1260 VXI
SWITCHING CARD

Model 1260-822
VXI OPTICAL SWITCH

PUBLICATION NO. 980673-060

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FOR YOUR SAFETY

Before undertaking any troubleshooting, maintenance or exploratory procedure, read carefully the **WARNINGS** and **CAUTION** notices.

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

If this instrument is to be powered from the AC line (mains) through an autotransformer, ensure the common connector is connected to the neutral (earth pole) of the power supply.

Before operating the unit, ensure the conductor (green wire) is connected to the ground (earth) conductor of the power outlet. Do not use a two-conductor extension cord or a three-prong/two-prong adapter. This will defeat the protective feature of the third conductor in the power cord.

Maintenance and calibration procedures sometimes call for operation of the unit with power applied and protective covers removed. Read the procedures and heed warnings to avoid “live” circuit points.

Before operating this instrument:

1. Ensure the instrument is configured to operate on the voltage at the power source. See Installation Section.

2. Ensure the proper fuse is in place for the power source to operate.

3. Ensure all other devices connected to or in proximity to this instrument are properly grounded or connected to the protective third-wire earth ground.

If the instrument:

- fails to operate satisfactorily
- shows visible damage
- has been stored under unfavorable conditions
- has sustained stress

Do not operate until performance is checked by qualified personnel.

Optical Ports

WARNING: To avoid eye damage, do not look directly into the optical output ports while there is an optical signal connected to the input port. Always attach the output ports to a receiver or cover with the supplied dust caps before enabling the source signal to the input port.

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Chapter 1

MODULE SPECIFICATION

Introduction

The 1260-822 is a VXI Optical Switch Module, developed as part of the Racal 1260 Series family of switch modules.

An Option 01T interface is required on at least one of the 1260 Series modules in the system. See the Option 01T User Manual (Publication No. 980806-999) for more details.

The following features are included in the 1260-822

- Two or four 2X2 Optical Switch configurations.
- Single-slot VXI C-size module.
- Single Mode, 9/125µm optical fiber with a wavelength range of 1290-1570 nm standard. Optional fiber types and wavelengths are available as specials.
- FC/SPC connectors are standard (other connectors or fiber pigtails are available as specials).
- Dust Caps are supplied with all front panel Fiberoptic adapters.

Figure 1-1, The 1260-822

Specifications[1]

Optical Fiber Type	9/125µm
Wavelength Range	1290-1570nm
Insertion Loss[2]	<1.9dB max., 1.1dB typ. (with connectors) <1.1dB max., (switch only)
Back Reflection[2]	<-55dB max.
Polarization Dependent Loss[3]	.05dB max., (switch only) 0.1db max., (with connectors)
Repeatability[4]	+/- .01dB max, +/- .005dB typ. (with connectors)
Isolation	-80dB min.
Switching Time	15msec
Shock	30g, 11msec, ½ sine wave

Revised 8/26/99

Vibration	0.013" $_{PK-PK}$, 5-55Hz
Bench Handling	4in, 45°
Temperature	
Operating	0 to +50° Centigrade
Non-operating	-40° to +71° Centigrade
Relative Humidity	90% RH non-condensing at ≤ 30° C
Power requirements	5 VDC at 1.31 Amps W/Option 01T 5 VDC at 0.31 Amp WO/Option 01T
Cooling Requirements	0.14 liter/sec @ .008 mmH_2O 0.58 liter/sec @ .035 mmH_2O

Dimensions Single-wide C-Size, VXIbus Module

Module Weight	1260-822D	1260-822B
w/OPT 01T	3.55lbs (1.61kg)	3.07lbs (1.40kg)
w/o OPT 01T	3.30lbs (1.50kg)	2.82lbs (1.28kg)

NOTES:

1. **Unless indicated all Specifications are referenced with connectors and measured at 23^{0}C ±5^{0}C.**
2. **Connector Insertion Loss typically less than 0.25dB and Back Reflection less than –45dB.**
3. **Connector PDL typically less than .02dB, measured at 1550nm.**
4. **Repeatability ; 50 cycles measured at constant temperature after 1 hour warm-up**

Ordering Information

Part numbers for both the 1260-822 switch modules and available accessories are listed below.

ITEM	DESCRIPTION	PART #
1260-822B Switch Module	1260-822B, Dual 2X2 Optical Switch	407709-002
1260-822D Switch Module	1260-822D, Quad 2X2 Optical Switch	407709-004
1260-822 Shipping Kit	Manual, Key Locks	407708
Additional Manual	1260-822 User Manual	980673-060

Safety

Refer to the **"FOR YOUR SAFETY"** page preceding the Table of Contents. Follow all **NOTES, CAUTIONS,** and **WARNINGS** to ensure personnel safety and prevent damage to the instrument.

Product Support

Racal Instruments has a complete Service and Parts Department. If you need technical assistance or should it be necessary to return your product for servicing, call 1-800-722-3262 or 1-949-859-8999 and ask for Customer Support. You may also contact Customer Support via E-Mail at:

Helpdesk@racalate.com

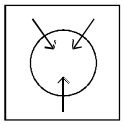
If parts are required to repair the product at your facility, call 1-800-722-3262 or 1-949-859-8999 and ask for the Parts Department.

When sending your instrument in for repair, complete the form in the back of this manual and enclose it with the instrument.

Chapter 2

INSTALLATION INSTRUCTIONS

Unpacking and Inspection



1. Before unpacking the switching module, check the exterior of the shipping carton for any signs of damage. All irregularities should be noted on the shipping bill and reported.
2. Remove the instrument from its carton, preserving the factory packaging as much as possible.
3. Inspect the switching module for any defect or damage. Immediately notify the carrier if any damage is apparent.
4. Have a qualified person check the instrument for safety before use.

CAUTION

Always perform unpacking, disassembly, repair, and cleaning at a static safe work station.

Reshipment Instructions

1. Use the original packing material when returning the switching module to Racal Instruments for servicing. The original shipping carton and the instrument's plastic foam will provide the necessary support for safe reshipment.
2. If the original packing material is unavailable, wrap the switching module in an ESD Shielding bag and use plastic spray foam to surround and protect the instrument.
3. Reship in either the original or a new shipping carton.

Option 01T Installation

Installation of the Option 01T is described in the Installation and Setup section of the 1260-Option 01T Users Manual, Publication No. 980806-999.

NOTE:

Be sure to install an Option 01T controller with release 7.1 or later firmware. Older Option 01 controllers and Option 01Ts with firmware below 7.1 are not compatible.

Module Installation

Installation of the 1260-822 Switching Module into a VXI mainframe, including the setting of switches SW1-1 through SW1-4, SW2, and SW3, is described in the Installation and Setup Section of the 1260 Option 01T Users Manual, Publication No. 980806-999.

Module Configuration

The 1260-822 is a 2X2 optical switch module consisting of up to four optical switch modules. Refer to **Figure 2-1** for a block diagram of the basic 2X2 switch used in a 1260-822.

The 1260-822 module can be organized via software as n independent 2X2 optical switches or as n synchronous 2X2 switches (where n = 2 or 4) by use of the **INCLUDE** command (Refer to the 1260-01T User Manual).

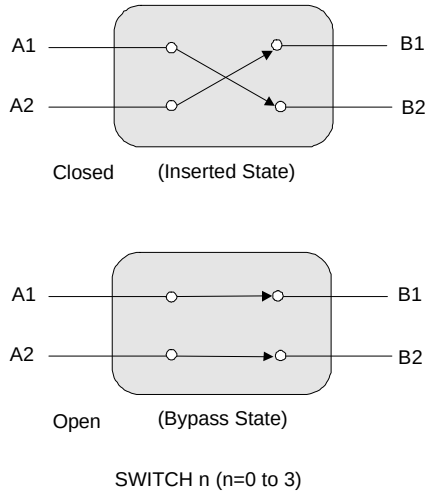


Figure 2-1, 1260-822 Block Diagram

Front Panel Connectors

The 1260-822 front panel connectors are labeled as shown in **Figure 2-3 through 2-4**. The connector type is a single mode FC connector adapter.

Fail LED

The Fail LED is available if the 1260 Option 01T Controller is installed. For further information refer to the 1260 Option 01T Users Manual, Publication No. 980806-999

Switch Status LED

The 1260-822 provides a single switch status LED (STATUS) common all switches installed. The status LED provides an indication of the state of the optical switch as shown below:

OFF: The optical switch is in an idle state.

GREEN: The optical switch is being accessed (in the process of switching). This pulse is stretched to allow the user to view switch accesses.

RED: An Error has occurred as a result of the last command. An Error is detected when position sense feedback from the switch does not match the programmed position.

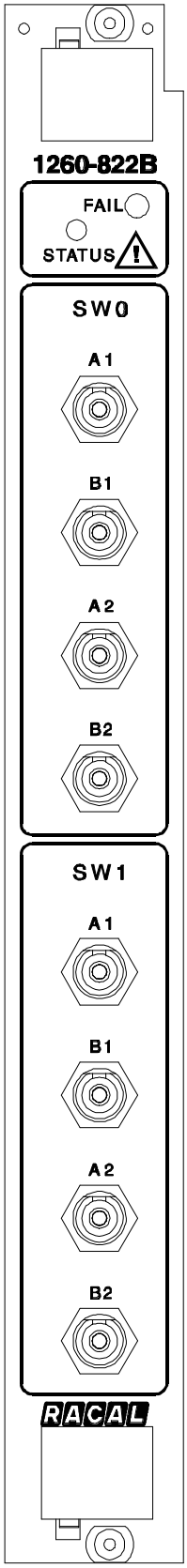


Figure 2-3, 1260-822B Front Panel Pin Connections, Front View

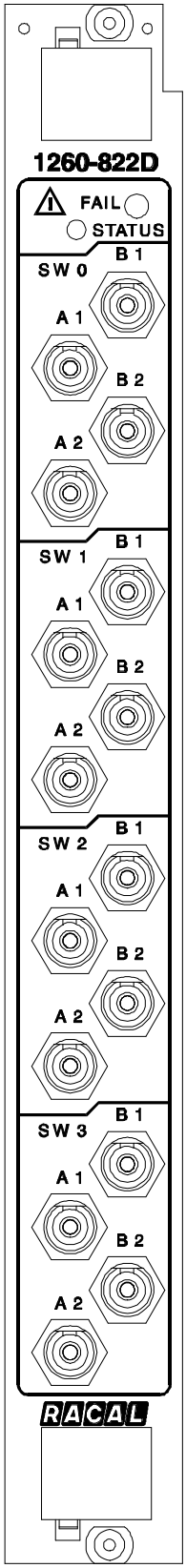


Figure 2-4, 1260-822D Front Panel Pin Connections, Front View

Mating Connectors

Mating connectors for the 1260-822 module are standard FC types. It is preferable to use fiberoptic cables with low insertion loss, low reflection FC/UPC or FC/SPC connector types.

Refer to Appendix B for cleaning adapters, connectors, and handling of fiberoptic cables.

Optical Ports

WARNING: To avoid eye damage, do not look directly into the optical output ports while there is an optical signal connected to the input port. Always attach the output ports to a receiver or cover the ports with the supplied caps before enabling the source signal to the input port.

Chapter 3
MODULE OPERATION

General Information

The 1260-822 may be operated either in *message-based mode* or in *register-based mode*.

When the *message-based mode* of operation is used, commands are sent to the 1260-01T command module. The 1260-01T command module interprets the commands, and operates the 1260-822 module by sending 8-bit bytes to control registers on the 1260-822 module.

A conceptual view of the message-based mode of operation is shown in Figure 3-1 below.

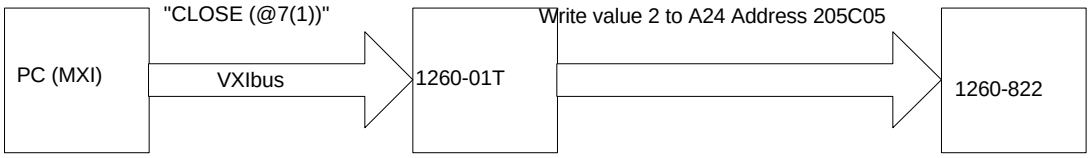


Figure 3-1, Message-Based Mode of Operation

When the *register-based mode* of operation is used, the user writes to the control registers on the 1260-822 module directly. The 1260-01T command module does not monitor the operations, and does not track the state of the optical switch on the module in this mode.

A conceptual view of the register-based mode of operation is shown in Figure 3-2 below.

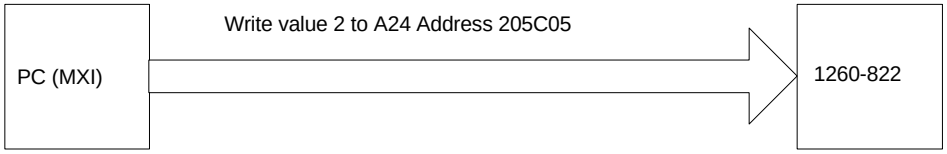


Figure 3-2, Register-Based Mode of Operation

Since the 1260-01T command module does not monitor the register-based mode of operation, it is advisable to select **either** the message-based or the register-based mode of operation, and continue to use the same mode throughout the application program.

In general, the message-based mode of operation is easier to use with utility programs, such as National Instruments VIC program. The message-based mode allows the user to send ASCII text commands to the 1260-01T and to read replies from the 1260-01T. In addition, there are a few features, such as a **SCAN** list and **OPC** commands, which are available only with the message-based mode of operation.

The register-based mode of operation provides a faster update of optical switches. This mode provides for switch operations in less than 4.5 microseconds (not counting software overhead inherent in I/O libraries such as VISA) and optical switch switching time. Since the optical switch switching time is slow, the Message Based operation is preferable.

Consult the 1260-01T User's Manual for a comparison of the message-based and register-based modes of operation.

Operating The 1260-822 In Message-Based Mode

Channel Descriptors For The 1260-822 Module

The standard 1260-01T commands are used to operate the 1260-822 module. These commands are described in the 1260-01T User's Manual.

Each 1260-01T command uses a *channel descriptor* to select the switch(s) of interest. The syntax for a channel descriptor is the same for all 1260 series modules. In general, the following *channel descriptor* syntax is used to select a switch:

```
(@<module address> (<channel range>)
```

Where:

<module address> is the address of the 1260-822, as set by the logical address DIP switch SW1 on the 1260-822.

The module address is a number from 1 through 12, inclusive.

Set the module addresses for the 1260-822 and other 1260-Series modules so that no address is used by more than one 1260-Series module. For instructions on setting module addresses for a 1260-Series module, see the label on the side panel of the module.

