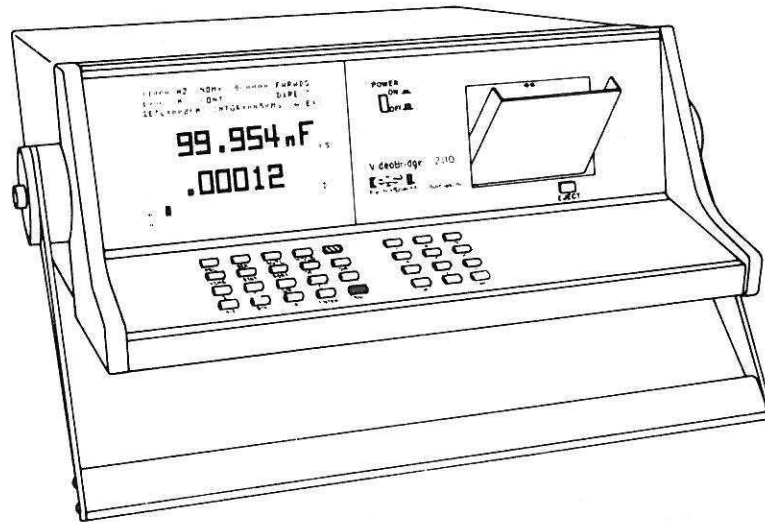# MODEL 2100/2110 VideoBridge

Version 2 Operating System

Manual Supplement

Part Number 51615A   September 1982

TABLE OF CONTENTS

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LIST OF ILLUSTRATIONS

LIST OF TABLES

PREFACE

The Version 2 Manual Supplement is a support document accompanying the Version 2 software package.

This new version software does not affect the basic operation of the instrument, or its calibration and performance tests. However, because there are significant changes to cassette tape operation (Model 2110 only), new error messages, and new remote output formats (GPIB and RS-232C), you should become thoroughly familiar with the changes described in this document.

> **NOTE:** Data recorded on the cassette tapes under Version 1 software will not run under Version 2. To reuse these tapes under Version 2 software you will need to reformat the tapes. Reformatting erases all data stored on the tape leaving a blank tape.

This Supplement is to be used with the Model 2100/2110 Operation and Service Manuals.

SECTION S
SAFETY INFORMATION

S.1 INTRODUCTION

Read and follow the CAUTIONS and WARNINGS in this manual. They are designed to emphasize safety during all phases of operation and maintenance.

S.2 Safety Terms And Meanings:

CAUTION -- Statements identify conditions or practices that could result in damage to the equipment or property.

WARNING -- Statements identify conditions or practices that could result in personal injury or loss of life. In addition, damage to the equipment or other property may result.

S.3 The following WARNINGS appear in this manual:

WARNING

INSTALLATION AND MAINTENANCE PROCEDURES DESCRIBED IN THIS MANUAL SUPPLEMENT ARE TO BE PERFORMED BY QUALIFIED SERVICE PERSONNEL ONLY.

WARNING

REMOVAL OF INSTRUMENT COVERS MAY CONSTITUTE AN ELECTRICAL HAZARD AND SHOULD BE ACCOMPLISHED BY QUALIFIED SERVICE PERSONNEL ONLY.

WARNING

WHEN PERFORMING ANY MAINTENANCE OPERATION, DO NOT REMOVE OR REPLACE CIRCUIT CARDS WHILE THE POWER IS TURNED ON. FAILURE TO TURN POWER OFF MAY RESULT IN ELECTRIC SHOCK OR DAMAGE TO THE INSTRUMENT.

```
            {~~~~~~~~~~~~~}
            {  CAUTION    }
            {~~~~~~~~~~~~~}
```

PARTICULAR CARE MUST BE TAKEN WHEN HANDLING MOS DEVICES, E.G. THE
EPROMS. THESE DEVICES ARE PARTICULARLY SUSCEPTIBLE TO STATIC
FIELDS WHICH CAN DESTROY THE DEVICE.

```
            {~~~~~~~~~~~~~}
            {  CAUTION    }
            {~~~~~~~~~~~~~}
```

USE CARE WHEN INSTALLING INTEGRATED CIRCUITS TO INSERT WITH PIN 1
ORIENTED CORRECTLY AND VERIFY THAT THERE ARE NO BENT PINS WHEN
INSTALLED.

```
            {~~~~~~~~~~~~~}
            {  CAUTION    }
            {~~~~~~~~~~~~~}
```

FORMATTING A TAPE DESTROYS ANY AND ALL DATA WHICH MAY HAVE BEEN
PREVIOUSLY SAVED ON THE TAPE.

S.4 The following WARNING labels appear on the instrument, see Figure
     S-1 for their locations.
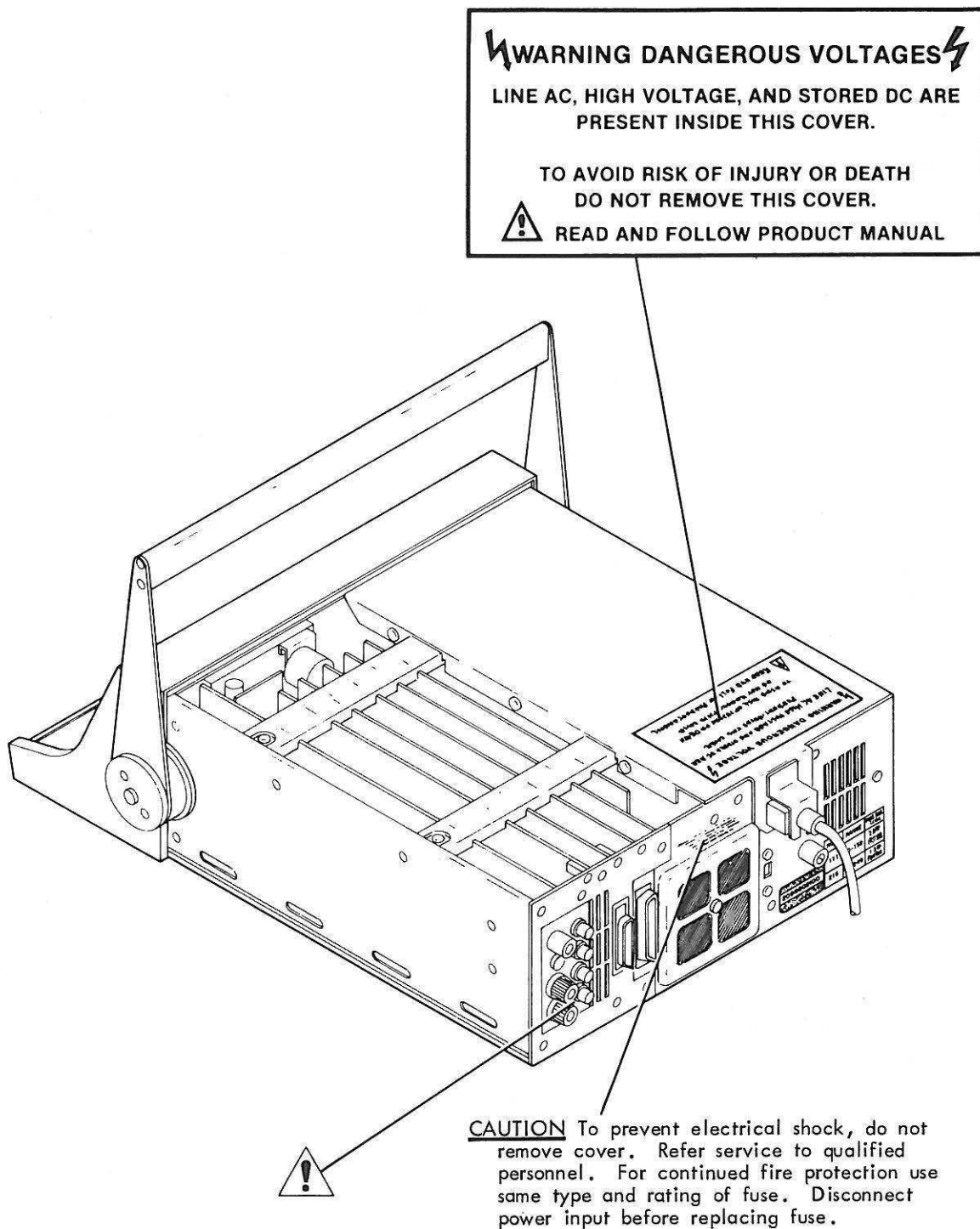
Figure S-1. Warning Label Locations

SECTION C
CONVENTIONS USED IN THIS MANUAL SUPPLEMENT

C.1 INTRODUCTION

Several programming examples are used in this Manual Supplement to clarify the basic descriptions given. These examples use terms that are explained in the following paragraphs.

C.2 TERMS AND MEANINGS

< >   This indicates that a particular key on the VideoBridge keyboard is to be pushed, i.e. push <1> indicates that the key labeled 1 (one) is to be pushed.

<yellow>   This indicates the yellow button is to be pushed.

<A> <B> <C>   This indicates that the letters A,B,C are to be pushed. (Applicable only to special alphanumeric mode.)

{}   Statements contained within these brackets indicate error messages as displayed in reverse video (black letters on green background) at the bottom of the CRT screen. (Refer to Section 2.11 ERROR MESSAGES in the Model 2100/2110 Operation and Service Manuals.)

" "   Statements contained within quotation marks indicate any messages or statements (other than those described above) as they would appear on the main screen of the Model 2100/2110.

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SECTION 1
DESCRIPTION

1.1 INTRODUCTION

Version 2 is a new version of the primary operating system software for ESI's Model 2100/2110 VideoBridges. This new version software replaces Version 1.5 or any previous version.

> **NOTE:** Refer to Section 3.1.2.1 Test Codes in this Manual Supplement for how to determine the software version within your instrument.

Version 2 is available as a field retrofit kit, P/N 51208, for instruments purchased prior to September 1982 with serial number date code of 1180 or later. It is the standard operating system software for instruments with a date code of 1082 or later. Read the following to determine the date code of your instrument.

example:

```
                                        ———————— Date Code

    209 11 80 2100 ————————————— instrument is a Model 2100

                       ———————————— year instrument was built (1980)

                       ———————————— month instrument was built (November)

                       ———————————— instrument was the ninth unit of the
                                      November 1980 production run (all run
                                      numbers start with 200)
```

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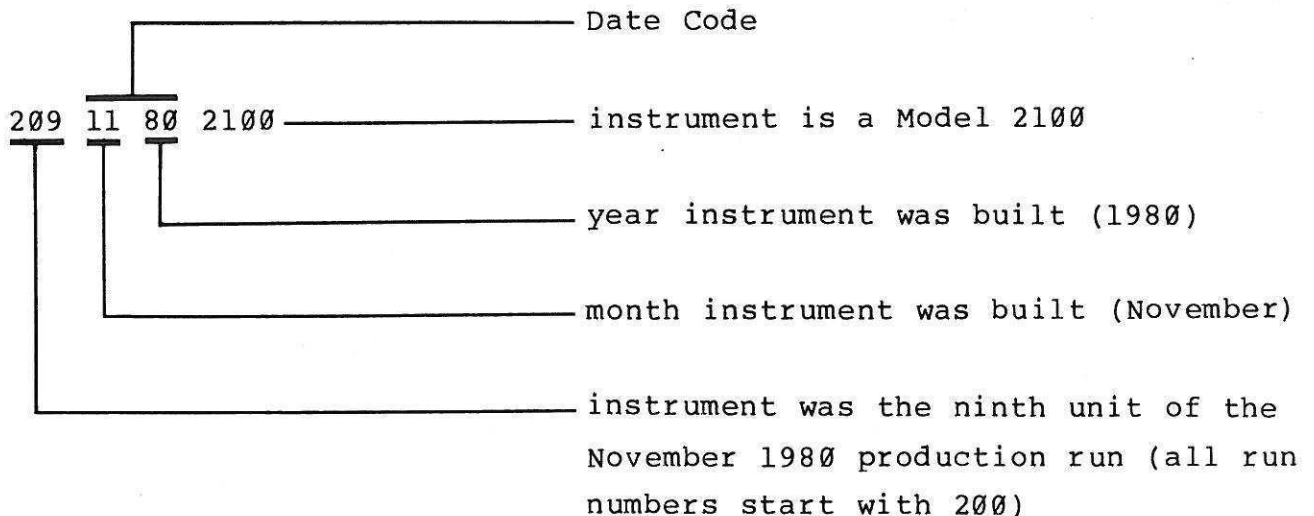
The serial number is located on the rear panel of the instrument.

SERIAL NO
20911802100
ELECTRO SCIENTIFIC INDUSTRIES, INC.
PORTLAND, OREGON, U.S.A.
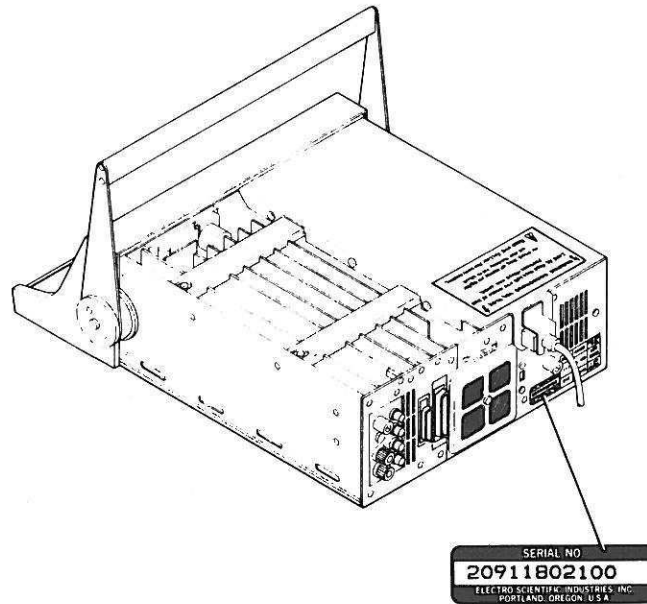
Figure 1-1. Serial Number Location

1.2 FEATURES

Following is a brief summary of the new features contained within this new version software. For additional details refer to Section 3 OPERATION or the Appendix at the end of this Manual Supplement.

1.2.1 Operation and Display

A special feature of the VideoBridge is its ability to read and display the actual test level supplied to the device-under-test. The actual test level may vary from the programmed value because of mismatches that might occur when attempting to use constant voltage on a low impedance device or constant current on a high impedance device. This feature becomes especially important when measuring devices that are sensitive to the test level, or that require a test level per a MIL-SPEC requirement. (For more information refer to Section 3.2 SIGNAL LEVELS in this Manual Supplement.)

1.2.2 Sorting

Sorting operations have been improved, both in ease of operation and for diagnosing setup problems. New sorting features include:

PASS/FAIL test -- (displayed on the screen) for hand operated GO/NO-GO testing.

Reject Bin Assignment -- Test code 15 gives you the ability to separate open-circuit parts and short-circuit parts from other components when sorting parts.

Diagnostics -- Display features that verify operation of the Handler Interface Option or the handler itself. One useful diagnostic feature is the ability to display the BIN number and both the Major and Minor values for the device under test on one screen.

