BARCO

BARCO PROJECTION SYSTEMS

BARCO LiMO PRO

R9828631

Installation Manual

LimoPro Kit
for

Projector type	from Software Version+Order No	Update
Data708	V3.4 (R32843340)	no
Data808s	V7.4 (R32843740)	no
Graphics808s	V7.4 (R32842040)	no
Graphics1208s/2	V7.2 (R32843420)	no
Data1209s	V7.2 (R32849016)	no
Graphics1209s	V7.2 (R32849016)	no
Vision1609s	V7.2 (R32843920)	no

Important: The '*Limoplus advanced options*' are not available if the LiMoPro kit is installed in above projectors with indicated sofware version.

For the following Cine series projectors, from software version 1.10, the extra options in the menu item *'Limoplus advanced options*' are available.

Cine 6	V1.10	-
Cine 7	V1.10	-
Cine 8	V1.10	-

For the following Series projectors the extra options in the menu item *'Limoplus advanced options*' are always available.

Cine MAX and Reality909

Contents

Installation Guidelines   **Date: 08/01/2001   R9828631**

Contents of the Kit R9828631

Kit R9828631

ITEM NO	DESCRIPTION	QUANTITY
R593529	BAG PE 100X 250X0.07	1
R593545	BAG ASTSH 203X 305	1
R593546	BAG ASTSH 152X 254	1
R5976225	MAN INS LIMO+	1
R763537	**UN LIMO+ FRMC**	**1**
R804793	BOX509AST 300X300X 55 2NB	1
R810873	LBL WARNING 3FIG 140X48	1
R810874	LBL B BARCOADDRESS 140X48	1
V593200	BAG PE 80X 120X0.06 WL	1

Unit R763537

ITEM NO	DESCRIPTION	QUANTITY
A576297	SPR L 6 M 3 H 5 NBRNI	6
B360861	SCR Z$7985M 3 X 6 STZY	2
B360861	SCR Z$7985M 3 X 6 STZY	4
B360862	SCR Z$7985M 3 X 8 STZY	4
R348003	GRMT P1.5 D 9.5/8 PBK	1
R3626696	SCR D921 M 3 X 8 SS	1
R367502	SPR D6798AD 3.2D 6 STZN	4
R7123023	SPRCL 0.5 D 3.2D 7 PLBK	2
R7625616	**UN *701 LIDO INT /3**	**1**
R763315	**UN LIMO+**	**1**
R806133	FRM V701 LIDO FIX	1
R807507	FRM V701 DIA CBL FIX	1
V313329	BSHG SN D30 /24 P3.2UL	1
V348065	CBLA CLP ADH R SO D 9.5	2
V3661026	NUT D934 M 3 SS	6
V367602	SPR L20 M 3 H 6 ISTZN	2
Z348019	CBLA TIE B L100 W2.4 CL-	9
Z3485128	CD CT $FTMT P12 SH 250	1
Z348704	CD CT X3 + SLV SHR 870	1

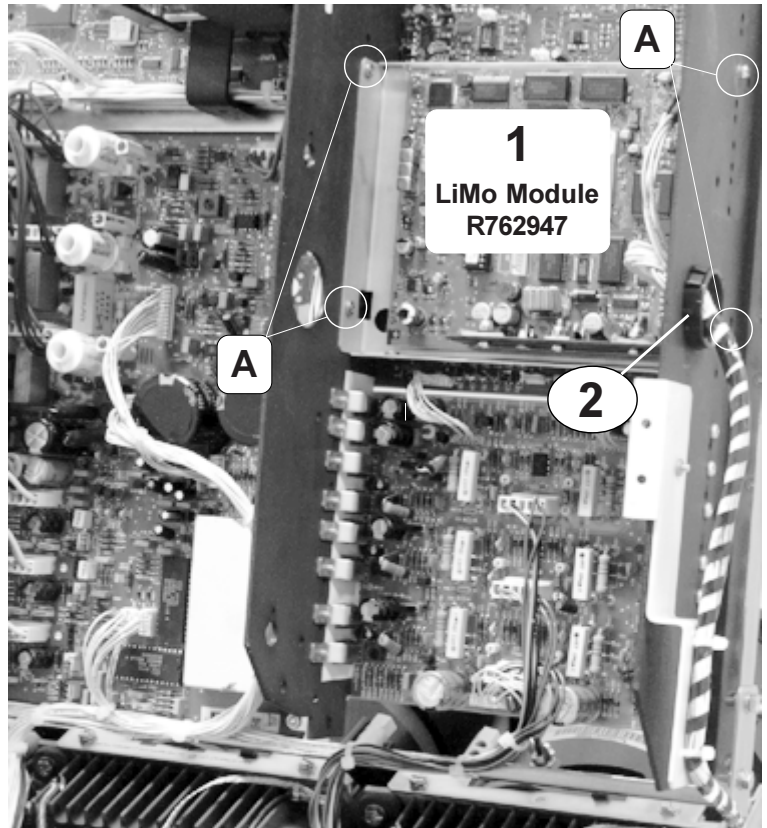**Installation Guidelines**   **Date: 08/01/2001   R9828631**
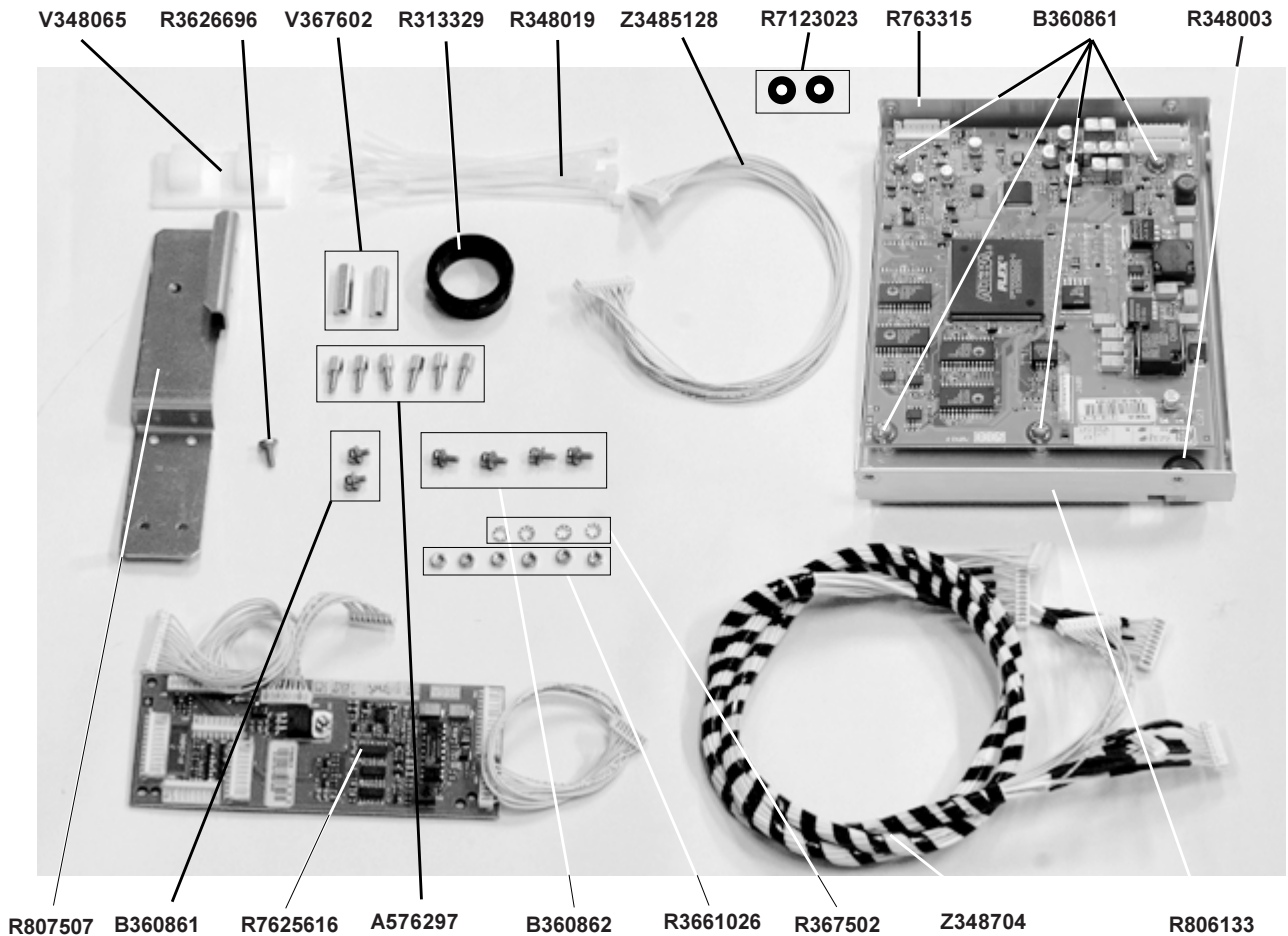
Installing the LiMo module in the *708 Series projectors

A. Mounting the LiMo module R762947

1

Mount the Limo Module between the two black heatsink plates with 4 screws R360862 (**A**), using the holes provided in the heatsink plates (see illustration)
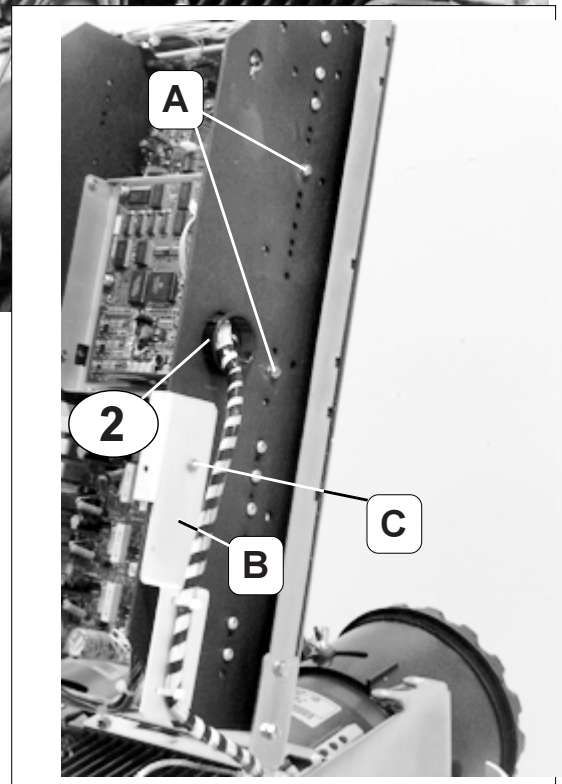

2

Insert the bushing in the provided hole in the heatsink for cable feeding through (see illustration).

3

Mount the metal cable support (**B**) using the fixation screw R3626696 (**C**) (see illustration).

