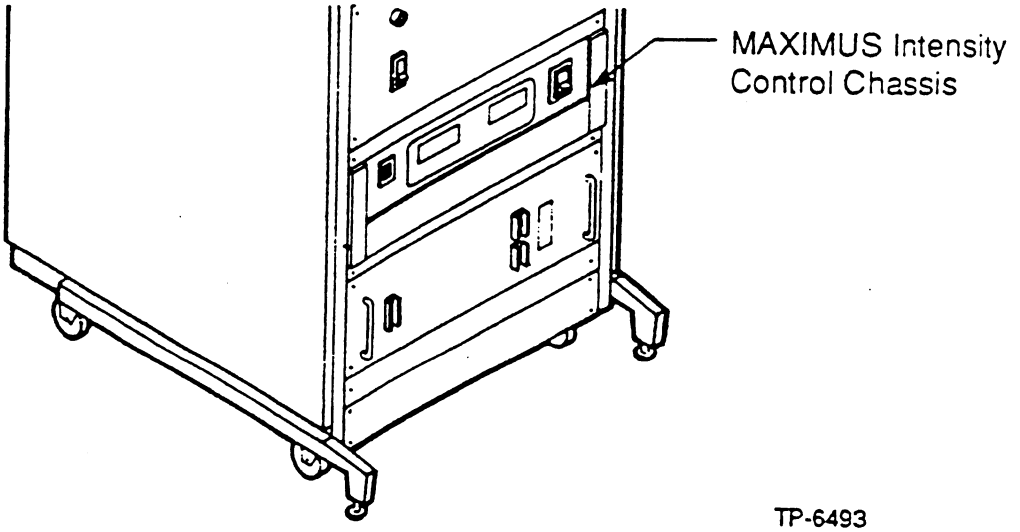

Figure 5-4
MAXIMUS Chassis

b. Briefly press the START switch until the LAMP ON indicator is lit. If the indicator does not light, press the START switch again.
c. Wait 10-15 minutes for the operating temperature to acclimate (178°C-212°C) before powering up the AUTOSTEP 200 system.

3. Make sure that all subsystem chassis switches are in the ON position: if not, power up all individual chassis (Figure 5-5).

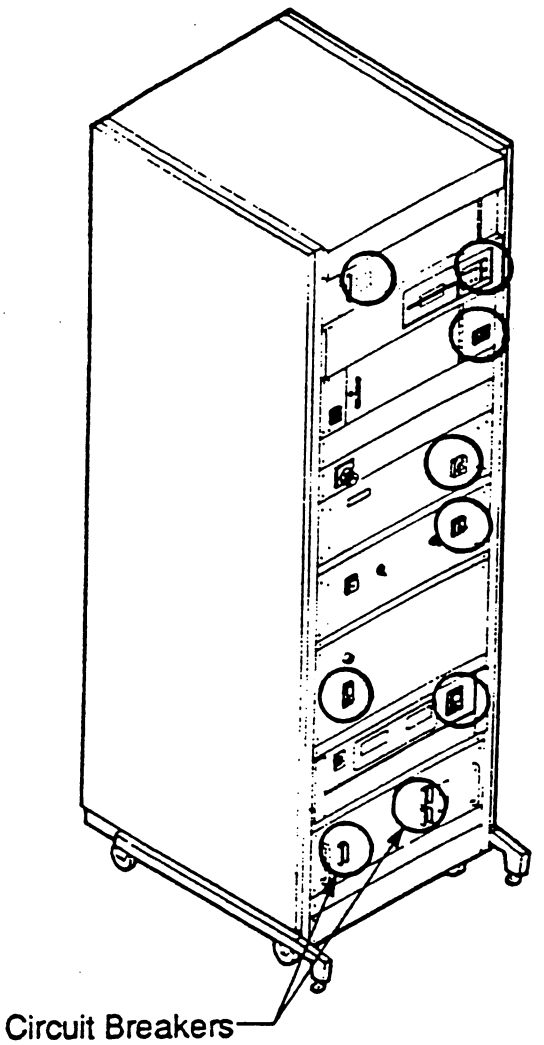

Figure 5-5
AUTOSTEP 200 Subsystem Power Switches

4. Turn on the system power by pressing the system power switch located on the user interface rack.
5. Press the HALT, then the RESTART key on the MICROPDP-11/53 computer.

The following is then displayed on the system monitor:

```
RSX-11M-PLUS V7.0 1280K SYSTEM:'INDRSX'

>RED DU:=SY:
>RED DU:=LB:
>RED DU:=SP:
>MOU DU:'MOPV7'
@DU:[1,2]STARTUP

15-DEC-89 07:29:22
```

NOTE: If nothing is displayed, the monitor may be improperly set: refer to Setting Up the VT340 Terminal in this section for additional information.

This sets up the AUTOSTEP 200 system software, and once completed (approximately 4 minutes), displays the following:

```
MOP SYSTEM VERSION V7.0
READING IN EXISTING CONFIGURATION FILE:
```

When this is displayed, the system reads the current configuration file and displays the configuration, similar to the following:

```
AWH III w/Theta III
DFAS
ACS Focus Offset Exists
RMS 10
AWA/D II
SECS Does Not Exist
Single Rack
60 Hz
Tropel 2040
No Prototype Software
Enable Talkthrough
PPC Exists
Micro DFAS Exists
```

NOTE: The configuration displayed on the terminal may or may not be the same as that presented above, since configurations vary from system to system.

6. If necessary, set the configuration using the **CONFIG** command. See the AUTOSTEP 200 Advanced Lithography System Administrator's Supplement (P/N 069422) for instructions on setting the configuration.
7. At the system prompt (:), log into the system using the command **LOG IN** (see Logging Into and Out of the System in this section for additional information on logging in). The system then automatically downloads the IAS software.

8. When inserting new reticles, enter the command **RMSLOAD** to start the RMS. The system will display the following:

```
RESETTING RMS SYSTEM...RESET COMPLETE

LOAD RETICLE CASSETTES AND HIT RETURN
WHEN COMPLETE. PLEASE WAIT UNTIL
TURNTABLE HAS STOPPED MOVING.
```

When the turntable stops moving, load the reticle cassette into the elevator assembly. The RMS will perform an inventory, print a directory of all reticles currently contained in the elevator cassettes, and then the RMS will return to the ready position.

Setting Up the VT340 Terminal

Set-up for the VT340 terminal involves a series of thirteen display screens that allow the user to view and change the terminal's operating features from the keyboard. Each screen lists particular sets of operating features for the terminal. For example, one screen lists display features, and another screen lists communication features, and so forth.

The AUTOSTEP 200 system requires two separate sessions to be set up. Session 1 is for the MICROPDP-11/53 computer, and session 2 is for the PC-AST. To set up the system, each session must be entered separately. Once out of the set-up mode, the SWITCH SESSIONS key is used to switch between sessions 1 and 2. Refer to Entering and Changing Data within the Set-Up Screens for the procedure to switch sessions.

> **NOTICE**
>
> The feature settings displayed in this section show the recommended settings for the AUTOSTEP 200 system. Deviation from these settings may cause unpredictable results.

Entering and Changing Data within the Set-Up Screens

Begin the set-up procedure for the VT340 terminal by pressing the SET-UP key. Verify that session 1 is active by making sure that the lower left-hand corner of the screen displays a 1. When the SET-UP key is pressed, the system then displays the Set-Up Directory screen, that is used to access the remaining screens within the set-up mode.

When screens are displayed on the monitor, the feature defaults are also displayed. (When originally setting up the VT340 terminal, the factory-default settings are displayed.)

Change data within the set-up screens, by performing the following:

1. Access the Set-Up Directory screen by pressing the SET-UP key.
2. Select the desired set-up screen, by using the up and down arrow keys to highlight the screen name, then pressing ENTER.
3. Select the desired feature to change, by using the up and down arrow keys to highlight the feature.
4. Select the current setting desired to change, by using the right and left arrow keys to highlight the setting.
5. Enter the new setting by pressing ENTER until the desired setting is displayed on the screen.
6. If another setting must be changed in the currently displayed screen, repeat steps 3 through 5. Repeat for all changes within the currently displayed screen.
7. When all desired changes have been made, return to the Set-Up Directory screen by pressing ADD CHOICE.
8. Save the new settings, by using the up and down arrow keys to highlight **Save Current Settings**, then pressing ENTER. (When the current settings are saved, a "**Done**" message appears at the bottom of the screen.)
9. Repeat the above procedure for the second session by performing the following:

   a. Exit SET-UP by pressing the SET-UP key.
   b. Switch to session 2 by pressing the SWITCH SESSIONS key.
   c. Enter SET-UP by pressing the SET-UP key.
   d. Repeat steps 1 through 8 (for session 2).

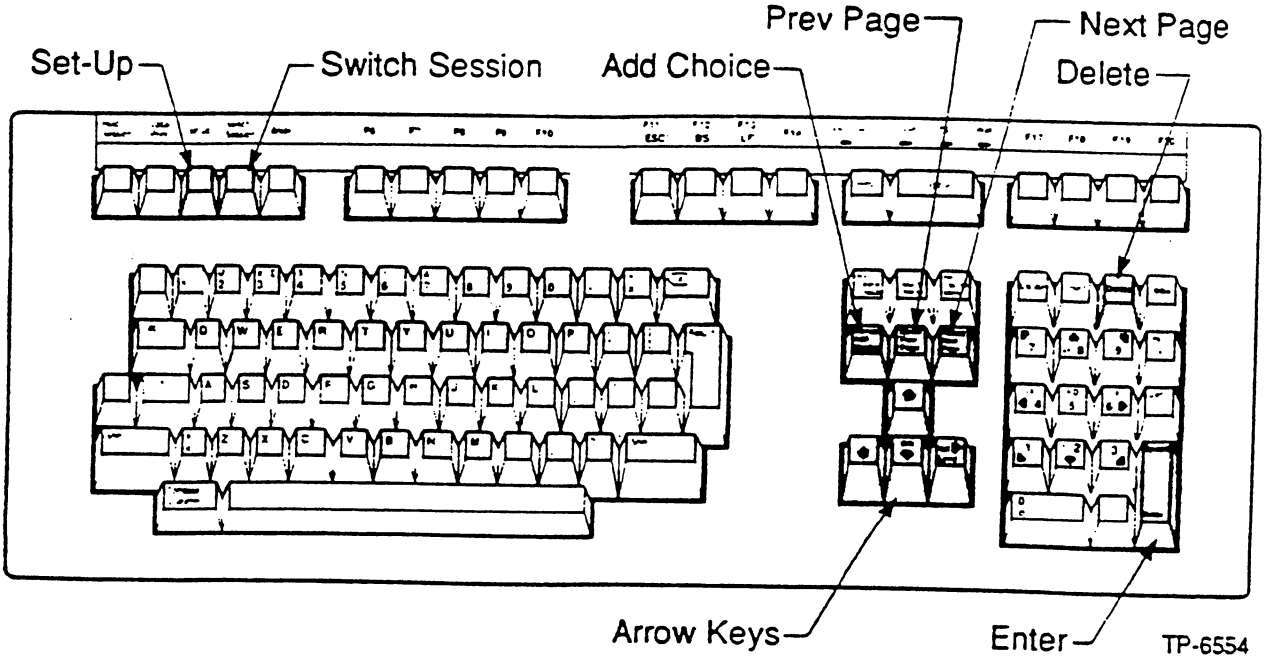

Figure 5-6
VT340 Keyboard

The following keys are helpful when setting up the VT340 terminal (Figure 5-6):

- The arrow keys: select the desired feature
- ENTER: inputs the data
- PREV PAGE: moves backward one page or screen
- NEXT PAGE: moves forward one page or screen
- SET-UP: enters or exits the set-up mode
- DELETE: deletes a character when entering or editing data
- SWITCH SESSION: switches from session 1 to session 2 and back
- ADD CHOICE: displays the Set-Up Directory screen. This key replaces the SELECT key (referenced within the screens).

The SET-UP Screens

The thirteen set-up screens used (listed in order of their appearance) when setting up the VT340 terminal are:

- Set-Up Directory screen
- Global Set-Up screen
- General Set-Up screen
- Display Set-Up screen
- Communication Set-Up screen
- Printer Set-Up screen
- Graphics Set-Up screen
- Keyboard Set-Up screen
- User-Defined Key Set-Up screen
- Local Editing Set-Up screen
- Tab Set-Up screen
- Diagnostic Set-Up screen
- Color Set-Up screen

The set-up screens are described in the following pages. The illustration of each screen shows the correct settings for the VT340 when using it with the AUTOSTEP 200 system. If necessary, change the data on the screen to match that in the illustration.

The Set-Up Directory Screen

The Set-Up Directory screen is the first screen displayed when the SET-UP key is pressed (Figure 5-7). The Set-Up Directory screen is used to access all other set-up screens, and perform general functions such as recalling and saving settings, and so forth.