13 Bin Sort -- Test code 25 gives you the capability to sort into two additional bins when using the Handler Interface option.

(For more information refer to Section 3.4 Component Sorting in this Manual Supplement.)

1.2.3 Tape Handling

Cassette tape operations (2110 only) have undergone the most significant changes of all. New features include a tape filing system with a directory, full alphanumeric entries for filenames, file deletions, and a special autostart feature that loads and executes a file automatically when instrument power is turned on. (For more information refer to Section 3.6 CASSETTE TAPE LOADER in this Manual Supplement.)

1.2.4 Options

The software for operating the GPIB (IEEE-488) and RS-232C remote output devices has been changed as follows:

Changes to the GPIB (IEEE-488) interface option include:

    Test Code 24 displays the address set by the 8-position switch on the GPIB Interface Option Circuit Card (P/N 46114).

    Test Code 23 allows devices without serial polling capability to be used as the host computer on the GPIB bus.

Changes to the RS-232C interface option include:

    Test Code 11 outputs VideoBridge status to a printer connected to Channel B of the RS-232C Interface option.

    The RS-232C Interface option is now initialized to honor the Clear-To-Send (CTS) signal.

    NOTE: For proper operation with Version 2 software, the RS-232C Interface option may require the addition of jumper wires to both the RS-232C circuit card P/N 45905 and the RS-232C cable connectors.

New output formatting for both devices appends a three-letter code to the end of each output string. The three-letter code indicates the mode and function of the measurement.

(For more information refer to APPENDIX A OPTIONS OPERATION in this Manual Supplement.)

1.2.5 Accessories

An accessory recommended to make full use of the many new features available to Model 2110 users is described in the following paragraphs.

1.2.5.1 Keyboard Overlay (Model 2110 only) P/N 49839

The Keyboard Overlay accessory, in conjunction with Test Code 20, redefines the main keypad on the VideoBridge. When Test Code 20 is programmed, the Keyboard Overlay provides full alphanumerics for giving meaningful names to tape files or for use with special application tapes where special formatting is required, i.e. user name, date, etc.

> **NOTE:** One Keyboard Overlay (P/N 49839) is supplied with each Version 2 retrofit kit (P/N 51208). (See Section 2 Retrofit Kit Installation in this Manual Supplement.)

(For more information refer to Section 3.1.2.2 Keyboard Overlay in this Manual Supplement.)

SECTION 2
RETROFIT KIT INSTALLATION

2.1 INTRODUCTION

Instruments purchased prior to September, 1982 can be updated to this new version software with a retrofit kit. The retrofit kit consists of a new Memory Expansion circuit card (P/N 46193) one Keyboard Overlay (P/N 49839), and one integrated circuit (2732 EPROM) to be added to the Motherboard. The retrofit kit installation instructions are applicable to both the Model 2100 and the Model 2110.

WARNING

REMOVAL OF INSTRUMENT COVERS MAY CONSTITUTE AN ELECTRICAL HAZARD AND SHOULD BE ACCOMPLISHED BY QUALIFIED SERVICE PERSONNEL ONLY.

2.2 EQUIPMENT REQUIRED

Philips screwdriver

IC removal tool capable of removing Integrated Circuits up to 28 pins in size.

CAUTION

PARTICULAR CARE MUST BE TAKEN WHEN HANDLING MOS DEVICES, E.G. THE EPROMS. THESE DEVICES ARE PARTICULARLY SUSCEPTIBLE TO STATIC FIELDS WHICH CAN DESTROY THE DEVICE.

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2.3 REMOVAL/REPLACEMENT PROCEDURE

STEP 1. Instrument Preparation. Turn instrument power OFF and remove all external connections.

STEP 2. Outer Cover. Remove the five rear panel screws holding the outer cover and slide cover off.
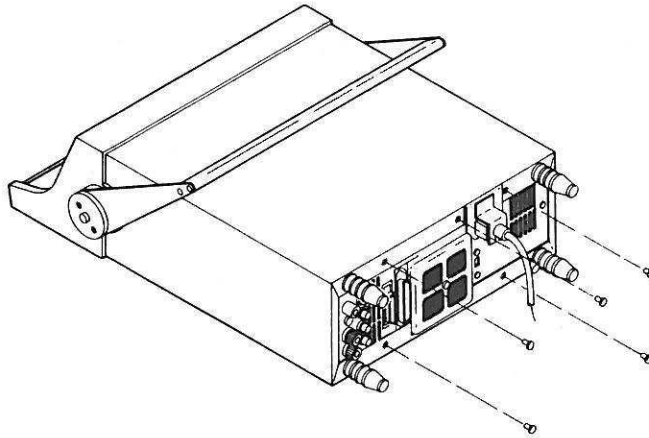
Model 2110 Rear View

STEP 3. Circuit Card Hold-Downs. Remove the screws securing the two plastic circuit card hold-downs and remove.
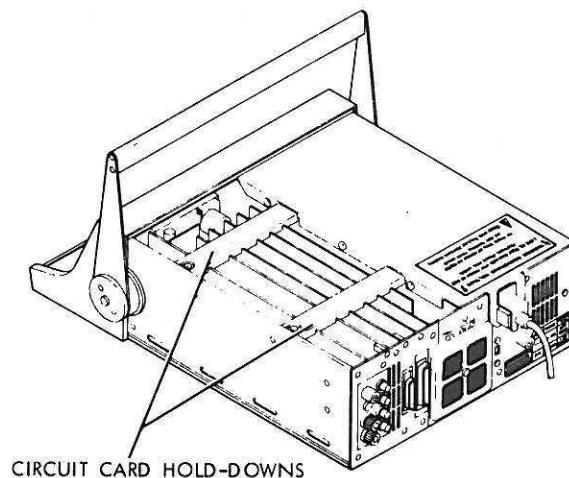
CIRCUIT CARD HOLD-DOWNS

STEP 4. Rear Panel (left side). Remove the eight screws holding the
         rear panel (left side).
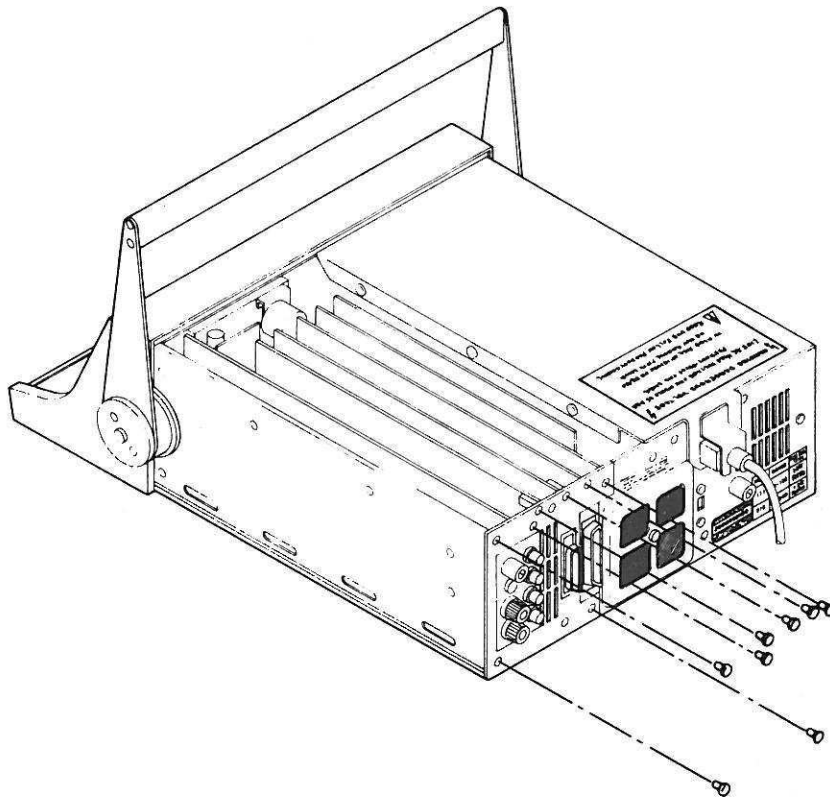
STEP 5. Circuit Assemblies. Remove two screws located on the
         instruments left side. Remove all circuit assemblies.
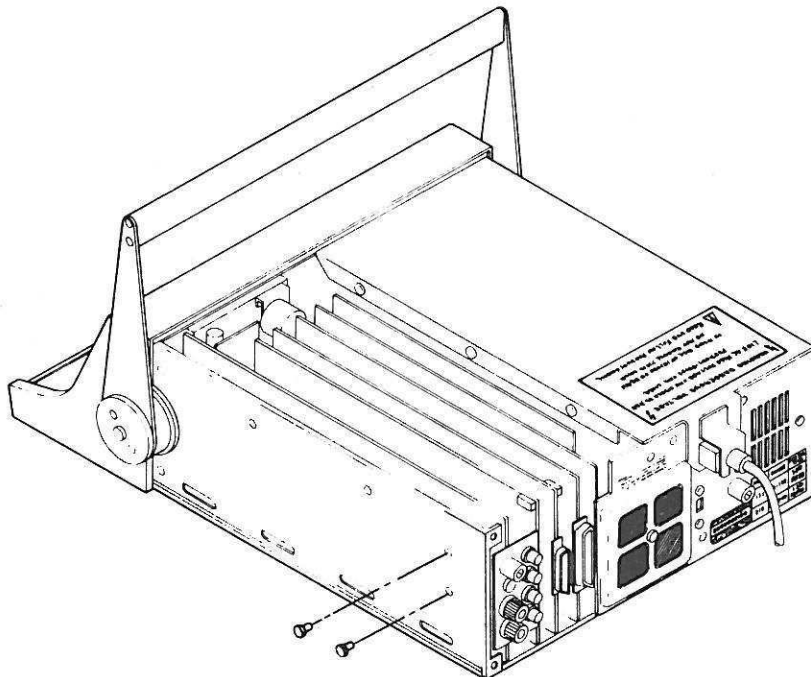
STEP 6. Motherboard. Turn the instrument over to rest top-side down. Remove the eight screws, unplug the keyboard, and hinge the motherboard out of the way.
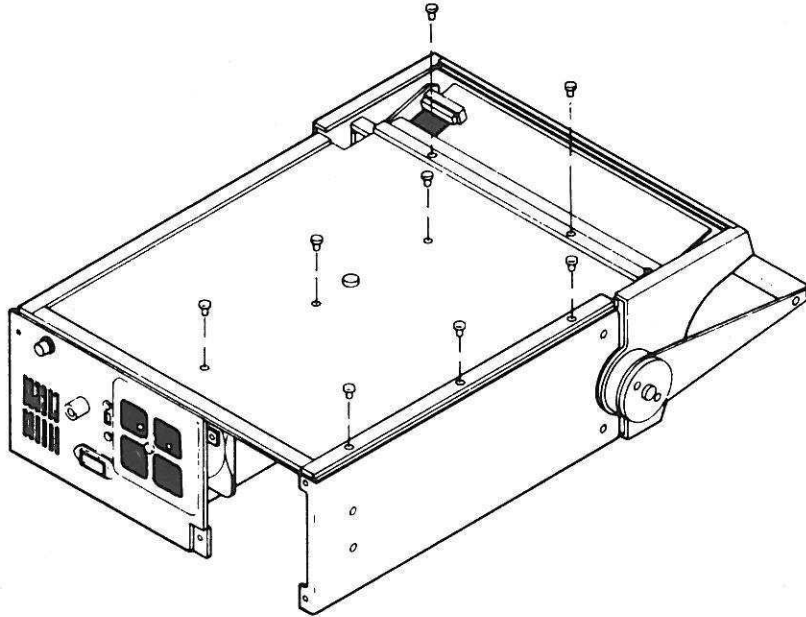
~~~~~~
}   CAUTION   {
~~~~~~

WHEN INSTALLING INTEGRATED CIRCUITS USE CARE TO INSERT WITH PIN 1 ORIENTED CORRECTLY AND VERIFY THAT THERE ARE NO BENT PINS.

STEP 7. Motherboard RAM Replacement. Remove the 24 pin integrated circuit from the location marked U3 on the Motherboard circuit assembly and insert the same part into position marked U5 on the same assembly (see Figure 2-1). Remove the 24 pin integrated circuit from the location marked U4 on the Motherboard circuit assembly and insert the same part into position marked U6 on the same assembly.

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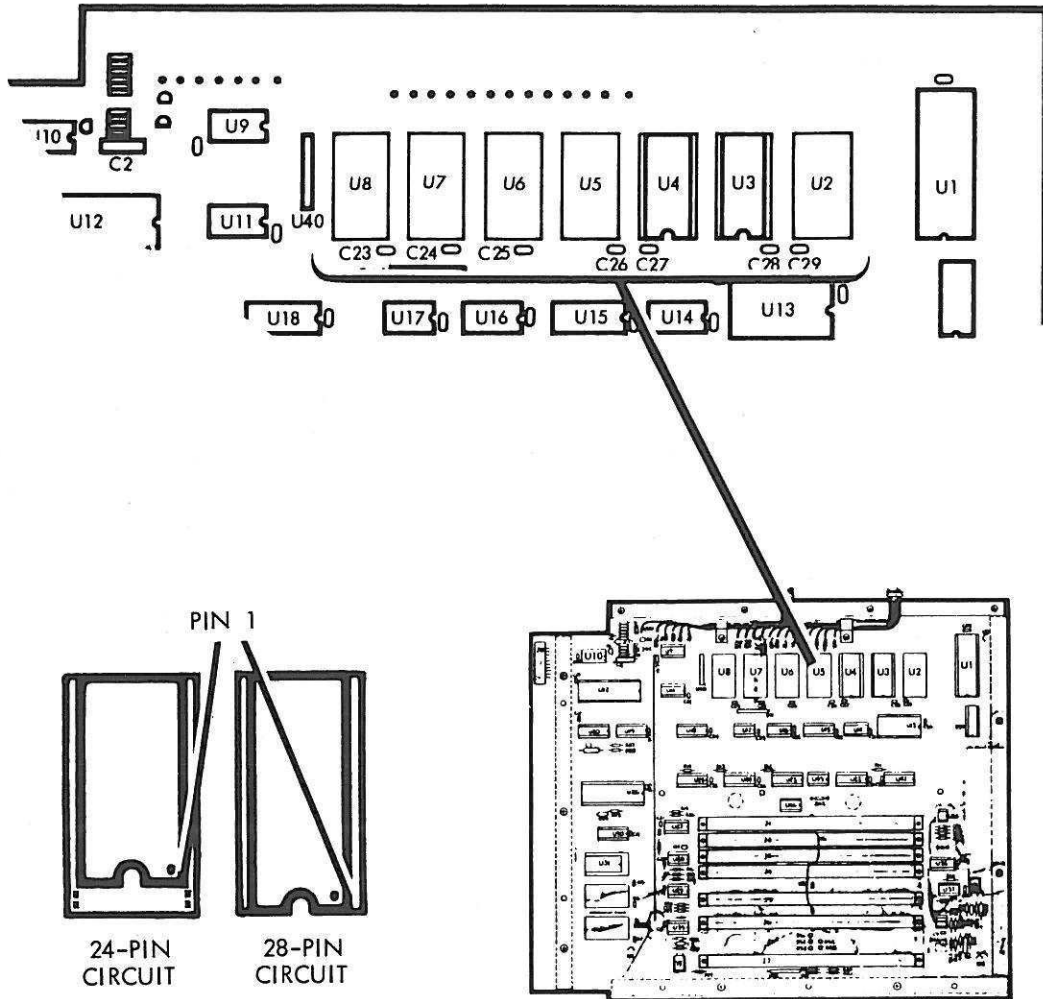
Figure 2-1. Motherboard RAM/EPROM Replacement

STEP 8. EPROM Installation. Remove the 2732 EPROM, provided as part of the retrofit kit, from the conductive foam in which it was shipped and insert it into position marked U3 on the motherboard circuit assembly (see Figure 2-1).