The *channel range* is comprised of the switch or range of switches to be operated. Multiple individual switches may be specified using the following channel descriptor syntax:

```
(@ <module address> ( <chan1> , <chan2> , .
. ., <chanN> ))
```

A range of switches may be specified using the following channel descriptor syntax:

```
(@ <module address> ( <first switch> :
<last switch> ))
```

The following examples illustrate the use of the channel descriptors for the 1260-822:

`CLOSE (@8(0))`	Closes switch 0 on the 1260-822 with module address 8
`OPEN (@8(0))`	Opens switch 0 on the 1260-822
`CLOSE (@3(0,2))`	Closes switches 0 and 2 on the 1260-822 with module address 3
`OPEN (@12(1:5))`	Opens switches 1 through 5 on the 1260-822 with module address 12

Reply To The MOD:LIST? Command

The 1260-01T returns a reply to the MOD:LIST? command. This reply is unique for each different 1260 series switch module. The syntax for the reply is:

<module address> : <module-specific identification string>

The <module-specific identification string> for the 1260-822 is:

1260-822B DUAL 2X2 OPTICAL SWITCH MODULE

or

1260-822D QUAD 2X2 OPTICAL SWITCH MODULE

So, for a 1260-822B whose <module address> is set to 8, the reply to this query would be:

8 : 1260-822B DUAL 2X2 OPTICAL SWITCH MODULE

Using The *OPC Query / Command

When you are using the 1260-822 in an automated test environment, it is important that you be aware of the time it takes for the switch movement to complete. For example, suppose you develop an automated test in which the optical switch closure is over the VXI bus via the CLOSE command. After each switch configuration, you might then take a reading from an optical power meter. In such a sequence, it is important that you not initiate the reading from the optical power meter before the 1260-822 has come to a stable position (up to 15 milliseconds).

Below is an example that illustrates the use of instrument commands and queries utilizing the *OPC? query. In this example, queries to other instruments (such as the power meter) are not made until all of the 1260-822's pending operations have completed.

Example: A command is sent to the 1260-822 to close switch 2, the command is immediately followed by an *OPC? query to the same 1260-822.

1. Write to the 1260-822 VXI address:

```
CLOSE(@8(2));*OPC?
```

2. Read from 1260-822 the VXI address:

1

Up to 15 milliseconds may be required before the `CLOSE(@8(2))` command is completed and the *OPC? produces a "1" in the 1260-01T output queue. After the *OPC? query is sent to the1260-822, the programmer should immediately attempt a read instruction from the controller. The programmer's controller will wait until the 1260-822 finishes all adjustments and the *OPC query provides a "1" to be read.

NOTE:

It is important that you remember to set the time-out of the controller's READ instruction to be greater than the longest time possible for the 1260-822 to make any switch changes (up to 15 msecs may be required to make large changes to the optical switch.

You can also have the OPC bit of the SESR set by using the command form of *OPC instead of the query form. By setting the OPC bit to "1" via an *OPC command, an event will be generated assuming the user has enabled the proper register bits.

- Advanced programmers can develop other methods to accomplish the set-and-wait-until-complete routine utilizing the event queues and status registers provided in the 1260-01T controller. Refer to the 1260 Option 01T Users Manual Publication No. 980806-999.

Operating The 1260-822 in Register-Based Mode

The 1260-822 may be operated by directly setting one of the two control registers on the 1260-822 module. The first control register on the module sets the position for each of the relays on the module. The second control register controls the state of the ERROR LED on the module.

The control registers are located in the VXIbus A24 Address Space. The actual A24 address for a control register depends on:

1. The A24 Address Offset assigned to the 1260-01T module by the Resource Manager program. The Resource Manager program is provided by the VXIbus slot-0 controller vendor. The A24 Address Offset is placed into the "Offset Register" of the 1260-01T by the Resource Manager.

2. The <module address> of the 1260-822 module. This is set by the setting of the logical Address DIP switch SW 1on the 1260-822 to a value between 1 and 12 inclusive .

3. The control register on the 1260-822 to update. Each control register on the 1260-822 has a unique address.

The base A24 Address for the 1260-822 module may be calculated by:

(A24 Offset of the 1260-01T) + (1024 x Module Address of 1260-822).

The A24 Offset is usually expressed in hexadecimal. A typical value of 204000_{16} will be used in the examples which follow. So, a sample 1260-822 with a module address of 7 would have the base A24 Address computed as follows:

Base A24 Address of 1260-822 = 204000_{16} +(400_{16} x 7_{10}) =

$205C00_{16}$

The control registers for 1260 series modules are always on odd A24 addresses. The three control registers for the 1260-822 reside at the following three odd A24 addresses for the module:

(Base A24 Address of 1260-822) + 5 = Relay Control Register

(Base A24 Address of 1260-822) + F = Error LED Control Reg

So, for our example, the control registers are located at:

205C05 Relay Control Register

205C0F ERROR LED Control Register

Switch Data Write Register

When a switch is closed, the A1 input is connected to B2 output, and the A2 input connected to B1 output. When a switch is opened, the A1 input is connected to B1 output, and the A2 input connected to B2 output.

A single bit within the Relay Control Register controls each switch of the 1260-822. When the bit is set to a 1, the corresponding switch is closed. When the bit is set to a 0, the corresponding switch is opened.

The Relay Control Register may be read as well. When the control register is read, the module returns the detected position rather than the commanded position. If the detected position is NOT the same as the commanded position, after the 15 millisecond settling time, then an error may have occurred. When the firmware controls the operation of the relays (message-based mode), this will result in the illumination of the ERROR LED. When register-based control is used, the programmer is responsible for controlling the ERROR LED.

The Relay Control Register bit assignments are shown below and also in Appendix A.

Control Register is located at (Module Base Address) + 5

Relay Control Register Bit	Switch	Input Channel	OPEN Connects Input To	CLOSE Connects Input To
0 (LSB)	0	A1 A2	B1 B2	B2 B1
1	1	A1 A2	B1 B2	B2 B1
2	2	A1 A2	B1 B2	B2 B1
3	3	A1 A2	B1 B2	B2 B1
4	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A
7 (MSB)	N/A	N/A	N/A	N/A

Relay Data Status Read Register

The 1260-822, via the Relay Data Status Register, provides a read back of the actual position of each of the relays. This data uses the same format as the Relay Control Register. When the bit is a 1 in the status register, the corresponding relay is in the closed position (A1 input connected to B2 output, A2 input connected to B1 output). When the bit is a 0 in the status register, the corresponding relay is in the open position (A1 input connected to B1 output, A2 input connected to B2 output). Bit 0 holds the status for switch 0, bit 1 holds the status for switch 1, and so on.

Note that since the status register reflects the ACTUAL relay position, and not the COMMANDED relay position, this register should not be used to form the relay control information when a single switch change is desired. This means that a programmer using the register-based mode should maintain a “RAM image” of the desired states of the relays.

ERROR LED Control Register

The ERROR LED Register controls the state of the 1260-822’s ERROR LED. When the bit is set to a 1, the ERROR LED is illuminated. When the bit is set to a 0, the ERROR LED is off.

The firmware normally controls this LED. When the confidence mode is turned on, the firmware will turn the ERROR LED on if the programmed state of each switch does not match the state read back via the Relay Data Status register.

ERROR LED Register is located at (Module Base Address) + F_{16}

Relay Control Register Bit	Controls
0 (LSB)	N/A
1	N/A
2	N/A
3	ERROR LED
4	N/A
5	N/A
6	N/A
7 (MSB)	N/a

1260-822 Example Code

The VISA I/O library may be used to control the module. The VISA function viOut8() is used to write a single 8-bit byte to a control register, while viIn8() is used to read a single 8-bit byte from the control register. The following code example shows the use of viOut8() to update the 1260-822 module.

The VISA library functions (viIn8() and viOut8()) account for the base A24 offset of the 1260-01T controller. Therefore, the application code below uses only the module address to calculate the offset of the two control registers and the status register.

The following example shows many places where “error handling code goes here”. This is intended for application-specific error handling code which depends on the application and the manner in which errors are handled. Therefore, the specifics of the error handling code are not shown in the example.

```
#include <visa.h>

/* This example shows a 1260-01T at logical address 16 and a VXI/MXI*
/* interface */
#define RI1260_01_DESC     "VXI::16"

/* For a GPIB-VXI interface, and a logical address of 77 */
/* the descriptor would be:  "GPIB-VXI::77" */

/* this example shows a 1260-822D with module address 7 */
#define MOD_ADDR_822  7


void example_operate_1260_822(void)
{
ViInt32 base_addr;
ViBusAddress control_reg;
ViBusAddress error_LED_reg;
ViSession hdl1260;         /* VISA handle to the 1260-01T */
ViSession hdlRM;      /* VISA handle to the resource manager */
ViStatus error;            /* VISA error code */
ViUInt8 ctrl_val;          /* control register value */
ViUInt8 position;          /* position read from status register */


     /* open the resource manager */
     /* this must be done once in application program */
     error = viOpenDefaultRM (&hdlRM);
     if (error < 0) {
          /* error handling code goes here */
     }

     /* get a handle for the 1260-01T */
     error = viOpen (hdlRM, RI1260_01_DESC, VI_NULL,VI_NULL,&hdl1260);
     if (error < 0) {
          /* error handling code goes here */
     }

/* form the offset for control register 0 */
/* note that the base A24 Address for the 1260-01T */
/* is already accounted for by VISA calls viIn8() and viOut8() */

     /* module address shifted 10 places = module address x 1024 */
     base_addr = (MOD_ADDR_822 << 10);
     control_reg = (ViBusAddress) (base_addr + 5);
     error_LED_reg = (ViBusAddress) (base_addr + 0xF);
```

```
 /*
  * CLOSE CHANNEL 2, OPEN ALL OTHER CHANNELS
  * Use “ctrl_val” as the RAM image to control all channels
 */
 ctrl_val = 0x04;

  /* write the control register */
 error = viOut8 (hdl1260, VI_A24_SPACE, control_reg, ctrl_val);
 if (error < 0) {
      /* error handling code goes here */
 }

 /* now close channel 0 */
 ctrl_val |= 0x01;
 error = viOut8 (hdl1260, VI_A24_SPACE, control_reg, ctrl_val);
 if (error < 0) {
      /* error handling code goes here */
 }

  /* wait 15 milliseconds to allow relays to settle */
  /* before chacking actual position */
  /* this is a fictional delay routine; system-dependent */
  msec_delay( 15 );

  /* read the relay status register */
 error = viIn8 (hdl1260, VI_A24_SPACE, control_reg, &position);
 if (error < 0) {
      /* error handling code goes here */
 }

  /* mask off the bits of interest (based on –82 model) */
  /* masks are: */
  /* 1260-822B:  0x03 */
  /* 1260-822D:  0x0F */
  /* this example is 1260-822D */
  mask = 0x0F;

  if ((position & mask) != (ctrl_val & mask)) {
      /* set the ERROR LED on */
      error = viOut8 (hdl1260, VI_A24_SPACE, error_LED_reg, 0x08);
      if (error < 0) {
           /* error handling code goes here */
      }
  }
 else {
      /* turn the ERROR LED off */
      error = viOut8 (hdl1260, VI_A24_SPACE, error_LED_reg, 0x00);
      if (error < 0) {
```

```
                /* error handling code goes here */
            }
        }

    /* close the VISA session */
    error = viClose( hdl1260 );
    if (error < 0) {
        /* error handling code goes here */
    }
}
```

Power and Module Cooling Considerations

The 1260-822 is a VXI module providing precise switching of optical channels using defraction limited collimating lenses which enhance both thermal stability and repeatability. Because of this, certain precautions should be applied when using the switch module in a VXI chassis.

Airflow Requirements

VXI Modules are required to specify a particular airflow to maintain a specific temperature rise. The air flow required and the resultant back pressure (pressure drop across the module) values determine a specific operating point that is plotted or compared against a VXI chassis cooling curve. If the module operating point is below the chassis cooling curve, there is a high probability that the module will remain within its specified temperature rise. If the operating point lies above the chassis cooling curve the temperature rise may exceed the specified value.

The following procedure details how to calculate the cooling requirements for the 1260-822.

1. Determine the maximum temperature rise allowed across the module. This is typically 10 °C, but could be higher or lower depending the chassis ambient temperature, and the overall reliability requirements of the module.

2. Determine the required airflow to maintain the specified temperature rise of the module. This is calculated from the module power and the desired temperature rise, and the specific heat of air. For a given temperature rise the required air flow is:

   Airflow(liters/sec) = 0.83/Temp Rise(°C) x Module Power (Watts)

   For a 10 °C rise and a 1260-822 with Option 01T and a module power of 7.0 Watts:

   Airflow(liters/sec) = 0.83/10 °C x 7.0 Watts ≅ 0.58 liters /sec

3. Determine the pressure drop across the module when the required airflow (liters/sec) is forced through the module. This can be determined by looking at pressure drop vs. airflow plot for the 1260-822 Module in **Figure 3-4**. Find the required airflow and then read the corresponding pressure in mm H_2O. For the case above, with an airflow of 0.58 liters/sec the pressure drop read from **Figure 3-4** is 0.035mm H_2O.

4. Plot the 1260-822 operating point (Pressure, Airflow) against the chassis cooling curve. If the module operating point lies under the chassis curve, the module should remain within the specified temperature. The 1260-822 Module cooling curve is shown in **Figure 3-4.**

CAUTION

The required airflow may need to be increased depending on airflow distribution across the module, the ambient temperature and reliability issues. Consult the VXI specification for more details.