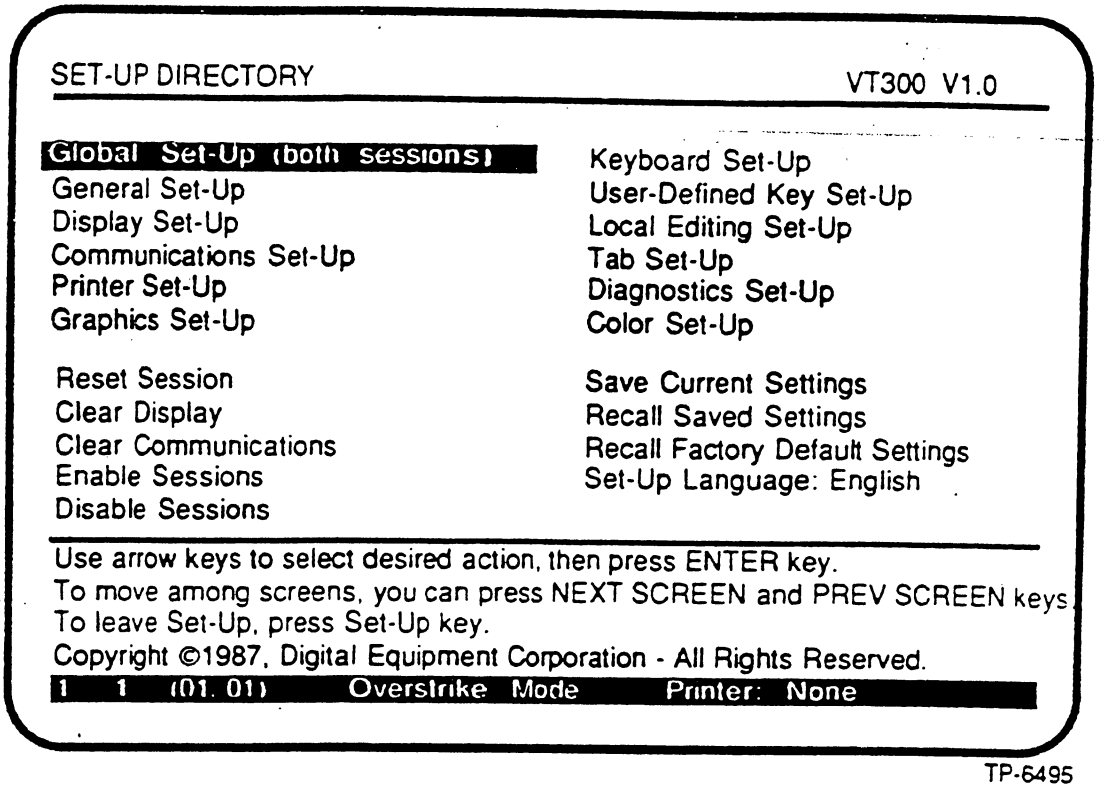

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Figure 5-7
Set-Up Directory Screen

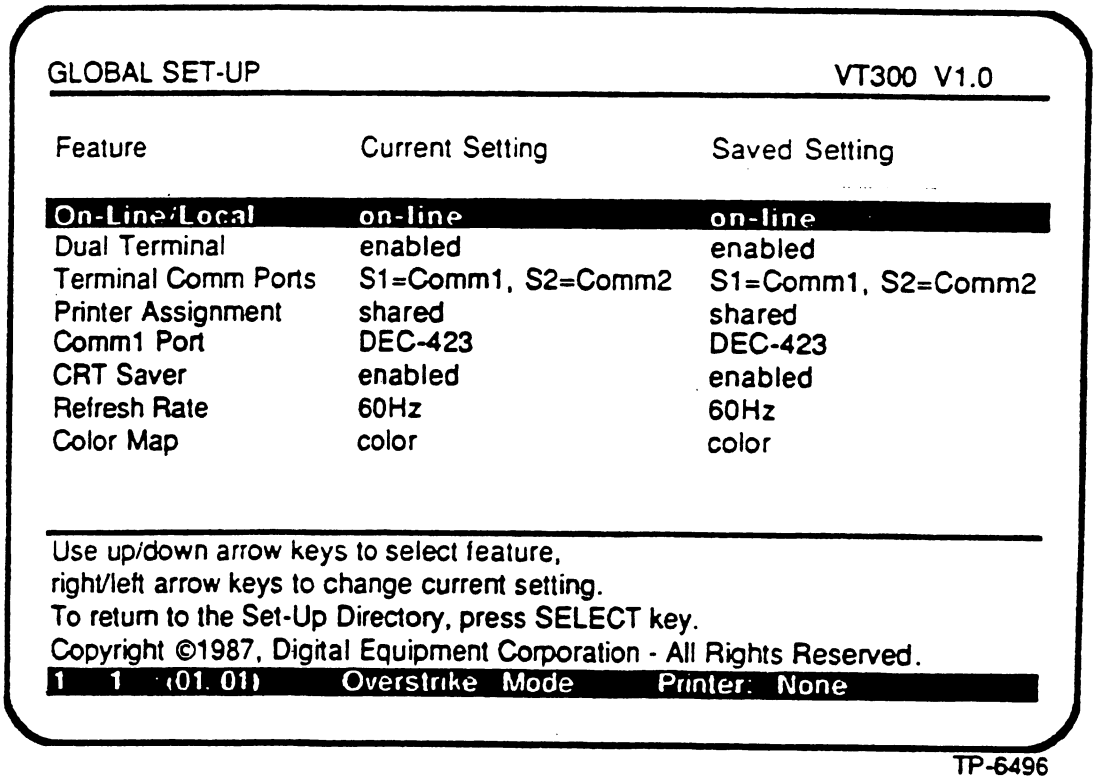
The top half of the Set-Up Directory screen lists the remaining twelve set-up screens. The bottom half of the Set-Up Directory screen lists the following general functions:

- **Reset Session** resets the currently active session to the current settings. (Reset Session does not affect data within the Communications, User-Defined Key, and Color Set-Up screens.)
- **Clear Display** clears the screen of the currently active session, when leaving the set-up mode.
- **Clear Communications** clears the communications for the currently active session, including any printing operation.
- **Enable Sessions** resumes an interrupted session due to power failure, and so forth.
- **Disable Sessions** disables the currently active session.
- **Save Current Settings** saves the settings within the currently active session. Make sure to save the current settings after completing setup of the VT340.

- **Recall Saved Settings** replaces the settings previously saved in the currently active session.
- **Recall Factory Default Settings** replaces all settings within the currently active session with the original factory-default settings.
- **Set-Up Language: English** indicates that the terminal uses the English language for the set-up screens.

The Global Set-Up Screen

The Global Set-Up screen features should be adjusted to those shown in Figure 5-8. Any changes to the Global Set-Up screen settings affect both session 1 and 2.



TP-6496

Figure 5-8
Global Set-Up Screen

Adjust the following features within the Global Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- Change the current setting for **Dual Terminal** to **enabled.**
- Change the current setting for **Comm 1 Port** to **DEC-423.**
- Change the current setting for **Color Map** to **color.**

The General Set-Up Screen

The General Set-Up screen features should be adjusted to those shown in Figure 5-9.

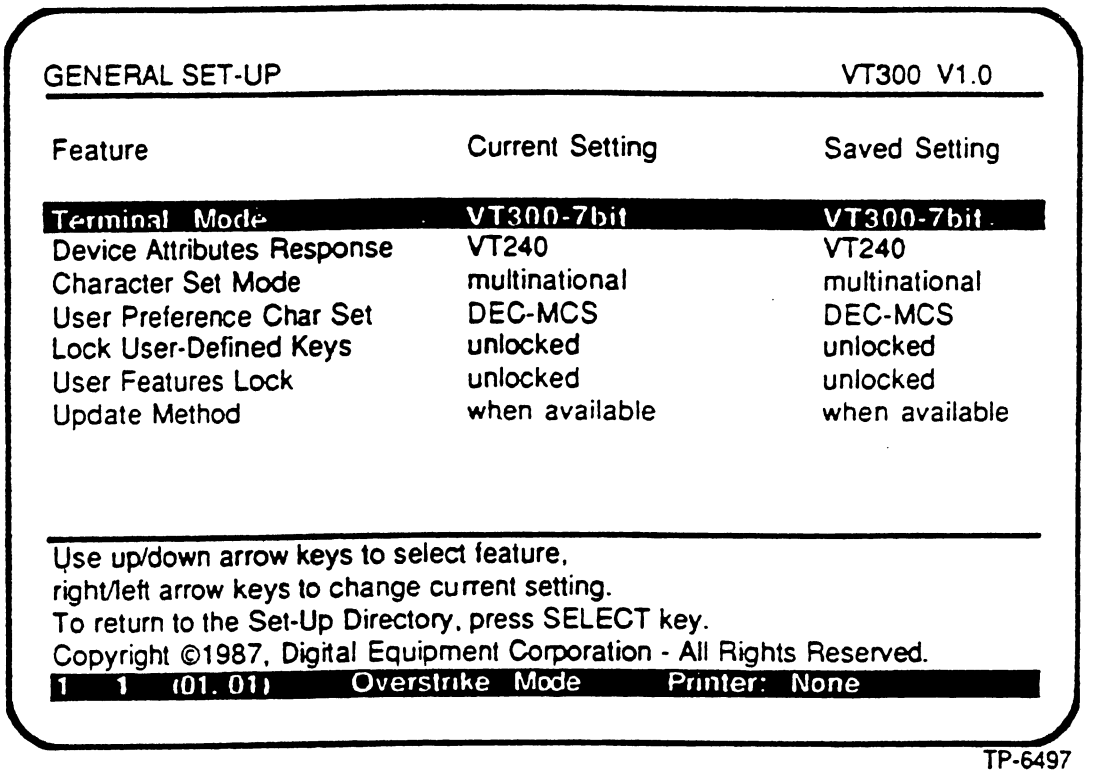


Figure 5-9
General Set-Up Screen

Adjust the following feature within the General Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- Change the current setting for **Device Attributes Response** to **VT240**.

The Display Set-Up Screen

The Display Set-Up screen changes the appearance of the data on the screen. The Display Set-Up screen features should be adjusted to those shown in Figure 5-10.

DISPLAY SET-UP VT300 V1.0

Feature	Current Setting	Saved Setting
Scrolling	jump	jump
Display Background	dark	dark
Column Mode	80	80
Page Arrangement	3 x 24	3 x 24
Horizontal Coupling	disabled	disabled
Vertical Coupling	enabled	enabled
Page Coupling	enabled	enabled
Status Display	indicator	indicator
Text Cursor	displayed	displayed
Cursor Style	block	block
Cursor Blink	blink	blink
Control Representation Mode	interpret controls	interpret controls
New Line Mode	no new line	no new line
Auto Wrap	no auto wrap	no auto wrap

Use up/down arrow keys to select feature,
right/left arrow keys to change current setting.
To return to the Set-Up Directory, press SELECT key.

1 1 (01, 01) Overstrike Mode Printer: None

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Figure 5-10
Display Set-Up Screen

Adjust the following features within the Display Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- Change the current setting for **Scrolling** to **jump**.
- Change the current setting for **Page Arrangement** to **3x24**.

The Communications Set-Up Screen

The Communications Set-Up screen sets features that make sure that the VT340 communicates with the system computer. The Communications Set-Up screen features should be adjusted to those shown in Figure 5-11.

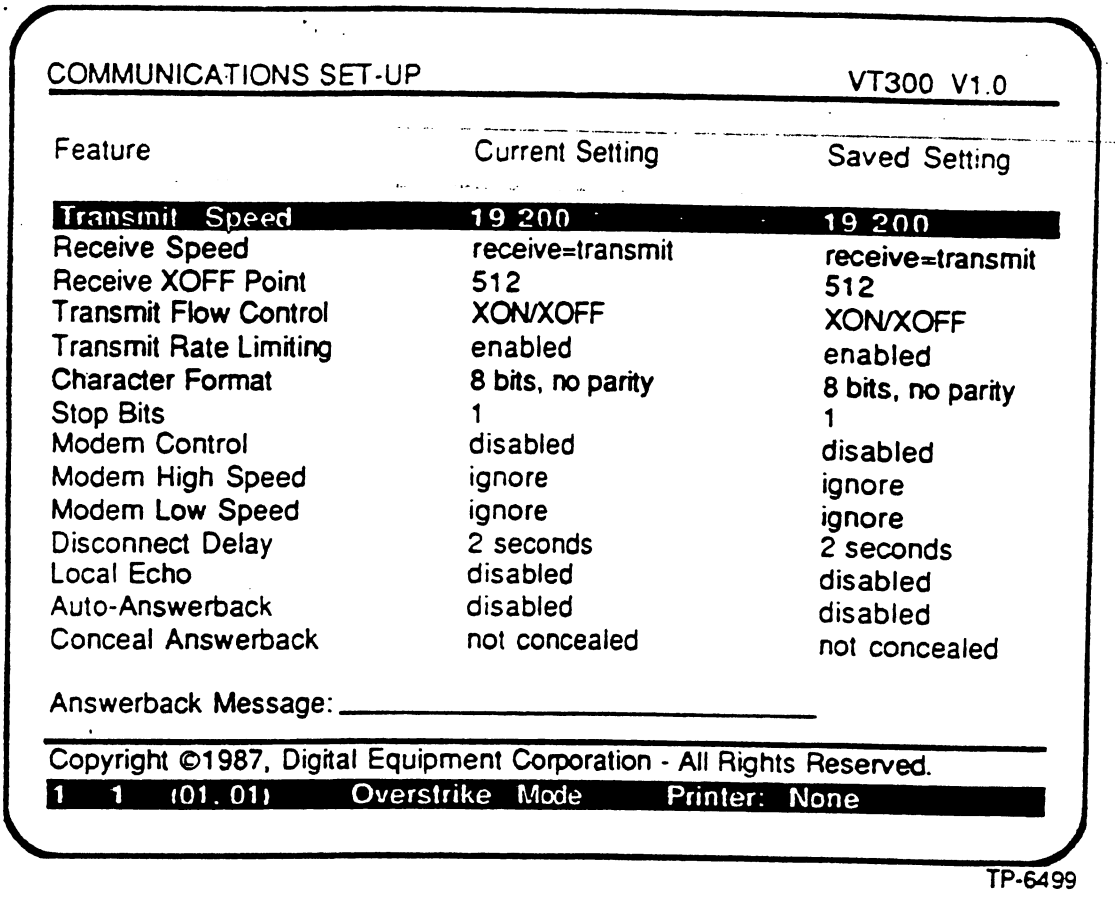

Figure 5-11
Communications Set-Up Screen

The Communications Set-Up screen features must be set separately for session 1 and session 2. The currently active session is displayed as the left-hand character in the status line. Refer to Entering and Changing Data within the Set-Up Screen in this section of the manual for procedures on how to switch sessions.

Adjust the following features within the Communications Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- For session 1, change the current setting for **Transmit Speed** to **19.200**.
- For session 2, change the current setting for **Transmit Speed** to **9600**.
- Change the current setting for **Receive XOFF Point** to **512** (for both sessions).
- Change the current setting for **Modem High Speed** to **ignore** (for both sessions).
- Change the current setting for **Modem Low Speed** to **ignore** (for both sessions).

The Printer Set-Up Screen

The Printer Set-Up screen features are set to match the AUTOSTEP 200 system printer. The Printer Set-Up screen features should be adjusted to those shown in Figure 5-12.