STEP 9. Circuit Card Installation. Perform STEPS 1 through 6 (above) in the reverse order, installing the Memory Expansion circuit card (P/N 46193) provided as part of the retrofit kit in place of the original Memory Expansion circuit card (P/N 47217). (Refer to Section 2.4 Repackaging For Shipment.)

2.4 REPACKAGING FOR SHIPMENT

To complete your exchange with ESI, return the Memory Expansion circuit card (P/N 47217) that was originally shipped with the Model 2100/2110.

To ship back to ESI, remove the plastic bag that is contained within the retrofit kit. The bag is printed with the title RETURN MATERIAL AUTHORIZATION. Follow the directions on the bag. Attach the shipping label contained within the plastic bag, to the package in which the memory card will be returned.

Save and re-use the package in which the retrofit kit was shipped. This package was especially designed for the Memory Expansion circuit card to protect the card during shipment. If the original package is unfit for use or is not available, the package used should be able to withstand 30-40 times the force of gravity (maximum) should it fall or be dropped.

SECTION 3
OPERATION

3.1 FRONT PANEL CONTROLS AND INDICATORS

The following key definitions replace those listed in Section 2.1.1 in the Model 2100/2110 Operation and Service Manuals.

3.1.1 Keyboard and Key Definitions

SORT -- Activates the component sorting mode. Display indicates BIN number or Reject for each component measured. SORT activates the appropriate Handler Interface relay in either SINGLE or CONTINUOUS measurement modes if the Handler Interface is installed. The Bin Counter is activated only in the SINGLE Measurement mode.

G/R -- Conductance (G)/Resistance (R) function key selects S (siemens -- units of conductance) or Ω (ohms -- units of resistance) as the bottom display function. G is selected in parallel equivalent circuit mode. RS is displayed in series equivalent circuit mode when the top display function is not series capacitance. ESR is displayed when series capacitance is selected as the top display function.

3.1.2 Special Functions

3.1.2.1 Test Codes

New test codes have been added to further enhance the operation of the VideoBridge. The following is a list of these new codes and their definitions. (Refer to Section 2.1.1 in the Model 2100/2110 Operation and Service manual for further details on the use of test codes.)

NOTE: These test codes apply to both the Model 2100 and the Model 2110 unless otherwise stated.

TEST CODE NO.	FUNCTION
5	SET RANGE. The instrument will auto-range until it measures a part which is within 20 percent of the specified range value. The instrument will then enter the HOLD mode without operator intervention. (For more information refer to Section 3.3.1 Range Hold in this Manual Supplement.)
7	Software Version. The instrument will display the date and version number of the instrument's software. Available RAM (Random Access Memory) is displayed as a message on the CRT.
-8	Special Handler routine displaying BIN number and both top and bottom display values. Also locks the keyboard. (For more information refer to Section 3.4.3 Handler Mode in this Manual Supplement.)
9 and -9	Keyboard lock. 9 CODE locks all the keys except the SINGLE key. -9 CODE unlocks the keyboard. The keyboard may also be unlocked by one of the following methods:

1. Ground pin 21 on the Handler Interface rear panel connector.

2. Type "UNLOCK" through the GPIB Interface.

3. Type "UNLOCK" through Channel B of the RS-232C Interface.

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TEST CODE NO.	FUNCTION
10 and -10	Remote output (measurement). 10 CODE outputs measured results through Channel B of the RS-232C Interface option at the end of each measurement cycle. -10 CODE clears the remote output command. (For more information refer to Appendix A.1.1 Remote Output in this Manual Supplement.)
11	Remote output (status). Outputs status information from both the direct display and status display of the VideoBridge through Channel B of the RS-232C Interface option. (For more information refer to Appendix A.1.2 Channel B Status Output in this Manual Supplement.)
12	Tape directory (2110 only). Displays the table of contents for a tape. The filenames will be listed with the starting block to the left of the name. (For more information refer to Section 3.5.4.1 Tape Directory in this Manual Supplement.)
13	Load applications programs (2110 only). (For more information refer to Section 3.6.4.2 Load Applications Programs in this Manual Supplement.)
14	Delete a file (2110 only). (For more information refer to Section 3.6.4.3 File Deletion in this Manual Supplement.)

TEST CODE NO.	FUNCTION
15 and -15	15 CODE redefines the binning priority, when sorting capacitors, such that an open-circuit part (low out-of-tolerance) or a short-circuit part (high out-of-tolerance) reading will select BIN 0 rather than BIN REJ which is normally selected during the sorting operation. -15 CODE clears this mode. (For more information on 15 CODE, refer to Section 3.4.4 Binning Priority in this Manual Supplement.)
16	Not used.
17	Not used.
18	Saves 9 CODE (keyboard lockout) on tape (2110 only). To unlock the keyboard after the tape file has been loaded, use -9 CODE. (Refer to Section 3.6.3.3 Keyboard Lock in this Manual Supplement for more information on this feature.)
19	Display last file loaded (2110 only). Upon entering this code, the VideoBridge will display: FILE= {filename}. (For more information refer to Section 3.6.4.4 Last File Loaded in this Manual Supplement.)
20 and -20	Alternate keyboard functions mode (Model 2110 only). 20 CODE redefines the main VideoBridge keyboard to include full alphanumerics. See section 3.1.2.2 Keyboard Overlay for new key definitions. To clear the alternate functions mode and return to the normal (default) functions mode use -20 code.

TEST CODE NO.	FUNCTION
21	GO/NO-GO Mode. The GO/NO-GO mode displays PASS or FAIL symbols on the CRT display. (For more information on 21 CODE refer to Section 3.4.5 GO/NO-GO Mode in this Manual Supplement.)
22	Set Auto Range Hold tolerance. (For more information refer to Section 3.3.1 Range Hold in this Manual Supplement.)
23 and -23	Set special GPIB Poll Mode to reset the SRQ line if the VideoBridge is addressed as a talker. To clear this mode use -23 CODE. (For more information refer to Appendix A.2.4 Special GPIB Poll Mode in this Manual Supplement.)
24	GPIB address. When the GPIB option is installed, the instrument will display the address setting of the switches on the GPIB circuit card (P/N 46114). (For more information refer to Appendix A.2.1 Instrument Address Selection in this Manual Supplement.)
25 and -25	Enable 13 Bin Sort Mode. 25 CODE allows 13 sorting limits to be set instead of the usual 11. To clear this mode use -25 CODE. (For more information on Codes 25 and -25 refer to Section 3.4.6 13 Bin Sort in this Manual Supplement.)

TEST CODE NO.	FUNCTION

26 and -26   Puts the instrument into the component sorting mode. The display indicates the BIN number in large characters and displays the top and bottom display values in small characters. The appropriate Handler relay is activated if the Handler Interface is installed. The Handler busy signal is not asserted and the keyboard is not locked in this mode. To clear this mode use -26 CODE. (For more information refer to Section 3.4.3 Handler Mode in this Manual Supplement.)

3.1.2.2 Keyboard Overlay

The Keyboard Overlay is used in conjunction with 20 code to redefine the main keyboard of the VideoBridge for full alphanumerics.

NOTE: The Keyboard Overlay is silkscreened on both sides. One side has the original keyboard functions. The other side has the new alphanumeric keyboard functions. Under normal operation, the overlay can be stored over the main keyboard with the original keyboard function face up. When the alternate keyboard function mode is selected the overlay can be flipped over to reveal the new alphanumeric functions. All discussion in this manual regarding the alternate keyboard function mode assumes the overlay is stored on the keyboard.

The Alternate Keyboard layout is as follows:
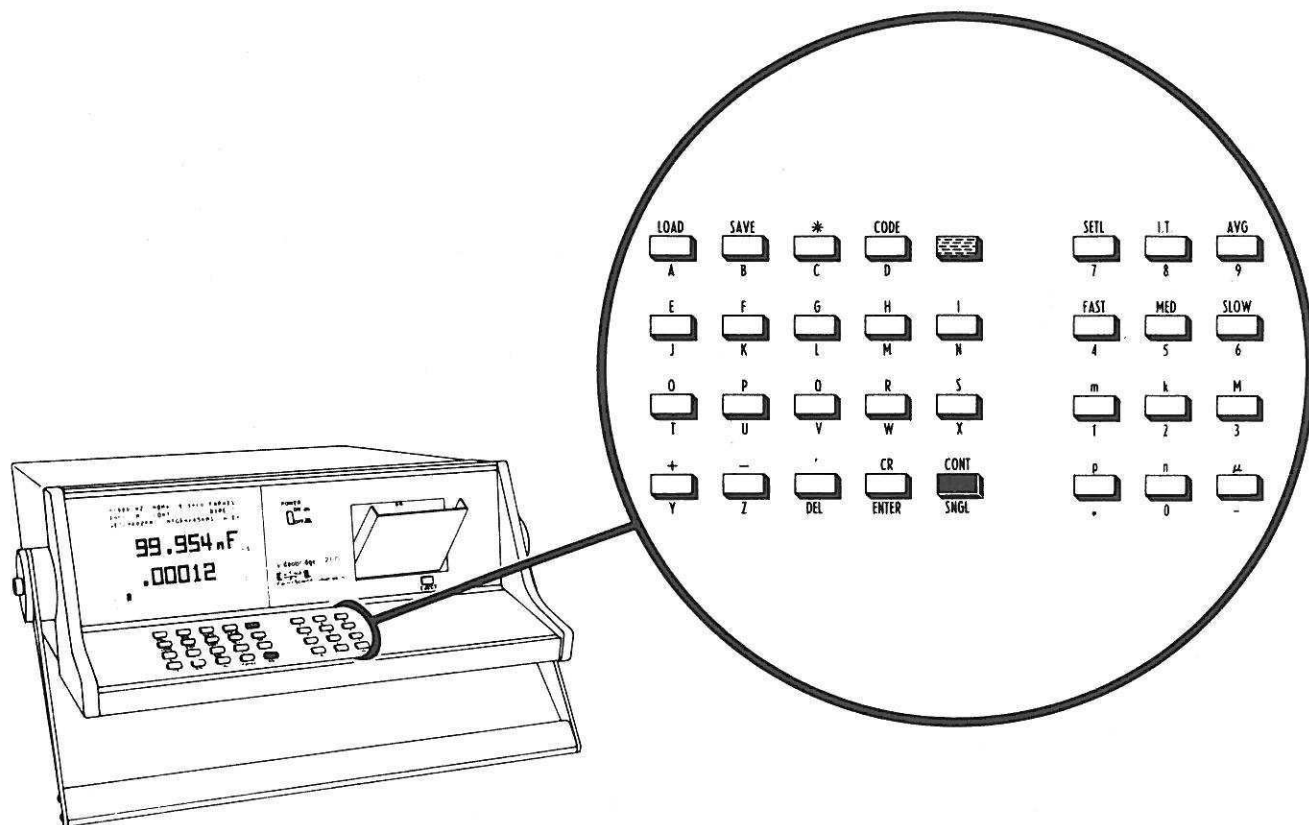
Figure 3-1.   Model 2110 Front Panel with Overlay

Many keys on the keyboard have more than one function. A function labeled in white is selected by pushing the key directly above the label.   An alternate function, labeled in yellow, is selected by pushing the yellow key followed by the key directly below the desired function. The following describes each key.

KEY	DEFINITION
A-Z	Letters for entering tape filenames. Each character is echoed on the CRT as it is entered.
+,-, *	Plus, minus, and asterisk keys for entering tape filenames. Each character is echoed on the CRT as it is entered.

KEY	DEFINITION
'	Precedes the file name when loading a file from tape or saving a file onto tape.
yellow	Upper function key selects functions labeled in yellow.
CODE	Selects special instrument functions not available directly on the keyboard. (See Section 3.1.2.1 Test Codes in this Manual Supplement for more details.)
SAVE	Stores the instrument's parameters on cassette tape. File name must be preceded by the ' sign. (Refer to Section 3.6.3 Saving Parameters in this Manual Supplement for more information.)
LOAD	Programs the instrument with measurement parameters stored on the cassette tape. File name must be preceded by the ' sign. (Refer to Section 3.6.4 Loading Parameter Programs in this Manual Supplement for more information.)
CR	Carriage return. Terminates special commands.
CONT	CONTINUOUS measurement mode. Operates in the same manner as described in Section 2.1.1 of the 2100/2110 Operation and Service Manuals.
DEL	DELETE last entry. Operates in the same manner as described in Section 2.1.1 of the 2100/2110 Operation and Service Manuals.

KEY	DEFINITION
ENTER	ENTER key is used for spacing as described in Section 2.1.1 of the 2100/2110 Operation and Service Manuals.
SGL	SINGLE measurement mode. Operates in the same manner as described in Section 2.1.1 of the 2100/2110 Operation and Service Manuals.

To enter the alternate keyboard function mode, push <2> <0> <yellow> <CODE> and follow the directions on the CRT.

EXAMPLE:

PUSH   DISPLAY   COMMENTS

```
HZ=1000.0 NOM= 0.00000  FARADS
1000  MV  SINGLE        DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                   BIAS OFF

                          F
                           CS

                            D

0 >
ALPHA KEYBOARD OVERLAY
```
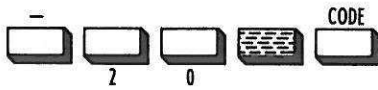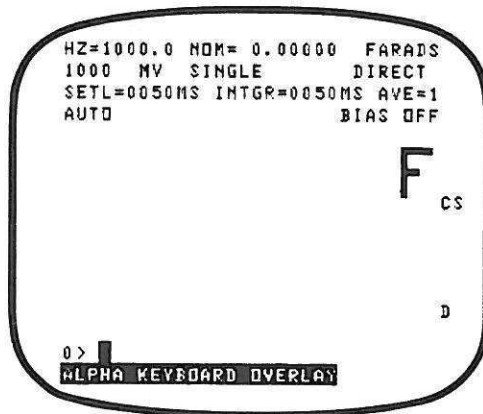
Place the keyboard overlay alternate function side up.

To exit this mode and return to the original keyboard functions mode, push <-> <2> <0> <yellow> <CODE> and follow the instructions on the CRT.