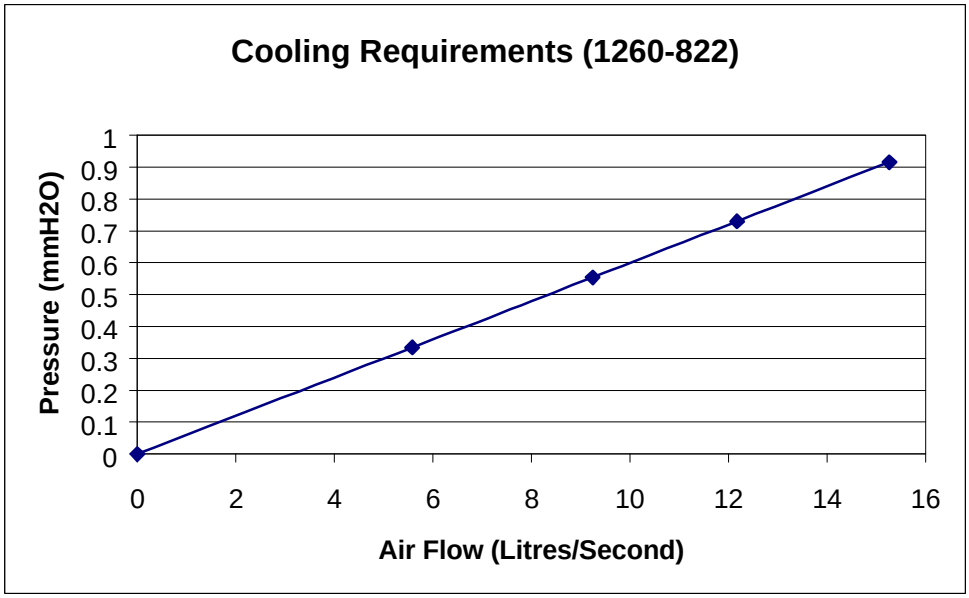


Figure 3-4, 1260-822 Optical Switch Airflow Resistance Curves

Chapter 4
DRAWINGS

407709-002	Final Assy, 1260-822B	4-3
407709-004	Final Assy, 1260-822D	4-5
405148	PCB Assy, L-BUS Jumper	4-7
435148	Schematic, L-BUS Jumper	4-8
405154-001	PCB Assy, 1260-82/822	4-9
435154-002	Schematic, 1260-822	4-10
407707	Cable Assy, Interface	4-21

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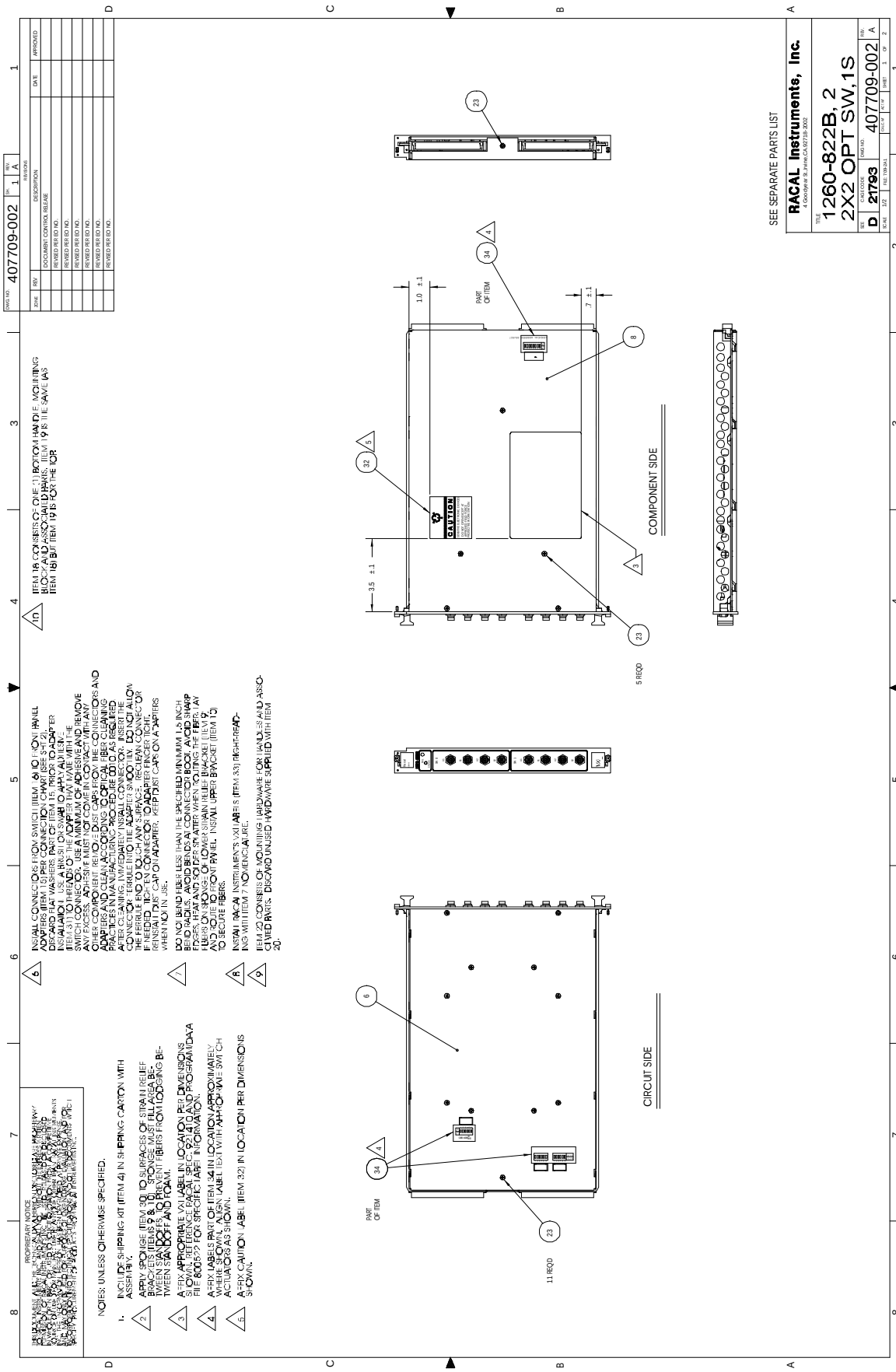
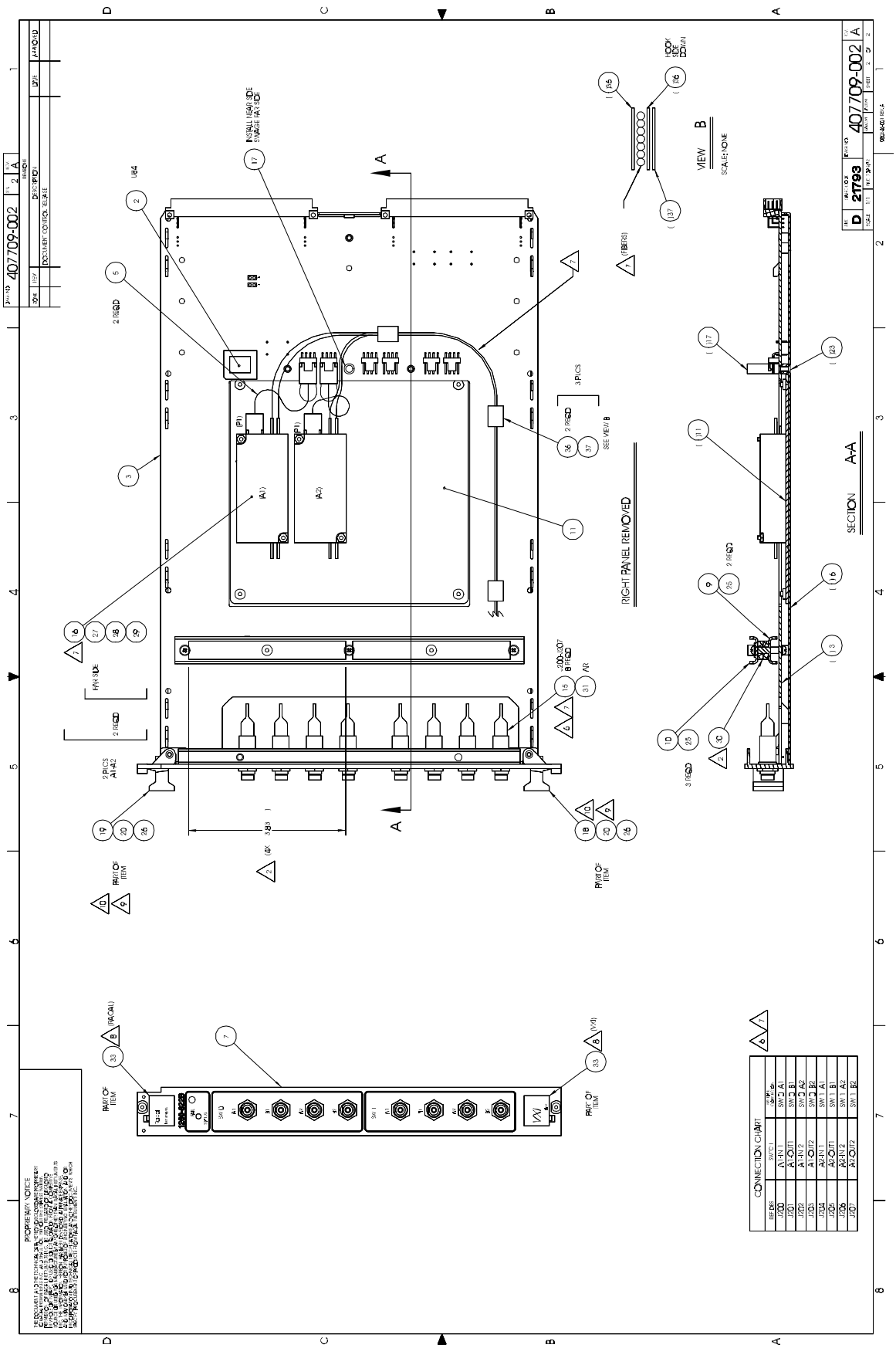
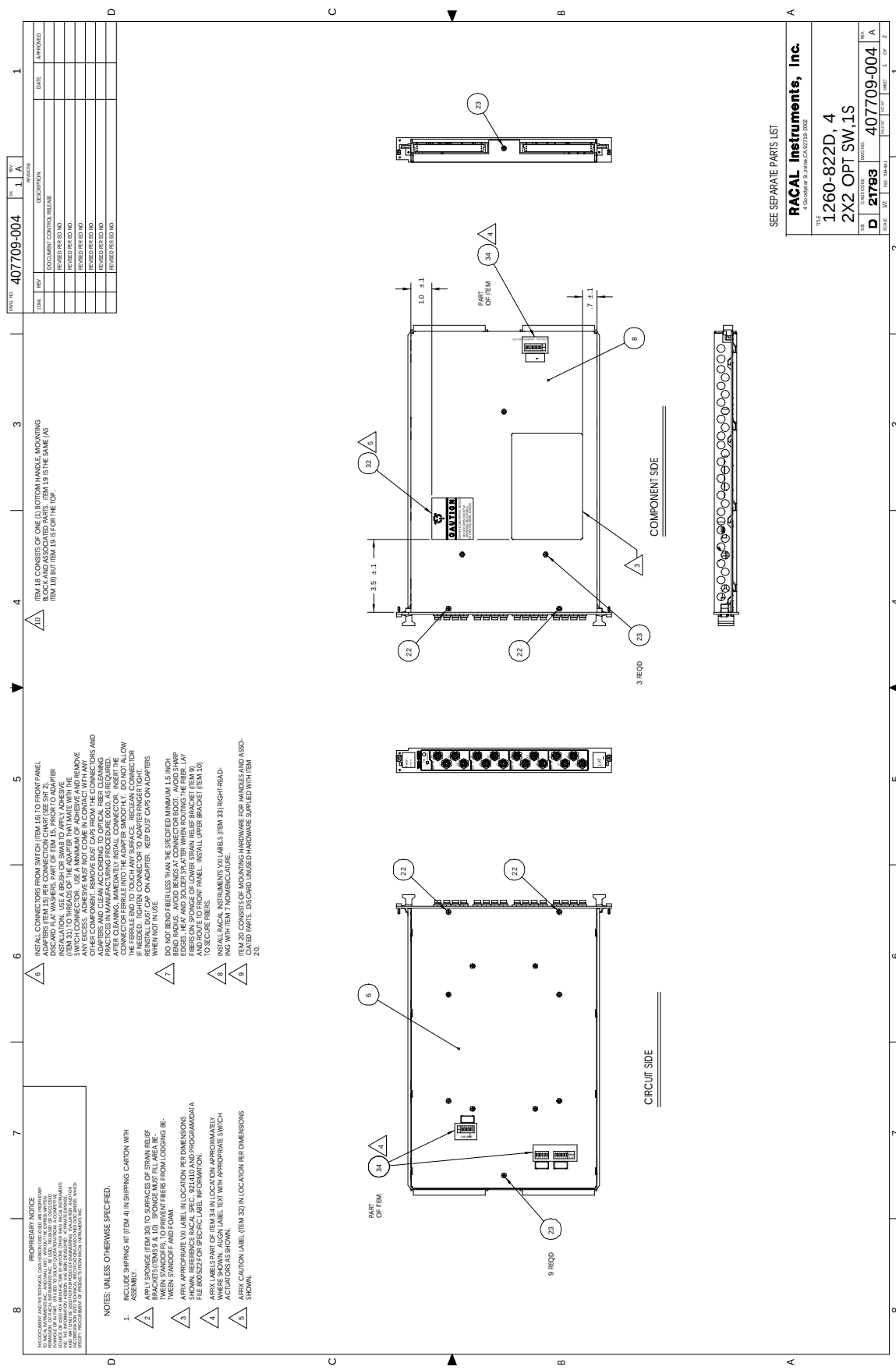
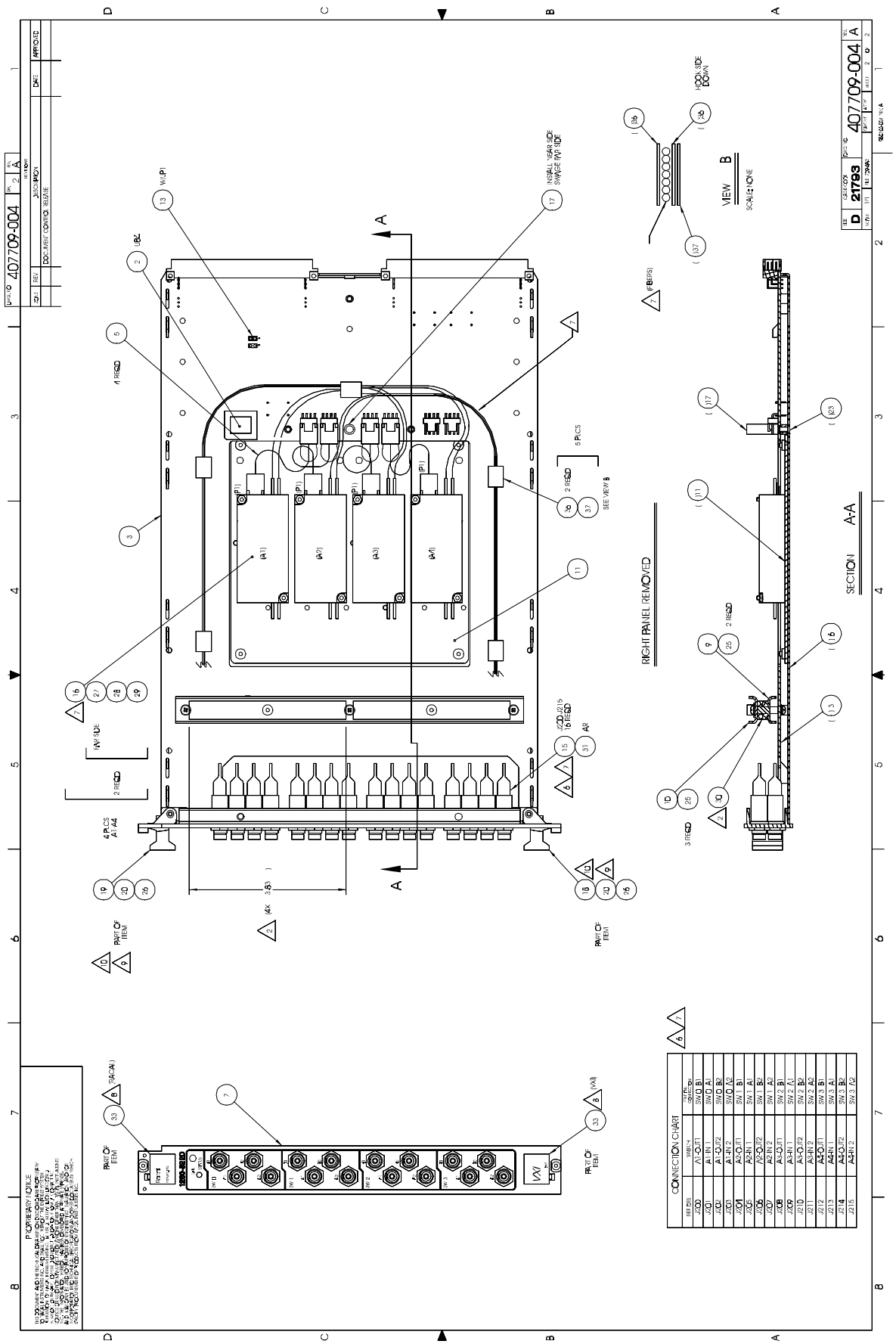
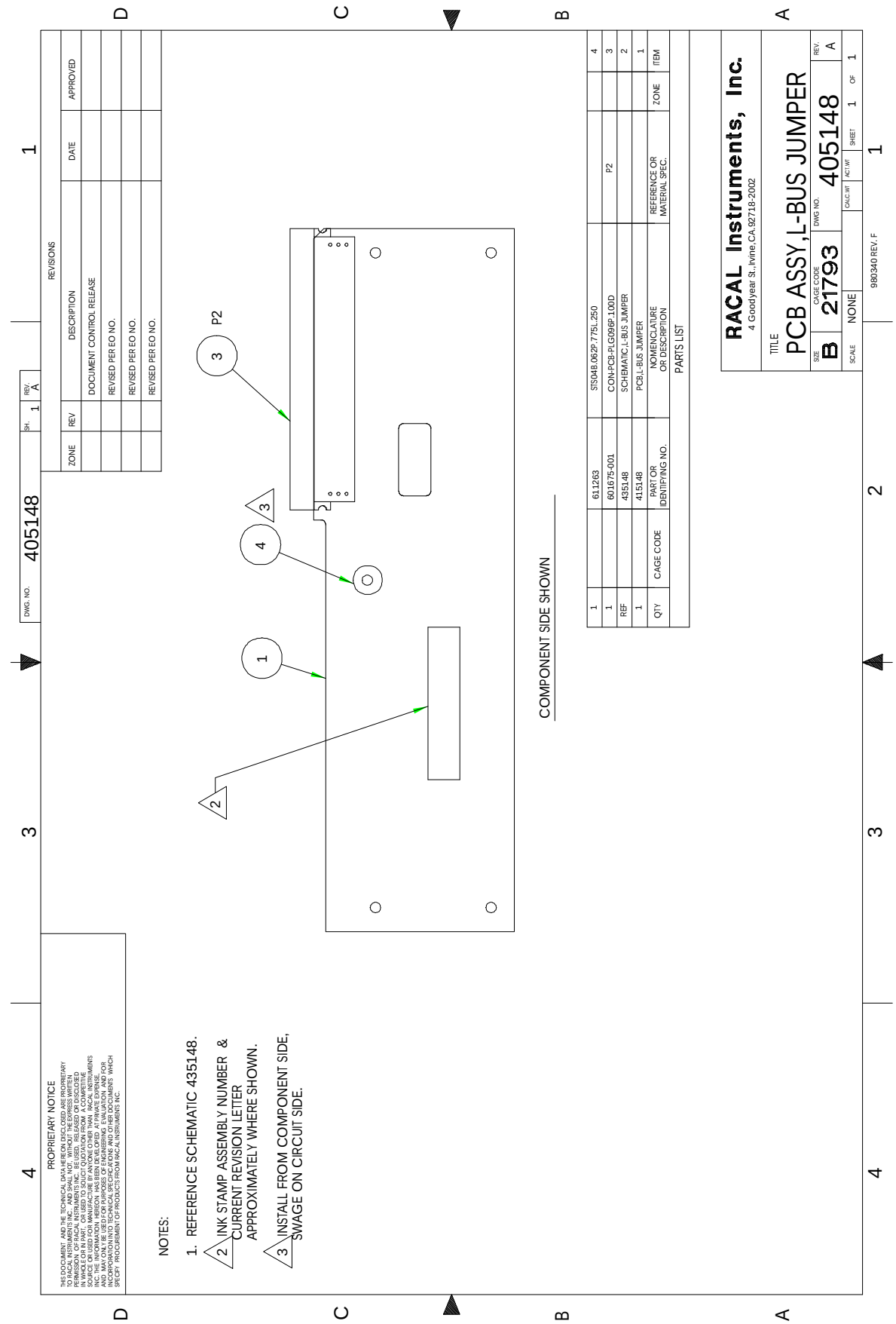