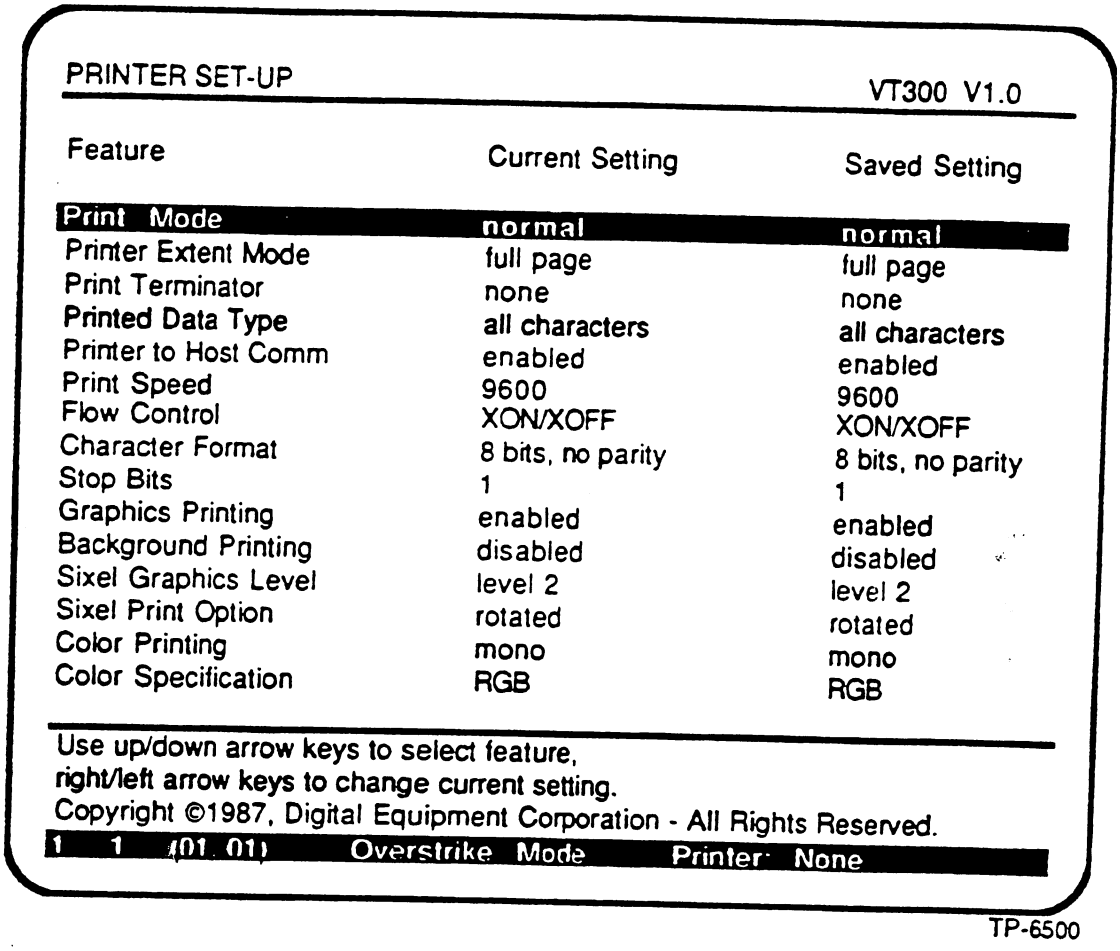

Figure 5-12
Printer Set-Up Screen

Adjust the following features within the Printer Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- Change the current setting for **Printed Data Type** to **all characters.**
- Change the current setting for **Print Speed** to **9600.**
- Change the current setting for **Background Printing** to **disabled.**
- Change the current setting for **Sixel Graphics Level** to **Level 2.**
- Change the current setting for **Sixel Print Option** to **rotated.**
- If the system has a DIGITAL LA75 monochrome printer, make sure that the current setting for **Color Printing** is set to **mono.**
- If the system has a DIGITAL LJ250 color printer, make sure that the current setting for **Color Printing** is set to **color.**
- Change the current setting for **Color Specification** to **RGB.**

NOTE: Both printers are optional, and are in addition to the printer supplied with the AST.

The Graphics Set-Up Screen

The Graphics Set-Up screen features should be adjusted to those shown in Figure 5-13.

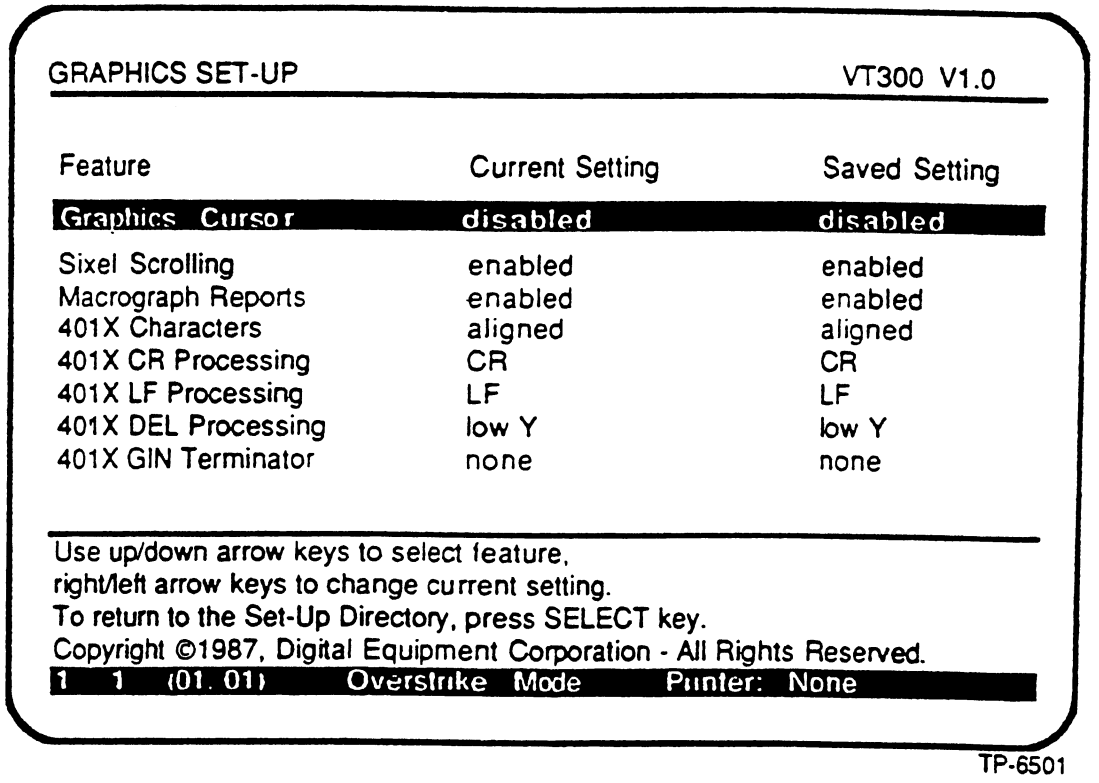

Figure 5-13
Graphics Set-Up Screen

Adjust the following feature within the Graphics Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- Change the current setting for **Graphics Cursor** to **disabled**.

The Keyboard Set-Up Screen

The Keyboard Set-Up screen features should be adjusted to those shown in Figure 5-14.

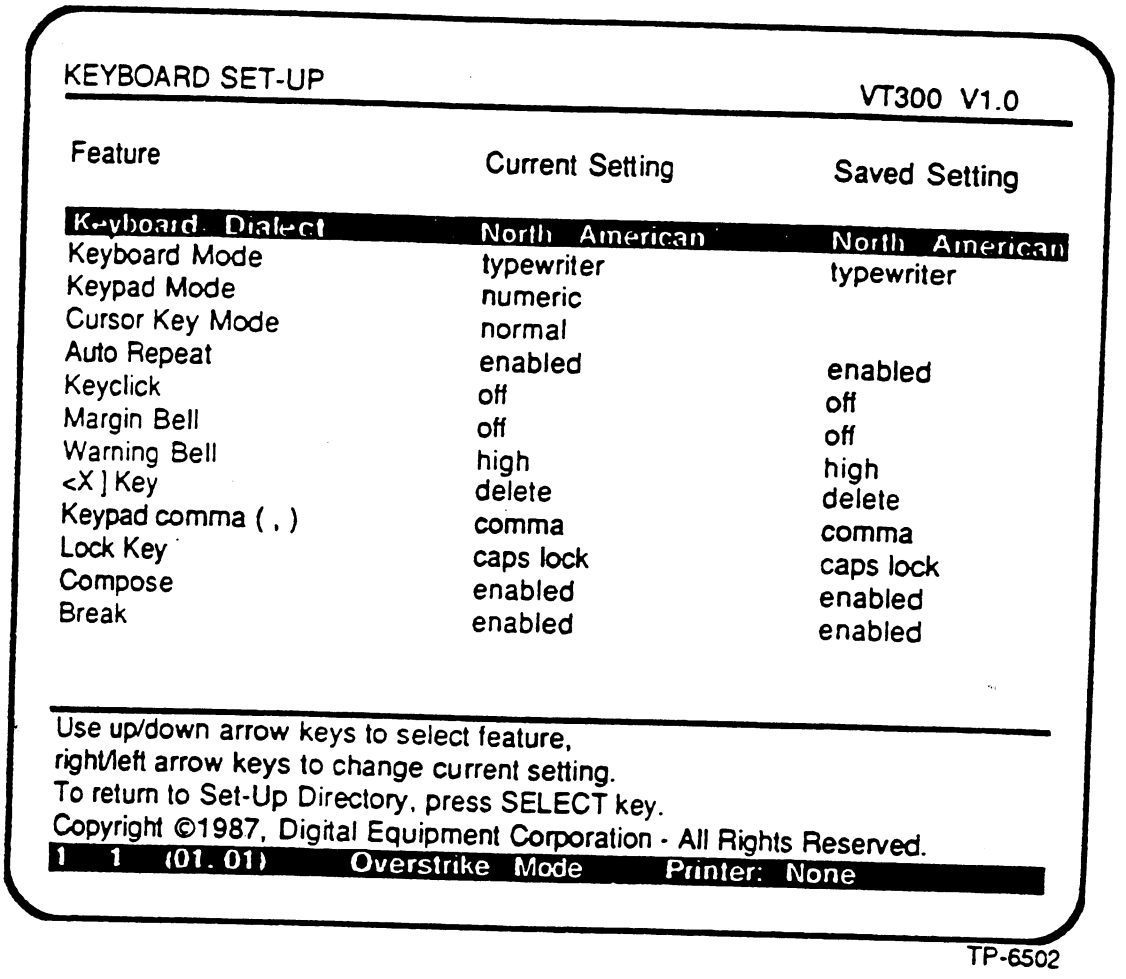

Figure 5-14
Keyboard Set-Up Screen

Adjust the following feature within the Keyboard Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- Change the current setting for **Keyclick** to **off**.

The User-Defined Key Set-Up Screen

The User-Defined Key Set-Up screen is used to set numbered function keys to represent text or commands (Figure 5-15). For example, function key F6 can be set to represent a MOP command.

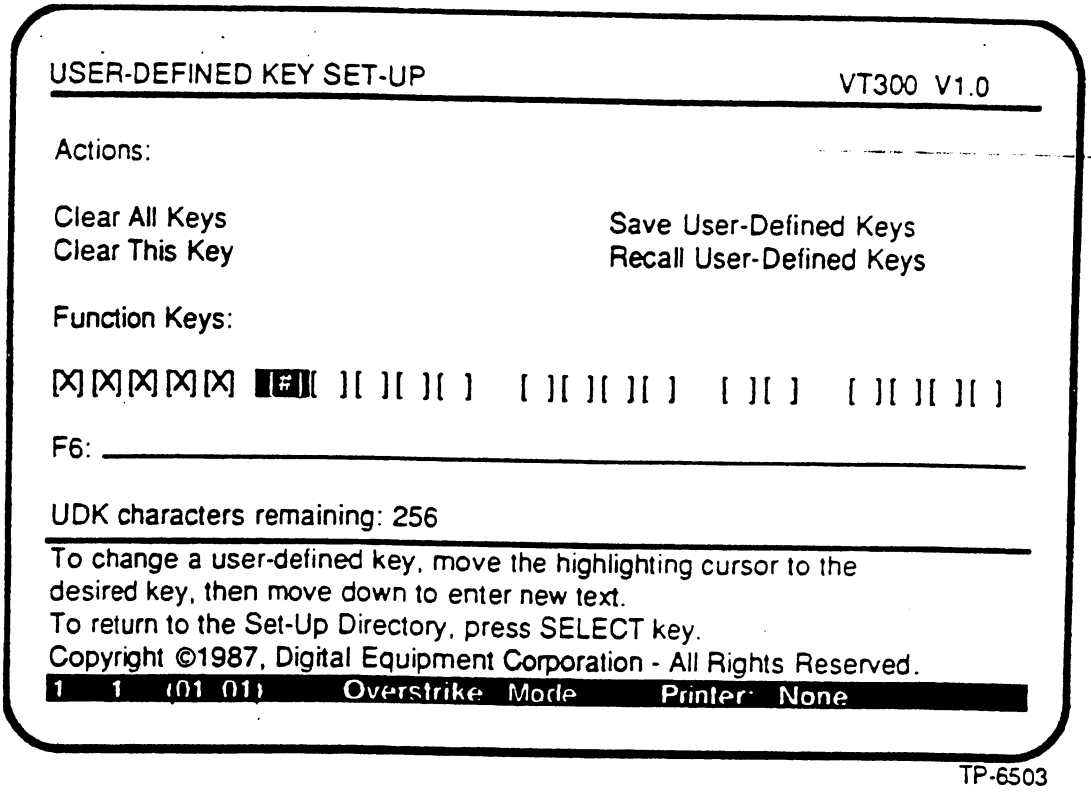

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Figure 5-15
User-Defined Key Set-Up Screen

The screen contains two types of features: action keys and function key displays. The action keys are used to perform the specified actions. The function key display represents the 20 top-row function keys on the keyboard. Each key is represented by a [ ]. The first 5 function keys cannot be user-defined, so they are displayed as [X]. The user-defined keys can be used by the operator to enter commonly used command or text strings so that they can be automatically entered by pressing a single key.

Set user-defined function keys (F6 through F20) as follows:

1. Display the Set-Up Directory screen by pressing SET-UP.
2. Select the User-Defined Key Set-Up screen, by using the arrow keys to highlight the screen, then pressing ENTER.
3. If an action is desired, use the arrow keys to highlight the action, then press ENTER.
4. If defining a function key to represent a particular text, perform the following:

   a. Select the desired function key, by using the arrow keys to highlight the [ ] that represents the desired function key. The function key number appears on the next line.
   b. Access the definition line by pressing the down arrow.
   c. Enter the definition for the function key (up to 256 characters long).