EXAMPLE:

PUSH   DISPLAY   COMMENTS

| | |_2| |_0| |▓▓| |CODE| ```
                              HZ=1000.0 MDM= 0.00000 FARADS
                              1000 MV SINGLE   DIRECT
                              SETL=0050MS INTGR=0050MS AVE=1
                              AUTO   BIAS OFF
                                                  F
                                                    cs

                                                  D
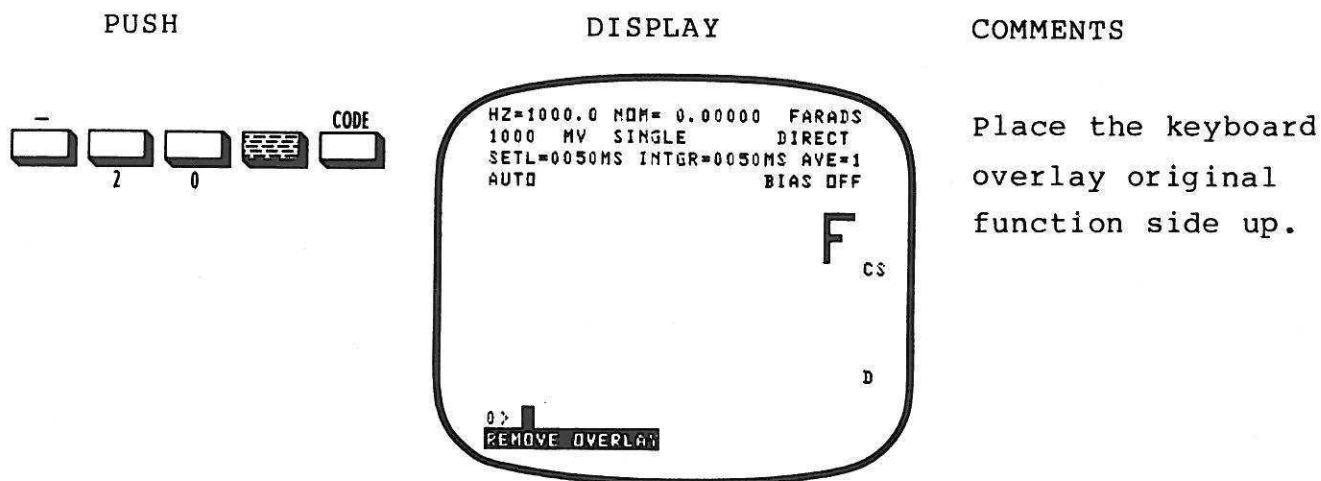
                              0>
                              REMOVE OVERLAY
                              ```

Place the keyboard overlay original function side up.

(For more information, refer to Section 3.6 Cassette Tape Loader in this Manual Supplement.)

## 3.2  SIGNAL LEVELS

Under certain conditions a test level can be programmed that the VideoBridge cannot supply. This is due to a mismatch occurring when a low impedance part is measured with a constant voltage or when a high impedance part is measured with constant current. When this happens, the following error messages are displayed:

{OVERLOAD ! -- SUPPLYING xx VOLTS} for low impedance devices

OR

{OVERLOAD ! -- SUPPLYING xx AMPS} for high impedance devices.

Where xx = the actual value of test signal level supplied by the VideoBridge.

The instrument will continue to perform the measurement at the highest possible test signal level. The test signal level will not exceed the programmed value.

(Refer to Section 2.5.2 in the Model 2100/2110 Operation and Service Manuals for additional details.)

## 3.3 RANGING

### 3.3.1 Range Hold

RANGE HOLD can be set in either of two ways:

1. In the same manner as described in Section 2.5.3.1 of the Model 2100/2110 Operation and Service Manuals.

2. Auto-Hold Mode via 5 CODE. This is for use during high speed part sorting operations. Activate the Auto-Hold mode by entering the range value then pushing <5> <yellow> <CODE>. This sets an internal control signal which is monitored during measurements. When a part is measured that is within +/-20% of the top measurement display range value, the instrument changes from AUTO Ranging to the HOLD mode without operator intervention.

EXAMPLE:

| PUSH | DISPLAY | COMMENTS |
|---|---|---|
| | | |



PUSH:

AUTO — Set instrument to AUTOrange mode.

1  0  [ ]  n

ENTER  5  [ ]  CODE — Sets AUTO-HOLD mode for 10nF.

DISPLAY:

```
HZ=1000.0 NOM= 0.00000  FARADS
1000  MV  SINGLE       DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                   BIAS OFF
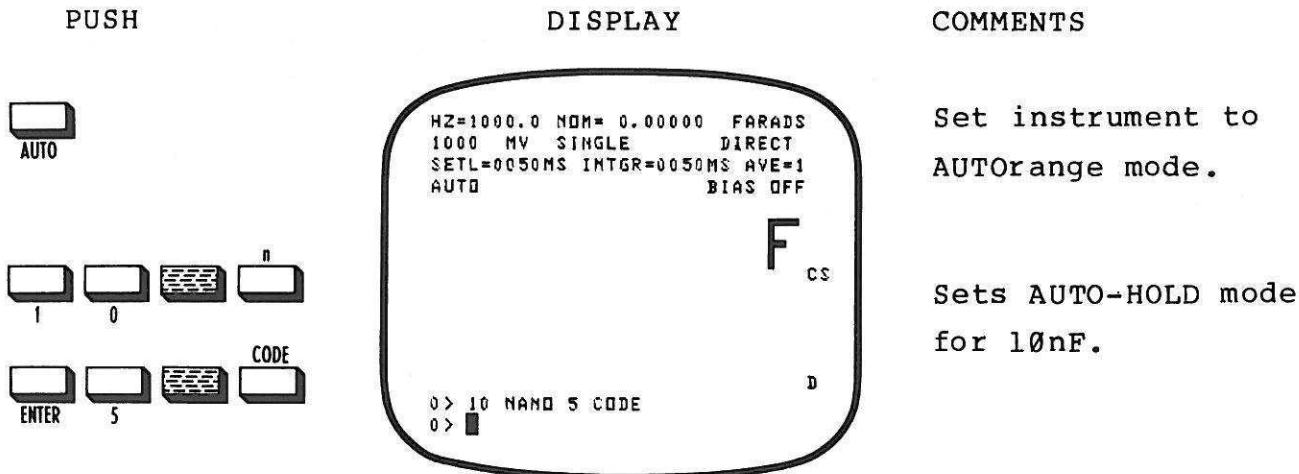
                          F  cs


                             D
0> 10 NANO 5 CODE
0> ■
```

Instrument begins measurement in AUTO mode.

Instrument measures part that is within +/-20% of the specified range value for the top measurement display and sets the HOLD mode accordingly.

NOTE: If the 20 percent limit is not convenient, this value can be changed by using 22 CODE. Enter <fractional specifier> <2> <2> <yellow> CODE, where <fractional specifier> is a numeric value representing the desired percent limit, i.e. <.><5> = 50%, <.><1> = 10%, <.><0><5> = 5%, etc.

(See Section 3.6 CASSETTE TAPE LOADER for information on saving RANGE HOLD as part of a parameter file.)

3.4 COMPONENT SORTING

Several features have been added to allow more flexibility when sorting parts. Special diagnostic modes have also been incorporated for user convenience. A detailed description of each new feature follows. (Refer to Section 2.7 Component Sorting in the Model 2100/2110 Operation and Service Manuals for more information.)

3.4.1 Status Display Update

Using percent limits allows different value parts to be sorted with the same limit values. While in this mode, the Model 2100/2110 automatically calculates new absolute values every time the nominal value is changed. Percent limits need not be re-entered when changing nominal value.

With Version 2 software new BIN limits will be recalculated from NOMINAL regardless of which display the NOMINAL was set under (DIRECT or STATUS).

3.4.2 Sort Mode

The SORT key puts the instrument into the component sorting mode. The display indicates either BIN number or Reject for each component measured. The appropriate Handler relay is activated if the Handler Interface is installed. The BIN COUNTER is activated only when in SINGLE measurement mode. The activation of the Handler relay is a new feature that adds the convenience of testing Handler setup before actual sorting begins. The best method for checking Handler setup is to use the CONTINUOUS measurement mode. The CONTINUOUS measurement mode continuously updates the BIN number display according to measured results.

3.4.3 Handler Mode

<8> <yellow> <CODE> - Activates the Handler Interface option and locks the keyboard. The display is not active under this code. The display will retain the contents of the last screen display before this code was entered. To deactivate this option, momentarily ground Pin 21 of the Handler Interface Card's rear panel connector.

<-> <8> <yellow> <CODE> - Activates the Handler Interface option, displays the BIN number in large display characters, displays the top and bottom display values in small characters and locks the keyboard. This code increases measurement time by 400ms compared to normal handler operation. To deactivate this option, momentarily ground Pin 21 of the Handler Interface card's rear panel connector. (See Figure 3-2)

<2> <6> <yellow> <CODE> - Puts the instrument into the component sorting mode. This display indicates the BIN number in large display characters, and displays the top and bottom display values in small characters. The appropriate handler relay is activated if the Handler Interface is installed. The handler Busy signal is not asserted in this mode. The keyboard is not locked under this mode. To clear this mode, push <-> <2> <6> <yellow> <CODE>. (See Figure 3-2).

```
HZ=1000.0 NOM= 0.00000  FARADS
1000  MV  SINGLE        SORT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                   BIAS OFF



            BIN 0


                  1.2595P
                  .12146
  NOW IN HANDLER MODE
```

Figure 3-2. -8 CODE and 26 CODE Display Format

3.4.4 Binning Priority

Test Code 15 redefines the binning priority of the VideoBridge for capacitor testing.

> NOTE: MAJOR   as used in the following discussion means the primary, or reactive element of the unknown, e.g. C, L. This is also the top display function.
>
> MINOR   as used in the following discussion means the secondary, or loss function of the unknown, e.g. R, G, D, Q. This is also the bottom display function.

The normal binning priority selection process is in the following manner:

> REJ   Does part fail as a MINOR reject? If yes, select BIN REJ.
>
> BIN 0   Does part fail as a MAJOR reject? If yes, select BIN 0.
>
> BINS 1...9   Part is an accepted value. Select appropriate BIN.

Under the above selection process, short-circuit and open-circuit parts could be sorted as minor rejects. Since parts improperly contacted during measurements could cause either of these conditions, the user may desire to separate short-circuit and open-circuit parts from parts that fail due only to a MINOR REJect condition. (The short-circuit and open-circuit parts can be resorted and the parts that failed the MINOR REJect can be discarded.)

Test code 15 redefines the binning priority to allow for this feature. The sorting decision priority is changed to the following:

BIN 0   Does part fail as a MAJOR reject? If yes, select BIN 0

REJ   Does part fail as a MINOR reject? If yes, select BIN REJ

BINS 1..9   Part is an accepted value. Select appropriate BIN

To use, push <15> <yellow> <CODE>. NOTE: There is no indication on the CRT to verify operation of this feature. To clear this mode and return to the normal binning priority selection process, push <-> <1> <5> <yellow> <CODE>.

3.4.5 GO/NO-GO Mode

The GO/NO-GO mode takes advantage of the CRT display during hand sorting operations. When in the GO/NO-GO mode, the words "PASS" and "FAIL" appear on the CRT. Components which would normally fall into BIN 1 will cause the left side of the screen to illuminate under the word PASS. All other BIN decisions will cause the right side of the screen to illuminate under the word FAIL.

The GO/NO-GO mode operates in either CONTINUOUS or SINGLE measurement modes. However, the BIN counter is active only when in the SINGLE mode.

To enter the GO/NO-GO mode, push <2> <1> <yellow> <CODE>. To exit this mode, enter any other measurement mode, e.g. DIRECT, DEVIATION, SORT.

Example: Test Parameter Setup for 1nF +/-10% with a dissipation reject
limit of 0.1.

PUSH	DISPLAY	COMMENTS

```
HZ=1000.0 NOM= 1.00000N FARADS
1000   MV  SINGLE       DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF

                        F
                         CS
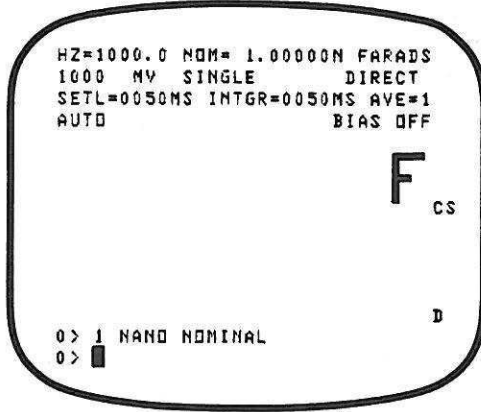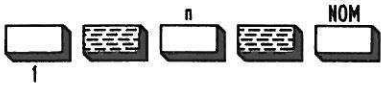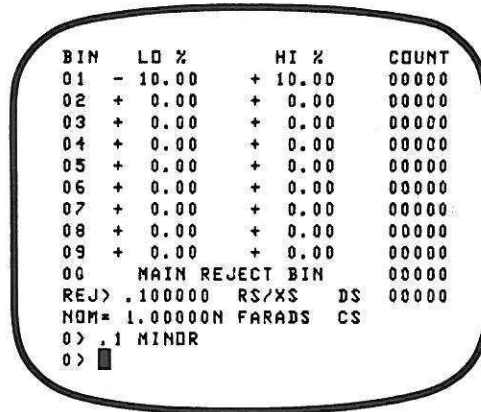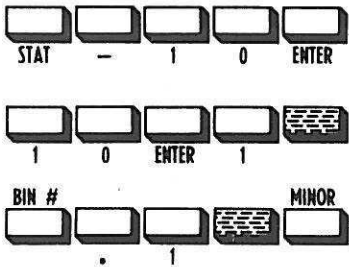

                              D
0> 1 NANO NOMINAL
0>
```

Set nominal
value to 1nF.

```
BIN    LO %        HI %      COUNT
01  -  10.00    +  10.00     00000
02  +   0.00    +   0.00     00000
03  +   0.00    +   0.00     00000
04  +   0.00    +   0.00     00000
05  +   0.00    +   0.00     00000
06  +   0.00    +   0.00     00000
07  +   0.00    +   0.00     00000
08  +   0.00    +   0.00     00000
09  +   0.00    +   0.00     00000
00     MAIN REJECT BIN       00000
REJ> .100000  RS/XS   DS     00000
NOM= 1.00000N FARADS  CS
0> .1 MINOR
0>
```

Set BIN 1 to +/-10%
of the nominal value
and REJ to 0.1 DS

```
HZ=1000.0 NOM= 1.00000N FARADS
1000   MV  SINGLE       GO/NOGO
SETL=0050MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF

PASS                        FAIL
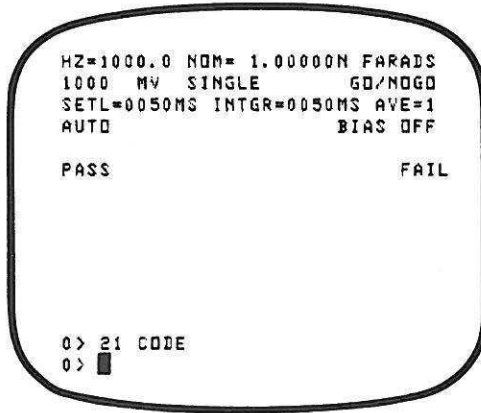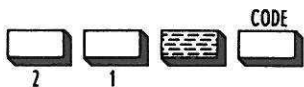



0> 21 CODE
0>
```

Enter GO/NO-GO
mode. Display
indicates this
setup condition
by displaying
"GO/NO-GO" and
the words "PASS"
and "FAIL" on the
CRT.