B. Mounting the Interface module R7625615

Before proceeding to the fixation of the Interface module onto the input frame, install the following connections:

1

Pull out the plug J400 on the input module and insert it in connector J102 on the Interface module.
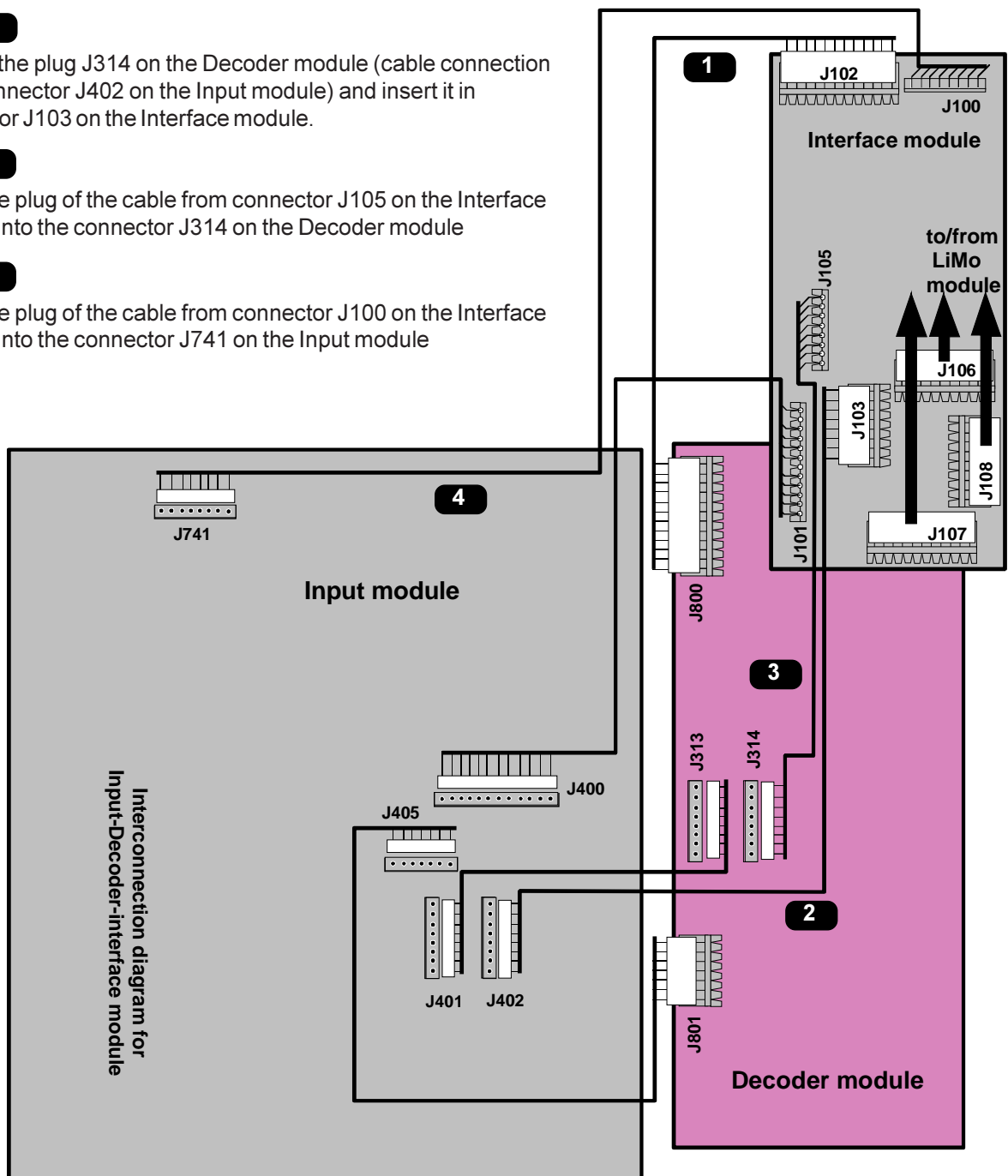
2

Pull out the plug J314 on the Decoder module (cable connection from connector J402 on the Input module) and insert it in connector J103 on the Interface module.

3

Insert the plug of the cable from connector J105 on the Interface module into the connector J314 on the Decoder module

4

Insert the plug of the cable from connector J100 on the Interface module into the connector J741 on the Input module

Interface module

to/from LiMo module

J102
J100
J105
J106
J103
J108
J101
J107

Input module

Interconnection diagram for Input-Decoder-interface module

J741
J400
J405
J401 J402
J800
J313 J314
J801

Decoder module

Proceed now to the fixation of the Interface module (see next page)

Fixation of the Interface module

Place the Interface module on the input frame lining up the fixation holes with the ones on the frame and secure the position with 2 screws R360861 (**A**)
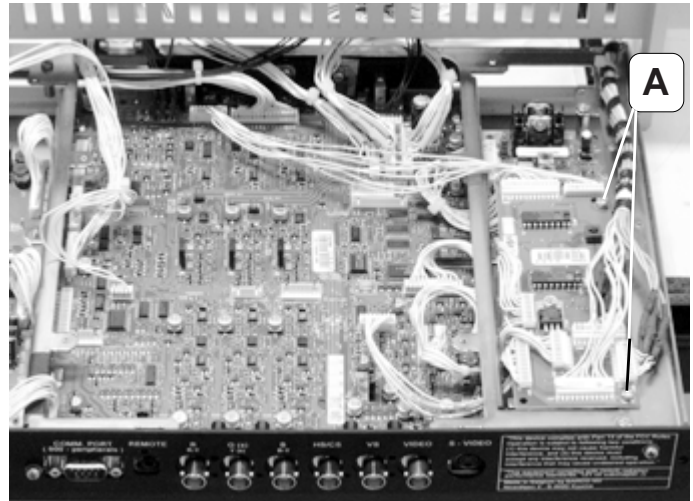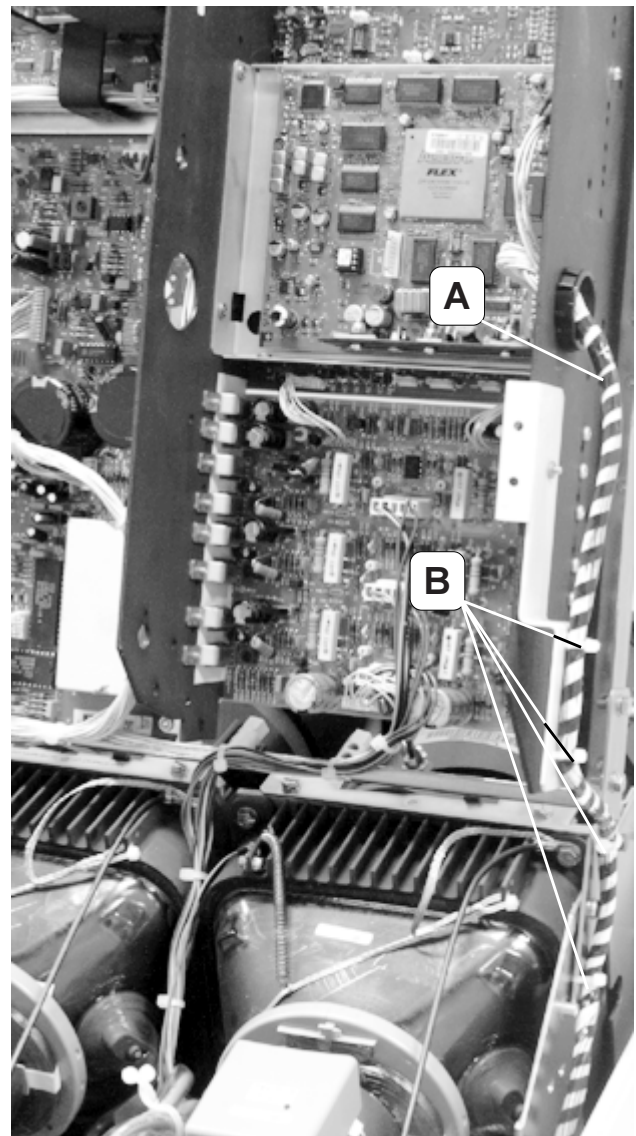

C. Mounting the Limo interconnection cable
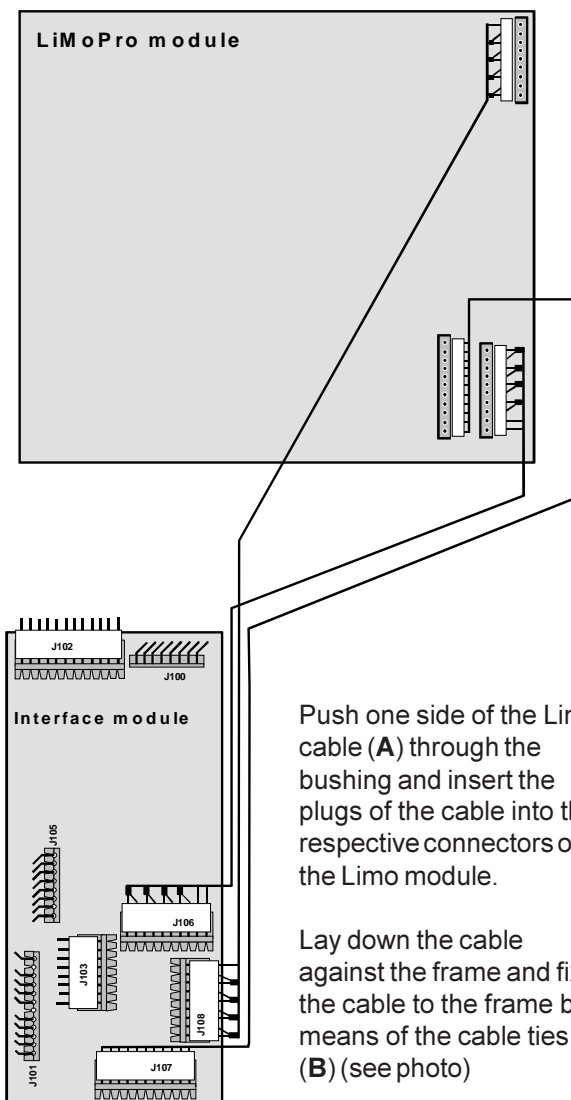
Push one side of the Limo cable (**A**) through the bushing and insert the plugs of the cable into the respective connectors on the Limo module.

Lay down the cable against the frame and fix the cable to the frame by means of the cable ties (**B**) (see photo)

Installation Guidelines   **Date: 08/01/2001   R9828631**

**Connection Limo Cable to the Interface module**

Fix the two self-adhesive cable guides (**A**) against the inside of the cabinet. To ensure surface is grease free, wipe area with alcohol first.