DWG NO 407709-002
REV A
DESCRIPTION
DOCUMENT CONTROL RELEASE
REVISED PER ECO NO.
SEE SEPARATE PARTS LIST
RACAL Instruments, Inc.
4 Goodyear St, Irvine CA 92718-2003
1260-822B, 2 2X2 OPT SW,1S
SIZE D
CAGE CODE 21793
407709-002
REV A
SCALE 1/2
SHEET 1 OF 2
CIRCUIT SIDE
COMPONENT SIDE
11 REQD
5 REQD
PART OF ITEM
CAUTION


407709-002
DOCUMENT CONTROL RELEASE
INSTALL NEAR SIDE
SWAGE FAR SIDE
HOOK SIDE DOWN
VIEW B
SCALE: NONE
RIGHT PANEL REMOVED
SECTION A-A
SEE VIEW B
3 PLCS
2 PLCS A1-A2
FAR SIDE
PART OF ITEM
CONNECTION CHART
PROPRIETARY NOTICE
D 21793
407709-002 A


DWG NO. 407709-004
REV A
REVISIONS
DESCRIPTION
DOCUMENT CONTROL RELEASE
RACAL Instruments, Inc.
1260-822D, 4
2X2 OPT SW,1S
407709-004
SEE SEPARATE PARTS LIST
CIRCUIT SIDE
COMPONENT SIDE
3 REQD
9 REQD
PART OF ITEM
CAUTION

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DWG. NO. 405148
SH. 1
REV. A
REVISIONS
ZONE
REV
DESCRIPTION
DATE
APPROVED
DOCUMENT CONTROL RELEASE
REVISED PER EO NO.
REVISED PER EO NO.
REVISED PER EO NO.
NOTES:
1. REFERENCE SCHEMATIC 435148.
2 INK STAMP ASSEMBLY NUMBER & CURRENT REVISION LETTER APPROXIMATELY WHERE SHOWN.
3 INSTALL FROM COMPONENT SIDE, SWAGE ON CIRCUIT SIDE.
P2
COMPONENT SIDE SHOWN
PARTS LIST
QTY
CAGE CODE
PART OR IDENTIFYING NO.
NOMENCLATURE OR DESCRIPTION
REFERENCE OR MATERIAL SPEC.
ZONE
ITEM
1 611263 STS048.062P.775L.250 4
1 601675-001 CON-PCB-PLG096P.100D P2 3
REF 435148 SCHEMATIC,L-BUS JUMPER 2
1 415148 PCB,L-BUS JUMPER 1
RACAL Instruments, Inc.
4 Goodyear St., Irvine, CA 92718-2002
TITLE
PCB ASSY,L-BUS JUMPER
SIZE B
CAGE CODE 21793
DWG NO. 405148
REV. A
SCALE NONE
CALC WT
ACT WT
SHEET 1 OF 1
980340 REV. F

DWG. NO. 435148	SH. 1	REV. A

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
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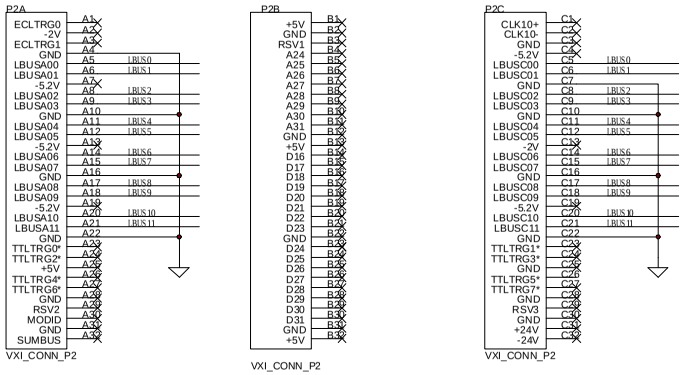
	REVISED PER EO NO.		
	REVISED PER EO NO.		
	REVISED PER EO NO.		

NOTES:



VXI LBUS JUMPERS

CAD CURRENT REV. LTR
FOR SHEET 1
REVISION A
DRAWN WITH PROTEL 98
VERSION 4.2.0

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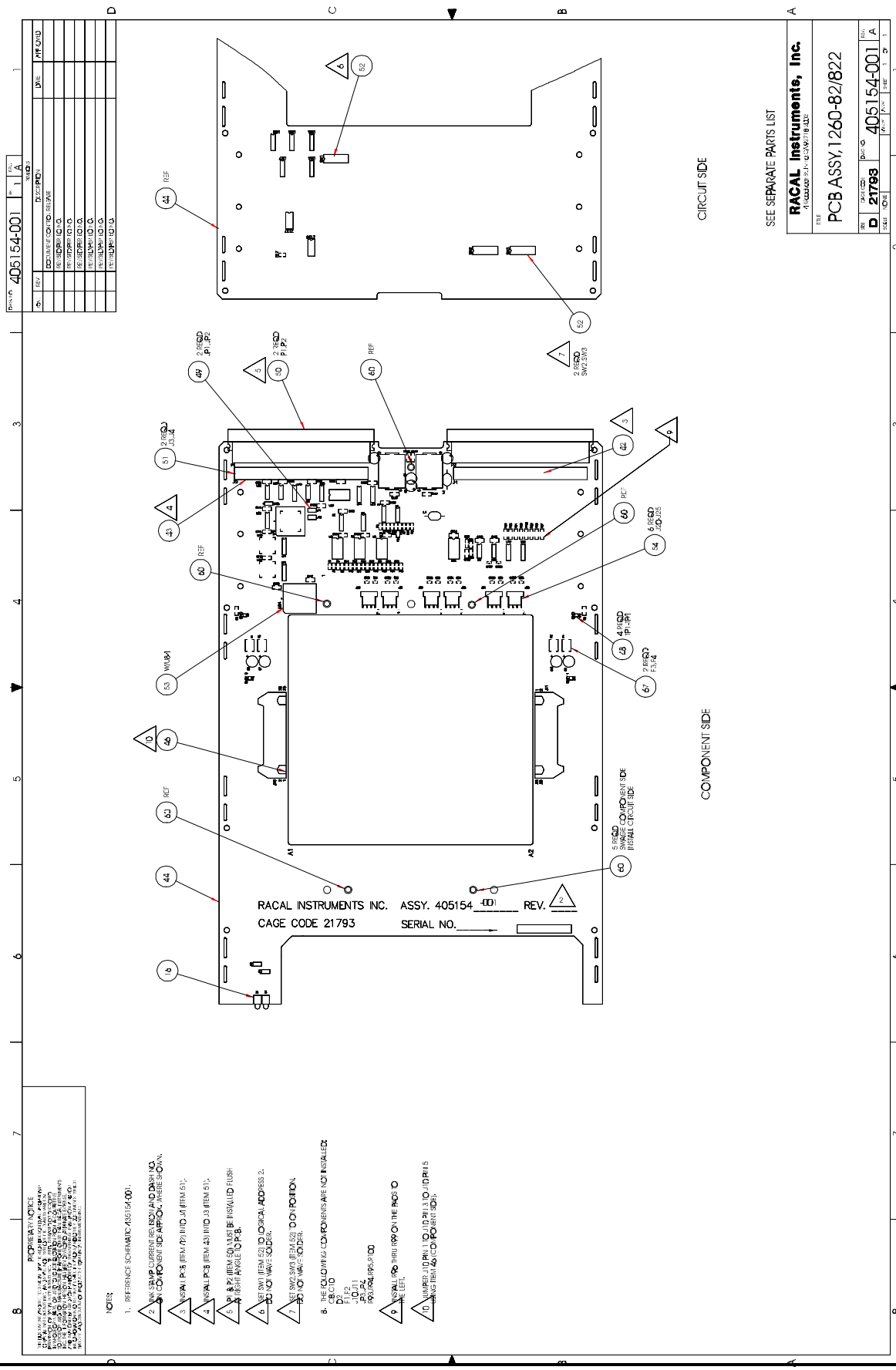
RACAL Instruments, Inc.
4 Goodyear St., Irvine, CA. 92618

TITLE
SCHEMATIC, L-BUS JUMPER

SIZE	CAGE CODE	DWG NO.	REV.
B	21793	435148	A

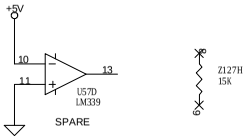
SCALE	NONE	27-Apr-1999	SHEET 1 OF 1


RACAL INSTRUMENTS INC. ASSY. 405154-001 REV. A
CAGE CODE 21793 SERIAL NO.
COMPONENT SIDE
CIRCUIT SIDE
SEE SEPARATE PARTS LIST
RACAL Instruments, Inc.
PCB ASSY, 1260-82/822
405154-001
21793

NOTES:

1. CAPACITOR VALUES ARE IN MICROFARADS, 50V, +/-20% UNLESS OTHERWISE SPECIFIED.
2. RESISTOR VALUES ARE IN OHMS, 1/16W, +/-5% UNLESS OTHERWISE SPECIFIED.
3. RESISTOR NETWORK VALUES ARE IN OHMS, +/-2%.
4. PARTS INDICATED ARE NOT INSTALLED.

UNUSED GATES



DWG. NO. 435154-002	SH. 1	REV. A

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
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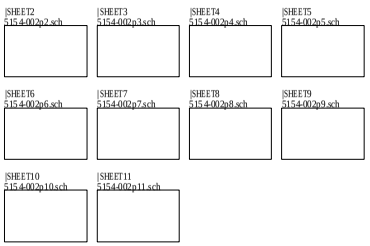
	REVISED PER EO NO.		
	REVISED PER EO NO.		
	REVISED PER EO NO.		