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PUSH	DISPLAY	COMMENTS

SNGL (10 times)

```
HZ=1000.0 NOM= 1.00000N FARADS
1000   MV  SINGLE        GO/NOGO
SETL=0005MS INTGR=0010MS AVE=1
AUTO                     BIAS OFF

PASS                          FAIL




0> SINGLE
0> ▮
```

10 measurements are made in the SINGLE mode and each indicates a PASS condition.

STAT

```
BIN   LO %       HI %      COUNT
01  - 10.00    + 10.00    00010
02  +  0.00    +  0.00    00000
03  +  0.00    +  0.00    00000
04  +  0.00    +  0.00    00000
05  +  0.00    +  0.00    00000
06  +  0.00    +  0.00    00000
07  +  0.00    +  0.00    00000
08  +  0.00    +  0.00    00000
09  +  0.00    +  0.00    00000
00     MAIN REJECT BIN    00000
REJ> .100000  RS/XS   DS  00000
NOM= 1.00000N FARADS  CS
0> STATUS
0> ▮
```

BIN STATUS counters display a tally of the result.

2 1 ▨ CODE

Reenter GO/NO-GO Mode.

PUSH	DISPLAY	COMMENTS

PUSH

SNGL (10 times)

```
HZ=1000.0 NOM= 1.00000N FARADS
1000   MY   SINGLE        GO/NOGO
SETL=0005MS INTGR=0010MS AVE=1
AUTO                      BIAS OFF

PASS                           FAIL
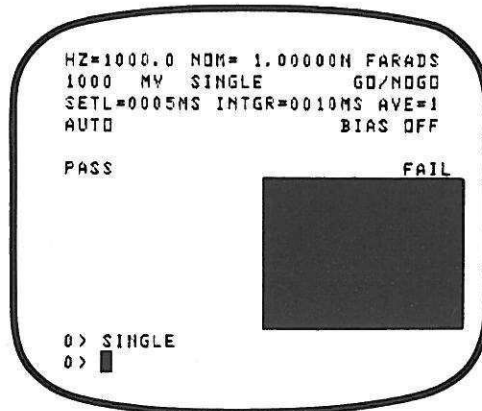



0) SINGLE
0) ▮
```

10 measurements are made in the SINGLE mode and each indicates a FAIL condition.

STAT

```
BIN   LO %       HI %      COUNT
01  - 10.00    + 10.00    00000
02  +  0.00    +  0.00    00000
03  +  0.00    +  0.00    00000
04  +  0.00    +  0.00    00000
05  +  0.00    +  0.00    00000
06  +  0.00    +  0.00    00000
07  +  0.00    +  0.00    00000
08  +  0.00    +  0.00    00000
09  +  0.00    +  0.00    00000
00     MAIN REJECT BIN     00005
REJ> .100000  RS/XS   DS   00005
NOM= 1.00000N FARADS  CS
0) STATUS
0) ▮
```

5 of the parts fail due to the MINOR reject requirement. 5 of the parts fail due to the MAJOR reject requirement. BIN STATUS counters display a tally of this result.

3.4.6 13 Bin Sort

Test Code 25 expands the number of programmable limits from 11 limits to 13 limits. This new feature is applicable to both manual sorting, and automatic sorting with a parts handler.

To access this feature:

PUSH   DISPLAY   COMMENTS

The top line and
Nominal line are not
displayed.

```
01  +  0.00      +  0.00      00000
02  +  0.00      +  0.00      00000
03  +  0.C0      +  0.00      00000
04  +  0.00      +  0.00      00000
05  +  0.00      +  0.00      00000
06  +  0.00      +  0.00      00000
07  +  0.00      +  0.00      00000
08  +  0.00      +  0.00      00000
09  +  0.00      +  0.00      00000
10  +  0.00      +  0.00      00000
11  +  0.00      +  0.00      00000
00      MAIN REJECT BIN      00000
REJ> 0.00000  RS/XS   DS   00000
0> STATUS
0> ▮
```

The order of outputs via the output connector on the Handler Interface card does not change. The two additional outputs are tied to pins 15 and 16 on the connector. Refer to Table 3-1 for the outputs connector wiring.

Table 3-1. VideoBridge Outputs Connector Wiring

OUTPUTS CONNECTOR

PIN NUMBER	FUNCTION
1	COMMON
2	BIN 0
3	BIN 1
4	BIN 2
5	BIN 3
6	BIN 4
7	BIN 5
8	BIN 6
9	BIN 7
10	BIN 8
11	BIN 9
16	BIN 10
17	BIN 11
15	BIN 12
12*	+5V (SYSTEM) OUT
13*	SYSTEM GROUND
14	START IN
18	BUSY OUT
19	BUSY COM
20	START COM
21	KEYBOARD UNLOCK

*ESI recommends that Pin 12 (+5V OUT) and Pin 13 (SYSTEM GROUND) not be used. Noise introduced into the 2100/2110 through these connections may affect measurement results.

NOTE: Pin 17 is BIN 10 which is the REJ bin.

To clear this mode and return to the normal (default) 11 Bin Sort Mode, push <-> <2> <5> <yellow> <CODE>.

3.5 POWER UP CONDITIONS (2110 ONLY)

When power is applied to the Model 2110 and a cassette tape is in place, the message "AUTOSTART TAPE SEARCH" and a blinking cursor appears on the screen. This is the new AUTOSTART feature that initiates an automatic search of the cassette tape directory for a file that has been designated for loading upon the application of power. If the search for such a file is unsuccessful, the message "NO AUTOSTART FILE ON TAPE" will be displayed. If no cassette tape is installed or if the unit is a Model 2100, the power up conditions are the same as those described in Section 2.3.2 of the Model 2100/2110 Operation and Service Manual. The only exception is that the software version is displayed on the CRT when power is applied to the VideoBridge. (Refer to Section 3.6.3.1 in this Manual Supplement for additional information on the AUTOSTART feature.)

3.6 CASSETTE TAPE LOADER

The file system has been improved to allow more files to be stored per cassette, and more flexibility in structuring files. The following paragraphs describe these new features.

3.6.1 Formatting

Data tapes that have been saved under Version 1 Operating System Software will not run under Version 2 Operating System Software.

Data tapes recorded under Version 1 must be reformatted to be used under Version 2. Reformatting destroys old data; therefore, use caution to assure that the tapes to be reformatted do not contain data that must be saved. Version 1 data cannot be transferred to Version 2 tapes.

To format a tape:

1. Place the tape in the cassette drive unit.

2. Push <3> <yellow> <CODE>. The Model 2110 will echo the message:
   {MAKE TAPE - ENTER TO START}.

3. Pushing any key starts the formatting process. The 2110 will echo
   the message:
   {BUSY - DO NOT DISTURB}.

4. Completion of the formatting process will be indicated by the
   following message printed on the CRT:
   {TAPE FORMATTED}.

〰〰〰〰〰〰
CAUTION
〰〰〰〰〰〰

**FORMATTING A TAPE DESTROYS ANY AND ALL DATA WHICH MAY HAVE BEEN
PREVIOUSLY SAVED ON THE TAPE.**

FORMAT TAPE (CODE 3) takes longer now because the entire length of the
tape is formatted. (Previously only sixteen blocks were written.) Tape
activity during the formatting phase is indicated by a blinking cursor
at the righthand side of the error display screen. If the cursor stops
blinking while the tape is either moving slowly or is stopped, the
tape is defective and should be discarded. (Refer to Section 2.9.3 in
the Model 2100/2110 Operation and Service Manuals for more information
on making a new tape.)

3.6.2 Tape File System

The tape structure is arranged in the following manner:

4 bytes per floating point number (e.g. 4 bytes for the top or bottom display result)

256 bytes per block

1.6 blocks per foot of tape

80 blocks per 50 foot tape

128 blocks per 80 foot tape

24 file entries per tape (this is a maximum number and may be decreased by large files)

2 sides per tape, each with the above specifications.

3.6.3 Saving Parameters

To save instrument parameters on the cassette tape:

PUSH

Where <filename> can be up to 10 characters in length in any combination of characters, numerals, or punctuation.

Alphanumeric entries can be achieved by either an external terminal or with the new Keyboard Overlay in conjunction with 20 CODE. (Refer to Section 2.1.2.2 in this Manual Supplement for additional details on the Keyboard Overlay.) (Refer to Appendix A.3 in the Model 2100/2110 Operation and Service Manuals for additional details on the use of an external terminal.)

Example: Using the component sorting example in Section 2.7.5 of the 2100/2110 Operation and Service Manuals, set up all test parameters and binning limits. Save this parameter program under the identification number 123.

PUSH	DISPLAY	COMMENTS

Completion of the SAVE operation is signaled by {FILE SAVED} printed on the CRT.

```
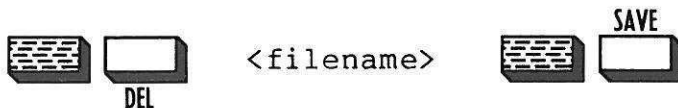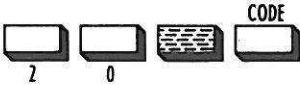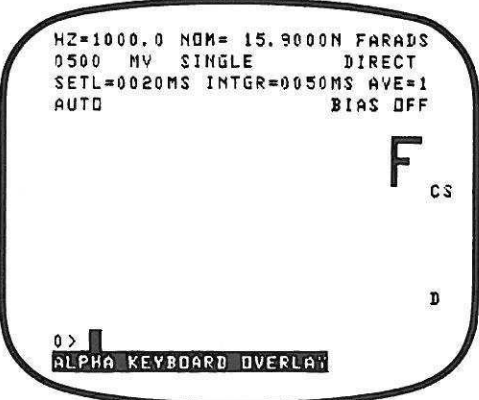HZ=1000.0 NOM= 15.9000N FARADS
0500  MV  SINGLE        DIRECT
SETL=0020MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF

                          F cs

                            D
0> '123 SAVE-FILE
0>
FILE SAVED
```

EXAMPLE 2: Using the same setup as in the above example, use the Keyboard Overlay and save the file under the filename of "15.9NANO".

PUSH	DISPLAY	COMMENTS

Place the keyboard overlay alternate function side up.

```
HZ=1000.0 NOM= 15.9000N FARADS
0500  MV  SINGLE        DIRECT
SETL=0020MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF

                          F cs

                            D
0>
ALPHA KEYBOARD OVERLAY
```

PUSH	DISPLAY	COMMENTS

Row 1:

```
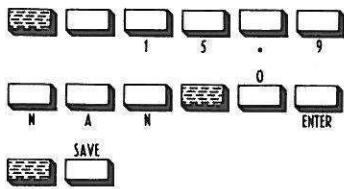HZ=1000.0 NOM= 15.9000  FARADS
0500  MY  SINGLE        DIRECT
SETL=0020MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF
                              F
                                CS

                              D

0> '15.9NAND   SAVE-FILE
0>
FILE SAVED
```

Completion of the SAVE operation is signaled by {FILE SAVED} printed on the CRT.

Row 2:

```
TABLE OF CONTENTS  AVAIL.=71
  BLK NAME        BLK NAME
   1 123           5 15.9NAND
   8




0> 12 CODE
0>
```

Verify the SAVE operation by examining the directory.

Row 3:

```
TABLE OF CONTENTS  AVAIL.=71
  BLK NAME        BLK NAME
   1 123           5 15.9NAND
   8
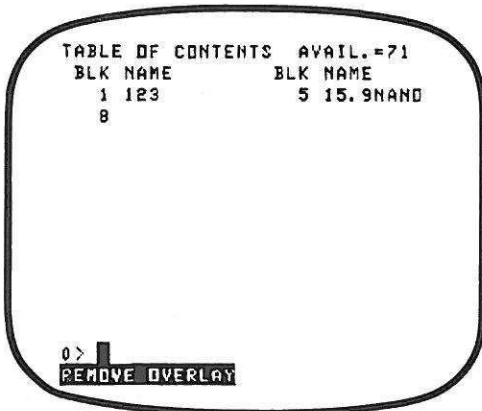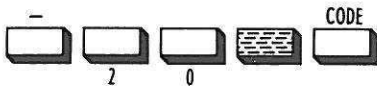



0>
REMOVE OVERLAY
```

Place the keyboard overlay with the original functions side up.

3.6.3.1 Autostart

To have a file automatically loaded when power is applied to the instrument name the file <'......> when saving it. Whenever power is applied, the instrument will immediately search for this filename and upon finding it will load it automatically.

Example: Using the component sorting example in Section 2.7.5 of the 2100/2110 Operation and Service Manuals, set up all test parameters and binning limits. Save this parameter program under the Autostart file name.

PUSH   DISPLAY   COMMENTS

Completion of the SAVE operation is SIGNALED by {FILE SAVED} printed on the CRT. When power is applied to the instrument, this file will LOAD automatically.

```
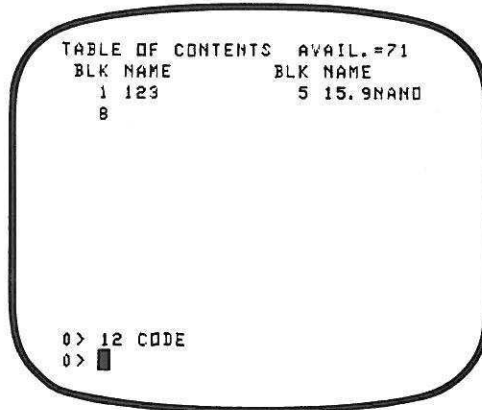TABLE OF CONTENTS   AVAIL.=71
BLK NAME            BLK NAME
   1 123              5 15.9NAND
   8



0> '...... SAVE-FILE
0>
FILE SAVED
```

3.6.3.2 Save Range Hold

To save RANGE HOLD information, Auto Range Hold must be set as part of the SAVE-FILE command. Any attempt at using Manual Range Hold when saving files will result in the following error message appearing on the screen: {USE 5 CODE TO SAVE IN HOLD}.

EXAMPLE:

PUSH	DISPLAY	COMMENTS

PUSH

[1] [▦] [n] [ENTER]

[5] [▦] [CODE]

DISPLAY

```
HZ=1000.0  NOM= 0.00000   FARADS
0500   MV   SINGLE        DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                     BIAS OFF

                         F
                          CS

                               D
0> 1 NAND 5 CODE
0> ▮
```

COMMENTS

Auto range hold is set for 1nF.

PUSH

[▦] [DEL] [1] [2] [3]

[▦] [SAVE]

DISPLAY

```
HZ=1000.0  NOM= 0.00000   FARADS
0500   MV   SINGLE        DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                     BIAS OFF

                         F
                          CS
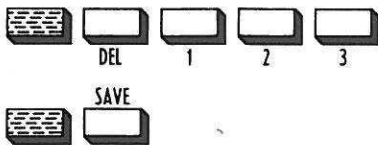
                               D
0> '123 SAVE-FILE
0>
FILE SAVED
```

COMMENTS

File 123 is saved with the autorange hold parameter set for 1nF.