Lay down the cable in the cable guides and fix the cable to the Input frame by means of a cable tie (**B**) (see photo)
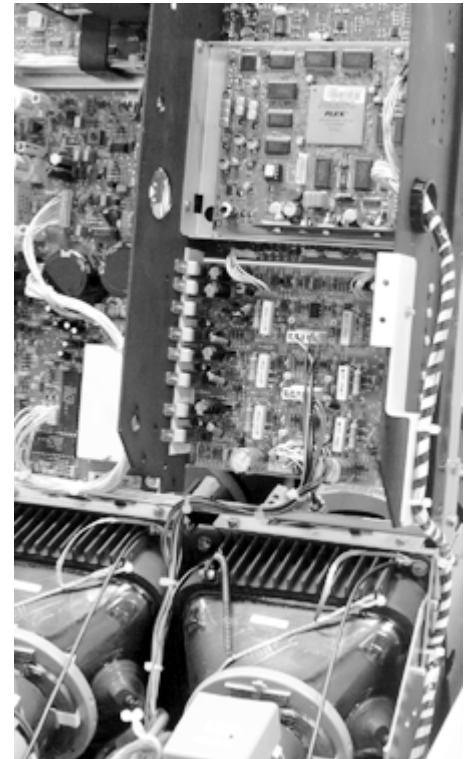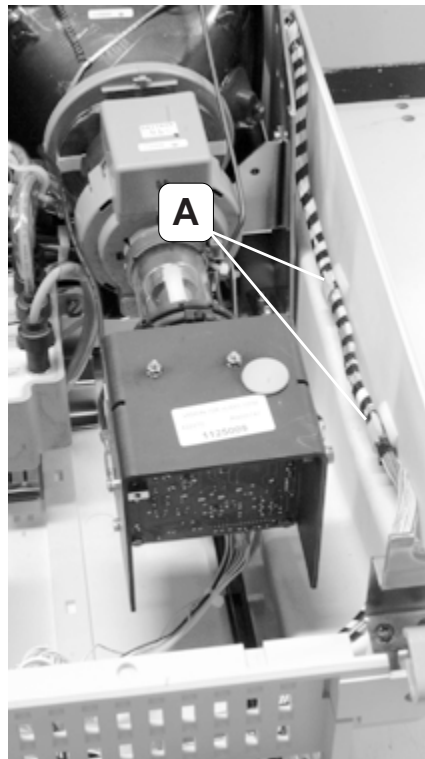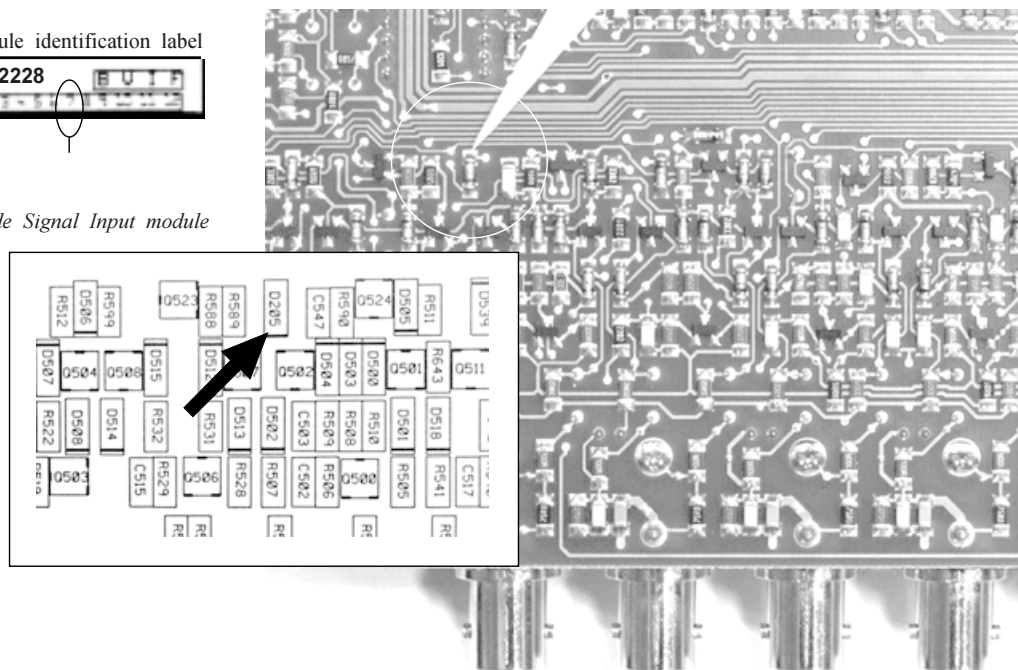

Insert the plugs of the cable into the respective connectors on the Interface module.
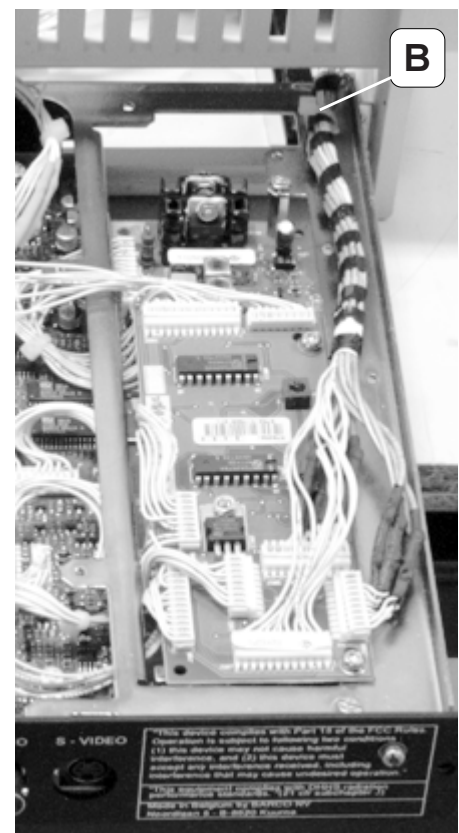
Modification on the Signal Input Module R762228 and R762766

ONLY RELATED TO THE PROJECTORS *708 Series

old Barcode   module identification label

R762766

Index

Index

Index

Solder side Signal Input module R762766

new Barcode

old Barcode   module identification label

R762228

Index

Solder side Signal Input module R762228

new Barcode
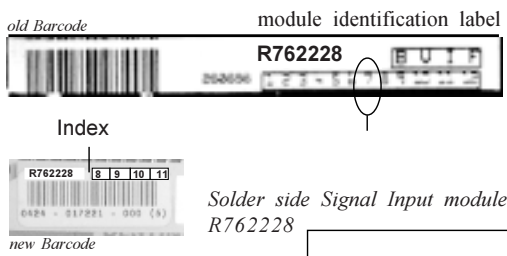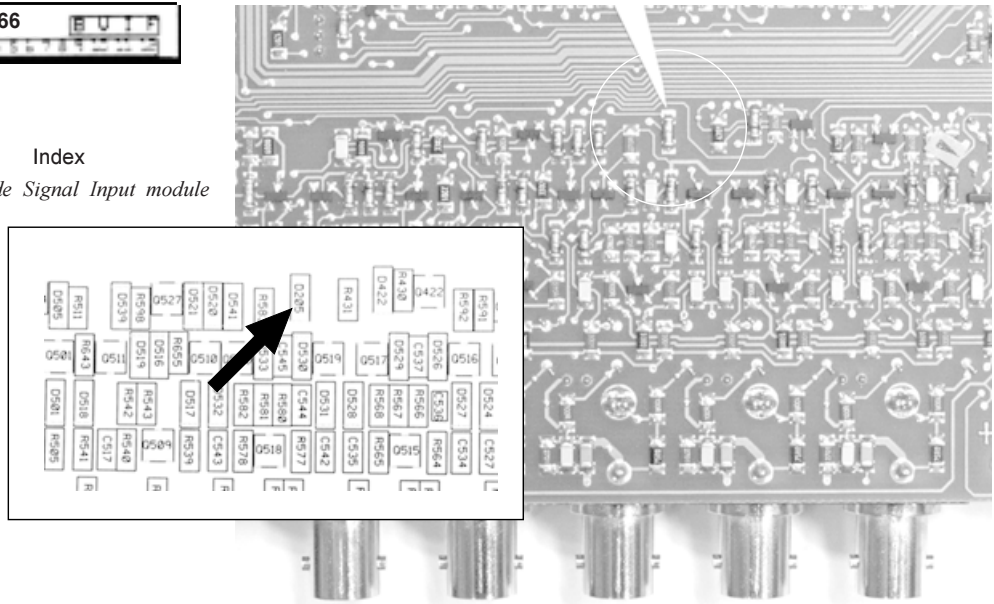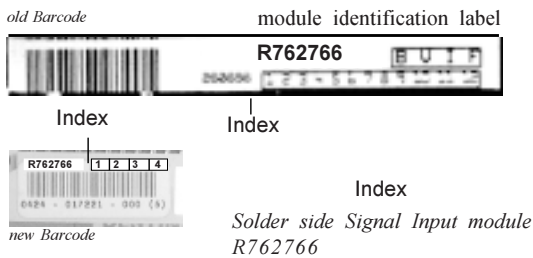
To ensure Linedoubling in case of Component Video input signals, remove the diode D205 on the respective Input modules **R762228 with print version R780352-7 and modification index < 8** and on the Input module **R762766 with modification index < 1**.

Installation Guidelines   **Date: 08/01/2001   R9828631**

Installing the LiMo module in the *808s Series projectors

A. Mount the Limo Interface module on the RGB Input+Decoder module as shown using the hardware provided in the Kit

Place the 2 spacers (**A**) on the module in the provided holes and secure the spacers with a nut (**B**) and an insulated washer (**C**).

D — R360861
Interface module
A — A576297
C — R7123023
Main module
B — R3661026
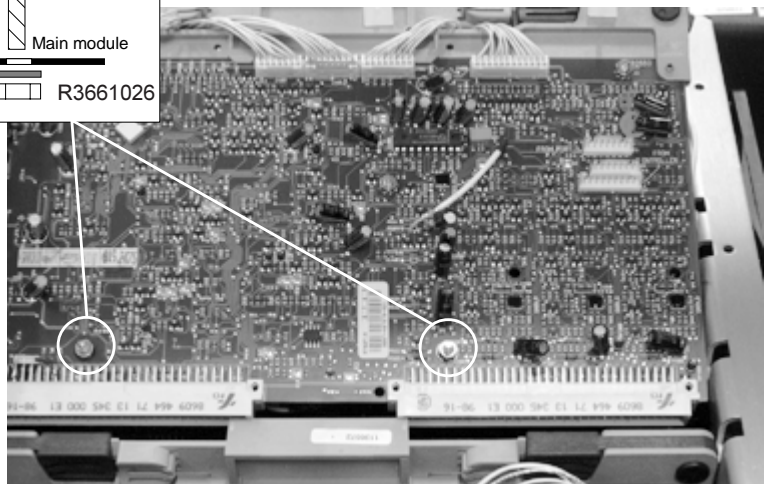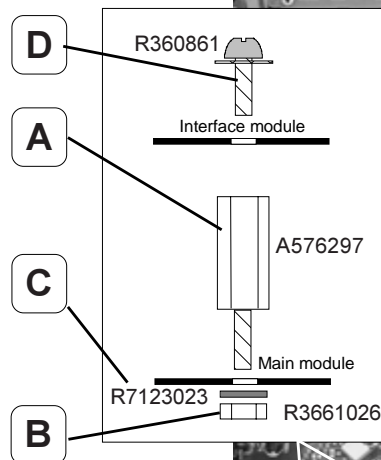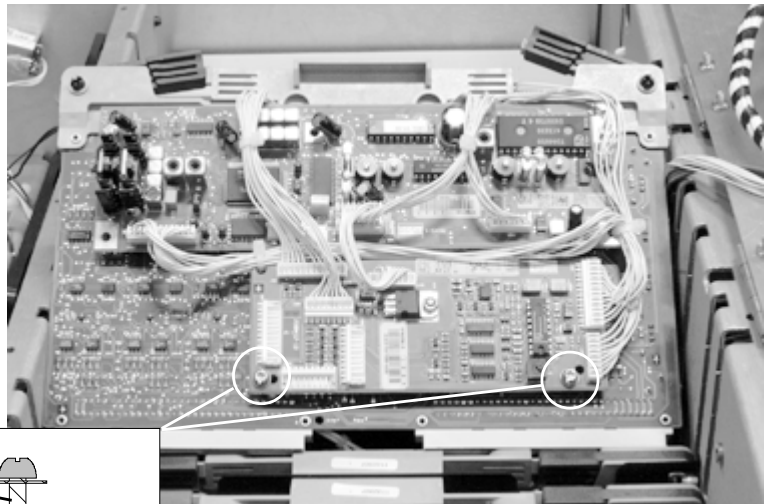
Place the Interface module on the spacers lining up the fixation holes and secure the module with 2 screws (**D**).