REFERENCE DESIGNATOR	DEVICE TYPE	POWER PINS		
		+5V PIN	+12V PIN	GND PIN
U3,5,6,93	74HCT273	20		10
U1,2,4,60,88,92,94	74HCT166	16		8
U7	74AHCT00	14		7
U53	231153-002 (16R4)	20		10
U54	74HCT138	16		8
U56	74HCT85	16		8
U57	LM339	3		12
U61,62	74HCT164	14		7
U70	231152-004(16L8Q-25)	20		10
U71,77	74HC253D	16		8
U73,74	26LS32	16		8
U75	26LS31	16		8
U76	231154 (22V10)	28		14
U82	74HC299	20		10
U84	27C256	32		16
U85,86,87	74LS161	16		8
U90	74ACT04	14		7
U91	556	14		7

CAD CURRENT REV. LTR
FOR SHEETS 1 THRU 11
REVISION A
DRAWN WITH PROTEL 98
VERSION 4.2.0

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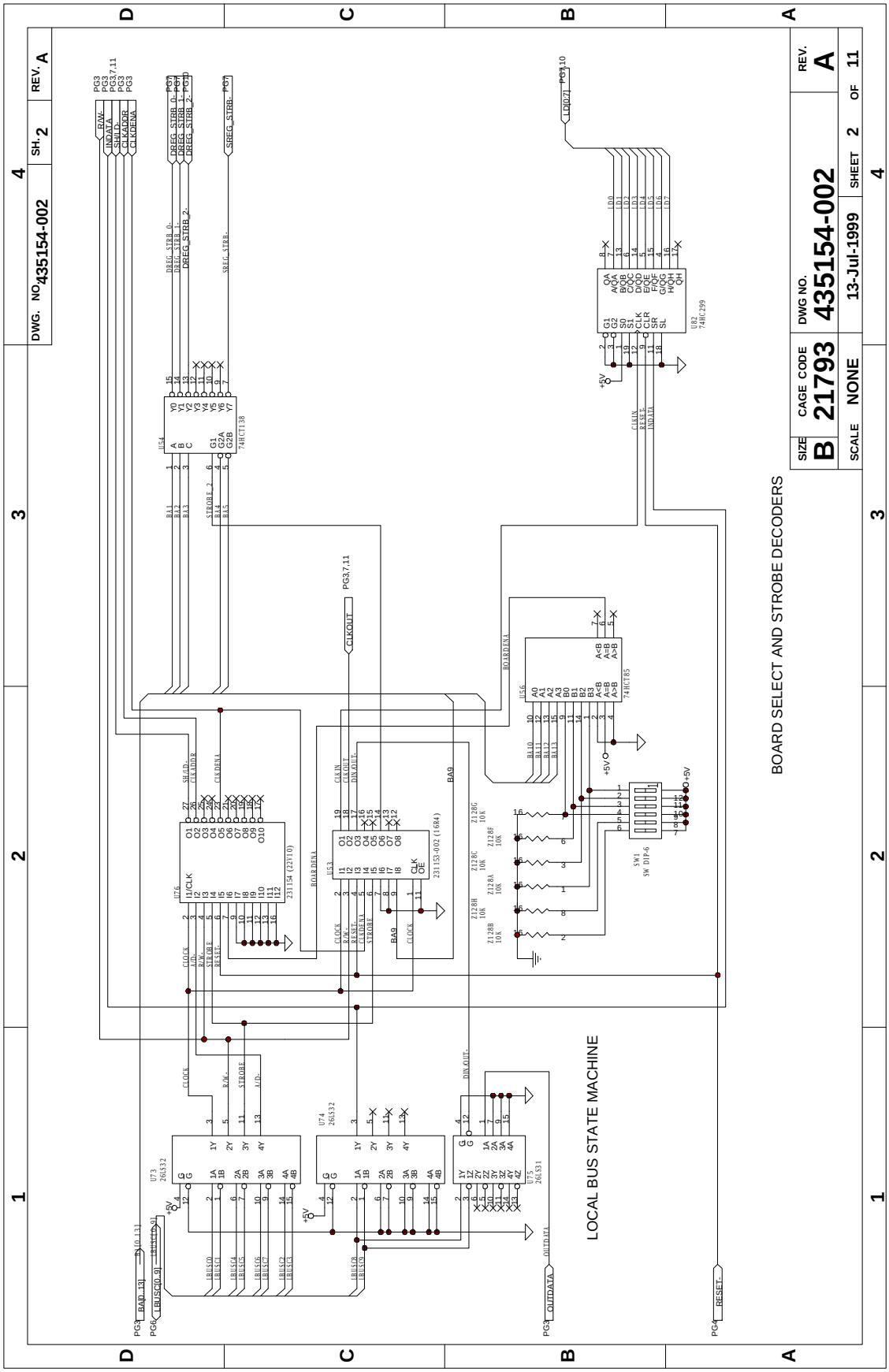
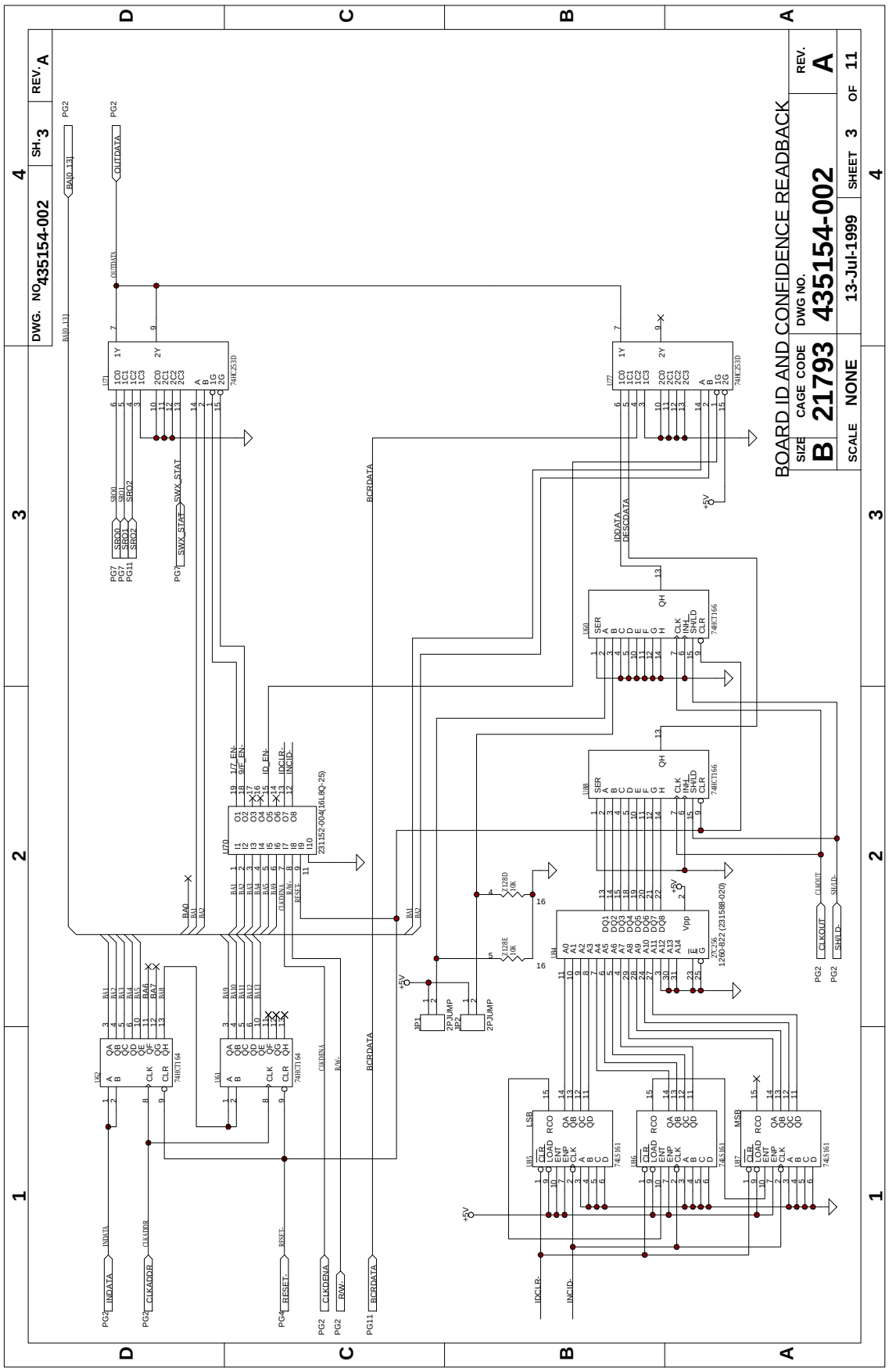
RACAL Instruments, Inc.
4 Goodyear St., Irvine, CA. 92618

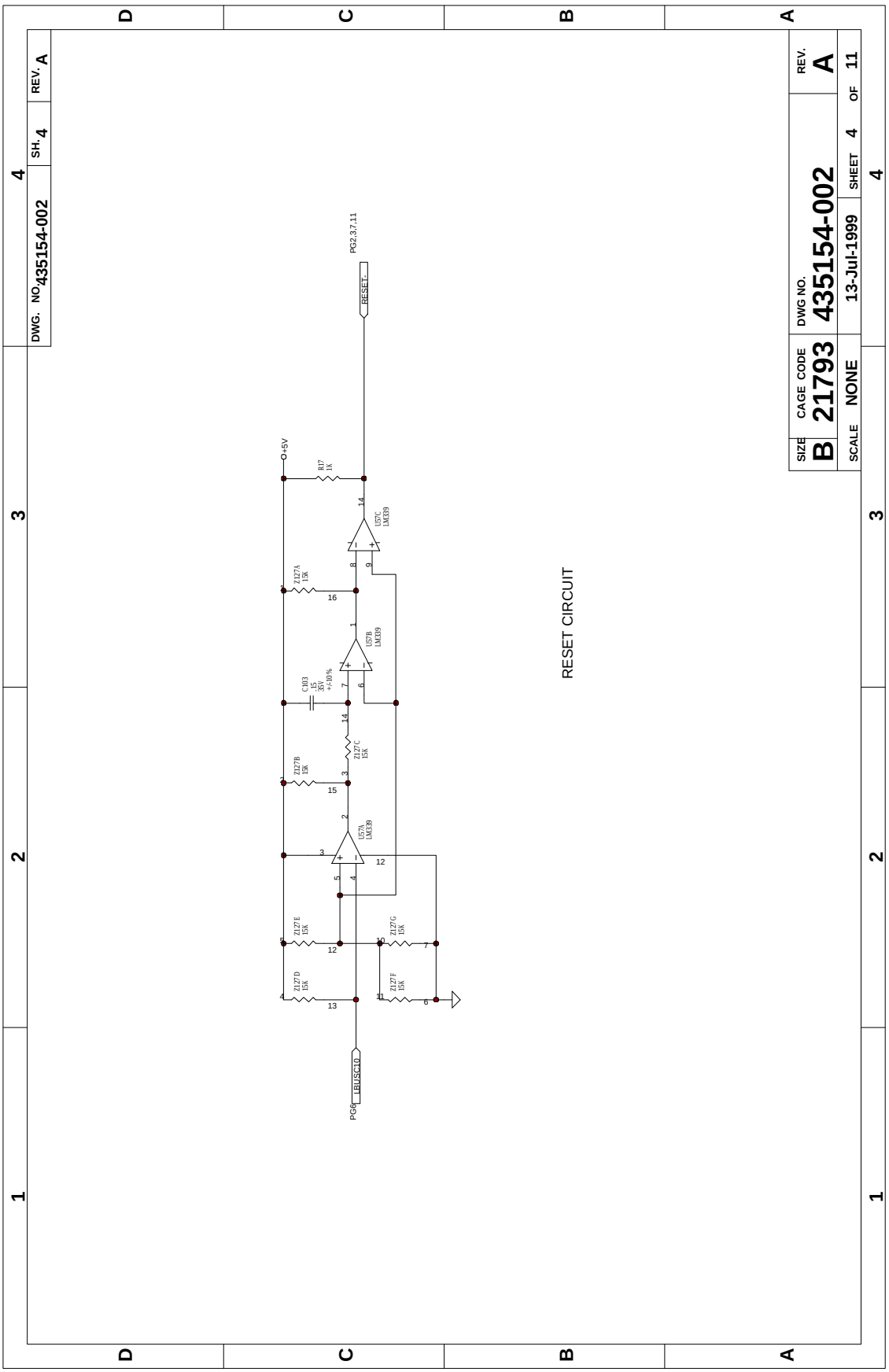
TITLE
SCHEMATIC, 1260-822

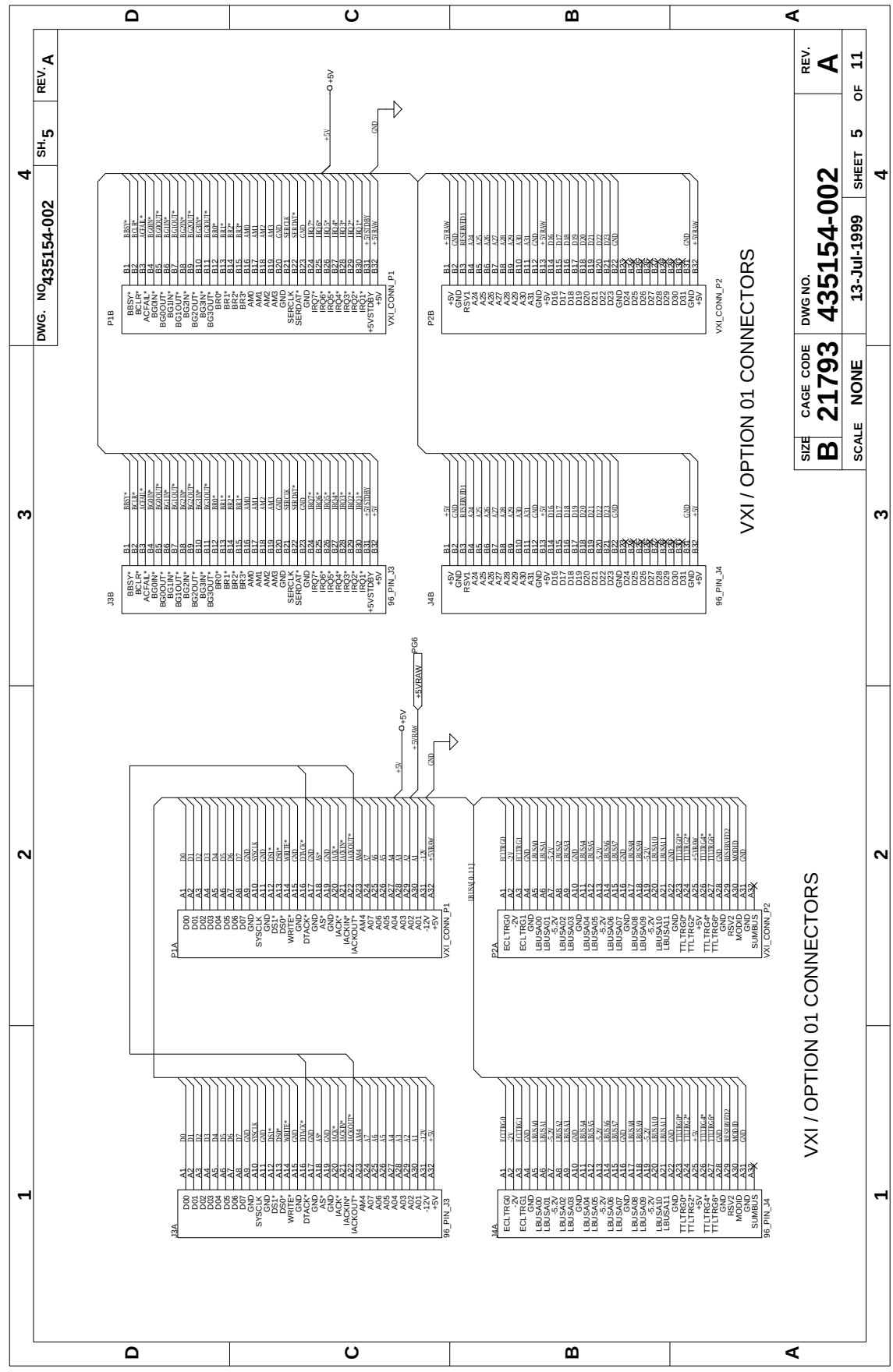
SIZE	CAGE CODE	DWG NO.	REV.
B	21793	435154-002	A

