



**Multi-
Tasker™**

MANUAL PART NUMBER: 400-0092-005

MT104-102

**6-IN, 1-OUT VGA SWITCHER
CARD FOR MULTI-TASKER™
ENCLOSURES USER'S GUIDE**

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PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT104-102**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT104-102** and to prevent fire and shock hazard. Please read them carefully and heed all warnings.

1.1 GENERAL

- Qualified ALTINEX service personnel, or their authorized representatives must perform all service.

1.2 INSTALLATION

- To prevent fire or shock, do not expose this unit to rain or moisture. Do not place the **MT104-102** in direct sunlight, near heaters or heat radiating appliances, or near any liquid. Exposure to direct sunlight, smoke, or steam can harm internal components.
- Handle the **MT104-102** carefully. Dropping or jarring can damage the card.
- Insert the card carefully into the slots of the Multi-Tasker™ without bending any edges.
- When removing a card, please make sure that the expansion card to which it is attached is also pulled out simultaneously.

1.3 CLEANING

- Clean only the connector area with a dry cloth. Never use strong detergents or solvents, such as alcohol or thinner. Do not use a wet cloth or water to clean the card. Do not clean or touch any component or PCB.

1.4 FCC / CE NOTICE

- This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- Any changes or modifications to the unit not expressly approved by ALTINEX, Inc. could void the user's authority to operate the equipment.

ABOUT YOUR MT104-102 2

MT104-102 6-in 1-out MT VGA Switcher Card

The **MT104-102** 6-in 1-out MT VGA SW Card uses two slots in Multi-Tasker™ enclosures. This card enables multiple computer video sources to be connected and switched to a single scan-rate compatible display. Resolutions supported range from VGA to QXGA.

Female 15-pin HD (VGA-type) connectors are provided for input and output. If used together with 15-pin HD to 5 BNC adapter cables available from ALTINEX, the **MT104-102** can pass RGBHV format computer video signals as well. Inputs are selected via easy-to-use ASCII commands from a control system or computer connected to the RS-232 port of the Multi-Tasker™ Basic Enclosure.

For convenience and flexibility, the **MT104-102** offers Sync Delay™, which briefly “blanks” the video channel signals while switching between signals, thereby avoiding any visual “glitch.” The **MT104-102** is Plug & Play compatible. To expand the number of VGA inputs, the **MT104-102** can be connected to an MT VGA SW Expansion card. *For more information on expansion see the MT104-104 & MT103-106 product descriptions.*

TECHNICAL SPECIFICATIONS 3

FEATURES/ DESCRIPTION	MT104-102
GENERAL	
Inputs	
Input Connector	(6) 15-pin HD Female
Internal Connector	(1) 10-pin IDC
Outputs	
Output Connector	(1) 15-pin HD Female
Compatibility	VGA thru QXGA, RGBHV & RGS

Table 1. **MT104-102** General

MECHANICAL	MT104-102
Enclosure Slots Required	Two
Weight	1.0 lb (0.45 kg)
Connector Panel	Black
T° Operating	10°C-35°C
T° Storage	50°C
Humidity	90% non-condensing
MTBF (calc.)	40,000 hrs

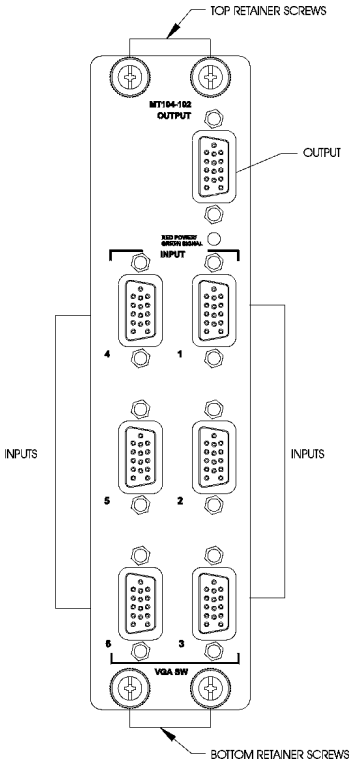
Table 2. **MT104-102** Mechanical

ELECTRICAL	MT104-102		
Input Video Signals			
Analog	1.7Vp-p max		
Impedance	75 Ohms +/-1% (terminated)		
Type	Differential		
Input Sync Signal			
Horizontal, Vertical	TTL (+/-)		
Impedance	10k Ohms		
Output Video Signals			
Analog	1.7V p-p max (terminated)		
Impedance	75 Ohms		
Output Sync Signals			
Horizontal, Vertical	TTL (+/-)		
Impedance	22 Ohms		
Frequency Compatibility			
Horizontal	15-130 kHz		
Vertical	25-180 Hz		
Bandwidth	350 MHz @-3dB		
Power			
Power from MT100-100	+6V	-6V	Power Consumption
MT104-102	125mA	90mA	1.3 watts