B. Install Interconnection cables between Interface module and the RGB Input+Decoder module as shown in figure 3 and 4.

Install the cable connections with the Interface module, and tie up the cables, using the provided cable ties (**F**) in the kit, on the indicated places (see photo 4)

Rear View: RGB Input+Decoder module R762719

Fig. 3

Important:
For the *1200 series projectors, do not place this cable tie.
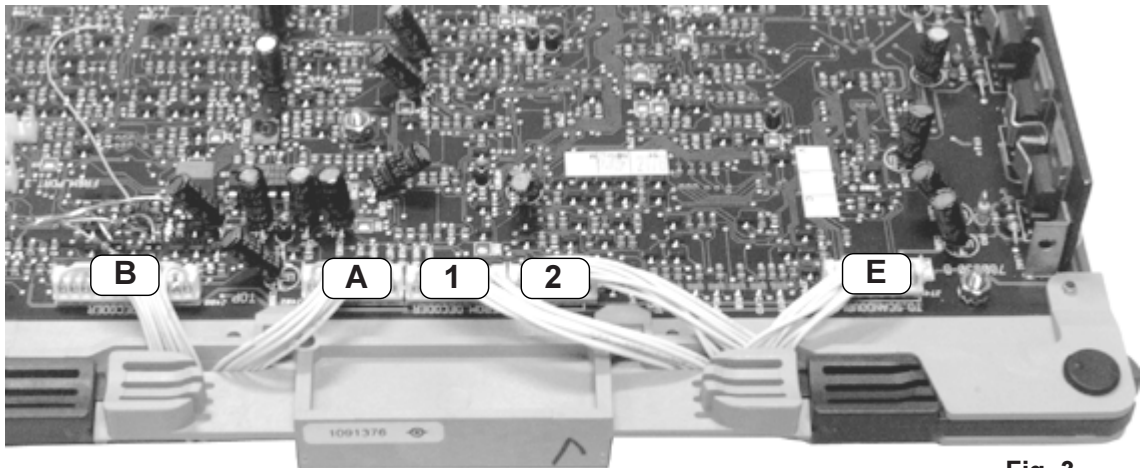
Front View: RGB Input+Decoder module R762719

Fig. 4

Installation Guidelines   **Date: 08/01/2001   R9828631**
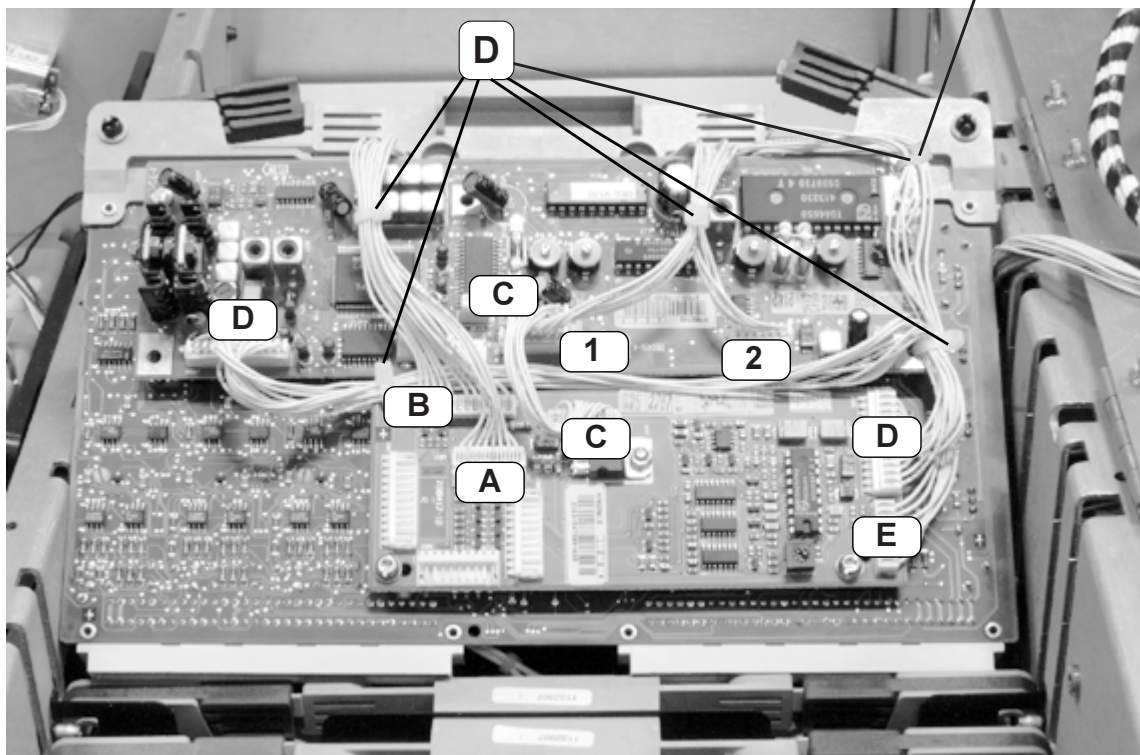
C. Mounting the LiMo module

1

Insert four spacers (**A**) through the provided holes in the metal cover of the Controller Module and secure with washer (**B**) and nut (**C**) provided in the Kit.

A576297

R367502
R3661026
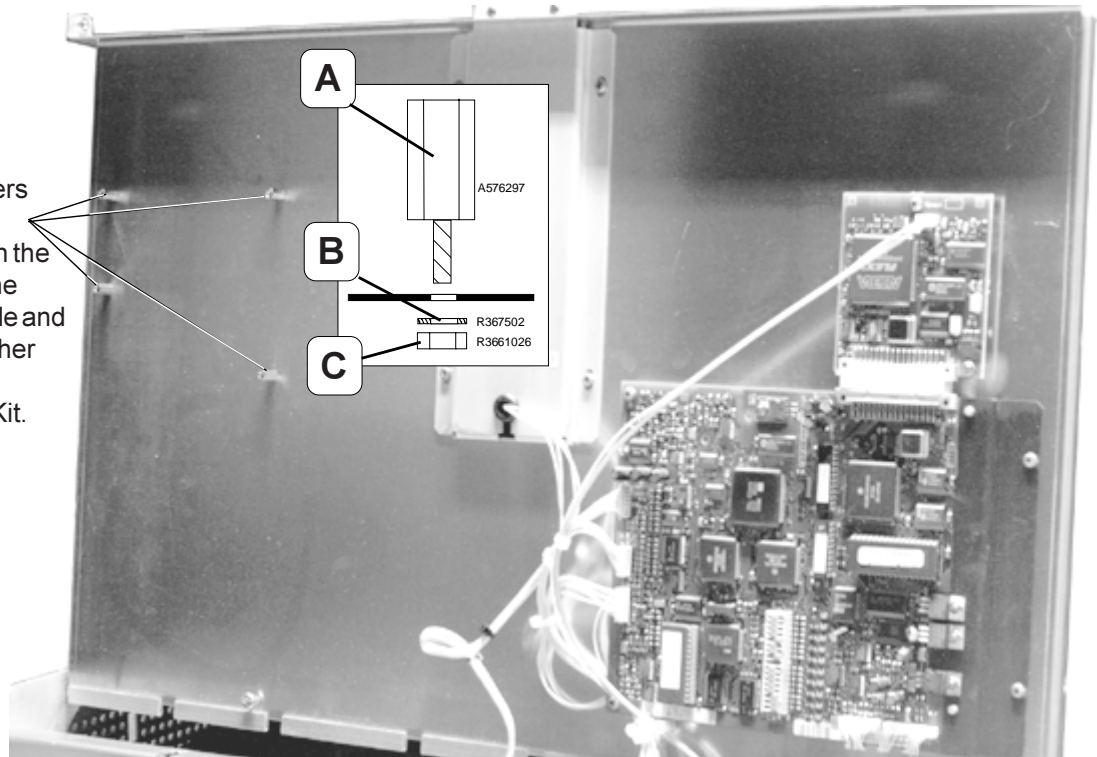
2

Remove the four screws (**D**) holding the LiMo module on its metal support bracket.
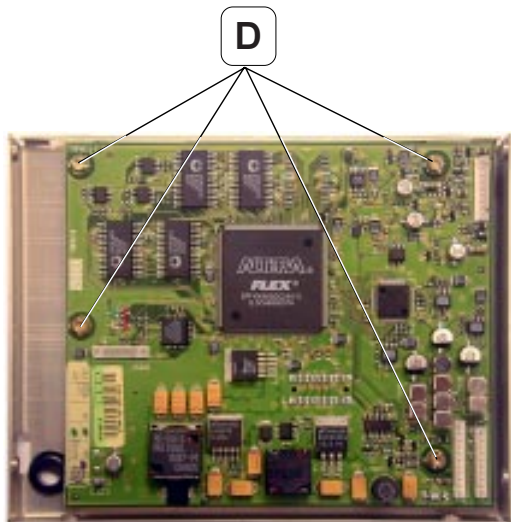
3

Place the LiMo module on the 4 mounted spacers and fix it to the spacers using the same screws (**D**).