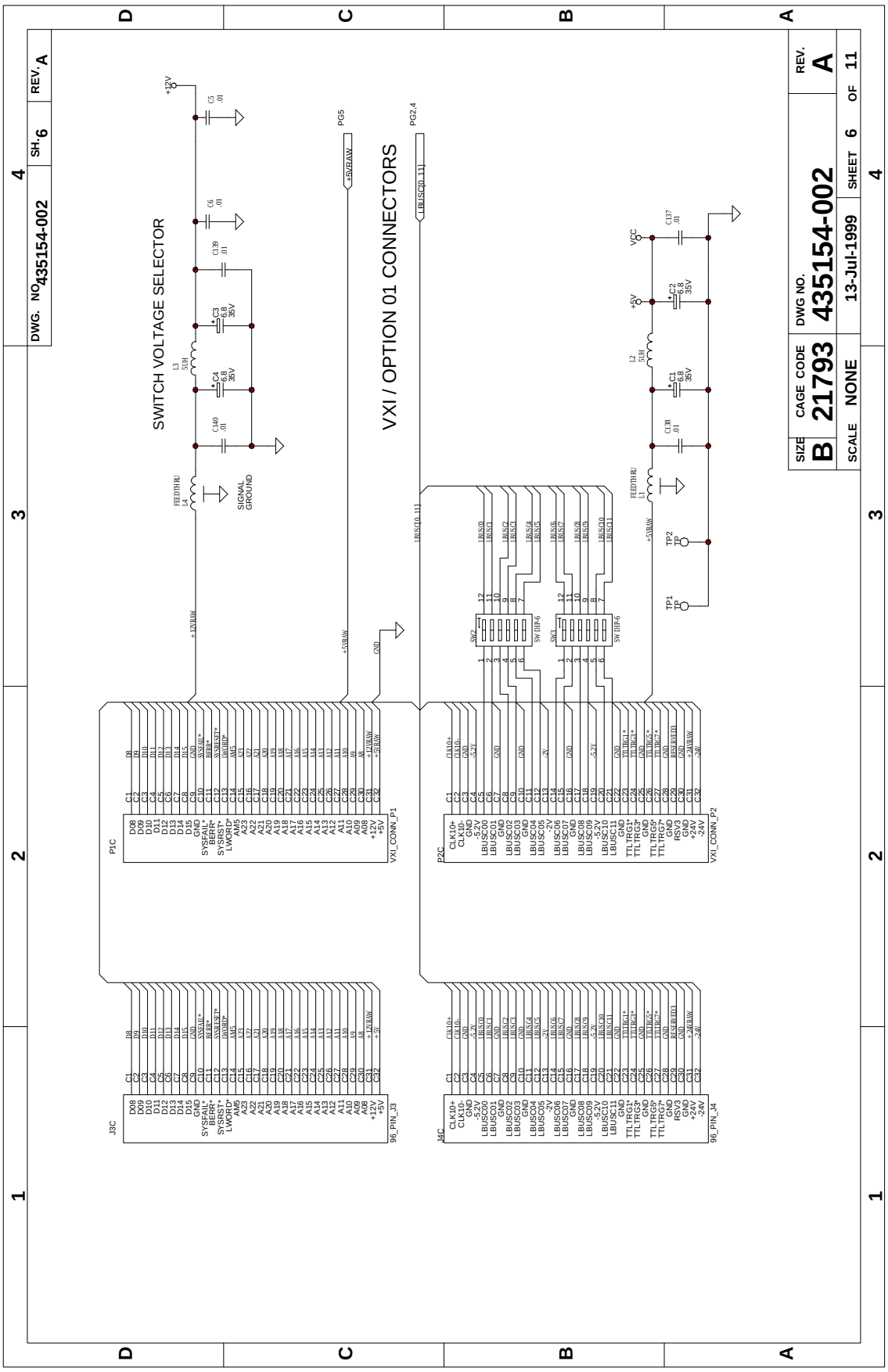
SCALE	NONE	2-Aug-1999	SHEET 1 OF 11

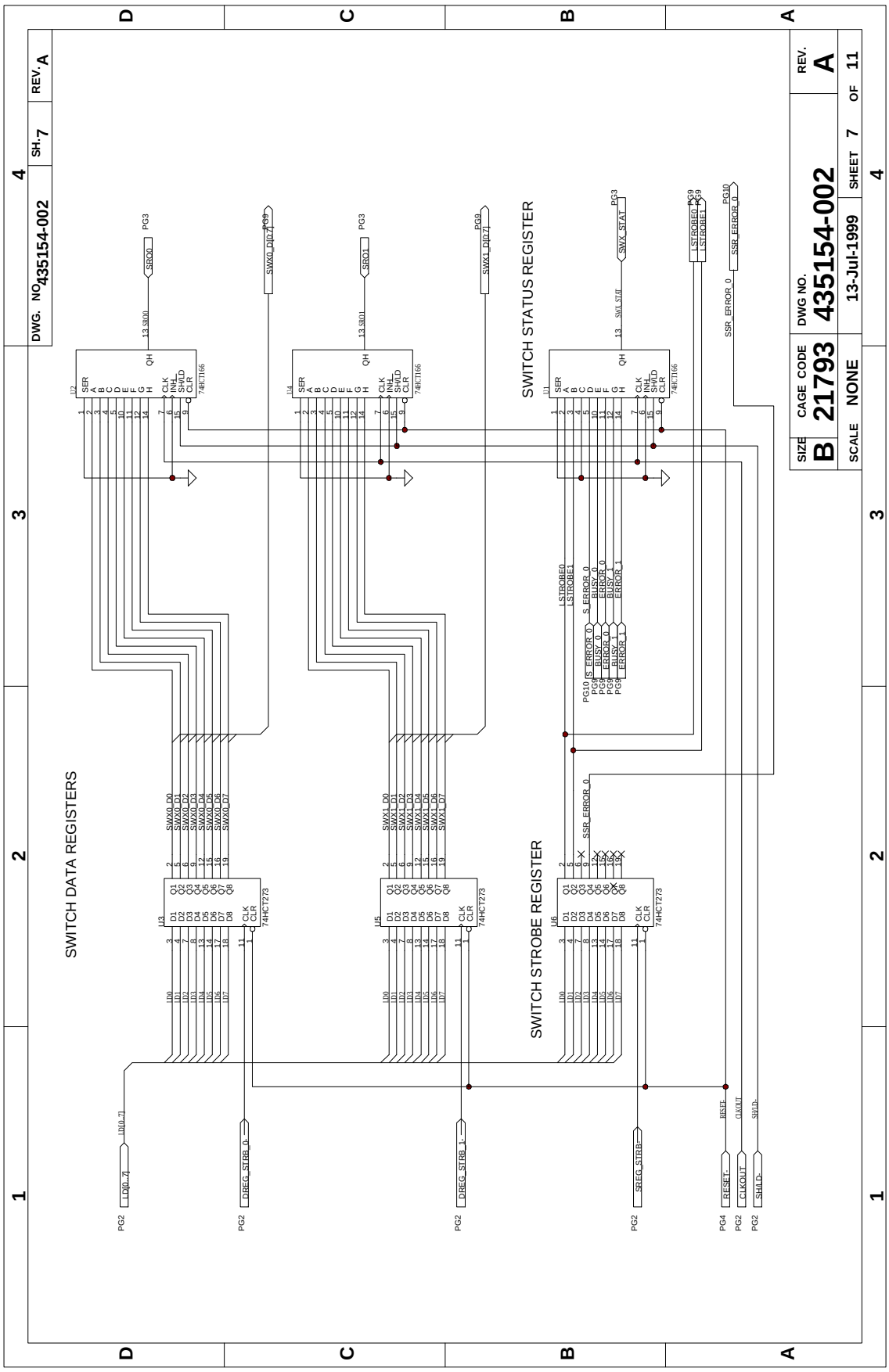

BOARD SELECT AND STROBE DECODERS
LOCAL BUS STATE MACHINE
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 2 OF 11
DWG. NO 435154-002
SH. 2
REV. A

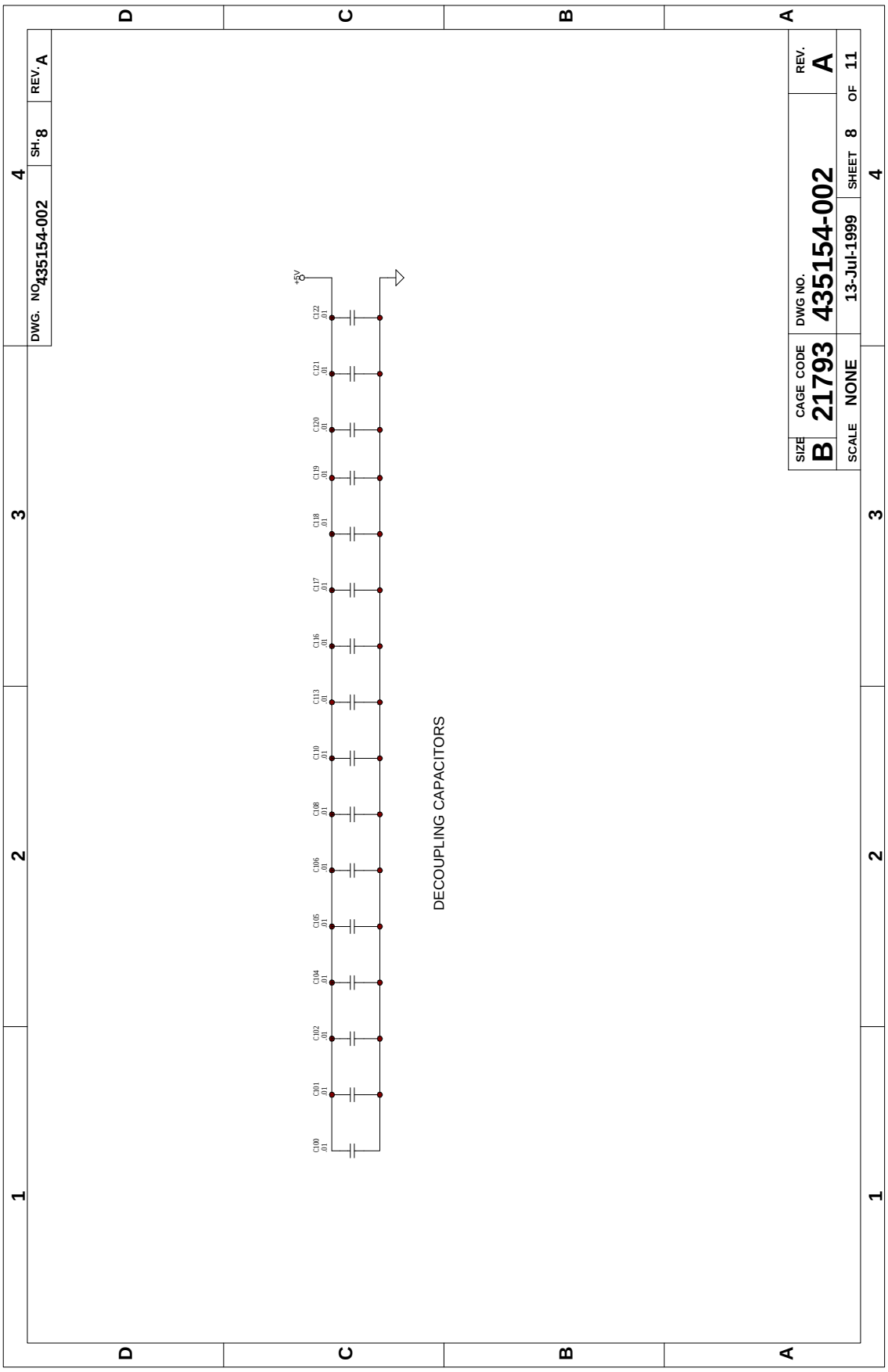

BOARD ID AND CONFIDENCE READBACK
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 3 OF 11
DWG. NO 435154-002
SH. 3
REV. A
74HCT64
74HCT166
74LS161
231152-004(16L8Q-25)
1260-822 (231588-020)
2PJUMP
INDATA
CLKADDR
RESET-
CLKDENA
R/W-
BCRDATA
IDCLR-
INCID-
CLKOUT
SH/LD-
OUTDATA
IDDATA
DESCDATA
SWX_STAT
+5V

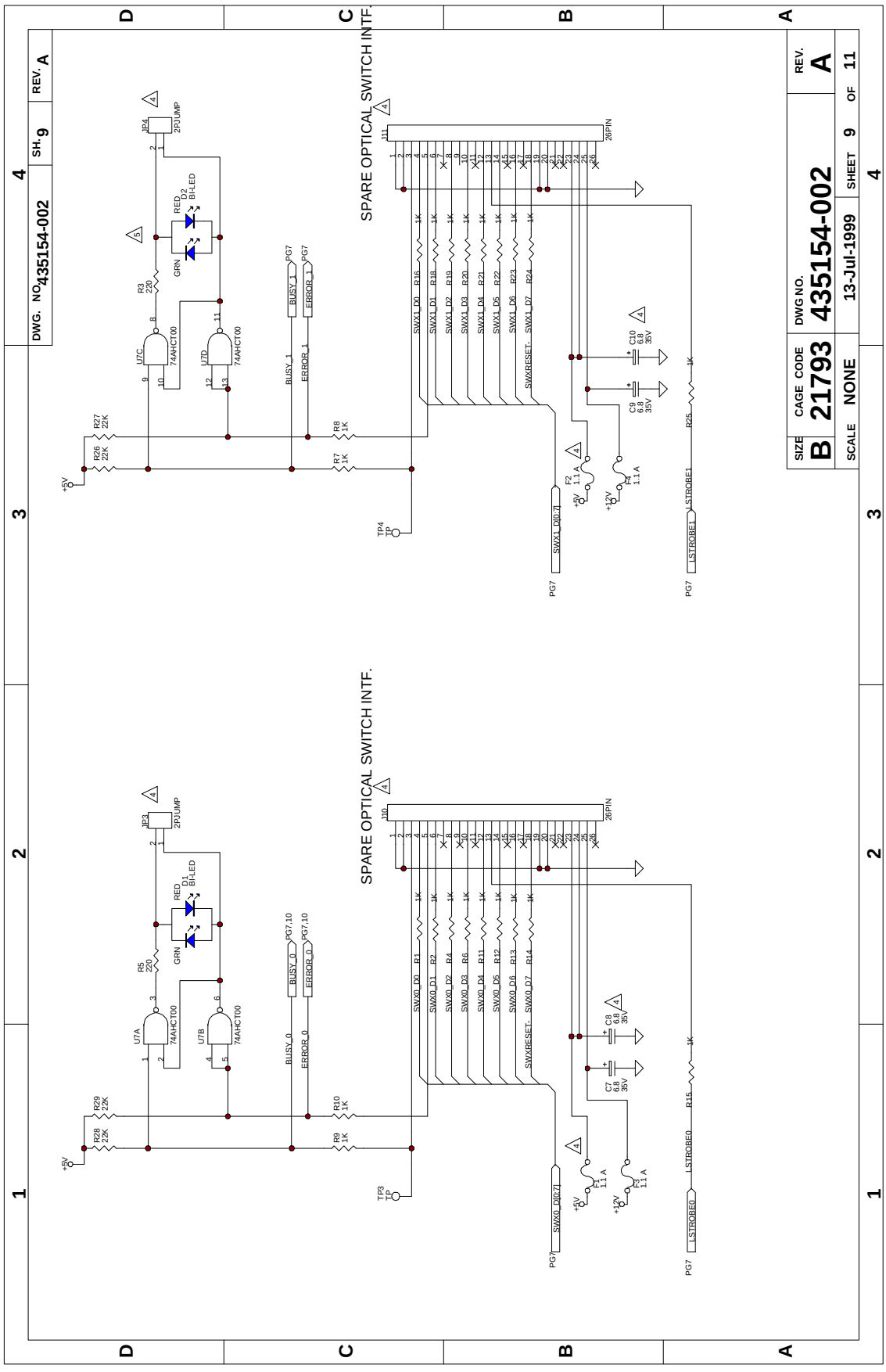

RESET CIRCUIT
DWG. NO 435154-002
SH. 4
REV. A
SIZE B
CAGE CODE 21793
SCALE NONE
DWG NO. 435154-002
REV. A
13-Jul-1999
SHEET 4 OF 11
RESET-
PG2,3,7,11
+5V
R17 1K
U57C LM339
Z127A 15K
U57B LM339
C103 .15 35V +-10%
Z127C 15K
Z127B 15K
U57A LM339
Z127E 15K
Z127G 15K
Z127D 15K
Z127F 15K
PG6
TBUSG10