5. To define another function key, repeat step 4.

6. When all function keys have been defined, save the function keys by using the arrow keys to highlight **Save User-Defined Keys**, then press ENTER.

It is necessary to exit the set-up mode before using the newly set function key. To use the newly set function key, hold down **Shift**, while pressing the desired function key.

The Local Editing Set-Up Screen

The Local Editing Set-Up screen selects and sets the features for the edit mode. The Local Editing Set-Up screen features should be adjusted to those shown in Figure 5-16.

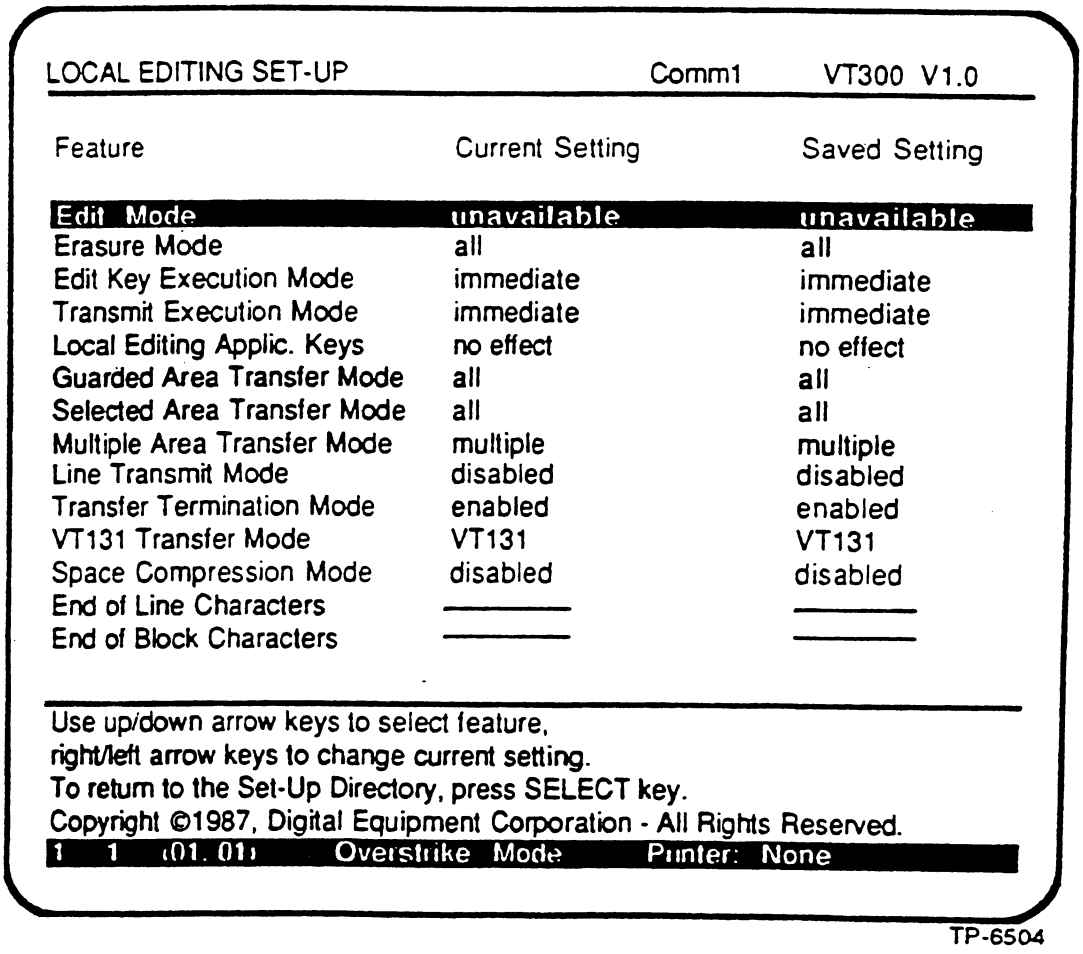

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Figure 5-16
Local Editing Set-Up Screen

Adjust the following feature within the Local Editing Set-Up screen, by performing the procedure in Entering and Changing Data within the Set-Up Screens in this section of the manual:

- Change the current setting for **VT131 Transfer Mode** to **VT131**.

The Tab Set-Up Screen

The Tab Set-Up screen sets the number of tab stops on a line. The Tab Set-Up screen is shown in Figure 5-17. No change is required to the Tab Set-Up screen.

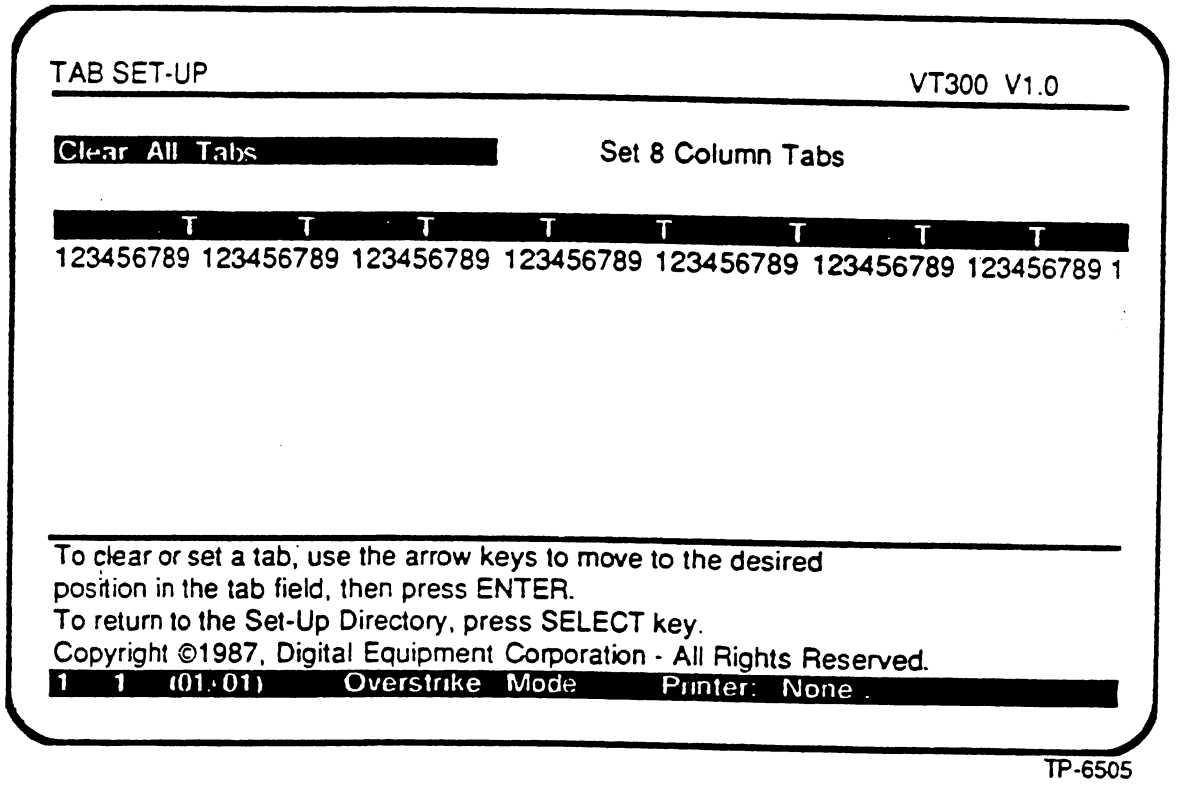

Figure 5-17
Tab Set-Up Screen

The Diagnostic Set-Up Screen

The Diagnostic Set-Up screen is used by service personnel to set-up and run diagnostics (Figure 5-18). Each time the terminal is turned on, the system automatically runs a power-up self-test that lasts approximately 15 seconds. No change is required to the Diagnostic Set-Up screen.

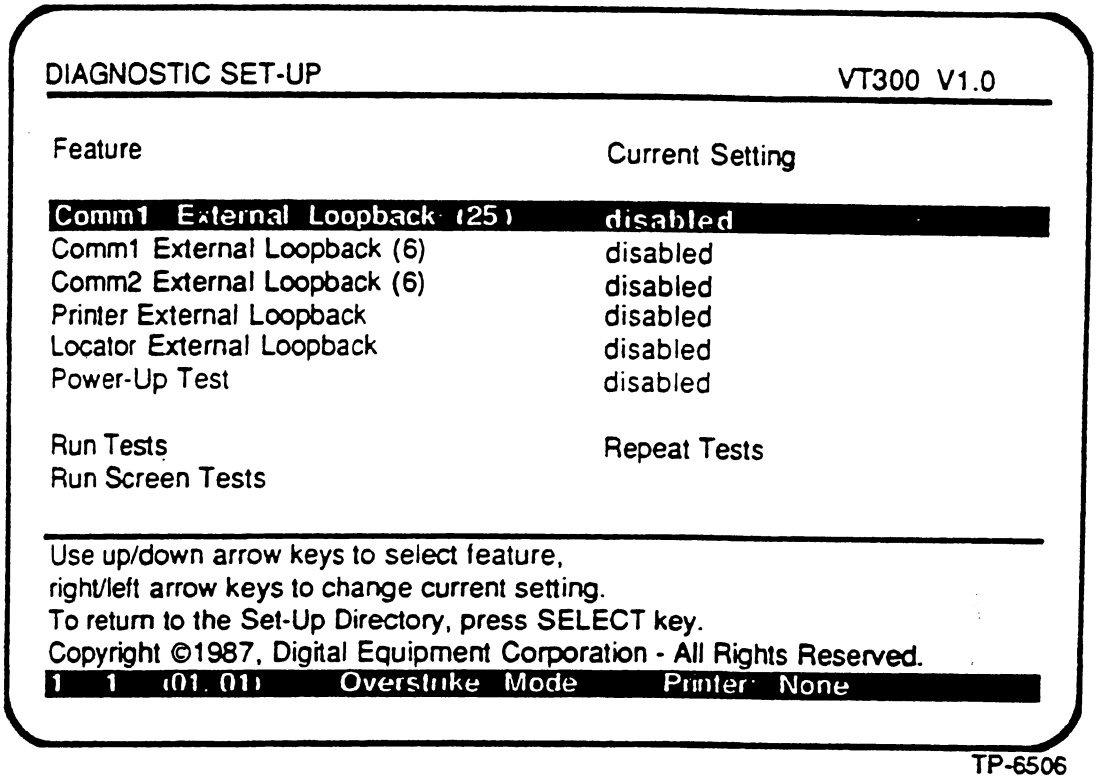

Figure 5-18
Diagnostic Set-Up Screen

The Color Set-Up Screen

The Color Set-Up screen selects, changes, and creates the foreground and background colors of the display (Figure 5-19). Up to 16 colors at a time can be selected, from 4096 possible colors. This function can also be performed using the COLORS command within the MOP. Refer to **Section 14 - Additional System Functions** for procedures on using the COLORS command.

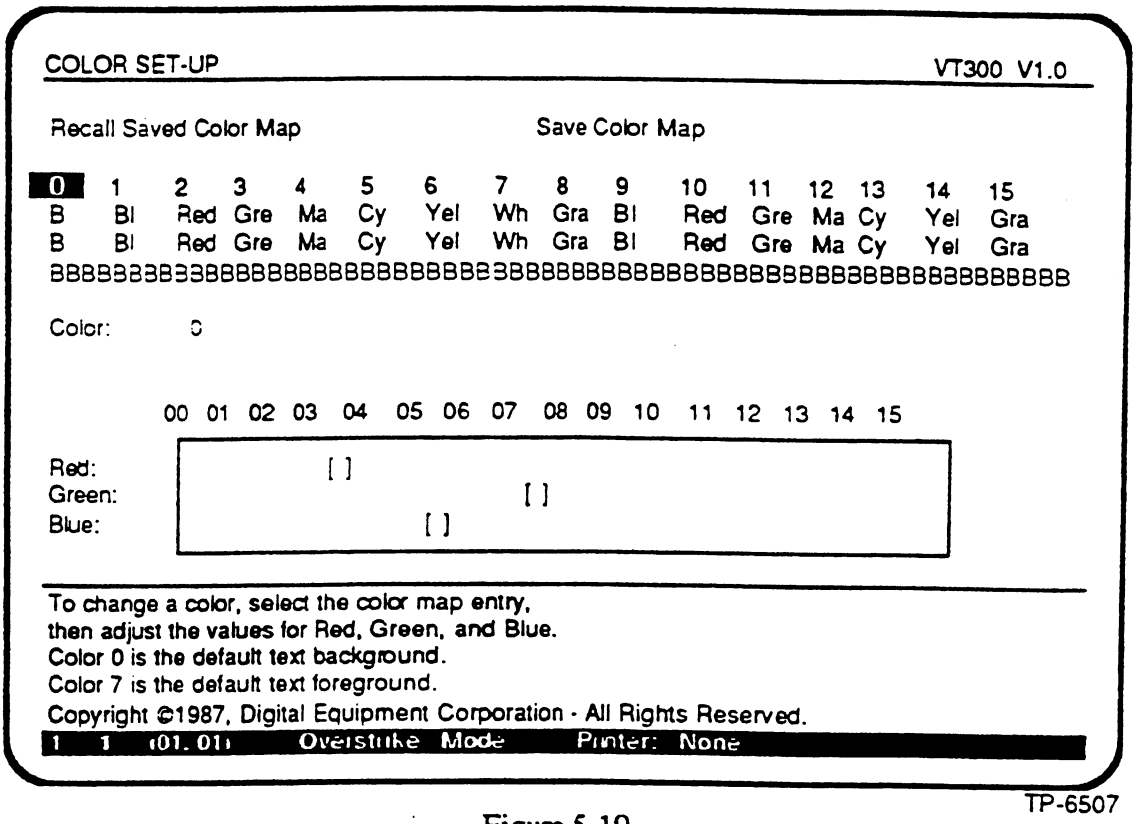

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Figure 5-19
Color Set-Up Screen

The top half of the screen (the color map) contains a row representing 16 available colors. Above each color is a reference number (from 0 to 15) that identifies that color. The default colors are as follows (* indicates the factory-set defaults for the foreground and background colors):

0	black (text background)*	8	gray (reverse)
1	blue	9	blue
2	red	10	red
3	green	11	green
4	magenta	12	magenta
5	cyan	13	cyan
6	yellow	14	yellow
7	grey (text foreground)*	15	white (bold)

NOTE: Colors 8 through 15 are different shades of the same colors as in colors 0 through 7.