D. Mounting the Interconnection Cable between the LiMo module and the Interface module.

Route the interconnection cable (**A**) as illustrated in photos below and fix the cable to the Controller module (**B**) and to the Interface module (**C**) using the provided cable ties in the kit.
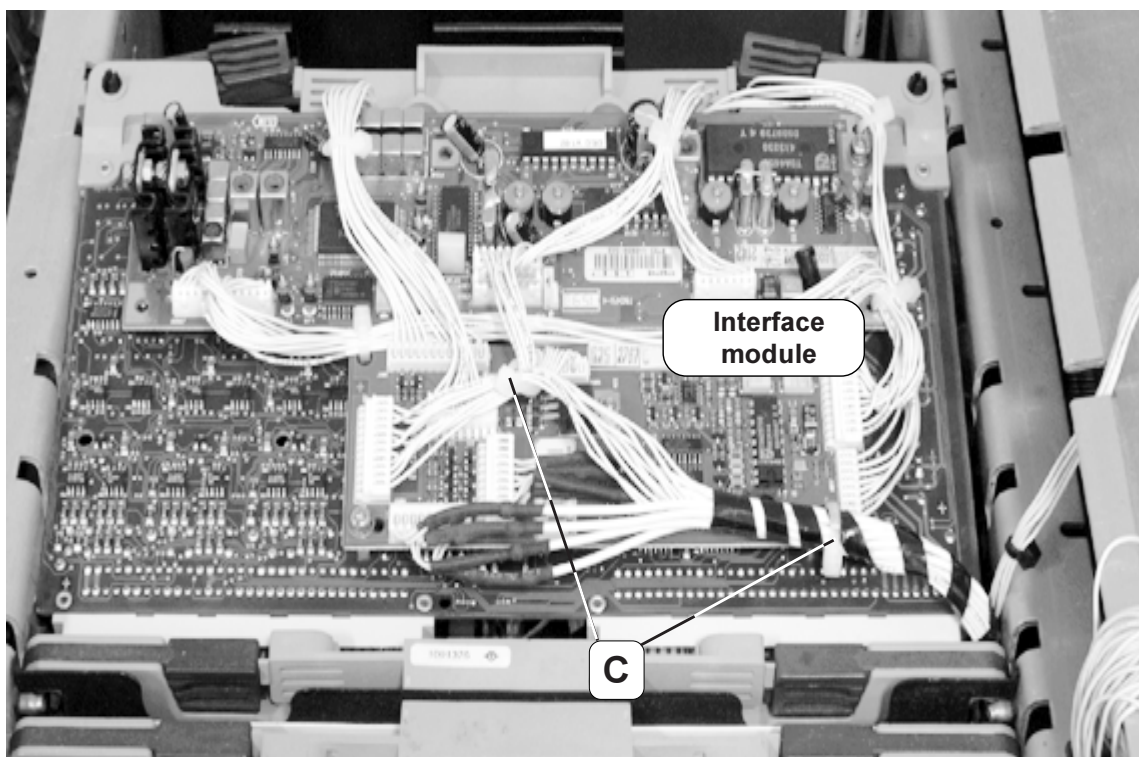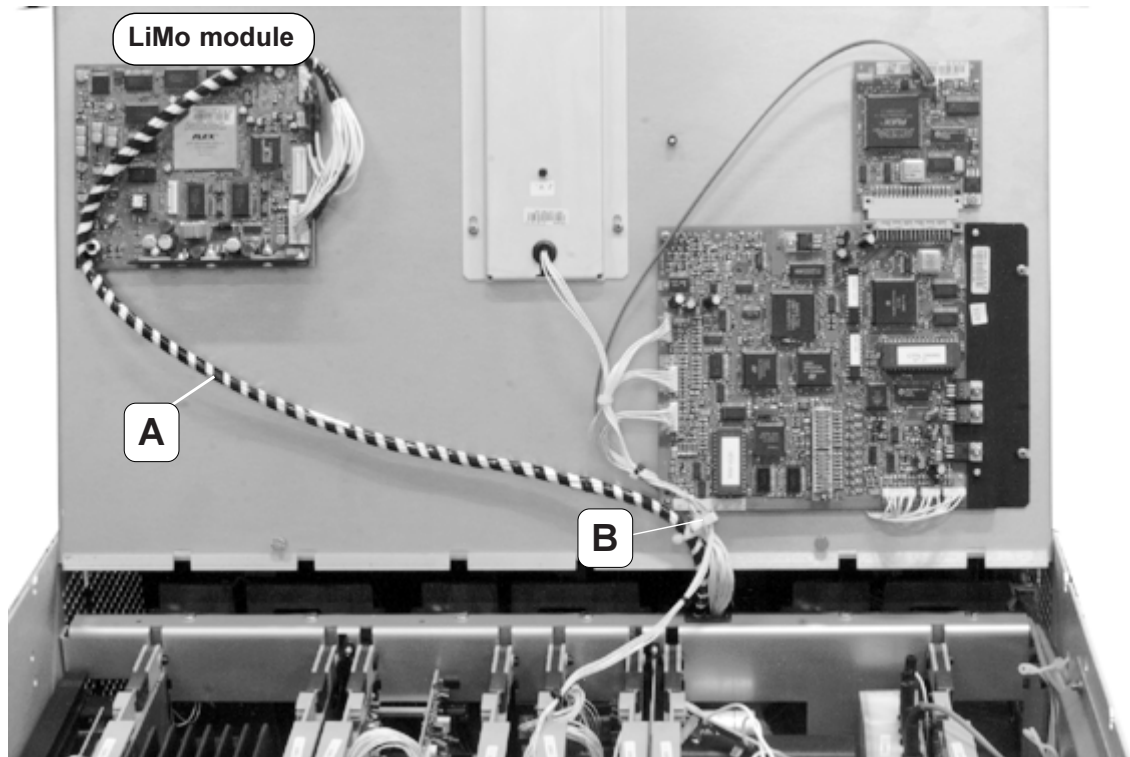
Section
3

Installing the LiMo module in the *1208s/*1209s/*1609s Series projectors

A. Mounting the LiMo Interface on the RGB Input+Decoder module
see page 8 'Projector *808s' Series

B. Interconnection LiMo Interface with the RGB Input+Decoder module
see page 9 'Projector *808s' Series

C. Mounting the LiMo module

1   **Mounting the 4 spacers on the Control unit**

Remove the Control unit from module cover by loosening the retaining screws (**A**) on both sides of the unit.

Turn out the retaining screw (**B**) and slide the Control module cover to the left to remove.

Insert four spacers (**C**) in the base of the controller module and secure the position of each spacer with a nut (**D**) and a washer (**E**).

Rear side Control unit

A576297

R367502
R3661026

Installation Guidelines   **Date: 08/01/2001   R9828631**
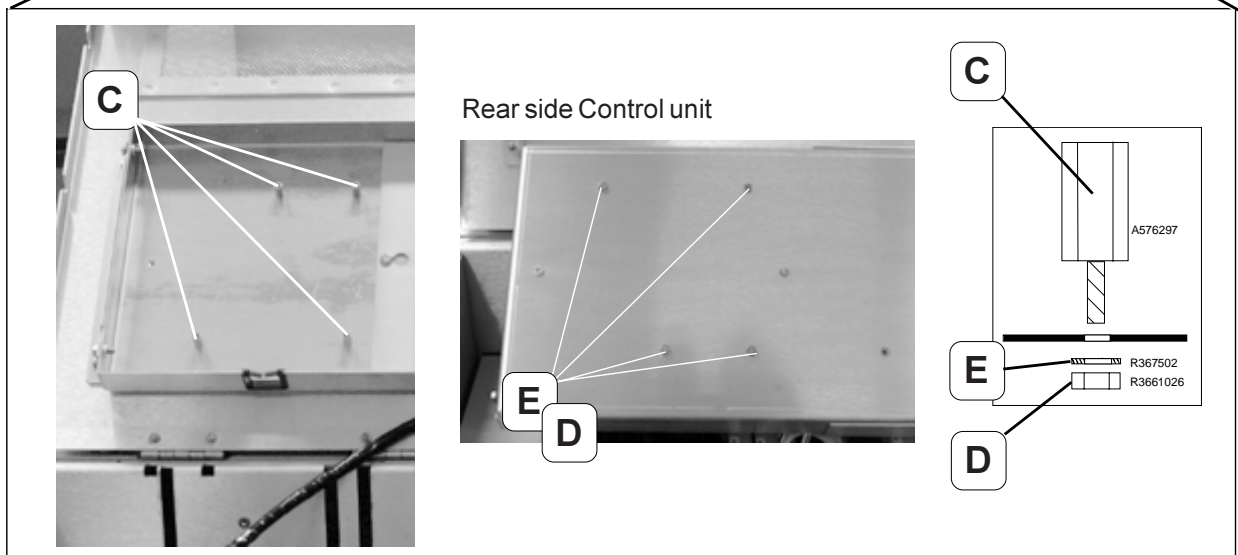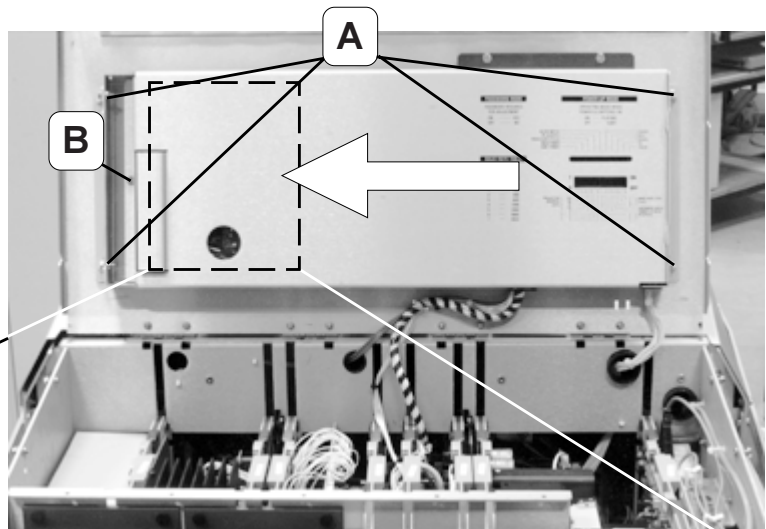
2   **Disassembly the LiMo unit.**

Remove the four screws (**A**) holding the LiMo
module on its metal support bracket. (Important:
the same screws will be used for securing the
Limo module to the spacers).
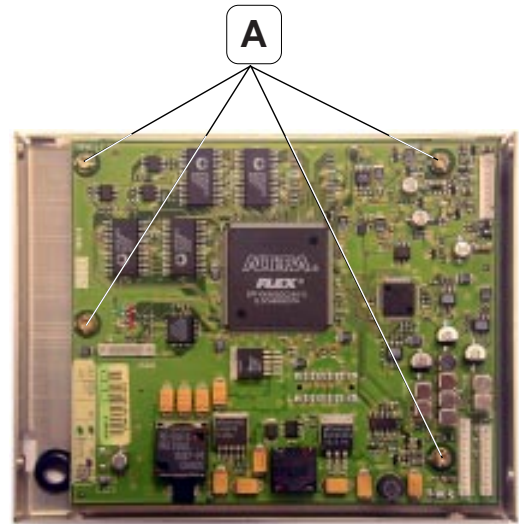
3   **LiMo module mounting**

Place the LiMo module on the installed spacers lining up the fixation holes with the spacers and fix it to the
spacers using the same four screws (**A**).
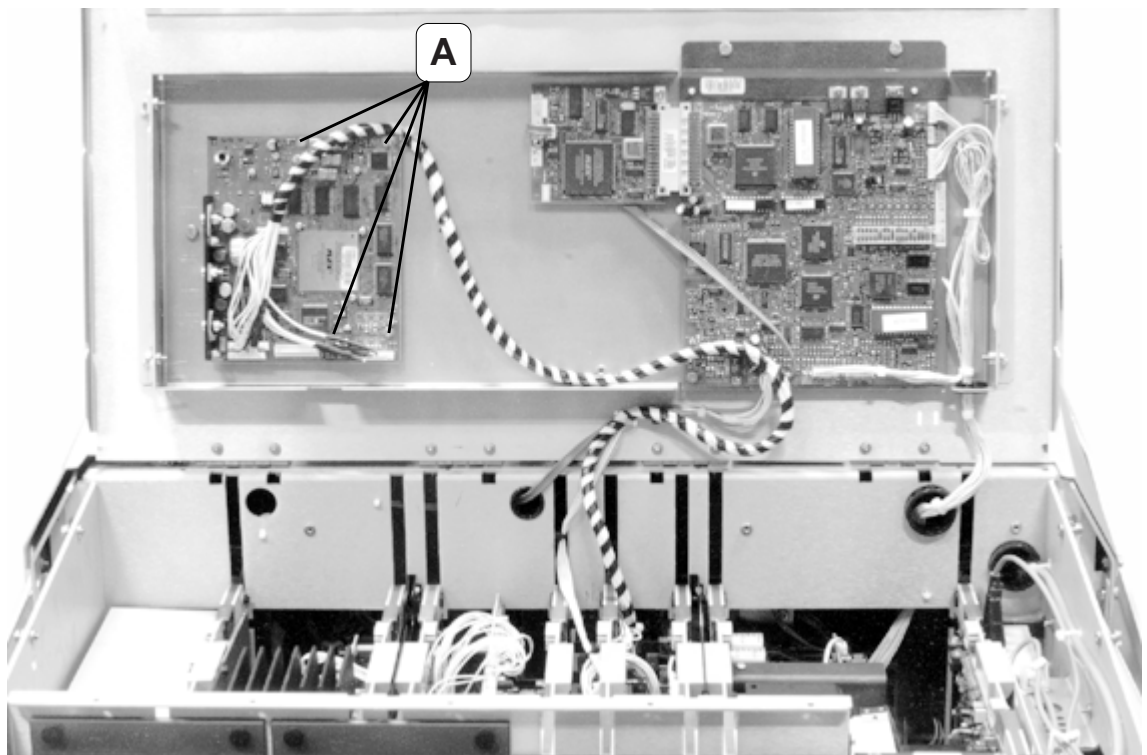
<table>
<tr><td>**4**</td><td>**Mount the Interconnection Cable between the LiMo module and the Interface module.**</td></tr>
</table>

Insert the plugs of the interconnection cable (**A**) in the frame and fix the cable to the frame as illustrated in photos below.