Table 3. **MT104-102** Electrical

PRODUCT DESCRIPTION

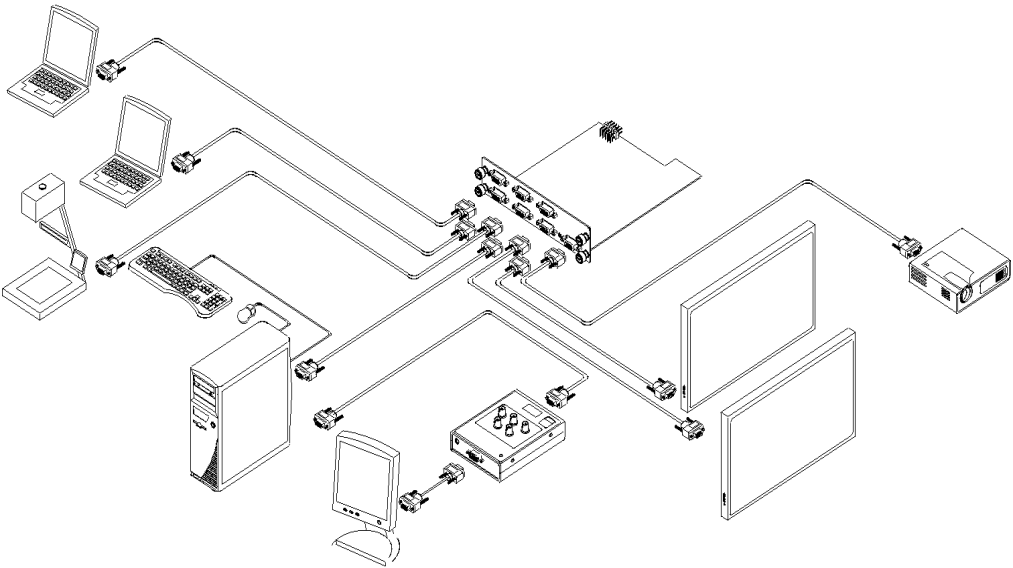
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APPLICATION DIAGRAM

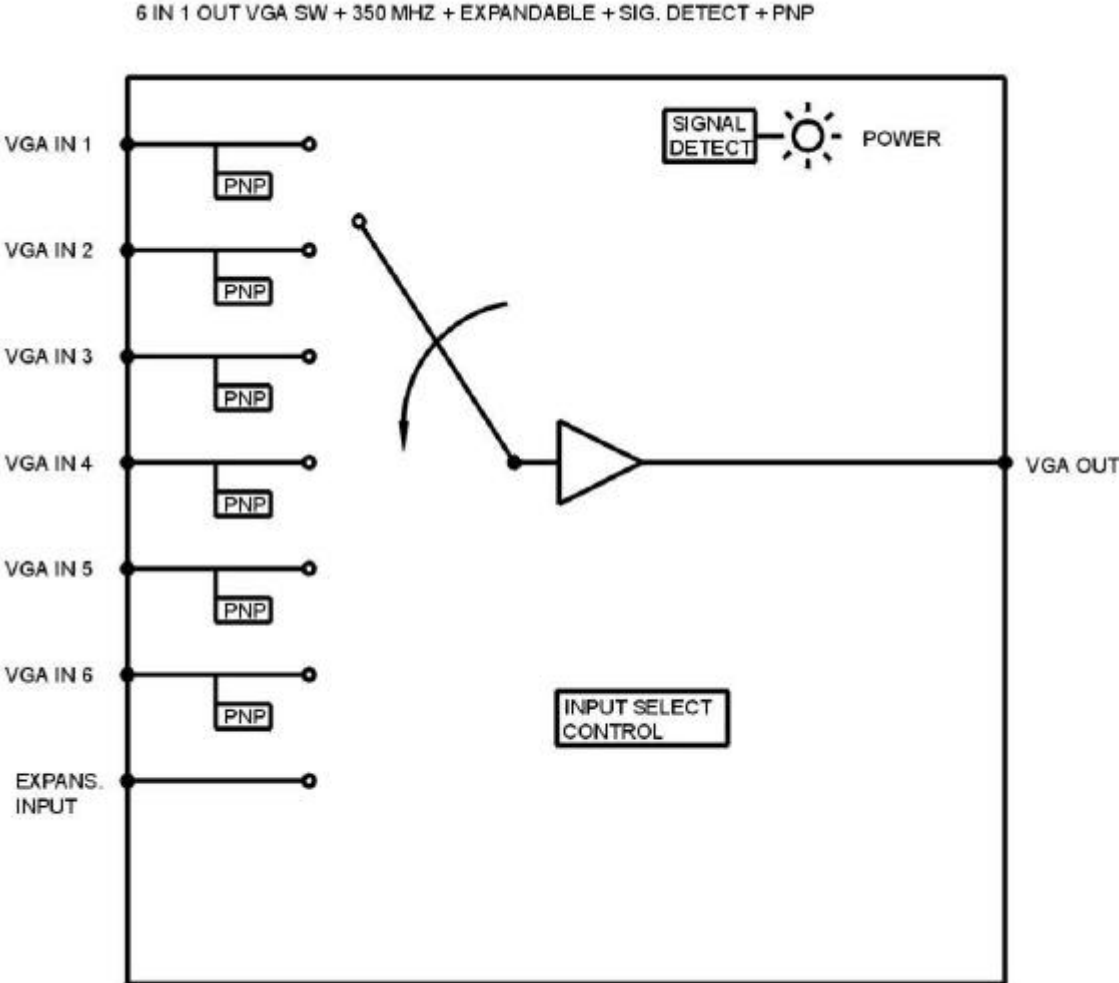
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Application Diagram 1