Create new colors in the color map by mixing the three primary colors (red, blue, green, also known as *RBG*) in the RBG mixer box (located in the middle of the screen), as follows:

1. Select the number representing the color on the top half of the screen, by using the arrow keys to highlight the number.
2. Mix the primary colors, by using the arrow keys to position the slides [] for each of the primary colors under the desired color numbers. Figure 5-20 shows an example of mixing the 3 primary colors to create a new color.

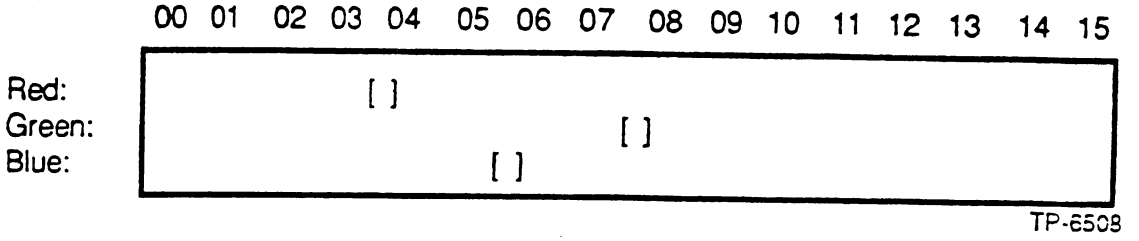

Figure 5-20
Creating a New Display Color

Change the foreground and background colors as follows:

1. Select the number in the top line that represents the foreground color (7: white is the default), by using the arrow keys to highlight the number.
2. Position the cursor in the RBG mixer box, by using the down arrow.
3. Select the desired foreground color, by using the arrow keys to position the slides [] for each of the 3 primary colors under the desired color numbers. As the slides are moved, the foreground color is displayed under the color map.
4. Select the number in the top line that represents the background color (0: black is the default), by using the arrow keys to highlight the number.
5. Position the cursor in the RBG mixer box, by using the down arrow.
6. Select the desired background color, by using the arrow keys to position the slides [] for each of the 3 primary colors under the desired color numbers. As the slides are moved, the background color is displayed under the color map.
7. If desired, save the new colors, by using the arrow keys to highlight **Save Color Map**, then pressing ENTER.

The new foreground and background colors will be displayed after exiting the set-up mode. Exit the set-up mode by pressing SET-UP.

NOTE: Make sure not to set the foreground and background colors to the same shade. If they are accidentally set to the same color, reset the colors to their factory-default settings by pressing CTRL-SET-UP.

Scrolling and Unscrolling Data Displayed on the Monitor

All information displayed on the monitor scrolls smoothly. When this function is not desired, press the HOLD SESSION key on the keyboard. To return to a smooth scroll display, press the HOLD SESSION key again.

Logging Into and Out of the AUTOSTEP 200 System

Logging in gains access to the AUTOSTEP 200 system. The command used to log into or out of the system is **LOG**.

Logging In

To log in to the AUTOSTEP 200 system, use the command **LOG IN**. The command **LOG IN** can be used in any of the following formats:

- **LOG IN [XX,X]** (with XX,X being the account number) uses DU1: as the default drive for a MICROPDP-11/53 computer. If the prompt **PASSWORD** is displayed, enter the one-to-eight-character password assigned to the account. When typed, this password is not displayed on the monitor, to prevent disclosure.
- **LOG IN** displays the prompt **USER NAME (Disk if Desired)**. Enter the account number being logged into (in brackets). If the system then displays the prompt **PASSWORD?**, enter the one-to-eight character password assigned to the account. When typed, this password is not displayed on the monitor, to prevent disclosure.

Once the password is entered (if required), the system displays the prompt **USER LOGGED IN**. The date and time are then displayed, along with the system prompt.

Logging Out

To log out of the system, enter the command **LOG OUT**. The screen clears to the system header and version, then returns to the system prompt. This allows other users to log in to the system using this terminal.

Section 6 - The MODE Command: Setting Parameters and Subsystems

Introduction

During system operation, various subsystems and features configured on the system can be selected for allocation during job execution. In addition, certain parameters frequently referenced by the AUTOSTEP 200 system during wafer exposure must also be specified. The MODE program is used for this purpose.

The MODE program is also used in the following situations:

- After powering up or booting the system
- After physically changing the system configuration
- To change any MODE parameters during system configuration
- To view all the MODE parameters within the program

Only those subsystems installed and configured on the AUTOSTEP 200 system can be selected for use within the MODE program.

NOTE: Depending on the system configuration, some of the following screens, prompts, or menu selections will not appear on the monitor.

The MODE program is organized into the following two sections:

- MODE: involves only those parameters that are available to general operators. These parameters include MODE units, baseline corrections, microscope rotation, objective spacing, loading corrections, stages alignment offset, system focus, AWA usage, DFAS or Micro DFAS baseline corrections, and INSITU baseline corrections.

- Supervisor MODE: involves those parameters that are only accessed from the account [10,1]. These parameters include all remaining parameters that involve the stages, chuck, and leveler, global alignment, local alignment, wafer loading, RMS, illumination and focus, interfaces, file control, and history questions.

Guide to Entering Data within the MODE Program

During the MODE program, when prompts are displayed on the monitor, any current data corresponding to the prompt is also displayed. To retain the data displayed at the prompt, press RETURN. To change the data, enter the new value, then press RETURN.

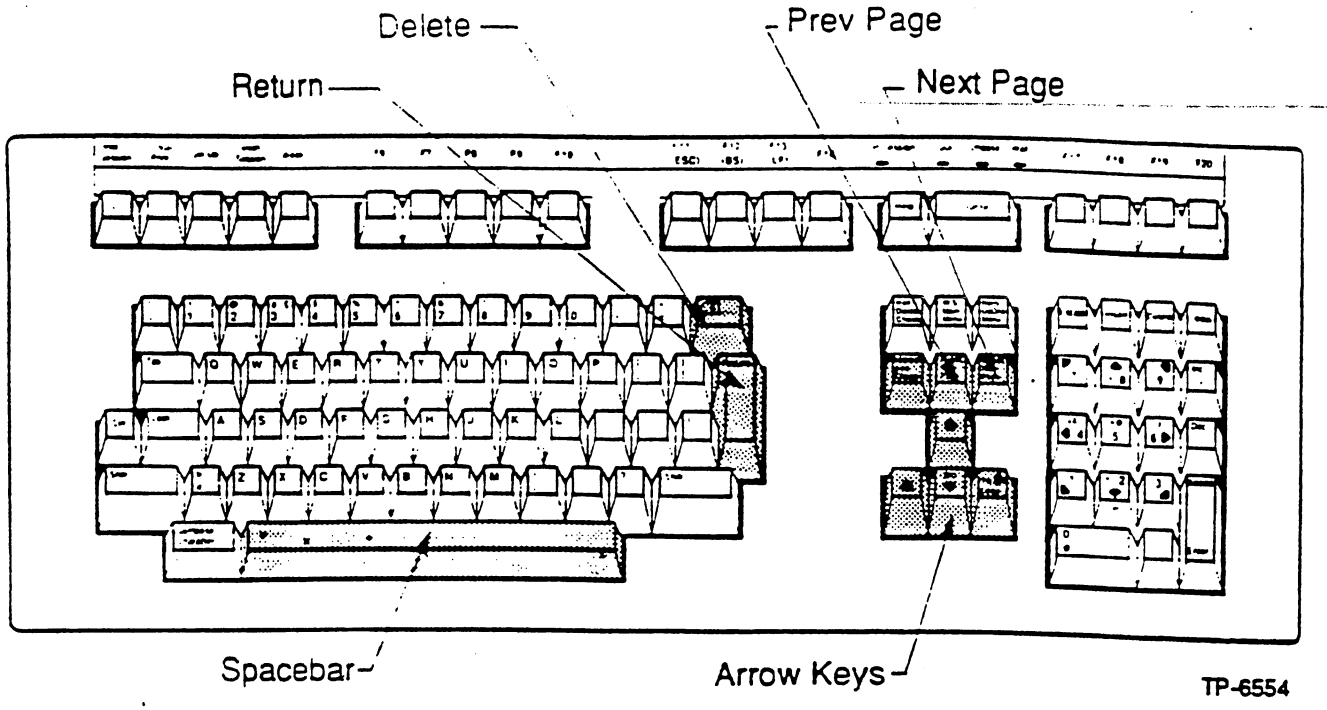

Figure 6-1
VT340 Keyboard

The following keys are helpful when using the MODE program (Figure 6-1):

- RETURN: Inputs the newly entered data, or retains the current data
- The arrow keys: Select an option from a menu
- DELETE: Deletes a character when entering or editing data
- PREV PAGE: Moves backward one screen when using the screens
- NEXT PAGE: Moves forward one screen when using the screens
- The spacebar: Returns to the main menu from the screens

Using the Menus and Screens within MODE

Figure 6-2 is a flowchart showing the menus and screens within MODE.

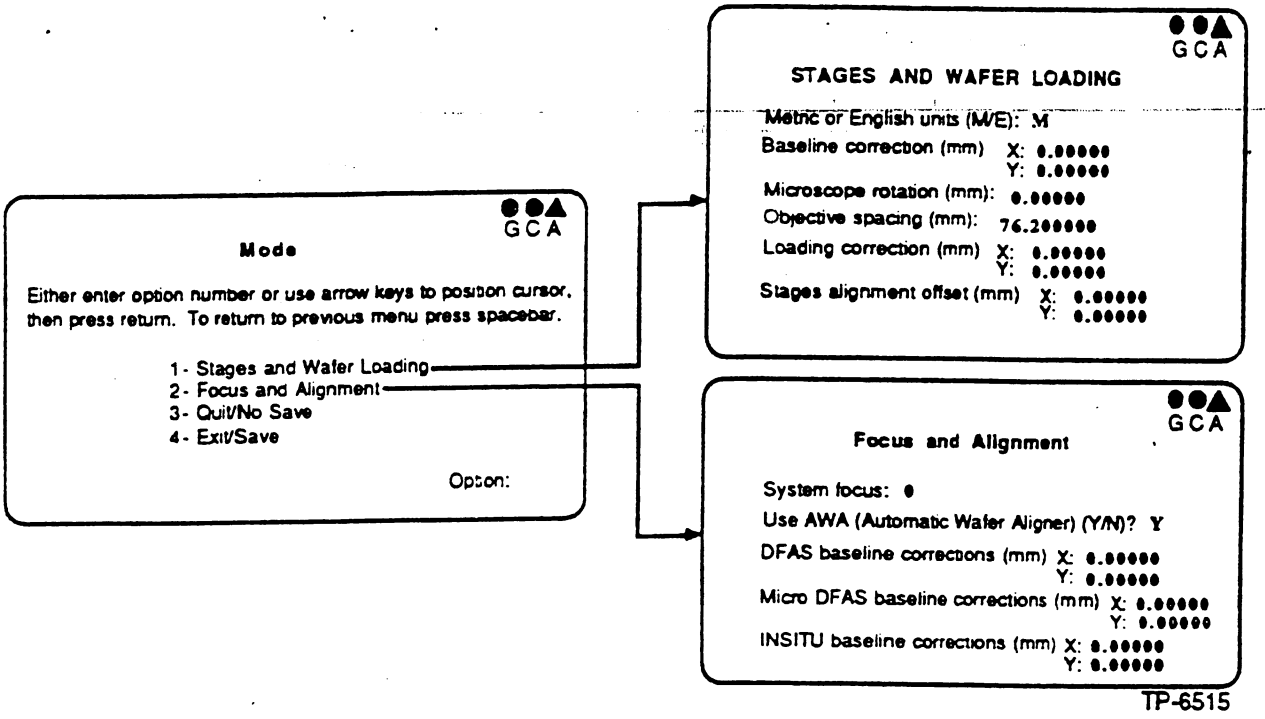

Figure 6-2
Flowchart of MODE Menu and Screens

The MODE Main Menu

Access the MODE main menu using the following procedure:

1. Log into the system using the procedure in **Section 5 - Setting Up and Powering Up the System.**
2. At the system prompt (:), enter MODE, then press RETURN. The system then displays the MODE main menu (Figure 6-3):

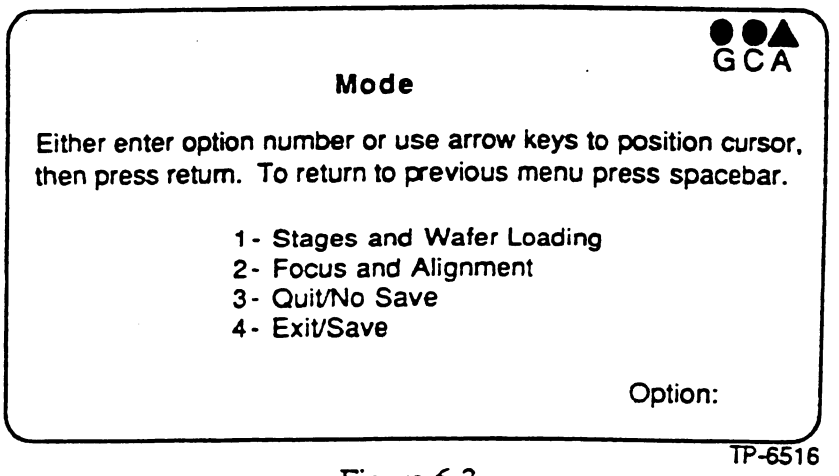

Figure 6-3
MODE Main Menu

Each of the MODE main menu selections is outlined below. Details of the screens are in the remainder of this section.

- **1 - Stages and Wafer Loading**, accesses a screen that sets parameters such as MODE units, baseline correction, microscope rotation, objective spacing, loading corrections, and stages alignment offset.
- **2 - Focus and Alignment**, accesses a screen that sets parameters such as system focus, AWA usage, DFAS or Micro DFAS baseline corrections, and INSITU baseline corrections.
- 3 - Quit/No Save, quits the function without saving any of the parameters that have been entered, then returns to the MODE main menu.
- 4 - Exit/Save, saves the parameters that have been entered, then exits the function and returns to the MODE main menu.

The Stages and Wafer Loading Screen

Access the Stages and Wafer Loading screen from the MODE main menu, using one of the following procedures:

- Type 1, then press RETURN.
- Use the arrow keys to highlight option 1, then press RETURN.