After file 123 is re-loaded, and a part is measured that is within +/-20% of the 1nF nominal, the instrument will go into the HOLD mode.

(Refer to Section 3.1.2.1 Test Codes and Section 3.3.1 Range Hold for more details.)

3.6.3.3 Keyboard Lock

The special Keyboard LOCK command, 9 CODE, can now be saved as part of a file with 18 CODE. This provision prevents any parameters from being inadvertently changed after the program is loaded.

   NOTE: When in this mode, all keys are locked except the SINGLE key.

EXAMPLE:

PUSH   DISPLAY   COMMENTS

Set up instrument parameters to be saved under filename 123. File 123 will set LOCK command when LOADed.

```
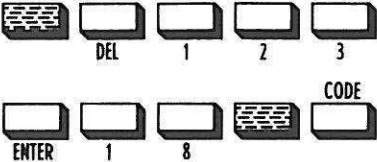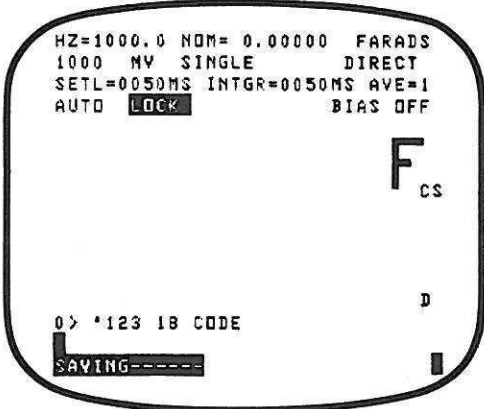HZ=1000.0 NOM= 0.00000  FARADS
1000   MY  SINGLE        DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO  LOCK              BIAS OFF

                         F cs

                              D
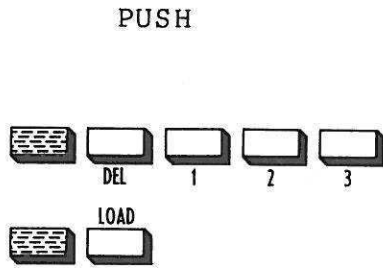0> '123 18 CODE
SAVING------
```

   NOTE: To unlock the keyboard, push <-> <9> <yellow> <CODE>.

3.6.4 Loading Parameter Programs

Programs saved on the cassette tape can be retrieved at any time. To load the Model 2110 with a prestored program, push <yellow> <DEL> <filename> <yellow> <LOAD>. <filename> can be any combination of numerals (via VideoBridge Keyboard) or letters (via external terminal or Keyboard Overlay).

(Refer to Section 3.1.2.2 in this Manual Supplement for more information on the Keyboard Overlay.) (Refer to Appendix A.3 in the 2100/2110 Operation and Service Manual for information on the use of a terminal.)

EXAMPLE:

PUSH	DISPLAY	COMMENTS

DEL 1 2 3

LOAD

```
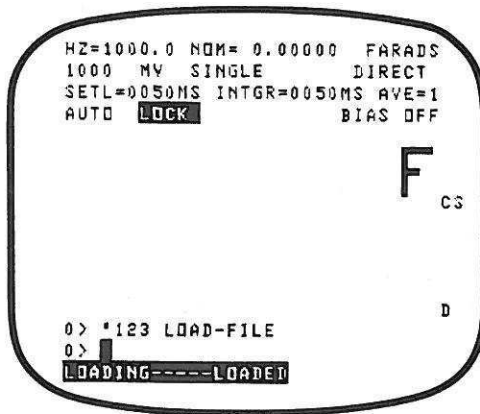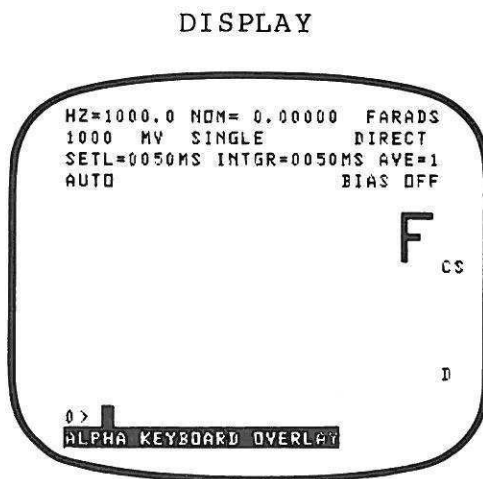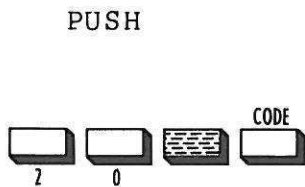HZ=1000.0 NOM= 0.00000  FARADS
1000   MV  SINGLE      DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF

                        F cs


                          D
0> '123 LOAD-FILE
LOADING-----
```

Load previously saved program. Completion of the reloading operation is signaled by {LOADED} printed on the CRT.

```
HZ=1000.0 NOM= 0.00000  FARADS
1000   MV  SINGLE      DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO  LOCK             BIAS OFF

                        F cs


                          D
0> '123 LOAD-FILE
0>
LOADING-----LOADED
```

NOTE: Program 123 is loaded with keyboard LOCKed since it was previously saved with the LOCK command. (See Section 3.6.3.3 Keyboard Lock.)

EXAMPLE: (ALPHANUMERICS)

PUSH	DISPLAY	COMMENTS

2 0 CODE

```
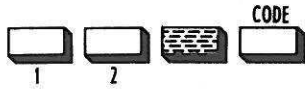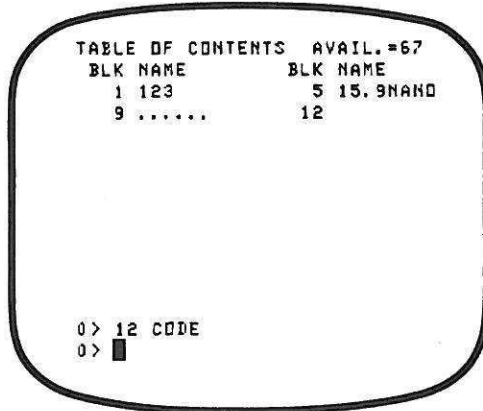HZ=1000.0 NOM= 0.00000  FARADS
1000   MV  SINGLE      DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF

                        F cs


                          D
0>
ALPHA KEYBOARD OVERLAY
```

Place the keyboard overlay alternate function side up.

PUSH	DISPLAY	COMMENTS

```
TABLE OF CONTENTS   AVAIL.=67
  BLK NAME           BLK NAME
    1 123              5 15.9NANO
    9 ......          12




  0> 12 CODE
  0> ▮
```

Examine the directory, choosing file "15.9NANO" for loading.

```
TABLE OF CONTENTS   AVAIL.=67
  BLK NAME           BLK NAME
    1 123              5 15.9NANO
    9 ......          12


                                    CS
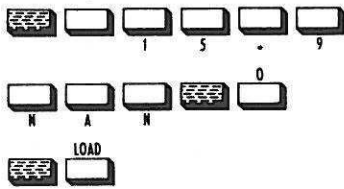


  0> '15.9NANO  LOAD-FILE           D
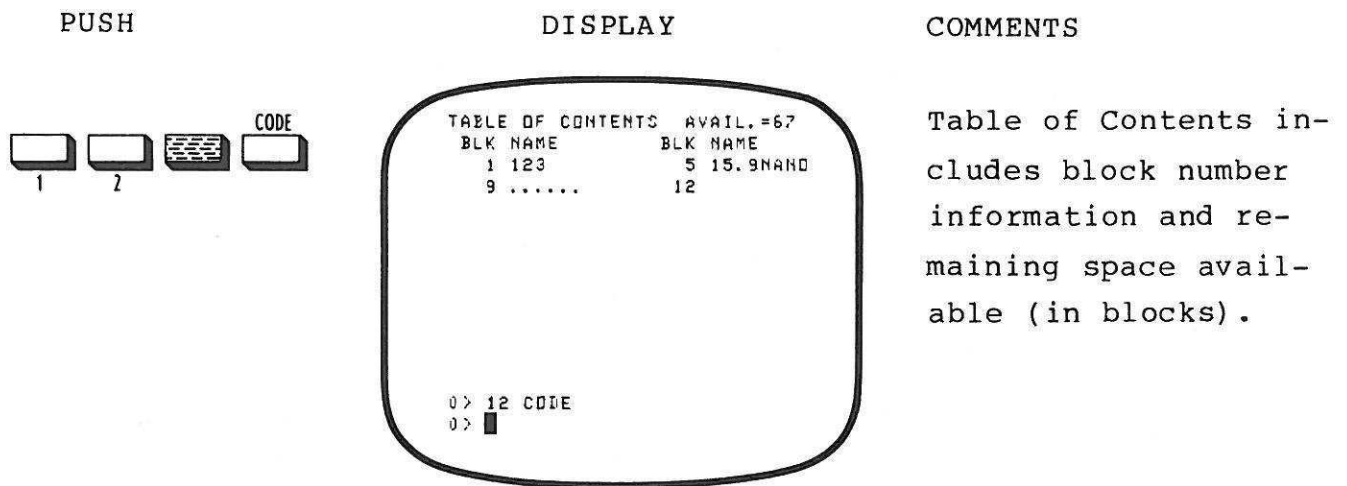  0>
  LOADING-----LOADED
```

Load the file. Completion of the reloading operation is signaled by {LOADED} printed on the CRT.

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3.6.4.1 Tape Directory

The Directory or Table Of Contents is a listing of all files on one side of the cassette tape. They are listed with the starting block to the left of the name. Use 12 CODE to display a Tape Directory.

EXAMPLE:

PUSH   DISPLAY   COMMENTS

```
                        TABLE OF CONTENTS  AVAIL.=67
  [1] [2] [▨] CODE        BLK NAME        BLK NAME
                           1 123           5 15.9NAND
                           9 ......        12




                         0> 12 CODE
                         0> ▮
```

Table of Contents includes block number information and remaining space available (in blocks).

(Refer to Section 3.6.2 Tape File System for more information.)

3.6.4.2 Load Applications Programs

ESI offers special applications software tapes in a form that will allow them to be used with Version 2 Operating System Software and all future software upgrades. To run application programs they must be loaded as described in the following example.

(Refer to Section 3.6.1 Formatting in this Manual Supplement for more information on tape compatibility.)

EXAMPLE: Insert the special Applications Software tape then do the following:

PUSH	DISPLAY	COMMENTS

PUSH: `1` `2` ▨ `CODE`

DISPLAY:
```
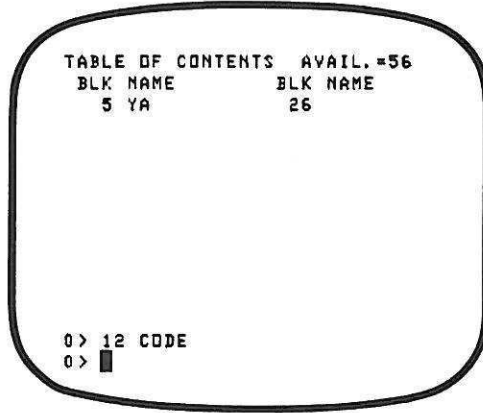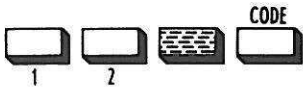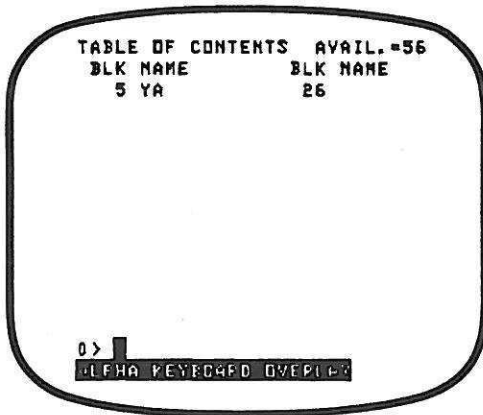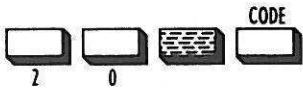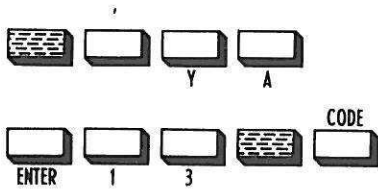TABLE OF CONTENTS  AVAIL.=56
  BLK NAME          BLK NAME
   5 YA              26




0> 12 CODE
0> ▊
```

COMMENTS: Examine the directory.

PUSH: `2` `0` ▨ `CODE`

DISPLAY:
```
TABLE OF CONTENTS  AVAIL.=56
  BLK NAME          BLK NAME
   5 YA              26
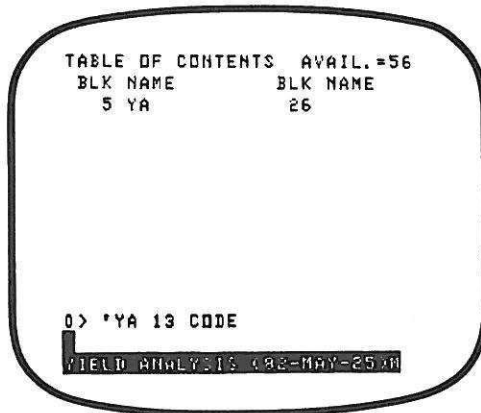



0>▊
ALPHA KEYBOARD OVERLAY
```

COMMENTS: Place the keyboard overlay alternate function side up.

PUSH	DISPLAY	COMMENTS

TABLE OF CONTENTS AVAIL.=56
BLK NAME   BLK NAME
  5 YA   26

0> 'YA 13 CODE
YIELD ANALYSIS (02-MAY-25)M

Load the Yield Analysis Application Program. Tape activity is indicated by a blinking cursor along with the file-name displayed in reverse video on the CRT.

Completion of the LOADING operation is signaled by the word {LOADED} printed on the CRT.

NOTE: For more information on the use of special Applications Software consult the document provided with the particular Application Software package.

3.6.4.3 File Deletion

Delete a file with 14 CODE.