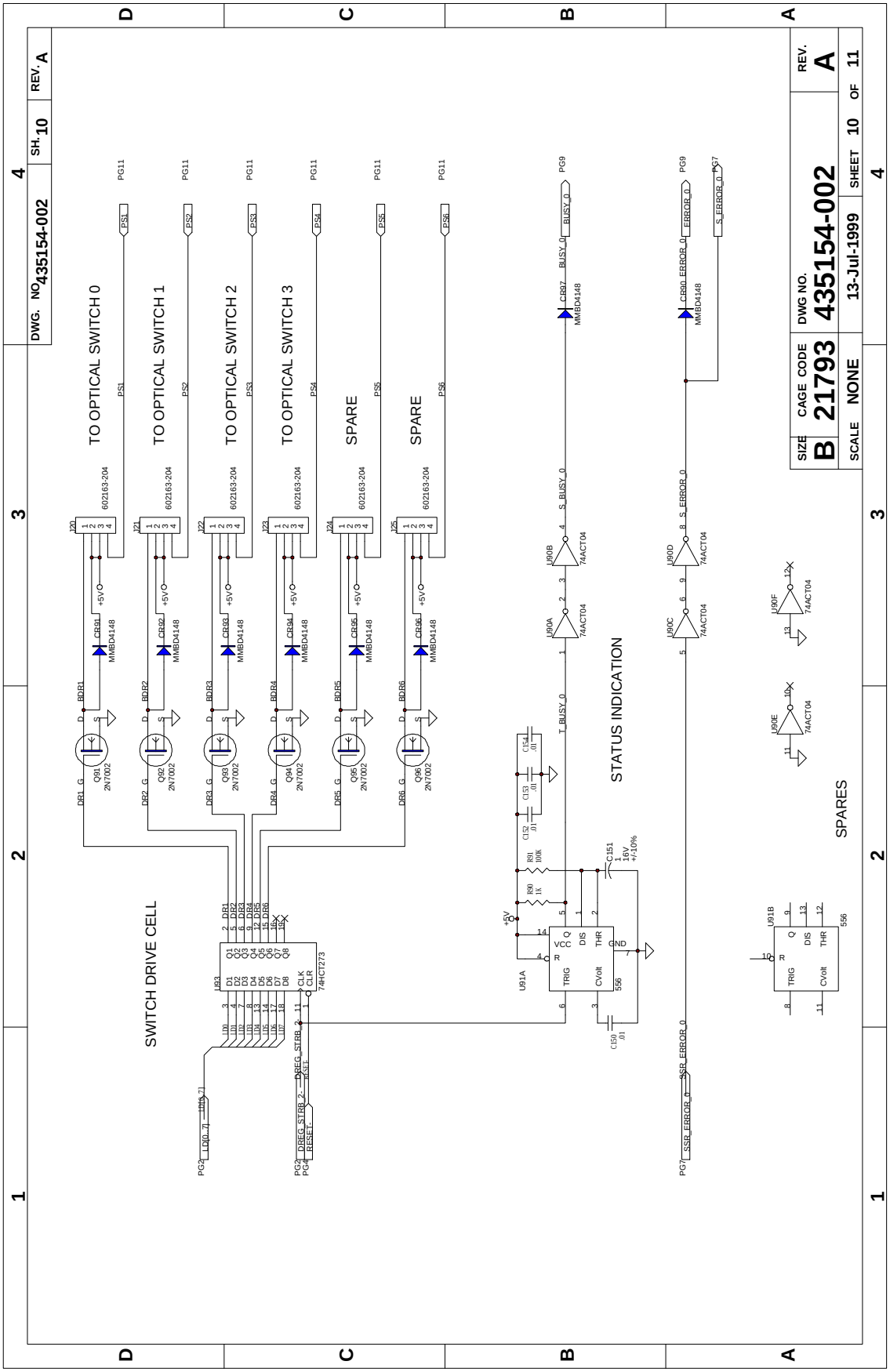

DWG. NO 435154-002
SH. 5
REV. A
VXI / OPTION 01 CONNECTORS
VXI / OPTION 01 CONNECTORS
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 5 OF 11

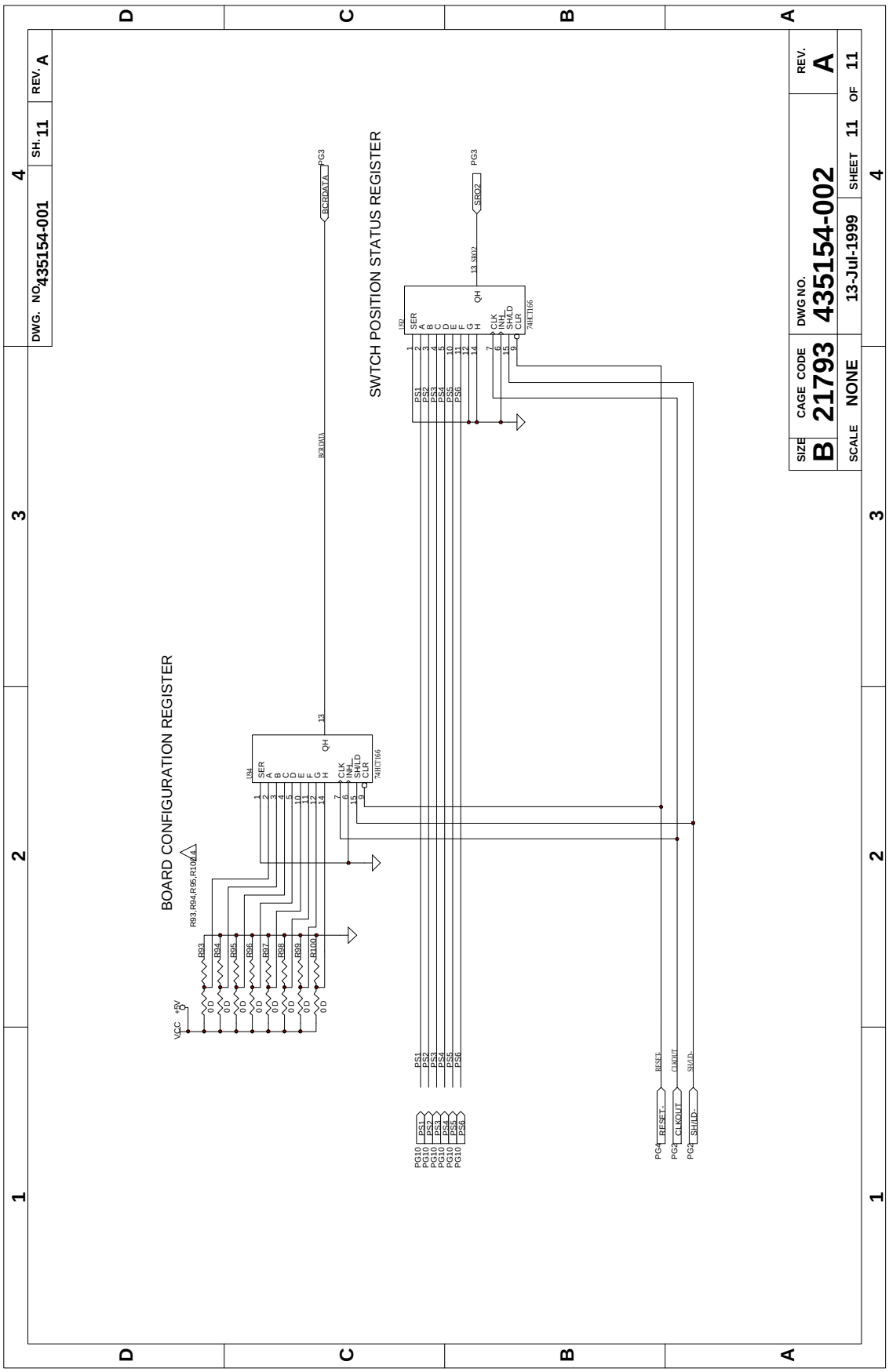

VXI / OPTION 01 CONNECTORS
SWITCH VOLTAGE SELECTOR
SIGNAL GROUND
VXI_CONN_P1
VXI_CONN_P2
96_PIN_J3
96_PIN_J4
SW DIP-6
DWG. NO 435154-002
REV. A
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 6 OF 11

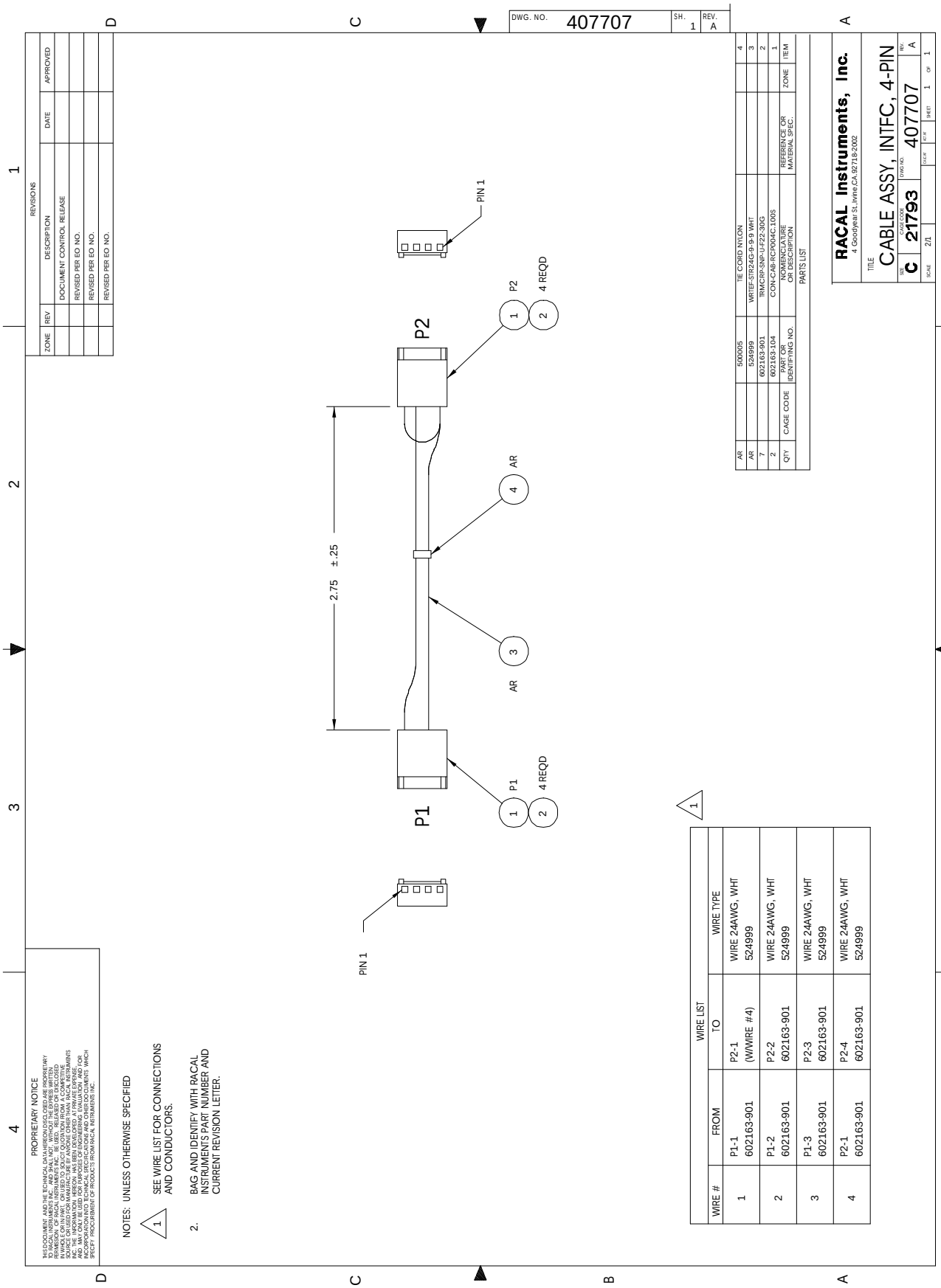

SWITCH DATA REGISTERS
SWITCH STROBE REGISTER
SWITCH STATUS REGISTER
74HCT166
74HCT273
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 7 OF 11
DWG. NO 435154-002
SH. 7
REV. A
LDQ0..7
DREG_STRB_0
DREG_STRB_1
SREG_STRB
RESET
CLKOUT
SHLD
SSR_ERROR_0
LSTROBE0
LSTROBE1
S_ERROR_0
BUSY_0
ERROR_0
S_ERROR_1
BUSY_1
ERROR_1
SWX_STAT
SWX0_D0..7
SWX1_D0..7


DECOUPLING CAPACITORS
+5V
C100 .01
C101 .01
C102 .01
C104 .01
C105 .01
C106 .01
C108 .01
C110 .01
C113 .01
C116 .01
C117 .01
C118 .01
C119 .01
C120 .01
C121 .01
C122 .01
DWG. NO 435154-002
SH. 8
REV. A
SIZE B
CAGE CODE 21793
SCALE NONE
DWG NO. 435154-002
REV. A
13-Jul-1999
SHEET 8 OF 11