The system then displays the Stages and Wafer Loading screen similar to the following example (Figure 6-4):

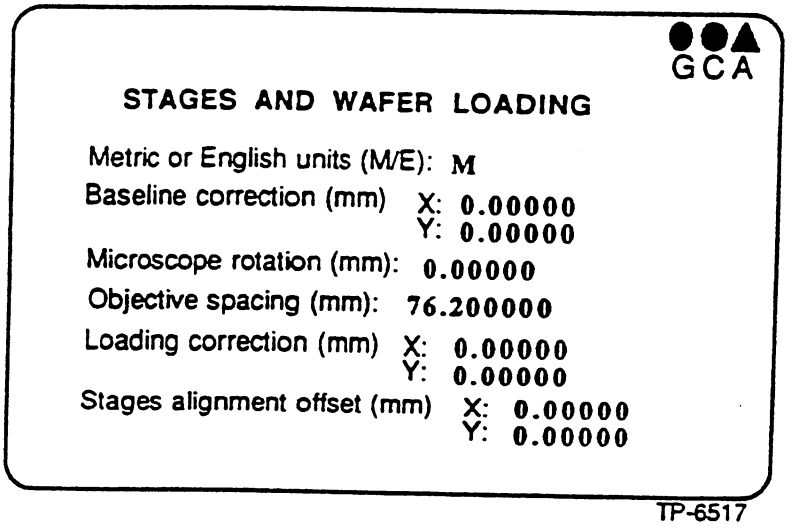

Figure 6-4
Stages and Wafer Loading Screen

Each of the Stages and Wafer Loading screen prompts are described below.

- **Metric or English units (M/E)**, is used to specify the units in which MODE parameters are being entered. Jobs are usually entered in metric units. Either type M, then press RETURN to specify metric units, or type E, then press RETURN to specify English units.

- **Baseline correction (mm) (X and Y)**, adjusts the nominal X/Y position of the wafer alignment microscope. Baseline is the distance between the optical center of the lens and the optical center of the right alignment microscope objective. Enter the desired values for X and Y, then press RETURN.

- **Microscope rotation (mm)**, compensates for any misalignment of the microscope objectives, with respect to the stage mirrors. Enter the appropriate value, then press RETURN.

- **Objective spacing (mm)**, is the exact distance between the wafer alignment microscope objectives. This value must be exact, to ensure proper functioning of the wafer scale feature. This distance is dependent upon wafer size: typically 3in. wafers use a microscope with a 2.5in. (63.5mm) objective spacing, 4in. wafers use a microscope with a 3in. (76.2mm) objective spacing, and 5, 6, and 8in. wafers use a microscope with a 4in. (101.6mm) objective spacing. Enter the appropriate value, then press RETURN.

- **Loading correction (mm) (X and Y)**, compensates for tolerances in the AWH orientation. These loading corrections ensure that the wafer is centered on the wafer chuck when it is loaded. Enter the desired values for X and Y, then press RETURN.

- **Stages alignment offset (mm) (X and Y)**, is used for matching wafer stepper systems during alignment. This correction positions wafer alignment marks under the microscope for alignment. Enter the desired values for X and Y, then press RETURN.

Once responses to the Stages and Wafer Loading prompts have been entered, perform one of the following:

- To continue with the Focus and Alignment screen prompts, press NEXT PAGE.
- To return to the MODE main menu, press the spacebar.

The Focus and Alignment Screen

Access the Focus and Alignment screen by performing one of the following:

- From the MODE main menu, either type 2 then press RETURN, or use the arrow keys to highlight option 2 then press RETURN.
- From the Stages and Wafer Loading screen, press NEXT PAGE.

The system then displays the Focus and Alignment screen similar to the following example (Figure 6-5):

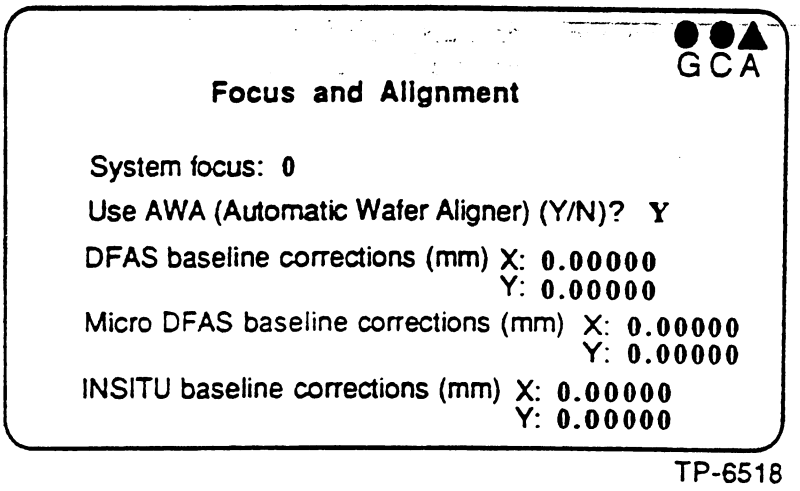

Figure 6-5
Focus and Alignment Screen

Each of the Focus and Alignment screen prompts is described below.

- **System focus**, is *typically* entered as a number between -50 and +50. If a change is desired, enter the number in units of 0.1µm, then press RETURN. (For example, entering 48 would equal a focus change of 4.8µm.) If no change is desired, press RETURN.

- **Use AWA (Automatic Wafer Aligner) (Y/N)**, specifies whether or not the AWA is used during system operation. Enter Y, then press RETURN to specify that the AWA will be used during system operation. Enter N, then press RETURN to specify that the AWA will not be used during system operation.

- **DFAS baseline corrections (mm) (X and Y)**, refer to the distance between the center of the lens and the center of the DFAS objective. Enter the desired values for X and Y, then press RETURN.

- **Micro DFAS baseline corrections (mm) (X and Y)**, refer to the distance between the center of the lens and the center of the Micro DFAS objective. Enter the desired values for X and Y, then press RETURN.

- **INSITU baseline corrections (mm) (X and Y)**, refer to the alignment from the left-hand objective of the wafer alignment microscope, to the center of the lens. Enter the desired values for X and Y, then press RETURN.

Once responses to the Focus and Alignment prompts have been entered, perform one of the following:

- To return to the Stages and Wafer Loading screen, press PREV PAGE.
- To return to the MODE main menu, press the spacebar.

Using the Menus and Screens within Supervisor MODE

Figure 6-6 is a flowchart showing the menus and screens within MODE.

NOTE: Depending on system configuration, some of the following screens, prompts, or menu selections will not appear on the monitor.

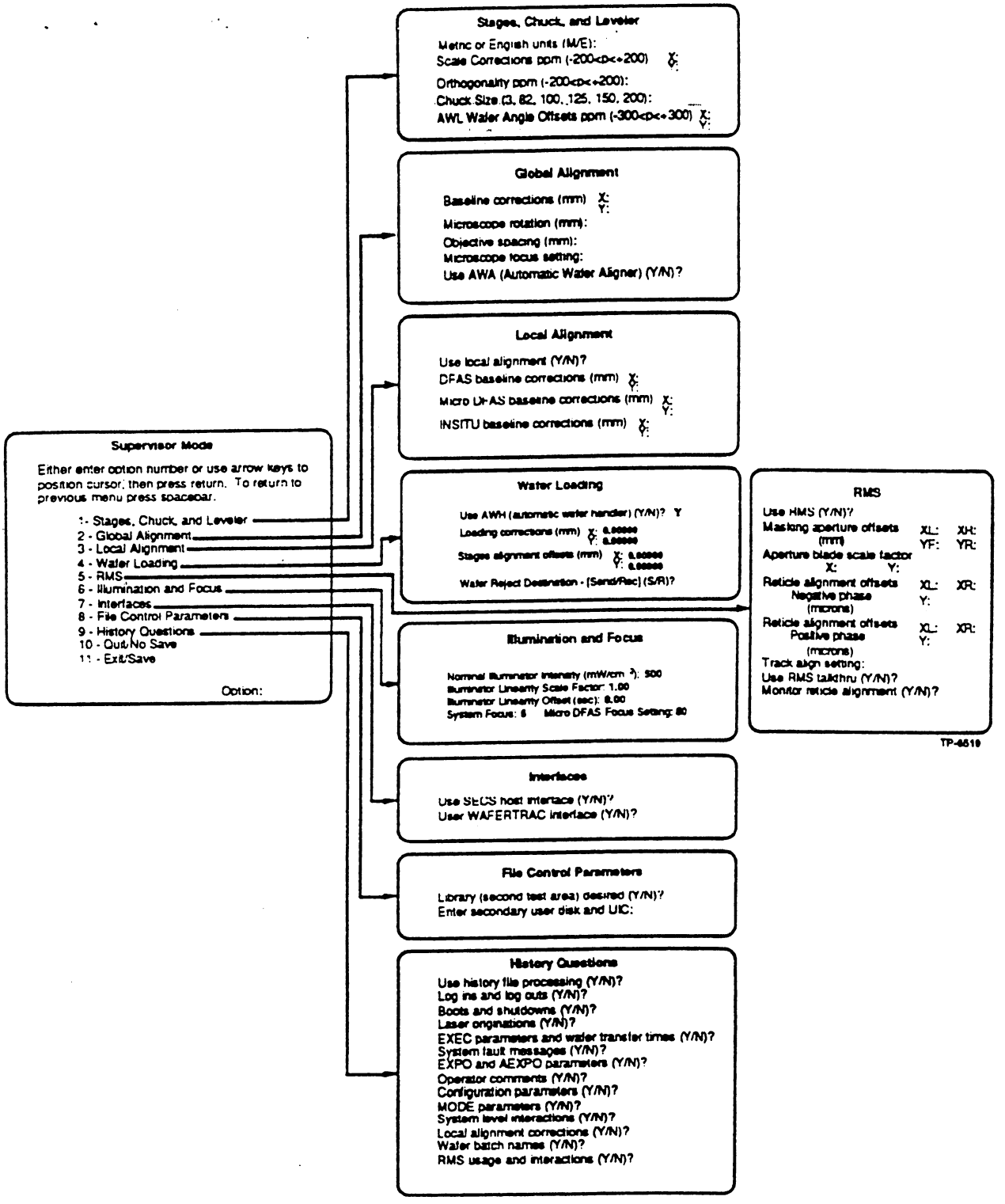

Figure 6-6
Flowchart of Supervisor MODE Menu and Screens

The Supervisor MODE Main Menu

Access the Supervisor MODE main menu using the following procedure:

1. Log into the system using the procedure in **Section 5 - Setting Up and Powering Up the System**. Use the account number [10,1] to enter the supervisor mode.
2. At the system prompt (:), enter **MODE**, then press RETURN.

The system then displays the Supervisor MODE main menu (Figure 6-7):

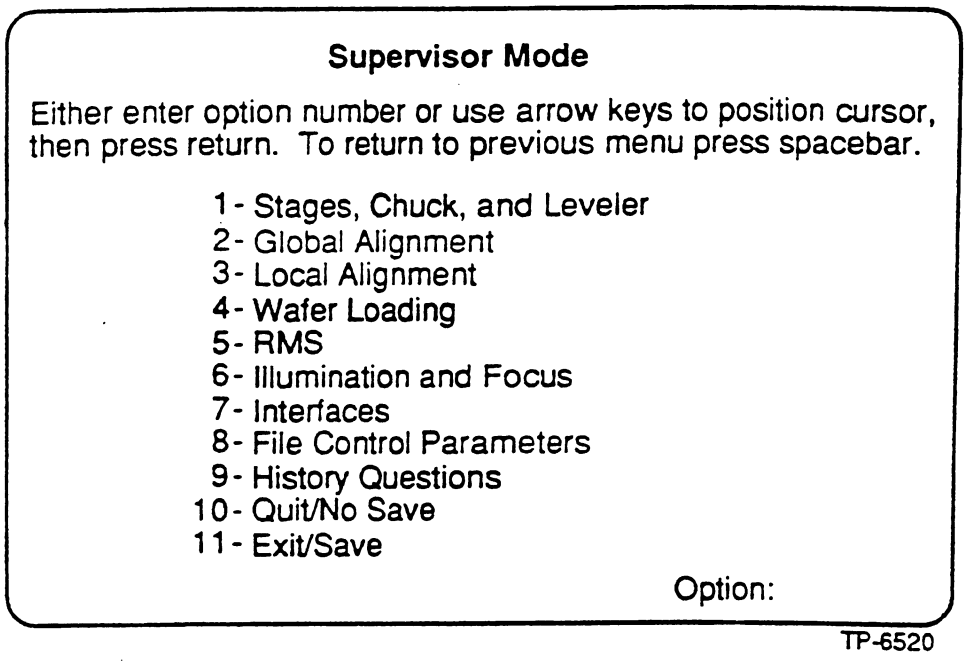

Figure 6-7
Supervisor MODE Main Menu

Each of the Supervisor MODE main menu selections is outlined below. Details of the screens are in the remainder of this section.

- **1 - Stages, Chuck, and Leveler**, accesses a screen that sets the unit of measure, scale corrections, orthogonality, chuck size, and AWL wafer angle offsets.
- **2 - Global Alignment**, accesses a screen that sets baseline correction, microscope rotation, objective spacing, microscope focus setting, and whether or not the system will use AWA.
- **3 - Local Alignment**, accesses a screen that sets the DFAS baseline corrections, Micro DFAS baseline corrections, INSITU baseline corrections, and whether or not the system will use local alignment.

- **4 - Wafer Loading**, accesses a screen that determines whether or not the system will use AWH, and sets the loading corrections, and stages alignment offset.
- **5 - RMS**, accesses a screen that sets the masking aperture offsets, reticle alignment offsets, track align setting, and whether or not the system will monitor reticle alignment and use RMS talkthru.
- **6 - Illumination and Focus**, accesses a screen that sets the illumination linearity scale factor and offset, system focus, and Micro DFAS focus setting.
- **7 - Interfaces**, accesses a screen that determines whether or not the system will use a SECS host interface or a WAFERTRAC interface during system operation.
- **8 - File Control Parameters**, accesses a screen that determines whether to use a library, and indicates the secondary user disk and UIC.
- **9 - History Questions**, accesses a screen that determines whether or not the system will use history file processing, to record log ins and log outs, boots and shutdowns, laser originations, EXEC parameters and wafer transfer times, system fault messages, EXPO and AEXPO parameters, configuration parameters, MODE parameters, system level interactions, local alignment corrections, wafer batch names, and RMS usage and interactions.
- **10 - Quit/No Save**, quits the function without saving any of the parameters that have been entered, then returns to the Supervisor MODE main menu.
- **11- Exit/Save**, saves the parameters that have been entered, then exits the function and returns to the Supervisor MODE main menu.