Lay down the cable (**A**) in the frame and fix the cable, using the cable ties (**B**) provided in the kit, to the points indicated on photos below.
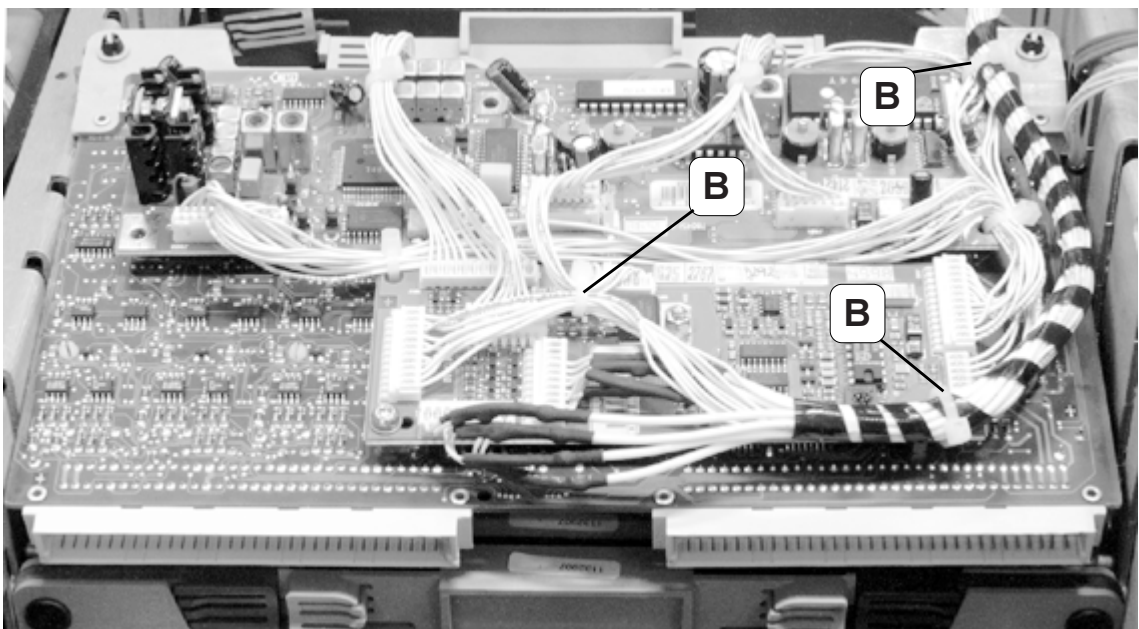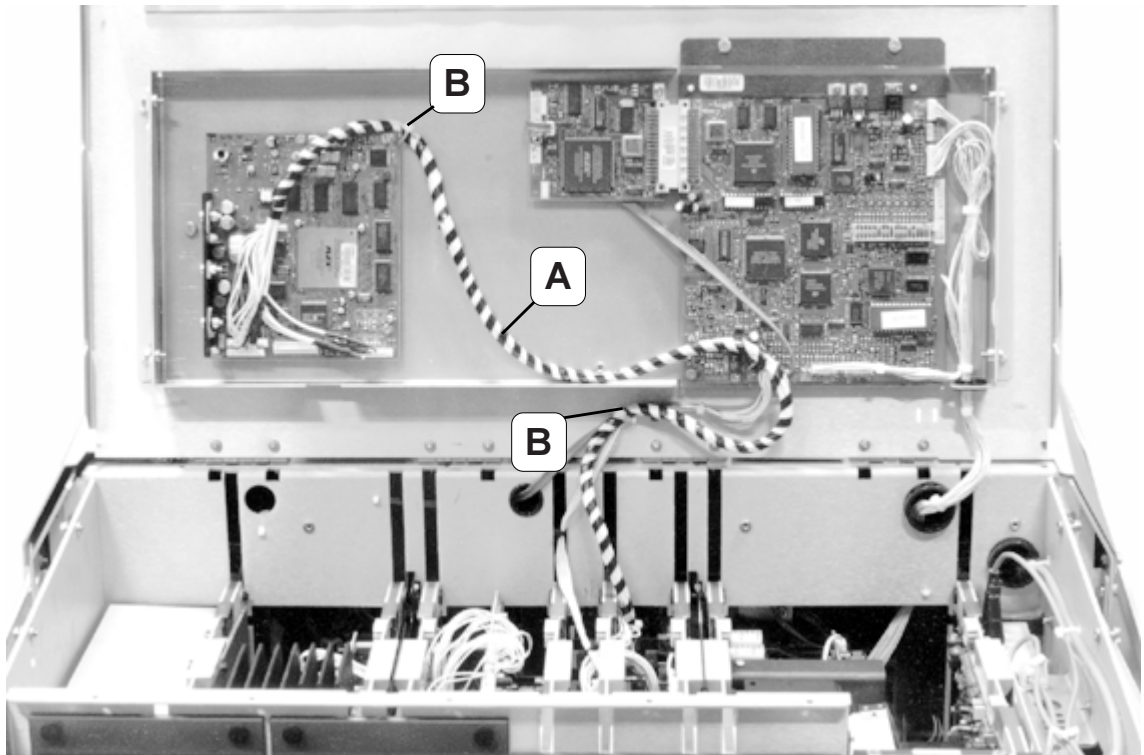
<table>
<tr><td>

Section

4

</td></tr>
</table>

LiMoPro Operation

Start up the Picture Tuning in the Random Access Adjustment Mode

1 Push the cursor keys ↑ or ↓ to highlight *Picture tuning* (menu 1).
2 Press **ENTER**.
   Depending on the input source, the 'Picture tuning' menu will display different items (menu 2).

```
   RANDOM  ACCESS
  ADJUSTMENT MODE

   PICTURE  TUNING
      GEOMETRY
     CONVERGENCE
       FOCUSING
     COLOR  SELECT
      SOFT  EDGE
    DRIVER  VOLTAGE

   Select  with  ↑ or ↓
      then  <ENTER>
    <EXIT>  to  return.
```
menu 1

```
    PICTURE  TUNING

     COLOR  BALANCE
  CONTRAST  MODULATION
      SYNC : FAST
        PEAKING
  CLAMP  MODE : NORMAL
    PORT2 : VIDEO
    LINE  MULTIPLIER

   Select  with  ↑ or ↓
   <ENTER>  to  accept
    <EXIT>  to  return.
```
menu 2
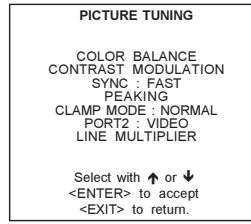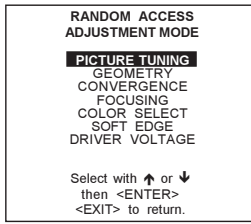
Starting up the Line Multiplier mode

1 Push the cursor keys ↑ or ↓ to select 'Line Multiplier' (menu 1).
2 Press ENTER to select.
   The image processing menu will be displayed (menu 2).

```
    PICTURE  TUNING

     COLOR  BALANCE
  CONTRAST  MODULATION
      SYNC : FAST
        PEAKING
      CLAMP  MODE
     PORT2 : VIDEO
    LINE  MULTIPLIER

   Select  with  ↑ or ↓
   <ENTER>  to  accept
    <EXIT>  to  return.
```
menu 1

```
   IMAGE  PROCESSING

  MOTION PROCESSING : ON

     OUTPUT  MODE
   VIDEO  EQUALIZING
    NOISE  REDUCTION
 CONTRAST  ENHANCEMENT

   SPLIT  SCREEN : OFF

   ADVANCED  SETTINGS
   Select  with  ↑ or ↓
      then  <ENTER>
    <EXIT>  to  return.
```
menu 2
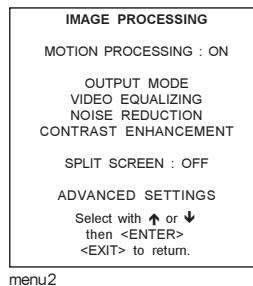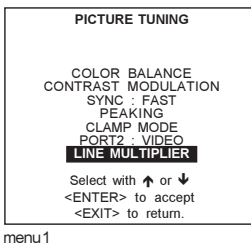
About LiMoPro digital video-processing module:

This menu item is always **active** when the projector is equipped with the LiMoPro digital video-processing module.
This module is designed to convert standard component (Y, Cr, Cb) video from its original 16 kHz line frequency (as used in PAL, NTSC and SECAM television standards) to a higher frequency of 32, 48 or 64 kHz. It is also capable of converting the low 50 or 60 Hz field frequency of these standards to twice that rate (100 or 120 Hz).

In addition, a lot of image processing features improve the image:

 - Time Base correction virtually eliminates the timing jitter caused by the common videocassette recorders.
 - De-interlacing gets rid of line flicker.
 - Film mode processing makes sure that material that has been converted from 24 Hz cinema to video (2:2 and 3:2 pull-down) is displayed without artifacts.
 - Dynamic noise reduction can be used to improve noisy video sources.
 - Static contrast enhancement allows the user to adjust the image contrast to personal taste.
 - Several detail-enhancing filters bring out details.

The setting of the LiMoPo will be saved together with the source number. Each time this source number is selected, the last saved version will be loaded.

Overview of menus and submenus

Overview of menus and submenus

IMAGE PROCESSING

MOTION PROCESSING:ON

OUTPUT MODE ─────────┐ **LINE MULTIPLIER**
                     │ **OUTPUT MODE**
                     │
LINE MULTIPLIER ─   │   - Pal/SECAM
VIDEO EQUALIZING   │   - NTSC
NOISE REDUCTION
CONTRAST ENHANCEMENT   **LINE MULTIPLIER**

SPLIT SCREEN   TIME BASE CORRECTION
                        LUMINANCE DELAY
ADVANCED SETTINGS ───── V SYNC REF: INDIRECT
                        CLAMP GATING: OFF   **LINE MULTIPLIER**

                        LIMO PLUS OPTIONS ───── CORING
                                                 LTI
                                                 CTI
                        FACTORY PRESET

To adjust the indicated items, proceed as follows:

Motion Processing

Why Motion Processing ?

With this function it is possible to recognize whether the source material was originally film or video. That prevents the creation of motion artifacts.

How to activate ?

1   Push the cursor keys ↑ or ↓ to select 'Motion Processing' (menu 1).
2   Press **ENTER** to toggle between ON and OFF.
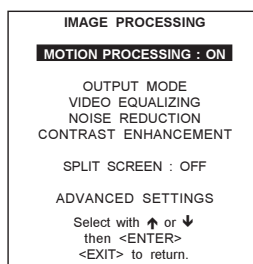
```
        IMAGE  PROCESSING
   MOTION PROCESSING : ON

        OUTPUT  MODE
       VIDEO  EQUALIZING
       NOISE  REDUCTION
    CONTRAST  ENHANCEMENT

      SPLIT  SCREEN : OFF

      ADVANCED  SETTINGS
      Select with ↑ or ↓
        then <ENTER>
      <EXIT>  to  return.
```
menu 1

Output Mode

What can be done ?

Within the output mode menu, it is possible to select a new output mode for a given input signal. The input signal can be line multiplied, interlaced or non-interlaced.

How to select a new scan rate ?