SPARE OPTICAL SWITCH INTF.
SPARE OPTICAL SWITCH INTF.
DWG. NO. 435154-002
REV. A
SH. 9
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 9 OF 11
74AHCT00
2PJUMP
BI-LED
26PIN


TO OPTICAL SWITCH 0
TO OPTICAL SWITCH 1
TO OPTICAL SWITCH 2
TO OPTICAL SWITCH 3
SPARE
SPARE
SWITCH DRIVE CELL
STATUS INDICATION
SPARES
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 10 OF 11
DWG. NO 435154-002
SH. 10
REV. A


BOARD CONFIGURATION REGISTER
SWTCH POSITION STATUS REGISTER
BCRDATA
SRO2
RESET
CLKOUT
SHLD
DWG. NO 435154-001
SH. 11
REV. A
SIZE B
CAGE CODE 21793
DWG NO. 435154-002
REV. A
SCALE NONE
13-Jul-1999
SHEET 11 OF 11


DWG. NO. 407707
SH. 1
REV. A
REVISIONS
ZONE
REV
DESCRIPTION
DATE
APPROVED
DOCUMENT CONTROL RELEASE
REVISED PER EO NO.
REVISED PER EO NO.
REVISED PER EO NO.
PIN 1
P2
P2
4 REQD
AR
AR
2.75 ±.25
P1
P1
4 REQD
PIN 1
PROPRIETARY NOTICE
NOTES: UNLESS OTHERWISE SPECIFIED
1 SEE WIRE LIST FOR CONNECTIONS AND CONDUCTORS.
2. BAG AND IDENTIFY WITH RACAL INSTRUMENTS PART NUMBER AND CURRENT REVISION LETTER.
WIRE LIST
WIRE # | FROM | TO | WIRE TYPE
1 | P1-1 602163-901 | P2-1 (W/WIRE #4) | WIRE 24AWG, WHT 524999
2 | P1-2 602163-901 | P2-2 602163-901 | WIRE 24AWG, WHT 524999
3 | P1-3 602163-901 | P2-3 602163-901 | WIRE 24AWG, WHT 524999
4 | P2-1 602163-901 | P2-4 602163-901 | WIRE 24AWG, WHT 524999
AR | 500005 | TIE CORD NYLON | 4
AR | 524999 | WRTEF-STR24G-9-9-9 WHT | 3
7 | 602163-901 | TRMCRP-SNP-U-F22-30G | 2
2 | 602163-104 | CON-CAB-RCP004C.100S | 1
QTY | CAGE CODE | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | REFERENCE OR MATERIAL SPEC. | ZONE | ITEM
PARTS LIST
RACAL Instruments, Inc.
4 Goodyear St., Irvine, CA 92718-2002
TITLE
CABLE ASSY, INTFC, 4-PIN
SIZE C
CAGE CODE 21793
DWG NO. 407707
REV A
SCALE 2/1
SHEET 1 OF 1
980337 REV. F

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Chapter 5
PARTS LIST

407709-002	Final Assy, 1260-822B	5-3
407709-004	Final Assy, 1260-822D	5-4
405148	PCB Assy, L-BUS Jumper	5-5
405154-001	PCB Assy, 1260-822	5-6
407707	Cable Assy, Interface	5-7
407708	Shipping Kit	5-8

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RACAL INSTRUMENTS INC.

Assembly 407709-002 1260-822B, 2 2x2 OPT SW,1S Date 7/22/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
2	231588-020	ICMEM-27C256-15-U84-PLCCP	EA	1.00000	U8 4
3	405154-001	PCB ASSY, 1260-82/822	EA	1.00000	
4	407708	SHIP KIT,1260-822 B&T	EA	1.00000	
5	407707	CABLE ASSY, INTFC, 4-PIN	EA	2.00000	W/A1-A2
6	456722	COVER, LEFT, VXI , MOD-ADDR	EA	1.00000	
7	456788-002	PANEL, FRONT, 1S, 1260-822B	EA	1.00000	
8	456773	PANEL, RIGHT, 88-1	EA	1.00000	
9	456775	BR~T, STRAIN RELIEF, LOWER, 1W	EA	1.00000	
10	456776	BRKT, STRAIN RELIEF, UPPER, 1W	EA	1.00000	
11	456786	PLATE, SWITCH MOUNTING	EA	1.00000	
15	602399	CONN,FC ADAPTER,CERAMIC SLV	EA	8.00000	J200-J207
16	602391	SWITCH, OPTICAL, 2x2, SGL MODE	EA	2.00000	A1-A2
17	611263	STSO4B. 062P. 775L - 250	EA	1.00000	
18	611264	HAN DLE-EXT-BOT	EA	1.00000	
19	611265	HANDLE-EXT-TOP	EA	1.00000	
20	611266	MOUNTING HDW, HANDLE	EA	.50000	
23	615541	S1M-PFL1H004-40X.250	EA	17.00000	
25	616252	S3M-PPANH004-40X.312	EA	5.00000	
26	616405	S1MPFL9-M2 - SXO - 45X12	EA	2.00000	
27	615519	S1M-PFL1HOO2-56X. 750	EA	4.00000	
28	617002	NT1HEXOO2-5655N-PSVT	EA	4.00000	
29	617126	W1S002 . 165D. 01ST. 088	EA	4.00000	
30	910634	SPONGE, PRESSURE, SENSITIVE	FT	.00001	
31	920962	LOCTITE-242-MED STR	EA	.00001	
32	921059	LABEL-CAUTION-STATIC	EA	1.00000	
33	921148-001	LABEL SET,VXI	EA	1.00000	
34	921309	LABEL,VXI SWTCH IDENT.	EA	1.00000	
36	611473	CABLE WRAP, VELCRO. ,63W	EA	.00001	
37	921055	TAPE-DBL SIDED-FOAM	EA	.00001	

RACAL INSTRUMENTS INC.

Assembly 407709-004 1260-822D,4 2x2 OPT SW,1S Date 7/22/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
2	231588-020	ICMEM-27C256-15-U84-PLCCP	EA	1.00000	U84
3	405154-001	PCB ASSY, 1260-82/822	EA	1.00000	
4	407708	SHIP KIT,1260-822 B&T	EA	1.00000	
5	407707	CABLE ASSY, INTFC, 4-PIN	EA	4.00000	W/A1-A4
6	456722	COVER, LEFT, VXI , MOD-ADDR	EA	1.00000	
7	456788-004	PANEL, FRONT, 1S, 1260-822D	EA	1.00000	
8	456773	PANEL,RIGHT, 88-1	EA	1.00000	
9	456775	BRKT, STRAIN RELIEF, LOWER, 1W	EA	1.00000	
10	456776	BRKT,STRAIN RELIEF,UPPER, 1W	EA	1.00000	
11	456786	PLATE, SWITCH MOUNTING	EA	1.00000	
13	601195	PLUG-JUMPER-0 .1 CTR	EA	1.00000	W/JP1
15	602399	CONN,FC ADAPTER,CERAMIC SLV	EA	16.00000	J2 00-J2 15
16	602391	SWITCH, OPTICAL, 2x2, SGL MODE	EA	4.00000	A1-A4
17	611263	STSO4B. 062P. 775L.250	EA	1.00000	
18	611264	HAN DLE-EXT-BOT	EA	1.00000	
19	611265	HANDLE-EXT-TOP	EA	1.00000	
20	611266	MOUNTING HDW, HANDLE	EA	.50000	
22	615540	S1M-PFL1HOO4-40X. 188	EA	4.00000	
23	615541	S1M-PFL1H004-40X.250	EA	13.00000	
25	616252	S3M-PPANH004-40X.312	EA	5.00000	
26	616405	S1MPFL9-M2 . 5x0. 45X12	EA	2.00000	
27	615519	S1M-PFL1HOO2-56X. 750	EA	8.00000	
28	617002	NT1HEXOO2-5655N-PSVT	EA	8.00000	
29	617126	W1S002 . 165D. 01ST. 088	EA	8.00000	
30	910634	SPONGE, PRESSURE, SENSITIVE	FT	.00001	
31	920962	LOCTITE-242-MED STR	EA	.00001	
32	921059	LABEL-CAUTION-STATIC	EA	1.00000	
33	921148-001	LABEL SET,VXI	EA	1.00000	
34	921309	LABEL,VXI SWTCH IDENT.	EA	1.00000	
36	611473	CABLE WRAP,VELCRO.,63W	EA	.00001	
37	921055	TAPE-DBL SIDED-FOAM	EA	.00001	

RACAL INSTRUMENTS INC.

Assembly 405148 PCB ASSY, L-BUS JUMPER Date 1/28/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
	415148	PCB, L-BUS JUMPER	EA	1.00000	-
	601675-001	CON-PCB-PLG096P. 100D	E	1.00000	P2
	611263	STS04B. 062P. 775L.250	EA	1.00000	-
2	435148	SCHEMATIC, L-BUS JUMPER	EA		-

RACAL INSTRUMENTS INC.

Assembly 405154-001 PCB ASSY,1260-822/822 Date 5/27/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
1	R-21-1801	CPCH2-0010.0N0050V20	EA	26.00000	CS, 6,100-102, 104-106, 108, 110,113, 116,-122, 137-140, 150, 152-154
2	050000-000	RSCH1-000 .00H. 06W005	EA	4.00000	R96, 97, 98, 99
3	050000-102	RSCH2-001 .00K. 06W005	EA	24.00000	R1, 2,4,6-25, 90
4	050000-104	RSCH2-100.00K. 06W005	EA	1.00000	R91
5	050000-221	RSCH1-220. 00H. 06W005	EA	2.00000	R3, 5
6	050000-223	RSCH2-022.00K. 06W005	EA	4.00000	R26, 27,28,29
7	080114	RSNW2-015. 000K16P08R	EA	1.00000	Z127
8	080120	RSNW2-010. 000K16P1SR	EA	1.00000	Z128
9	100164	CPFT1-0800. 0P0050v	EA	2.00000	L1, 4
10	110126	CPTA3-0006. 8u0035v20	EA	6.00000	C1, 2,3,4,7,9
11	110244	CPCH3-0001 . 0U0016V10	EA	1.00000	C151
13	130198	CPCH2-0150. 0N0035v10	EA	1.00000	C103
14	200363	TRFE-NCHPR-SS60V200M2N7 002	EA	6.00000	Q91-96
15	210153	DISLC-075. 0V00 . 20A-1N4148	EA	7.00000	CR90-97
16	210155	DILED-002 . 2V00 . 01A-RED/GRN	EA	1.00000	D1
17	231093	ICLIN-LM33 9 COMP	EA	1.00000	U57
18	231096	ICINT-2 6LS32---RCVR	EA	2.00000	U73, 74
19	231119	ICDIG-74HC2 99---SHFT	EA	1.00000	U82
20	231120	ICDIG-74HCT1 66-SHFT	EA	7.00000	U1, 2,4, 60,88, 92, 94
22	231125	ICINT-26L531---DRVR	EA	1.00000	U75
23	231130	ICDIG-74HCT273-FLOP	EA	4.00000	U3, 5, 6, 93
24	231131	ICDIG-74HCT164-SHFT	EA	2.00000	U61, 62
25	231135	ICDIG-74HCT85	EA	1.00000	U56
26	231147	ICDIG-74HC253D—MUX	EA	2.00000	U71, 77
27	231152-004	ICPLA-16L8Q-25-U70-PLCCP	EA	1.00000	U70
28	231153-002	ICPLA-16R4-U53-PLCCP	EA	1.00000	U53
29	231154	ICMEM-22V10-U52-PAL	EA	1.00000	U76
30	231380	ICDIG-74ACT04---SOIC	EA	1.00000	U90
32	231386	ICDIG-74L5161----	EA	3.00000	U85, 86,87
33	231445	ICDIG-74HCT138—SOIC	EA	1.00000	U54
36	231519	ICLIN-556 SOIC	EA	1.00000	U91
37	231596	ICDIG-74AHCT00—SOIC	EA	1.00000	U7
40	310193	CKF1-SH005. 00U10. 1%I	EA	2.00000	L2, 3
42	401951	PCB ASSY,L-BUS JUMPER,P4	EA	1.00000	W/J4
43	401951-003	PCB ASSY,BUS GRANT,JUMPER,P3	EA	1.00000	W/J3
44	415154-001	PCB, 1260-8XX	EA	1.00000	
45	435154-001	SCHEMATIC, 1260-822	EA		
46	500204	WRTEF-SLD28G-9-9-9-WHT	FT	.00001	
48	601197	POST-TEST-. 025 SQ	EA	4.00000	TP1, TP2, TP3, TP4
49	601208-010	CON-PCB-PLG02SD. 100S	EA	2.00000	JP1, JP2
50	601675	CON-PCB-PLG096S. 100T	EA	2.00000	P1, P2
51	601925	CON-PCB-RCP96SD. 100T	EA	2.00000	J3, J4
52	601969	SWITCH,DIP-6 POS,LOW	EA	3.00000	SW1-3
53	602068-032	CON-SKT-RCPO32S.050S	BA	1.00000	w/U84
54	602163-204	CON-PCB-PLGOO4S.1OOSRT ANGLE	BA	6.00000	J20-J25
60	611258-001	STSO4T.062P.170L.218	BA	5.00000	
67	921421	FUSE-01. 1OOA-030V	BA	2.00000	P3, 4

RACAL INSTRUMENTS INC.

Assembly 407707 CABLE ASSY, INTFC,4-PIN Date 5/27/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
1	602163-104	CON-CAB-RCP004C. 100S	EA	2.00000	
2	602163-901	TRMCRP-SNP-U-F22-30G	EA	7.00000	
3	524999	WRTEF-STR24G-9-9-9 WHT	FT	.00001	
4	500005	TIE CORD NYLON	FT	.00001	

RACAL INSTRUMENTS INC.

Assembly 407708 SHIP KIT, 1260-822 Date 4/16/99 Revision A

#	Component	Description	U/M	Qty Reqd	Ref
	455540	KEY, LOCKOUT, TTL AC	EA	2.00000	
	455541	KEY, LOCKOUT, TTL, C	EA	2.00000	
	455542	KEY, LOCKOUT, TTL, A	EA	2.00000	
	615013	S1M-PPANH002-56X. 188	EA	3.00000	
	980673-060	MANUAL, 1260-822	EA	1.00000	

Chapter 6

PRODUCT SUPPORT

Product Support

Racal Instruments has a complete Service and Parts Department. If you need technical assistance or should it be necessary to return your product for repair or calibration, call 1-800-722-3262. If parts are required to repair the product at your facility, call 1-949-859-8999 and ask for the Parts Department.

When sending your instrument in for repair, complete the form in the back of this manual.

For worldwide support and the office closes to your facility, refer to the Support Offices section on the following page.

Reshipment Instructions

Use the original packing material when returning the 1260-822 to Racal Instruments for calibration or servicing. The original shipping crate and associated packaging material will provide the necessary protection for safe reshipment.

If the original packing material is unavailable, contact Racal Instruments Customer Service for information.

Support Offices

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