EXAMPLE:

PUSH	DISPLAY	COMMENTS
| `1` `2` ▨ `CODE` | ```
TABLE OF CONTENTS   AVAIL.=67
BLK NAME          BLK NAME
   1 123            5 15.9NAND
   9 ......        12




0> 12 CODE
0> ▮
``` | Examine the Directory, and select file 123 for deletion. |
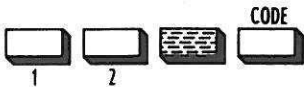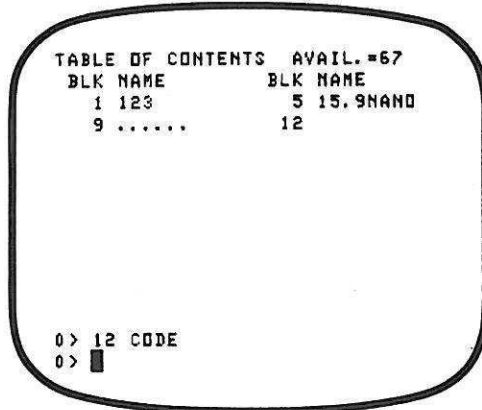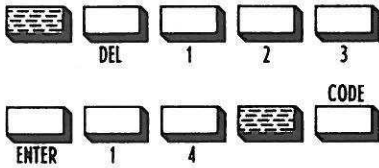| ▨ `DEL` `1` `2` `3`<br>`ENTER` `1` `4` ▨ `CODE` | ```
TABLE OF CONTENTS   AVAIL.=67
BLK NAME          BLK NAME
   5 15.9NAND       9 ......
  12




0> '123 14 CODE
0> ▮
``` | The CRT outputs the new Directory as a result of the DELETE operation. |

3 - 36

3.6.4.4 Last File Loaded

Display the name of the last file loaded with 19 CODE.

EXAMPLE:

PUSH	DISPLAY	COMMENTS

PUSH: [1] [9] [▒] [CODE]

DISPLAY:
```
TABLE OF CONTENTS   AVAIL.=67
 BLK NAME          BLK NAME
   5 15.9NANO       9 ......
  12

0 >
FILE = 15.9NANO
```

COMMENTS:
Display prints
{FILE=filename}
on the CRT, where
filename is the
name of the last
file loaded.

(Refer to Section 3.1.2.1 for additional information on the above test codes.)

APPENDIX A
OPTIONS OPERATION

A.1 RS-232C INTERFACE OPTION

A.1.1 Remote Output - 1Ø CODE

The result of each measurement can be output to a printer connected to Channel B of the RS-232C Option. To use:

PUSH [1] [0] [▒▒▒] [CODE]

Output begins as soon as the instrument completes a measurement cycle. (Also see Section A.1.4 Data Format in this Manual Supplement.)

A.1.2 Channel B Status Output - 11 CODE

The entire status of the instrument, including the contents of the Bin counters and all settings for frequency, settling time, etc., can be transmitted to a printer connected to Channel B of the RS-232C Interface by 11 CODE. The printer will indicate it is ready to accept information by asserting (logic high) the Clear-To-Send signal line.

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EXAMPLE:

PUSH   PRINTER   COMMENTS

[keys: 1 1 ▓ CODE]

```
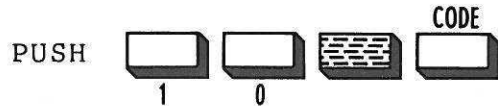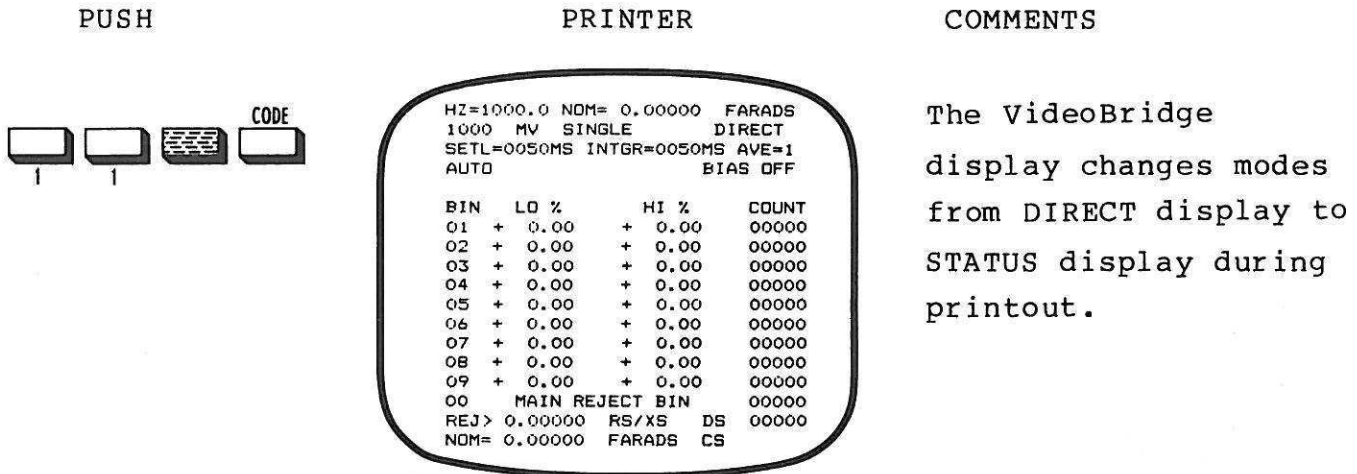HZ=1000.0 NOM= 0.00000  FARADS
1000  MV  SINGLE        DIRECT
SETL=0050MS INTGR=0050MS AVE=1
AUTO                    BIAS OFF

BIN   LO %        HI %       COUNT
01  +  0.00    +  0.00      00000
02  +  0.00    +  0.00      00000
03  +  0.00    +  0.00      00000
04  +  0.00    +  0.00      00000
05  +  0.00    +  0.00      00000
06  +  0.00    +  0.00      00000
07  +  0.00    +  0.00      00000
08  +  0.00    +  0.00      00000
09  +  0.00    +  0.00      00000
00      MAIN REJECT BIN     00000
REJ> 0.00000  RS/XS   DS    00000
NOM= 0.00000  FARADS  CS
```

The VideoBridge display changes modes from DIRECT display to STATUS display during printout.

NOTE: Only one series of status information is printed each time 11 CODE is programmed.

A.1.3 Clear to Send

Under Version 2 software, the RS-232C Interface is initialized to honor the Clear-To-Send (CTS) signal. If the RS-232C circuit card (P/N 45905) is Revision "D" or earlier, jumper wires may be required on both the RS-232C circuit card (P/N 45905) and the RS-232C cable connectors for proper operation with Version 2 software. Since the RS-232C Interface is capable of communicating to either a terminal on Channel "A", or a terminal or a printer on Channel "B", only the modification for the particular peripheral device need be performed. Do Steps 1-5, then read Step 6 carefully before continuing. These modifications are necessary only if the instrument fails to properly respond to remote comands after Version 2 Software is installed.

The RS-232C circuit card revision letter is located next to the part number on the component side of the circuit card.

The following procedure assumes that the VideoBridge functioned correctly when connected to the RS-232C device before Version 2 Software was installed.

```
┌─────────────┐
│   WARNING   │
└─────────────┘
```

INSTALLATION AND MAINTENANCE PROCEDURES DESCRIBED IN THIS MANUAL
SUPPLEMENT ARE TO BE PERFORMED BY QUALIFIED SERVICE PERSONNEL ONLY.

```
┌─────────────┐
│   WARNING   │
└─────────────┘
```

WHEN PERFORMING ANY MAINTENANCE OPERATION, DO NOT REMOVE OR REPLACE
CIRCUIT CARDS WHILE THE POWER IS TURNED ON. FAILURE TO TURN POWER OFF
MAY RESULT IN ELECTRIC SHOCK OR DAMAGE TO THE INSTRUMENT.

Use the following procedure to make the necessary modifications:

RS-232C Circuit Card (P/N 45905) Modification

> NOTE: Refer to Section 2 Retrofit Kit Installation, Steps 1
> through 5 for disassembly instructions required for the following
> procedure.

STEP 1. Connect the RS-232C device to the VideoBridge and attempt to
         communicate in the same manner as before Version 2 Software
         was installed. If the instrument fails to respond as
         expected, then continue with the following Steps.

STEP 2. Remove the RS-232C circuit card (P/N 45905) from the Video-
         Bridge Motherboard per disassembly instructions as noted
         above.

STEP 3. Verify that there are connections between pins 19, 22, and 31
         on U23 of the RS-232C circuit card, P/N 45905, (Figure A-1).
         If not, then continue with Step 4, otherwise go to Step 5.

STEP 4. On U23 (Z80-SIO) jumper pin 19 and pin 22 to pin 31 (Figure
         A-1).

```

U23 REAR VIEW
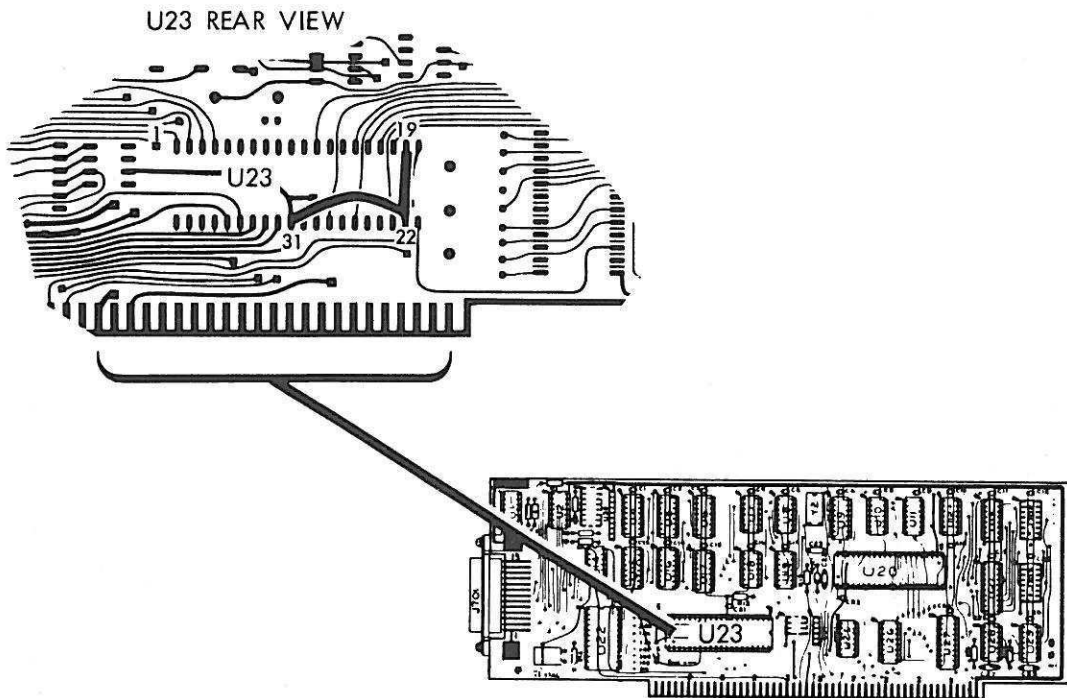
Figure A-1.  RS-232C Jumper Wire Installation

STEP 5.  Reinstall the RS-232C circuit card (P/N 45905) being careful
         to insert the card into the same slot in the Motherboard from
         which it was removed in step 2.

STEP 6.  Connect the RS-232C device to the VideoBridge and attempt to
         communicate as in step 1. If the instrument fails to respond
         correctly then continue with the following:

              If connecting to a terminal on Channel "A"

                  - Perform Steps 7-14


              If connecting to a terminal on Channel "B"

                  - Perform Steps 15-21


              If connecting to a printer on Channel "B"

                  - Perform Steps 22-26

## RS-232C Cable Connector Modification

Before continuing with the following steps, review Appendix A.3.2.2.1 RS-232C Signal Flow in the Model 2100/2110 Operation and Service Manuals for additional configuration information.

Refer to Table A-1 in this manual supplement for a connection summary of STEPS 7-26.

> NOTE: In the following steps, pin numbers are given for the Video-Bridge connector, but not for the peripheral device. Since some devices used on the RS-232C bus do not fully comply with the RS-232C standard, it is necessary to refer to the instructions for the particular device being used for the proper pin number assignments.

### For 3-wire terminal operation on Channel "A":

STEP 7.  Connect pins 4 (RTS) and 5 (CTS) to pin 8 (DCD) on the VideoBridge connector.

STEP 8.  Connect pin 6 (DSR) to pin 20 (DTR) on the VideoBridge connector.

STEP 9.  Connect RTS and CTS to DCD on the terminal connector.

STEP 10.  Connect DSR to DTR on the terminal connector.

STEP 11.  Connect pin 1 (SHIELD) from the VideoBridge connector to the SHIELD pin of the terminal connector.

STEP 12.  Connect pin 2 (TRANSMIT DATA) from the VideoBridge connector to the TRANSMIT DATA pin of the terminal connector.

STEP 13.  Connect pin 3 (RECEIVE DATA) from the VideoBridge connector to the RECEIVE DATA pin of the terminal connector.

STEP 14.  Connect pin 7 (SIGNAL GROUND) from the Videobridge connector to the SIGNAL GROUND pin of the terminal connector.

For 3-wire terminal operation on Channel "B":

STEP 15.   Connect pin 13 (DCD) to pin 20 (DTR) on the VideoBridge connector.

STEP 16.   Connect RTS and CTS to DCD on the terminal connector.

STEP 17.   Connect DSR to DTR on the terminal connector.

STEP 18.   Connect pin 1 (SHIELD) of the VideoBridge connector to the SHIELD pin on the terminal connector.

STEP 19.   Connect pin 7 (SIGNAL GROUND) of the VideoBridge connector to the SIGNAL GROUND pin on the terminal connector.

STEP 20.   Connect pin 14 (SECONDARY TRANSMIT DATA) of the VideoBridge connector to the SECONDARY TRANSMIT DATA pin on the terminal connector.

STEP 21.   Connect pin 16 (SECONDARY RECEIVE DATA) of the Videobridge connector to the SECONDARY RECEIVE DATA pin on the terminal connector.

For 3-wire printer operation on Channel "B":

STEP 22.   Connect DCD to RTS and DSR to DTR on the terminal connector.

STEP 23.   Connect pin 1 (SHIELD) of the VideoBridge connector to the SHIELD pin on the printer connector.

STEP 24.   Connect pin 7 (SIGNAL GROUND) of the VideoBridge connector to the SIGNAL GROUND pin on the printer connector.

STEP 25.   Connect pin 13 (DCD) the VideoBridge connector to the CTS pin on the printer connector.

STEP 26.  Connect pin 16 (SECONDARY RECEIVE DATA) of the VideoBridge connector to the SECONDARY RECEIVE DATA pin on the printer connector.
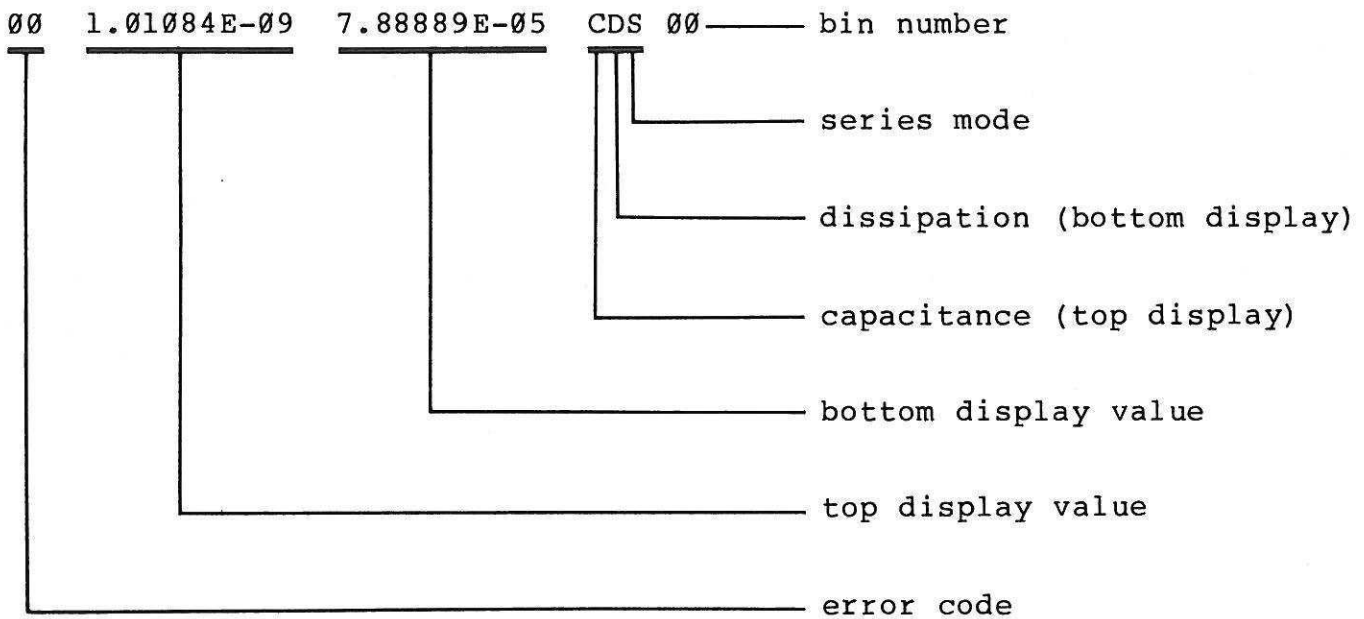
Table A-1.  RS-232C Cable Connections

| MODEL 2100/2110 REAR PANEL CONNECTOR (J1) | | PERIPHERAL DEVICE CONNECTOR* |
|---|---|---|
| CHANNEL A  (steps 7-14) | | TERMINAL |
| Pin Number | Label | Label |
| 1 | CHASSIS GND ———————— | SHIELD |
| 2 | RS232C IN ———————— | TRANSMIT DATA |
| 3 | RS232C OUT ———————— | RECEIVE DATA |
| 4 | RTSA | RTS |
| 5 | CTSA | CTS |
| 6 | DSR | DSD |
| 7 | SIGNAL GND ———————— | SIGNAL GROUND |
| 8 | DCD | DSR |
| 20 | DTRA | DTR |
| CHANNEL B  (steps 15-21) | | TERMINAL |
| Pin Number | Label | Label |
| 1 | CHASSIS GND ———————— | SHIELD |
| 7 | SIGNAL GND ———————— | SIGNAL GROUND |
| | | RTS |
| | | CTS |
| 13 | CTSB | DCD |
| 14 | RXDB ———————— | SECONDARY RECEIVE DATA |
| 16 | TXDB ———————— | SECONDARY TRANSMIT DATA |
| | | DSR |
| 20 | DTRA | DTR |
| CHANNEL B  (steps 22-26) | | PRINTER |
| Pin Number | Label | Label |
| 1 | CHASSIS GND ———————— | SHIELD |
| 7 | SIGNAL GND ———————— | SIGNAL GROUND |
| 13 | CTSB ———————— | CTS |
| 16 | TXDB ———————— | SECONDARY RECEIVE DATA |
| | | DCD |
| | | RTS |
| | | DSR |
| | | DTR |

*Consult manufacturer's specs for Peripheral Device pin number assignments.

## A.1.4  Data Format

A new output format adds bin number information and a three letter
code at the end of each output string for the top and bottom
measurement display functions.  Present users need not modify their
setup since the additional information is appended to the existing
output string and can be ignored when interpreting the final results
(see sample printout-below).