1. Push the cursor keys ↑ or ↓ to select 'Output Mode' (menu 1).
2. Press **ENTER** to display the output mode menu (menu 2a or 2b)
   Depending on the frequency of the input source, menu 2a or 2b will be displayed.
   If your input signal is PAL or SECAM signal, menu 2a will be displayed. If it is a NTSC signal, menu 2b will be displayed.

```
  IMAGE PROCESSING

MOTION PROCESSING : ON

  ┌──────────────┐
  │ OUTPUT MODE  │
  └──────────────┘
  VIDEO EQUALIZING
  NOISE REDUCTION
CONTRAST ENHANCEMENT

SPLIT SCREEN : OFF

ADVANCED SETTINGS
  Select with ↑ or ↓
    then <ENTER>
  <EXIT>  to return.
```
menu 1

```
    LINEMULTIPLIER
    OUTPUT MODE

  50Hz  625 Lines  NI
  50Hz  935 Lines NI
  100hz  625 Lines NI
  50Hz 1250 Lines NI
  100Hz 1250 Lines  I




  Select with ↑ or ↓
    then <ENTER>
  <EXIT>  to return.
```
menu 2a

```
    LINEMULTIPLIER
    OUTPUT MODE

  60Hz  525 Lines  NI
  60Hz  785 Lines NI
  120hz  525 Lines NI
  60Hz 1050 Lines  NI
  120Hz 1050 Lines  I




  Select with ↑ or ↓
    then <ENTER>
  <EXIT>  to return.
```
menu 2b

3. Push the cursor keys ↑ or ↓ to select a new scan rate (menu 3).
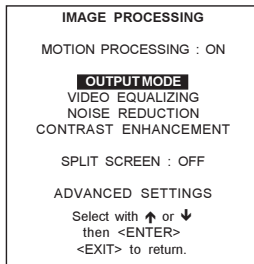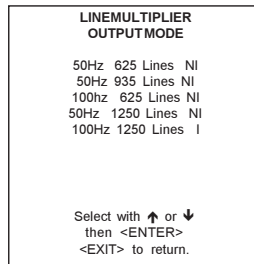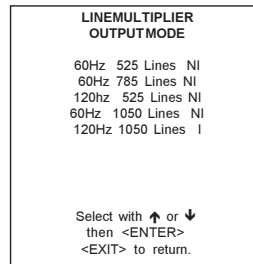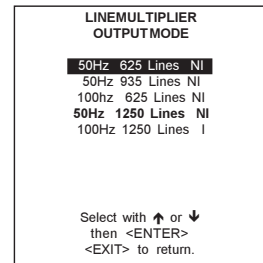4. Press **ENTER** to activate this scan rate.
   e.g. 50 Hz 625 lines NI ==>
       Vertical frequency of the image : 50 Hz
       Quantity of horizontal lines : 625 lines
       Interlace mode : NI = Non-interlaced image (progressive scan).

```
    LINEMULTIPLIER
    OUTPUT MODE

  ┌───────────────────┐
  │ 50Hz  625 Lines  NI│
  └───────────────────┘
  50Hz 935 Lines NI
  100hz  625 Lines NI
  50Hz  1250 Lines  NI
  100Hz 1250 Lines  I




  Select with ↑ or ↓
    then <ENTER>
  <EXIT>  to return.
```
menu 3

Video Equalizing

What can be done ?

The sharpness of the image can be adjusted for 3 frequency ranges (low, medium and high) separately.
In total 7 pre-programmed factory presets are available, 1 to 7. In addidtion to 7, a customized adjustment of the sharpness for the 3 ranges is also possible.

How to select Video Equalizing ?

1. Push the cursor keys ↑ or ↓ to select 'Video Equalizing' (menu 1).
2. Press **ENTER** to display the adjustment menu (menu 2).

How to adjust the Video Equalizing ?

1. Push the cursor keys ← or → to select 'Low' or Mid' or 'HI(gh)' or 'Factory Preset : x'
2. Push the cursor keys ↑ or ↓ to adjust the sharpness in the chosen band (low, mid or high) or to scroll through the factory presets (x = 1 to 7).
   Factory preset 8 corresponds to the customized adjustment as made in the low, mid and high range.

```
  IMAGE PROCESSING

MOTION PROCESSING : ON

  OUTPUT  MODE
  ┌──────────────────┐
  │ VIDEO  EQUALIZING │
  └──────────────────┘
  NOISE  REDUCTION
CONTRAST  ENHANCEMENT

SPLIT  SCREEN  :  OFF

ADVANCED  SETTINGS
  Select with ↑ or ↓
    then <ENTER>
  <EXIT>  to return.
```
menu 1

```
   ▯    ▯    ▯
   █    █    █

  LOW   MID   HI.
  FACTORY PRESET : x
  Select with ← or →
Adjust or scroll presets
   with ↑ or ↓
  <EXIT>  to return.
```
menu 2

Installation Guidelines   **Date: 08/01/2001 R9828631**
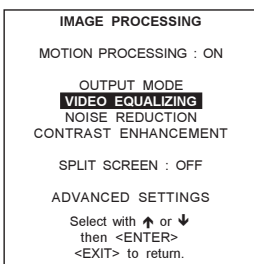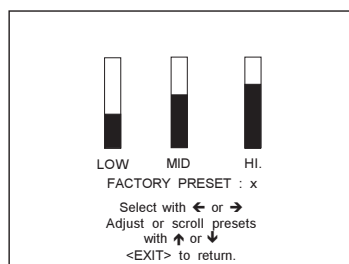
Noise Reduction

What can be done ?

Display of noisy images, due to noisy video sources, can be improved by the use of the Noise Reduction feature.

How to select and adjust the Noise Reduction ?

1 Push the cursor keys ↑ or ↓ to select 'Noise Reduction' (menu 1).
2 Press **ENTER** to display the adjustment text box (menu 2).
3 Push the cursor keys ↑ or ↓ to minimize the noise level in the picture.
4 Press **ENTER** to return to the 'Image Processing' menu.

```
        IMAGE PROCESSING

MOTION PROCESSING : ON

    OUTPUT  MODE
   VIDEO  EQUALIZING
    NOISE  REDUCTION
  CONTRAST  ENHANCEMENT

     SPLIT  SCREEN

   ADVANCED  SETTINGS
   Select with ↑ or ↓
      then <ENTER>
    <EXIT>  to  return.
```

```

                    Dynamic
                 Noise Reduction

              Off            Max
```

menu 1   menu 2

Contrast Enhancement

What can be done ?

Enhancing the contrast results in a more dynamic image.

How to select and adjust the contrast enhancement ?

1 Push the cursor keys ↑ or ↓ to select 'Contrast Enhancement' (menu 1).
2 Press **ENTER** to display the adjustment text box (menu 2).
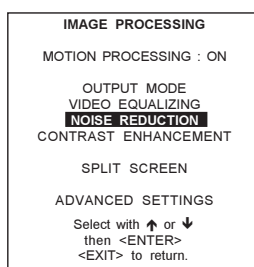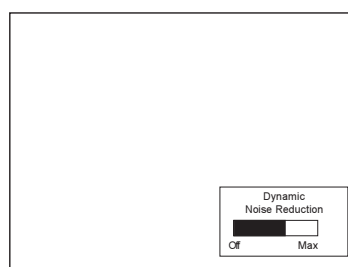3 Push the cursor keys ↑ or ↓ to adjust the contrast enhancement.
4 Press **ENTER** to return to the 'Image Processing' menu.

```
        IMAGE PROCESSING

MOTION PROCESSING : ON

    OUTPUT  MODE
   VIDEO  EQUALIZING
    NOISE  REDUCTION
  CONTRAST ENHANCEMENT

     SPLIT  SCREEN

   ADVANCED  SETTINGS
   Select with ↑ or ↓
      then <ENTER>
    <EXIT>  to  return.
```

```

                    Contrast
                   Enhancem.

              0            100
```
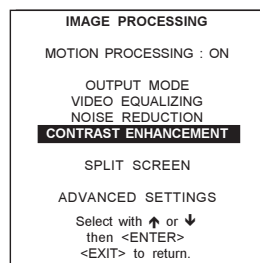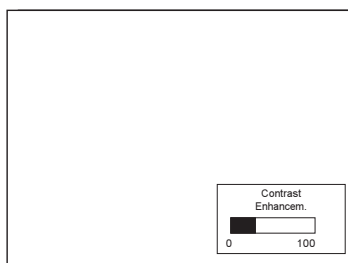
menu 1   menu 2

Split Screen

What can be done ?

When the split screen is 'on', the left half of the image will be displayed without enhancements, the right half shows the image with all selected image processing enabled.

How to activate the Split Screen function ?

1 Push the cursor keys ↑ or ↓ to select 'Split Screen' (menu 1).
2 Press **ENTER** to toggle between ON and OFF.

```
IMAGE PROCESSING

MOTION PROCESSING : ON

OUTPUT MODE
VIDEO EQUALIZING
NOISE REDUCTION
CONTRAST ENHANCEMENT

SPLIT SCREEN

ADVANCED SETTINGS
Select with ↑ or ↓
then <ENTER>
<EXIT> to return.
```
menu 1

Advanced Settings

How to select the Advanced Settings ?

1. Push the cursor key ↑ or ↓ to select 'Advanced Settings' (menu 1).
2. Press ENTER to select.
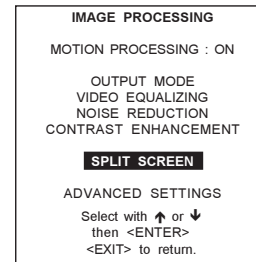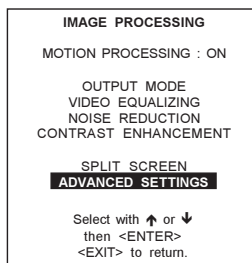   The advanced Settings menu will be displayed (menu 2).
    A warning is displayed in the advanced settings menu : "Advanced adjustment should be performed only by qualified personnel".

```
IMAGE PROCESSING

MOTION PROCESSING : ON

OUTPUT MODE
VIDEO EQUALIZING
NOISE REDUCTION
CONTRAST ENHANCEMENT

SPLIT SCREEN
ADVANCED SETTINGS

Select with ↑ or ↓
then <ENTER>
<EXIT> to return.
```
menu 1
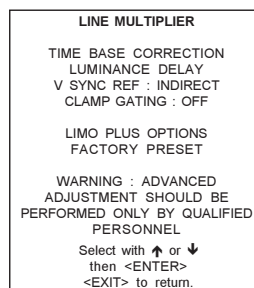
```
LINE MULTIPLIER

TIME BASE CORRECTION
LUMINANCE DELAY
V SYNC REF : INDIRECT
CLAMP GATING : OFF

LIMO PLUS OPTIONS
FACTORY PRESET

WARNING : ADVANCED
ADJUSTMENT SHOULD BE
PERFORMED ONLY BY QUALIFIED
PERSONNEL
Select with ↑ or ↓
then <ENTER>
<EXIT> to return.
```
menu 2

Time Base Correction

Why Time Base Correction ?

With the Time Base Correction function it is possible to clean-up low quality videotape noise to obtain a more stable image.

How to activate ?

1 Push the cursor keys ↑ or ↓ to select 'Time Base Correction' (menu 1).
2 Press **ENTER** to toggle between ON and OFF.
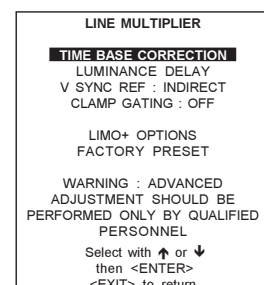
```
LINE MULTIPLIER

TIME BASE CORRECTION
LUMINANCE DELAY
V SYNC REF : INDIRECT
CLAMP GATING : OFF

LIMO+ OPTIONS
FACTORY PRESET

WARNING : ADVANCED
ADJUSTMENT SHOULD BE
PERFORMED ONLY BY QUALIFIED
PERSONNEL
Select with ↑ or ↓
then <ENTER>
<EXIT> to return.
```
menu 1

Luminance Delay

When is it necessary ?