The Stages, Chuck, and Leveler Screen

Display the Stages, Chuck, and Leveler screen from the Supervisor MODE main menu, using one of the following procedures:

- Type **1**, then press RETURN.
- Use the arrow keys to highlight option 1, then press RETURN.

The system then displays the Stages, Chuck, and Leveler screen similar to the following example (Figure 6-8):

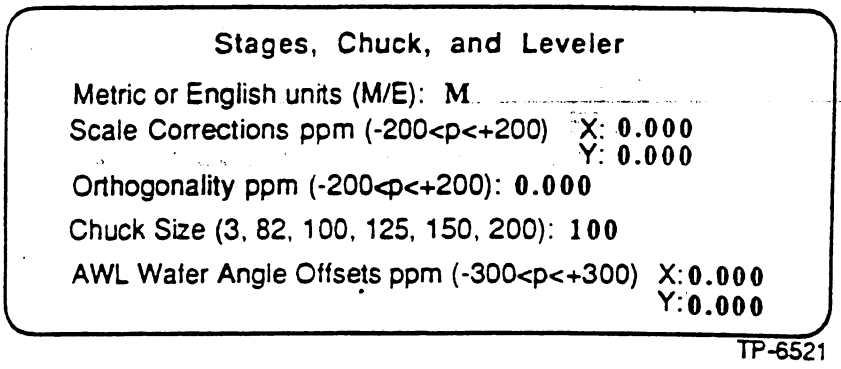

Figure 6-8
Stages, Chuck, and Leveler Screen

Each of the Stages, Chuck, and Leveler screen prompts is described below.

- **Metric or English units (M/E)**, specifies the units in which MODE parameters are being entered. Jobs are usually entered in metric units. Either type M, then press RETURN to specify metric units, or type E, then press RETURN to specify English units.

- **Scale Corrections ppm (-200<p<+200) (X and Y)**, are used to calibrate the stage stepping for system matching. The center of both scale and orthogonality adjustments is the image containing the right alignment die. To change the scale corrections, enter the desired values for X and Y (a positive value increases the center-to-center distance, while a negative value decreases the center-to-center distance), then press RETURN. If no change in scale corrections is necessary, press RETURN.

- **Orthogonality ppm (-200<p<+200) (X and Y)**, refers to the ability of the X and Y stages to move perpendicularly to each other. Orthogonality is also used when matching systems. This software correction compensates for the stage motions, so that they move perpendicularly. This correction is typically supplied with the system at the time of installation, and can be checked using the local alignment system. To enter or change the orthogonality correction, enter the desired values for X and Y, then press RETURN. If no change is desired, press RETURN.

- **Chuck Size (3, 82, 100, 125, 150, 200)**, locates the center of the chuck relative to the center of the stage motion. Enter the appropriate value, then press RETURN.

- **AWL Wafer Angle Offsets ppm (-300<p<+300) (X and Y)**, enable an offset for the leveler. This offset compensates for minor tips in the optical column. Enter the desired values for X and Y, then press RETURN.

After entering responses to the Stages, Chuck, and Leveler screen prompts, perform one of the following:

- To continue with the Global Alignment screen prompts, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To move to the History Questions screen, press PREV PAGE.

The Global Alignment Screen

Display the Global Alignment screen by performing one of the following:

- From the Supervisor MODE main menu, either type 2, then press RETURN, or use the arrow keys to highlight option 2, then press RETURN.
- From the Stages, Chuck, and Leveler screen, press NEXT PAGE.
- From the Local Alignment screen, press PREV PAGE.

The system then displays the Global Alignment screen similar to the following example (Figure 6-9):

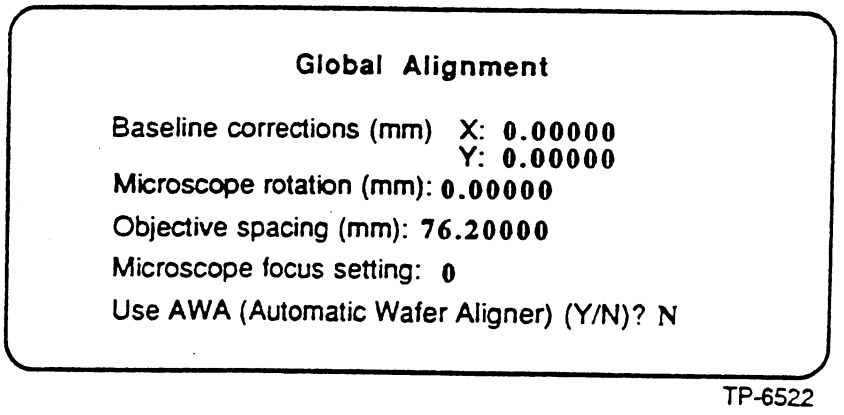

Figure 6-9
Global Alignment Screen

Each of the Global Alignment screen prompts is described below.

- **Baseline corrections (mm) (X and Y)**, adjusts the nominal X/Y position of the wafer alignment microscope. Baseline is the distance between the optical center of the lens and the optical center of the right alignment microscope objective. Enter the desired values for X and Y, then press RETURN.

- **Microscope rotation (mm)**, compensates for any misalignment of the microscope objectives, with respect to the stage mirrors. Enter the appropriate value, then press RETURN.

- **Objective spacing (mm)**, is the exact distance between the wafer alignment microscope objectives. This value must be exact, to ensure proper functioning of the wafer scale feature. This distance is dependent upon wafer size: typically 3in. wafers use a microscope with a 2.5in. (63.5mm) objective spacing, 4in. wafers use a microscope with a 3in. (76.2mm) objective spacing, 5, 6, and 8in. wafers use a microscope with a 4in. (101.6mm) objective spacing. Enter the appropriate value, then press RETURN.

- **Microscope focus setting**, specifies the focus setting for the microscope. The nominal value is 0. Each unit corresponds to a 0.1µm shift. Enter the desired value, then press RETURN.

- **Use AWA (Automatic Wafer Aligner) (Y/N)**, specifies whether or not the AWA is used during system operation. Enter Y, then press RETURN if the system will be using the AWA during system operation. Enter N, then press RETURN either if the wafers will be manually aligned and exposed, or if the AWA will be manually executed during system operation.

After entering responses to the Global Alignment screen prompts, perform one of the following:

- To continue with the Local Alignment screen prompts, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To return to the Stages, Chuck, and Leveler screen, press PREV PAGE.

The Local Alignment Screen

Display the Local Alignment screen by performing one of the following:

- From the Supervisor MODE main menu, either type 3, then press RETURN, or use the arrow keys to highlight option 3, then press RETURN.
- From the Global Alignment screen, press NEXT PAGE.
- From the Wafer Loading screen, press PREV PAGE.

The system then displays the Local Alignment screen similar to the following example (Figure 6-10):

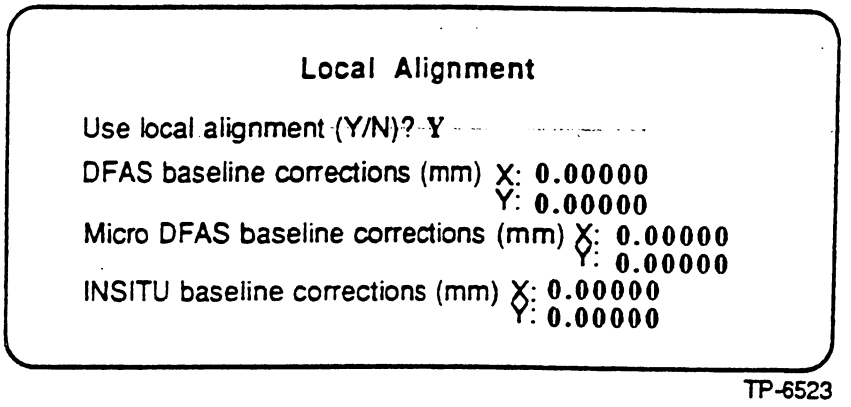

Figure 6-10
Local Alignment Screen

Each of the Local Alignment screen prompts is described below.

- **Use local alignment (Y/N)**, specifies whether local alignment is used during system operation. Enter Y, then press RETURN if the system will be using local alignment during system operation. Enter N, then press RETURN if the system will not be using local alignment during system operation. If N is entered, the screen will not display any of the remaining prompts on the local alignment screen.

- **DFAS baseline corrections (mm) (X and Y)**, refers to the distance between the center of the lens and the center of the DFAS objective. Enter the desired values for X and Y, then press RETURN.

- **Micro DFAS baseline corrections (mm) (X and Y)**, refers to the distance between the center of the lens and the center of the Micro DFAS objective. Enter the desired values for X and Y, then press RETURN.

- **INSITU baseline corrections (mm) (X and Y)**, refers to the alignment from the left-hand objective of the wafer alignment microscope to the center of the lens. Enter the desired values for X and Y, then press RETURN.

After entering responses to the Local Alignment screen prompts, perform one of the following:

- To continue with the Wafer Loading screen prompts, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To return to the Global Alignment screen, press PREV PAGE.

The Wafer Loading Screen

Display the Wafer Loading screen by performing one of the following:

- From the Supervisor MODE main menu, either type **4**, then press RETURN, or use the arrow keys to highlight option 4, then press RETURN.
- From the Local Alignment screen, press NEXT PAGE.
- From the RMS screen, press PREV PAGE.

The system then displays the Wafer Loading screen similar to the following example (Figure 6-11):

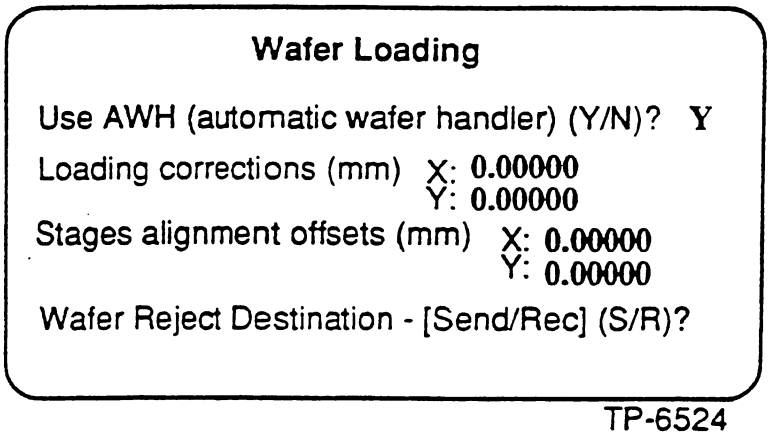

Figure 6-11
Wafer Loading Screen

Each of the Wafer Loading screen prompts is described below.

- **Use AWH (automatic wafer handler) (Y/N)**, specifies whether or not the AWH is used during system operation. Enter **Y**, then press RETURN if the AWH will be used during system operation. Enter **N**, then press RETURN if the AWH will not be used during system operation.

- **Loading corrections (mm) (X and Y)**, compensate for tolerances in the AWH orientation. These loading corrections ensure that the wafer is centered on the wafer chuck when it is loaded. Enter the desired values for X and Y, then press RETURN.

- **Stages alignment offsets (mm) (X and Y)**, are used for matching wafer stepper systems during alignment. This correction positions wafer alignment marks under the microscope for alignment. Enter the desired values for X and Y, then press RETURN.

- **Wafer Reject Destination** permits the user to determine the destination of a wafer when it is rejected. By selecting the S option,

the wafer is returned to the pre-align station for removal by the user. If the R option is selected, the wafer is placed on the receive holding station for removal by the user.

After entering responses to the Wafer Loading prompts, perform one of the following:

- To continue with the RMS screen prompts, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To return to the Local Alignment screen, press PREV PAGE.

The RMS Screen

Display the RMS screen by performing one of the following:

- From the Supervisor MODE main menu, either type 5, then press RETURN, or use the arrow keys to highlight option 5, then press RETURN.
- From the Wafer Loading screen, press NEXT PAGE.
- From the Illumination and Focus screen, press PREV PAGE.

The system then displays the RMS screen similar to the following example (Figure 6-12):

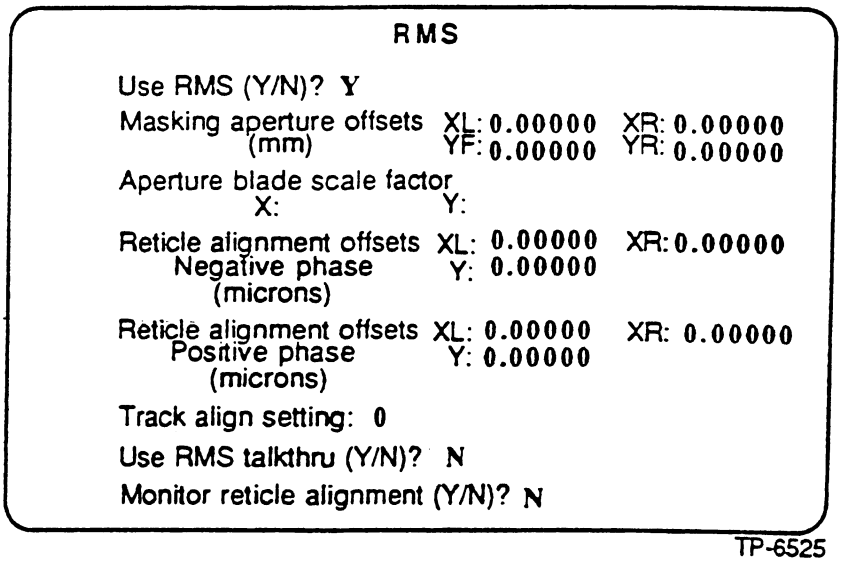

Figure 6-12
RMS Screen

Each of the RMS screen prompts is described below.

- **Use RMS (Y/N)**, specifies whether or not the RMS is used during system operation. Enter Y, then press RETURN if the Reticle Management System (RMS) will be used during system operation.

Enter N, then press RETURN if the RMS will not be used during system operation. When N is entered, the remaining prompts within the RMS screen do not appear.

- **Masking aperture offsets (mm) (XL, XR, YF and YR)**, specifies the offsets for the 4 masking aperture blades. Aperture blades enable any part of the reticle (containing information such as the reticle bar code, nomenclature, etc.) to be masked. Due to tolerances, these blades do not align to an ideal location. The four masking aperture offsets (left, right, front and back) induce the required offset. Enter the desired masking aperture offset values for XL, XR, YF, and YR, then press RETURN.