```
00   1.01084E-09   7.88889E-05   CDS 00 ———— bin number

                                  | |
                                  | └——————————— series mode

                                  └——————————————— dissipation (bottom display)

                              └————————————————————— capacitance (top display)

                  └———————————————————————————————————— bottom display value

      └—— top display value

  └—— error code
```

> **NOTE:** The bin number code is a two digit code representing bins
> 00-09 for normal binning or bins 00-11 for expanded binning (25
> CODE).   In either case, bin REJ is represented by a display of
> '99' for the bin number code.

For more information refer to Section 2.4 Measurement Functions in the
Model 2100/2110 Operation and Service Manuals. Also, see Section
A.1.1 Remote Output -10 CODE in this Manual Supplement.

A.2 MODEL 2100/2110 GENERAL PURPOSE INTERFACE BUS (GPIB) OPTION

A.2.1 Instrument Address Selection

Setting an address of 31 on the GPIB circuit card (P/N 46114) (positions 1 through 5 ON) removes the 2100/2110 from the bus even though it remains physically connected. This conforms to the IEEE-488 specification and can be used for initial setup and diagnostic purposes.

The address setting of the switch can be read via the CRT to verify correct setting if needed for diagnostic purposes. To access this feature:

PUSH	DISPLAY	COMMENTS
2 4 [CODE]	HZ=1000.0 NOM= 0.00000 FARADS 1000 MV SINGLE DIRECT SETL=0050MS INTGR=0050MS AVE=1 AUTO BIAS OFF F cs D 0>24 CODE IEEE ADDR = 03	GPIB option is installed. Display indicates switch setting.
2 4 [CODE]	HZ=1000.0 NOM= 0.00000 FARADS 1000 MV SINGLE DIRECT SETL=0050MS INTGR=0050MS AVE=1 AUTO BIAS OFF F cs D 0>24 CODE IEEE OFF-LINE	GPIB option is not installed. Display indicates this condition with the message {IEEE OFF-LINE}

(Refer to Appendix A.2.8 in the Model 2100/2110 Operation and Service Manual for more information on address selection.)

A.2.2 Remote Commands

Local Lockout function conforms to the IEEE-488 specification. When the GPIB Controller issues the Local Lockout command the Model 2100/2110 keyboard is locked.

Group Execute Trigger will now cause the Model 2100/2110 to take a single measurement when addressed as a listener. Since this is a command sent directly to the GPIB controller integrated circuit in the VideoBridge, response time is faster, thereby decreasing overall measurement time.
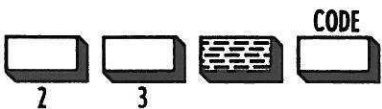
A.2.3 Data Format

New output formatting adds the same bin number and three character strings as described for the RS-232C. (Refer to Appendix A.1.4 Data Format in this Manual Supplement for sample printout.)

A.2.4 Special GPIB Poll Mode

In normal use the system controller monitors the SRQ lines of all devices connected to the bus. The SRQ line is set low, by a device connected to the GPIB bus, to request service from the system controller. The controller conducts a poll to determine which device caused the interrupt. The interrupting device resets the SRQ line at the time it is polled. The controller can take the appropriate action by branching to an interrupt service routine.

If a system controller cannot conduct a serial poll (such as the Commodore PET computer), the SRQ line never resets leaving the SRQ permanently asserted (logic low).

To allow using a controller that cannot conduct a serial poll:

1. PUSH

2. Follow the directions as stated in Section A.2 MODEL 2100/2110 GENERAL PURPOSE INTERFACE BUS (GPIB) OPTION in the Model 2100/2110 Operation and Service Manual.

Test Code 23 allows the instrument to reset the SRQ line when the instrument is addressed as a talker.

To return the instrument to the normal state, push <-> <2> <3> <yellow> <CODE>.

> **NOTE:** This special feature violates normal IEEE-488 protocol. It should be used only for controllers that cannot conduct a serial poll.

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APPENDIX B
TEST AND ERROR CODES

B.1 Test Code Summary

CODE NO.	FUNCTION
1 and -1	Bias Voltage ON (capacitor measurements with voltage bias). To remove the bias voltage from the device under test use -1 CODE.
2	Reset STATUS display. All bin limits and counters are set to zero.
3	"Make Tape" Formats cassette tapes to accept test parameters.
4	Keyboard control transferred from the VideoBridge to an external video-terminal. Control is transferred through Channel A of the RS-232C Interface option. To return control to the VideoBridge keyboard, type KB on the external terminal.
5	SET RANGE. The instrument will auto-range until a part is measured which is within +/-20 percent of the specified range value. The instrument will then go into the HOLD mode without operator intervention. (For more information refer to Section 3.3.1 Range Hold in this Manual Supplement.)

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CODE NO.	FUNCTION
6 and -6	D correction multiplier ON (default mode when instrument is turned ON). To remove the D correction multiplier, use -6 CODE.
7	Software Version. The instrument will display the date and version of the instrument's software, and available user RAM, as a message on the CRT.
8	Activate Handler Interface option and Lockout the Keyboard. The display is not active under this code. The display will retain the contents of the last screen display before this code was entered. Component sorting begins when the option is activated. To deactivate this option, temporarily ground Pin 21 of the Handler Interface rear panel connector.
-8	Sets Bridge to special Handler routine displaying BIN number and both the top and bottom display values on the screen and locks the keyboard. (For more information refer to Section 3.4.2.1 Handler Mode in this Manual Supplement.)

CODE NO.	FUNCTION
9 and -9	Keyboard lock. 9 CODE locks all the keys except the SINGLE key. -9 CODE unlocks the keyboard. The keyboard may also be unlocked by one of the following methods:
	1. Ground pin 21 on Handler Interface rear panel connector.
	2. Type UNLOCK through the GPIB Interface.
	3. Type UNLOCK through Channel B of the RS-232C Interface.
10 and -10	Remote output (measurement). 10 CODE outputs measured results through Channel B of the RS-232C Option at the end of each measurement cycle. -10 CODE clears the remote output command. (For more information refer to APPENDIX A OPTIONS OPERATION in this Manual Supplement.)
11	Remote output (status). Outputs status information from both the direct display and status display of the VideoBridge through Channel B of the RS-232C Option. (For more information refer to Appendix A.1.2 Channel B Status Output in this Manual Supplement.)

CODE NO.	FUNCTION
12	Tape directory (Model 2110 only). Displays the table of contents for a cassette tape. The filenames will be listed with the starting block to the left of the name. (For more information refer to Section 3.6.4.1 Tape Directory in this Manual Supplement.)
13	Load applications programs (Model 2110 only). (For more information refer to Section 3.6.4.2 Load Applications Programs in this Manual Supplement.)
14	Delete a tape file (Model 2110 only). (For more information refer to Section 3.6.4.3 File Deletion, in this Manual Supplement.)
15 and -15	15 CODE redefines the binning priority when sorting, such that an open-circuit part (low out-of-tolerance) or a short-circuit part (high out-of-tolerance) reading will select BIN 0 rather than BIN REJ as normally selected during the sorting operation. -15 CODE clears this mode. (For more information on 15 CODE, refer to Section 3.4.4 Binning Priority, in this Manual Supplement.)
16	Not used.
17	Not used.

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CODE NO.	FUNCTION
18	Saves 9 CODE <keyboard lockout> on tape (Model 2110 only). To unlock the keyboard after the tape file has been loaded in lock use -9 CODE. (Refer to Section 3.6.3.3 Keyboard Lock in this Manual Supplement for more information on this feature.)
19	Display last file loaded (Model 2110 only). Upon entering this code, the VideoBridge will display: {file= filename}. (For more information refer to Section 3.6.4.4 Last File Loaded, in this Manual Supplement.)
20 and -20	Alternate keyboard functions mode (Model 2110 only). 20 CODE redefines the main VideoBridge keyboard to include full alphanumerics. See Section 3.1.2.2 Keyboard Overlay for new key definitions. To clear the alternate functions mode and return to the normal (default) functions mode use -20 CODE.
21	GO/NO-GO Mode. The GO/NO-GO mode displays PASS or FAIL symbols on the CRT display. (For more information on 21 CODE refer to Section 3.4.5 GO/NO-GO Mode in this Manual Supplement.)

CODE NO.	FUNCTION
22	Set Auto Range Hold tolerance. (For more information refer to Section 3.3.1 Range Hold in this Manual Supplement.)
23 and -23	Set special GPIB Poll Mode to reset the SRQ line when the VideoBridge is addressed as a talker. To clear this mode use 23 CODE. (For more information refer to Appendix A.2.4 Special GPIB Poll Mode in this Manual Supplement.)
24	GPIB address. When the GPIB Option is installed the instrument will display the address setting of the switches on the GPIB circuit card (P/N 46114). (For more information refer to Appendix A.2.1 Instrument Address Selection in this Manual Supplement.)
25 and -25	Enable 13 Bin Sort Mode. 25 CODE allows 13 sorting limits to be set instead of the usual 11. To clear this mode use -25 CODE. (For more information on CODES 25 and -25 refer to Section 3.4.6 13 Bin Sort in this Manual Supplement.)

CODE NO.	FUNCTION
26 and -26	Puts the instrument into the component sorting mode. The display indicates the BIN number in large characters and displays the top and bottom display values in small characters. The appropriate handler relay is activated if the Handler Interface is installed. The handler busy signal is not asserted and the keyboard is not locked in this mode. To clear this mode use -26 CODE. (For more information refer to Section 3.4.3 Handler Mode in this Manual Supplement.)

B.2   ERROR CODES ASSIGNMENT SUMMARY FOR MODEL 2100/2110 REMOTE OUTPUT DEVICES (For more information see Appendix A.1.4 Data Format in the manual supplement.)

CODE	ERROR MESSAGE
00	No error
01	Unused
02	Stack Empty
03	Stack Full
04	Syntax Error
05	Dictionary Full
06	Compiler Buffer Full
07	Vocabulary Stack Full
08	Vocabulary Stack Full
09	Loop Stack Empty
10	Loop Stack Full
11	Undefined Word
12	Ram Space Full
13	Open File Error (CPM only)
14	Bad Filename (CPM only)
15	Unused

CODE	ERROR MESSAGE
16	Block Error (Tape I/O)
17	Unused
18	End of file Encountered
19	Unused
20	Floating Point Overflow
21	Floating Point Overflow
22	Float -> Fix error - Number too big
23	Unused
24	Unused
25	Float -> Double Precision Fix error - number too big
26	Unused
27	Input overloaded
28	Can't supply volts
29	Can't supply current
30	No Tape In Place
31	Write Protected
32	Page Not Found
33	Bad Read (CRC error)
34	Bad Write (CRC error)
35	File Does Not Exist
36	Tape Full
37	Dictionary Full
38	Tape Jammed
39	Bad-Tape Discard

WARRANTY OF QUALITY

Electro Scientific Industries, Inc., warrants its products to be free from defects in material and workmanship. Rigorous quality control permits the following standard warranties:

1. Two years for components and instruments utilizing passive circuitry. One year on repairs of out-of-warranty items.

2. One year on components and instruments utilizing active circuitry as identified in the price list. Six months on repair of out-of-warranty items.

During the in-warranty periods, we will service or, at our option, replace any device that fails in normal use to meet its published specifications. Batteries, tubes and relays that have given normal service are excepted. Special systems will have warranty periods as listed in their quotation.

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