When a colour shift is recognized on the screen. e.g. if colour bars are projected and a line between the colours is recognized.

How to adjust ?

1. Push the cursor key ↑ or ↓ to select 'Luminance delay' (menu 1).
2. Press **ENTER** to activate.
3. Push the cursor key ↑ or ↓ to adjust the luminance delay until the colour shift is eliminated (menu 2).
4. Press **ENTER** to return to the 'Advanced Settings' menu.

```
       LINE MULTIPLIER

  TIME  BASE  CORRECTION
  LUMINANCE  DELAY
  V SYNC REF : INDIRECT
  CLAMP GATING : OFF

  LIMO PLUS OPTIONS
  FACTORY PRESET

  WARNING : ADVANCED
  ADJUSTMENT SHOULD BE
  PERFORMED ONLY BY QUALIFIED
  PERSONNEL
  Select with ↑ or ↓
  then  <ENTER>
  <EXIT>  to return.
```
menu 1

```
                Luminance
                  Delay

           -      0      +
```
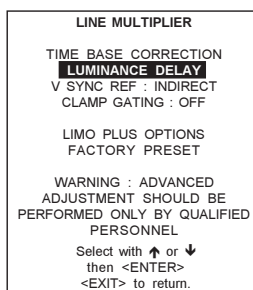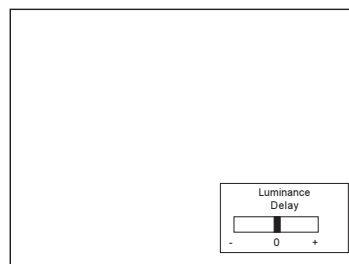menu 2

Vertical Sync Reference

Why necessary ?

DIRECT: this sync processing has the disadvantage that glitches and other disturbances in the video signal sometimes get passed and hence may cause problems in the image.

INDIRECT: this sync processing throws away any disturbances that are not really sync signals. By source switching a rolling effect on the image can occur. This sync processing is preferred especially with low quality material.

How to change the vertical sync reference ?

1. Push the cursor key ↑ or ↓ to select 'V Sync Ref' (menu 1).
2. Press **ENTER** to toggle between 'direct' and ' indirect'.
   Default position : indirect.
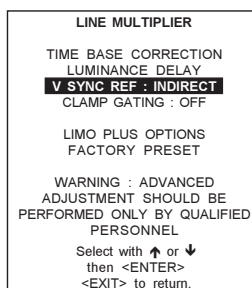
```
       LINE MULTIPLIER

  TIME  BASE  CORRECTION
  LUMINANCE  DELAY
  V SYNC REF : INDIRECT
  CLAMP GATING : OFF

  LIMO PLUS OPTIONS
  FACTORY PRESET

  WARNING : ADVANCED
  ADJUSTMENT SHOULD BE
  PERFORMED ONLY BY QUALIFIED
  PERSONNEL
  Select with ↑ or ↓
  then  <ENTER>
  <EXIT>  to return.
```
menu 1

Clamp Gating

Why necessary ?

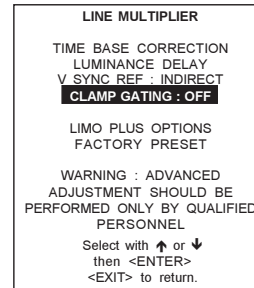Clamp Gating is useful when copy protection signals are present in the vertical interval of the video signal that would otherwise confuse the LiMoPro, causing horizontal brightness differences near the top of the screen.

How to change the Clamp Gating ?

1. Push the cursor key ⬆ or ⬇ to select 'Clamp Gating' (menu 1).
2. Press **ENTER** to toggle between ON and OFF.
   Default position : OFF.

Suggested default settings of TBC, Clamp Gate and V-Ref

```
            LINE MULTIPLIER

       TIME BASE CORRECTION
         LUMINANCE DELAY
       V SYNC REF : INDIRECT
       CLAMP GATING : OFF

         LIMO PLUS OPTIONS
         FACTORY PRESET

       WARNING : ADVANCED
     ADJUSTMENT SHOULD BE
   PERFORMED ONLY BY QUALIFIED
           PERSONNEL

       Select with ⬆ or ⬇
           then <ENTER>
         <EXIT> to return.
```
menu 1

TBC	VS Ref	Clamp Gate
ON	Indirect	OFF

Combination Matrix V-Sync Ref/Clamp Gate
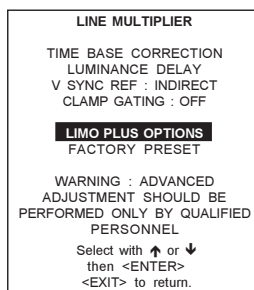*(TBC is mostly independent from the other options. For setting, see respective chapter)*

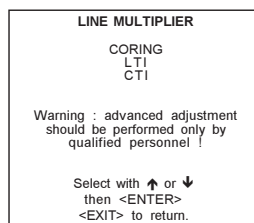| VS Ref	Clamp Gate	Application
Indirect	OFF	Use this default. Should give best stability on most video sources.
Direct	OFF	Use this when the default settings causes unwanted vertical image rolling when switching sources.
Indirect	ON	Try this when default setting causes dark and/ or bright horizontal stripes on the screen, or when the old interface module is used. This may cause those stripes to appear when none were present in the default setting..
Direct	ON	To be avoided. May cause horizontal dark and bright stripes on top and bottom of the screen ("Clamping errors").

Limo Pro Options

How to select the Limo Pro Options ?

1. Push the cursor key ⬆ or ⬇ to select 'Limo Pro Options' (menu 1).
2. Press **ENTER** to display the Limo Pro menu (menu 2).

```
            LINE MULTIPLIER

       TIME BASE CORRECTION
         LUMINANCE DELAY
       V SYNC REF : INDIRECT
         CLAMP GATING : OFF

         LIMO PLUS OPTIONS
         FACTORY PRESET

       WARNING : ADVANCED
     ADJUSTMENT SHOULD BE
   PERFORMED ONLY BY QUALIFIED
           PERSONNEL
       Select with ⬆ or ⬇
           then <ENTER>
         <EXIT> to return.
```
menu 1

```
            LINE MULTIPLIER

              CORING
               LTI
               CTI

     Warning : advanced adjustment
      should be performed only by
           qualified personnel !

       Select with ⬆ or ⬇
           then <ENTER>
         <EXIT> to return.
```
menu 2

Coring

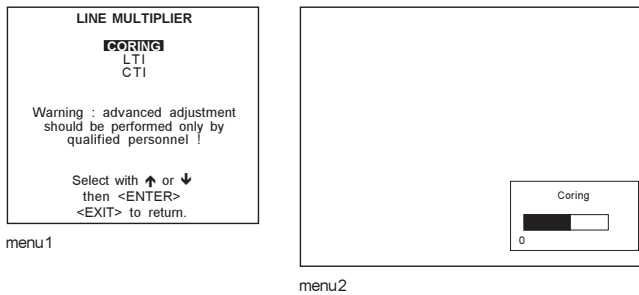### *What can be done ?*

With coring, a noise threshold will be set for all filters.

How to set up ?

1. Push the cursor key ⬆ or ⬇ to select 'Coring' (menu 1).
2. Press **ENTER** to select coring.
3. Use the cursor keys to adjust the coring (noise threshold).

```
LINE MULTIPLIER

   CORING
    LTI
    CTI

Warning : advanced adjustment
  should be performed only by
      qualified personnel !

Select with ⬆ or ⬇
  then <ENTER>
 <EXIT> to return.
```
menu 1

```
                    Coring
                  ▆▆▆▆
                  0
```
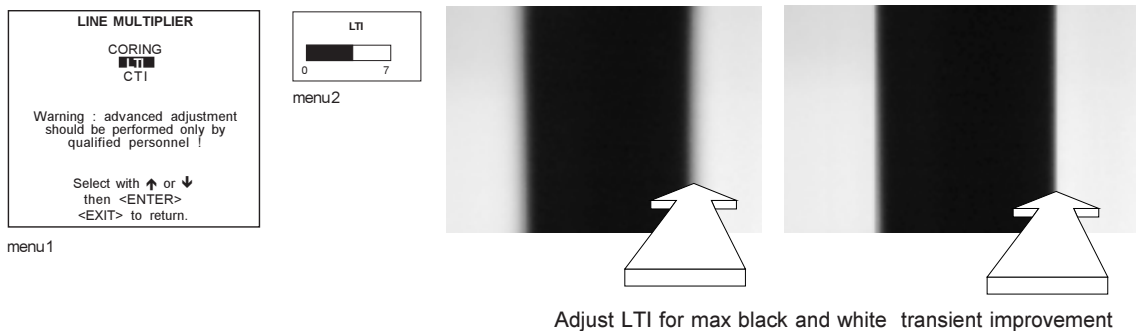menu 2

LTI

What can be done ?

LTI = Luminance transient improvement. This function makes the luminance transients sharper (from dark areas to highlight areas) without overshoot, undershoot or ringing.

How to set up ?

1. Push the cursor key ⬆ or ⬇ to select 'LTI' (menu 1).
2. Press **ENTER** to select.
3. Use the cursor keys to change the LTI value. Only 7 steps are possible.

```
LINE MULTIPLIER

   CORING
    LTI
    CTI

Warning : advanced adjustment
  should be performed only by
      qualified personnel !

Select with ⬆ or ⬇
  then <ENTER>
 <EXIT> to return.
```
menu 1

```
    LTI
  ▆▆▆
  0      7
```
menu 2

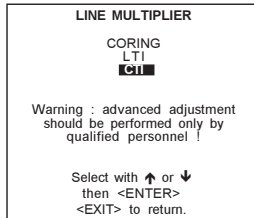Adjust LTI for max black and white transient improvement
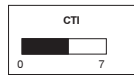
CTI

What can be done ?

CTI = Chrominance (colour) transient improvement. This function makes the chrominance transients (from one colour to another) sharper without overshoot, undershoot or ringing.

Installation Guidelines   **Date: 08/01/2001   R9828631**

How to set up ?

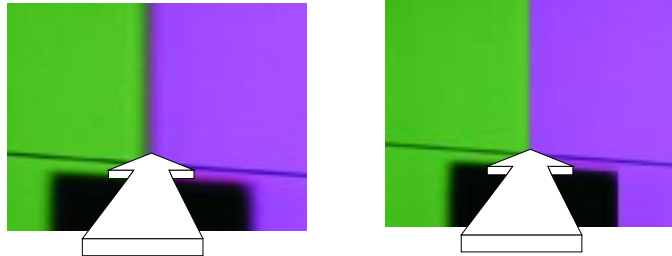1. Push the cursor key ↑ or ↓ to select 'CTI' (menu 1).
2. Press **ENTER** to select.
3. Use the cursor keys to change the CTI value. Only 7 steps are possible.

```
    LINE MULTIPLIER

         CORING
          LTI
          CTI

 Warning : advanced adjustment
   should be performed only by
       qualified personnel !

     Select with ↑ or ↓
       then <ENTER>
     <EXIT>  to return.
```
menu 1

```
        CTI

  0            7
```
menu 2

Adjust CTI for max colour transient improvement

Factory Preset

What can be done ?

All following settings for LiMoPro will be set to factory preset:

Time base correction : on
Luminance delay : 0
Vertical sync reference : indirect
Clamp gating : off

How to activate ?

1. Push the cursor key ↑ or ↓ to select 'Factory Preset' (menu 1).
2. Press **ENTER** to activate.