- **Aperture blade scale factor (X and Y)**, allows the operator to modify the blade travel relative to the distance between the platen and the blades. Enter the desired values, then press RETURN.

- **Reticle alignment offsets Negative Phase (microns) (XL, XR and Y)**, modify the placement of the reticle by the RMS onto the reticle platen: either the lateral motion or the reticle rotation can be modified as required. Enter the desired reticle alignment offset values for XL, XR, and Y, then press RETURN.

- **Reticle alignment offsets Positive Phase (microns) (XL, XR and Y)**, modify the placement of the reticle by the RMS onto the reticle platen: either the lateral motion or the reticle rotation can be modified as required. Enter the desired reticle alignment offset values for XL, XR, and Y, then press RETURN.

- **Track align setting**, sets the column at the proper height when loading or unloading a reticle. This value is set by an authorized GCA field service representative. Enter the desired value (a positive value increases, while a negative value decreases), then press RETURN.

- **Monitor reticle alignment (Y/N)**, specifies when the system checks reticle alignment. Enter Y, then press RETURN to instruct the system to check reticle alignment before each pass is exposed. Enter N, then press RETURN to instruct the system to check reticle alignment only when the RMS is loaded.

- **Use RMS talkthru (Y/N)**, specifies whether or not RMS commands are used for troubleshooting. Enter Y, then press RETURN when RMS commands are to be used for troubleshooting. (During job execution, the **RMS>** prompt will be displayed when the RMS encounters a problem.) Enter N, then press RETURN when RMS commands are not required.

After entering responses to the RMS prompts, perform one of the following:

- To continue with the Illumination and Focus screen prompts, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To return to the Wafer Loading screen, press PREV PAGE.

The Illumination and Focus Screen

Display the Illumination and Focus screen by performing one of the following:

- From the Supervisor MODE main menu, either type 6, then press RETURN, or use the arrow keys to highlight option 6, then press RETURN.
- From the RMS screen, press NEXT PAGE.
- From the Interfaces screen, press PREV PAGE.

The system then displays the Illumination and Focus screen similar to the following example (Figure 6-13):

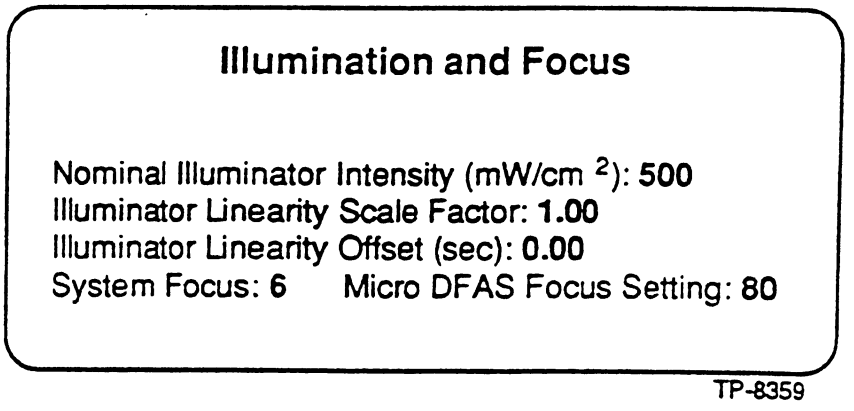

Figure 6-13
Illumination and Focus Screen

Each of the Illumination and Focus screen prompts is described below.

NOTE: Refer to **Section 13 - Achieving the Best System Performance** for complete information on Dose Control Parameters and the use of the the Illumination and Focus screen parameters.

- **Nominal Illuminator Intensity,** allows the user to change the nominal illuminator intensity value. The energy output of the MAXIMUS 2000 can be targeted to this value. The range of value is 200 to 700 mW/cm^2. The default setting is 500 mW/cm^2.

- **Illumination Linearity Scale Factor,** allows the user to adjust the shutter opening duration as follows:

job exposure x illumination linearity scale factor = total exposure

- **Illumination Linearity Offset (sec),** shifts exposure time so that measured energy is equal to calculated energy throughout all ranges of exposure time within 2%.

- **System focus,** specifies the system focus. The system focus value is *typically* entered as a number between -50 and +50. To make a change, enter the number in units of 0.1micron, then press RETURN. (For example, entering 48 would equal a focus change of 4.8µm.) If no change is desired, press RETURN.

- **Micro DFAS focus setting,** is the absolute focus setting for the best Micro DFAS performance. To make a change, enter the number in units of 0.1micron, then press RETURN. If no change is desired, press RETURN.

After entering responses to the Illumination and Focus prompts, perform one of the following:

- To continue with the Interfaces screen, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To return to the RMS screen, press PREV PAGE.

The Interfaces Screen

Display the Interfaces screen by performing one of the following:

- From the Supervisor MODE main menu, either type 7, then press RETURN, or use the arrow keys to highlight option 7, then press RETURN.
- From the Illumination and Focus screen, press NEXT PAGE.
- From the File Control Parameters screen, press PREV PAGE.

The system then displays the Interface screen similar to the following example (Figure 6-14):

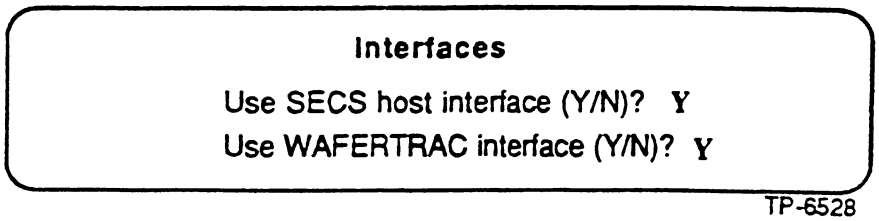

Figure 6-14
Interfaces Screen

Each of the Interfaces screen prompts are described in the following paragraphs.

NOTE: The *Use SECS Host Interface (Y/N)* option within the Interfaces Screen is not supported in Version 7.3 AUTOSTEP 200 system software.

- **Use SECS host interface (Y/N)**, is not currently used during system operation. Enter **N**, then press RETURN.

- **Use WAFERTRAC interface (Y/N)**, specifies whether or not the system uses a WAFERTRAC interface during system operation. Enter **Y**, then press RETURN if the system will be using a WAFERTRAC interface during system operation. Enter **N**, then press RETURN if the system will not be using a WAFERTRAC interface during system operation.

After entering responses to the Interfaces prompts, perform one of the following:

- To continue with the File Control Parameters screen, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To return to the Illumination and Focus screen, press PREV PAGE.

The File Control Parameters Screen

Display the File Control Parameters screen by performing one of the following:

- From the Supervisor MODE main menu, either type **8**, then press RETURN, or use the arrow keys to highlight option 8, then press RETURN.
- From the Interfaces screen, press NEXT PAGE.
- From the History Questions screen, press PREV PAGE.

The system then displays the File Control Parameters screen similar to the following example (Figure 6-15):

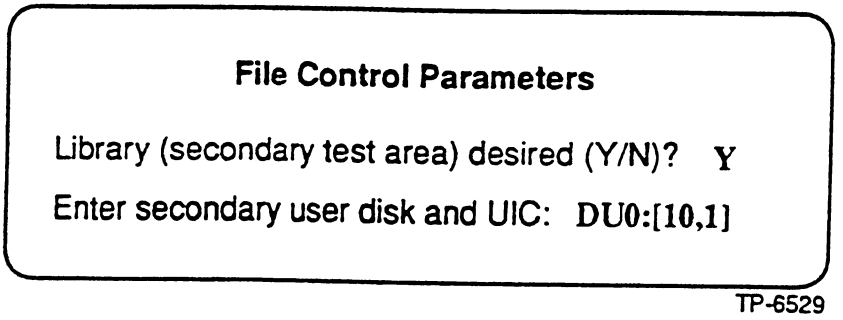

Figure 6-15
File Control Parameters Screen

Each of the File Control Parameters screen prompts are described in the following paragraphs.

- **Library (secondary test area) desired (Y/N)**, specifies whether or not a library is used. Enter Y, then press RETURN if a library will be used. Enter N, then press RETURN if a library will not be used.

- **Enter secondary user disk and UIC**, specifies the disk drive and the account where the secondary area is desired. Enter the desired area, then press RETURN (for example, enter **DU1:[10,1]** RETURN).

After entering responses to the File Control Parameters prompts, perform one of the following:

- To continue with the History Questions screen, press NEXT PAGE.
- To return to the Supervisor MODE main menu, press the spacebar.
- To return to the Interfaces screen, press PREV PAGE.

The History Questions Screen

Display the History Questions screen by performing one of the following:

- From the Supervisor MODE main menu, either type 9, then press RETURN, or use the arrow keys to highlight option 9, then press RETURN.
- From the File Control Parameters screen, press NEXT PAGE.
- From the Stages, Chuck, and Leveler screen, press PREV PAGE.

The system then displays the History Questions screen similar to the following example (Figure 6-16):

```
                History Questions
Use history file processing (Y/N)? Y
Log ins and log outs (Y/N)? N
Boots and shutdowns (Y/N)? N
Laser originations (Y/N)? N
EXEC parameters and wafer transfer times (Y/N)? N
System fault messages (Y/N)? N
EXPO and AEXPO parameters (Y/N)? N
Operator comments (Y/N)? N
Configuration parameters (Y/N)? N
MODE parameters (Y/N)? N
System level interactions (Y/N)? N
Local alignment corrections (Y/N)? N
Wafer batch names (Y/N)? N
RMS usage and interactions (Y/N)? N
```

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Figure 6-16
History Questions Screen

Each of the History Questions screen prompts are described in the following paragraphs.

- **Use history file processing (Y/N)**, specifies whether or not history file processing is used. Enter **Y**, then press RETURN when history file processing is required. Enter **N**, then press RETURN when history file processing is not required. When N is entered, the system will not display the remaining prompts within the History Questions screen.

- **Log ins and log outs (Y/N)**, specifies whether or not the system records all log in and log out activity. Enter **Y**, then press RETURN to record each time a user logs into or out of the system. Enter **N**, then press RETURN when it is not necessary to record all log in and log out activity.

- **Boots and shutdowns (Y/N)**, specifies whether or not the system records all boot and shut down activity. Enter **Y**, then press RETURN to record each time the system is either booted or shut down. All responses at this prompt are recorded. Enter **N**, then press RETURN when it is not necessary to record all boot and shutdown activity.

- **Laser originations (Y/N)**, specifies whether or not the system records all laser origination activity. Enter **Y**, then press RETURN to record each time a laser is originated. Enter **N**, then press RETURN when it is not necessary to record each laser origination.

- **EXEC parameters and wafer transfer times (Y/N)**, specifies whether or not the system records all activity regarding wafers processed during a pass. Enter **Y**, then press RETURN to record each time a wafer is processed during a pass. Enter **N**, then press RETURN when it is not necessary to record the EXEC parameters and wafer transfer times each time a wafer is processed during a pass.

The following information is included in the record:

- The time that wafer processing began
- The time that wafer alignment began
- The final alignment corrections for X and Y (on alignment levels only)
- The time that wafer scaling was requested
- The time that wafer scaling began
- The time that wafer exposure began
- The time that wafer exposure ended

- **System fault messages (Y/N)**, specifies whether or not the system records all fault message activity that occurs during system operation. Enter **Y**, then press RETURN to record each time a fault message is displayed on the system monitor, and to record the particular fault that caused the message. Enter **N**, then press RETURN when it is not necessary to record the system fault data.

- **EXPO and AEXPO parameters (Y/N)**, specifies whether or not the system records the parameters set during AEXPO and DEXPO runs during system operation. Enter **Y**, then press RETURN to record the parameters set during AEXPO and DEXPO runs. Enter **N**, then press RETURN when a list of the AEXPO and DEXPO parameters is not required.

- **Operator comments (Y/N)**, specifies whether or not the system records all operator comments during system operation. Enter **Y**, then press RETURN to record any operator comments at any time during system operation. Enter **N**, then press RETURN when operator comments are not required during system operation. When Y is entered to this prompt, the operator can then press the @ key at any time during system operation. This action allows the operator to enter a comment, up to 80 characters long within one line. After each line is entered, press RETURN. Once the entire comment is entered, press RETURN twice.

- **Configuration parameters (Y/N)**, specifies whether or not the system records all activity regarding any system configuration changes. Enter **Y**, then press RETURN to record each time the system configuration is changed, along with the new configuration. Enter **N**, then press RETURN when it is not necessary to record system configuration changes.

- **MODE parameters (Y/N)**, specifies whether or not the system records all activity regarding MODE parameter changes. Enter **Y**, then press RETURN to record all parameters each time the command MODE is entered. Enter **N**, then press RETURN when it is not necessary to record all MODE parameters and entries.

- **System level interactions (Y/N)**, specifies whether or not the system records all system interactions. Enter **Y**, then press RETURN to record *all* system interactions. When Y is entered, each time data is entered into the system, a record is also entered in the history file. Enter **N**, then press RETURN when it is not necessary to record all system interactions.

- **Local alignment corrections (Y/N)**, specifies whether or not the system records all alignment data when local alignment is performed. Enter **Y**, then press RETURN to record when local alignment is performed, for all alignment corrections at each location. Enter **N**, then press RETURN when it is not necessary to record all alignment correction data when local alignment is performed.

- **Wafer batch names (Y/N)**, specifies whether or not the system records all wafer batch names exposed during job execution and EXPO passes. Enter **Y**, then press RETURN to record all wafer batch names exposed during job execution and EXPO passes. After entering Y, when either the command EXEC or EXPO is entered, the system will display the prompt **ENTER BATCH NAME**. Enter **N**, then press

RETURN when it is not necessary to record all wafer batch names exposed during system operation.

- **RMS usage and interactions (Y/N)**, specifies whether or not the system records all commands that are entered when RMS talkthru is enabled. Enter Y, then press RETURN to record all commands that are entered at the **RMS>** prompt when RMS talkthru is enabled. Enter N, then press RETURN when it is not necessary to record all commands that are entered when RMS talkthru is enabled.

After entering responses to the History Questions prompts, perform one of the following:

- To change any data entered in any of the Supervisor MODE screens, press either PREV PAGE or NEXT PAGE until the desired screen appears, then edit the data.
- To return to the Supervisor MODE main menu, press the spacebar.