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Application Diagram 2: Internal View of the MT104-102



INSTALLING YOUR MT104-102 6

- Step 1.** Slide the **MT104-102** into an available slot in the Multi-Tasker™ Enclosure in order to connect to the bus. Make sure that the **MT104-102** card fits into place. Secure the card to the Multi-Tasker™ by tightening the retainer screws located on the top and bottom of the **MT104-102** card.
- Step 2.** The LED on the card panel will turn red indicating that the card is in full operation. A green LED indicates that a signal is present. An LED that is blinking red indicates that the card is experiencing a problem. If the LED is blinking, see Troubleshooting Guide in section 8.
- Step 3.** Connect a coaxial cable from the video source to the input connector of the **MT104-102**. Connect the output connectors of the **MT104-102** to the display devices through a coaxial cable.
- Step 4.** Starting from the left, identify the slot number where the **MT104-102** card is plugged into the Enclosure and note that it is for RS-232 control.

OPERATION 7

7.1 RS-232 CONTROL

When used in the Multi-Tasker™ Enclosure, the **MT104-102** has many advanced remote control capabilities, which are accessible through standard RS-232 communication. The actual controlling can be accomplished through a computer control system or any other device capable of sending RS-232 commands.

7.1.1 RS-232 INTERFACE

The RS-232 commands for the **MT104-102** are in a simple ASCII character format.

1. Square brackets “[]” are part of the command.
2. Use uppercase letters for all commands.

After processing a command, an OK or ER will be returned as feedback if "F" is included at the end of a command string or if the unit ID is zero.

Commands such as [ON], [OFF], and [IO] that end in "S" will be saved into memory. Commands not ending in "S" will still be executed but will not be restored when the system is reset (power off & power on again).

7.2 DESCRIPTION OF COMMANDS

Each command consists of three parts: function, card ID, and unit ID. [Function, Card ID, Unit ID]

Example:

[VERC3U2]
 VER = Function
 C3 = Card ID
 U2 = Unit ID

For function, see a detailed explanation under each command description.

Card ID is an assigned value from 1 to 19 (1 to 8 or 1 to 2 depending on which enclosure is being used), which represents the number of slots. Card ID 0 (C0) is used for the controller (see user's guide for the MT100-100). Changing the position of a card will significantly affect the commands recorded on software definitions or a third party control system.

Unit ID has a value from 0 to 9. Unit ID 0 should be used for single unit operation. If the Unit ID is set to 0, then each command can be used without Ui (use command [SETU0]; see user's guide for the MT100-100).

Example:

[VERC3]: for unit ID zero
 [VERC3Ui]: for unit ID other than zero
 [VERC3]: equivalent to [VERC3U0]

1. [VER]

This command receives the software version and card type for the **MT104-102** card.

Command Format: [VERCnUi]

Cn = card ID number (n = # from 1 to 19)
 (1-8 for MT100-101 or 1-4 for MT100-106)

Ui = Unit ID (i = # from 0 to 9) (refer to the MT100-100 user's guide for explanation)

Example:

If one **MT104-102** card is in slot #2 of unit 3:

To send command **[VERC2U3]**, the Multi-Tasker™ Enclosure will return feedback as:

MT104-102 690-0158-003

2. [C]

This command receives the status of the card.

Command Format: **[CnUi]**

Cn = card id (n = 1 to 19)

(1-8 for MT100-101 or 1-4 for MT100-106)

Ui = unit id (i = from 0 to 9) (*refer to the MT100-100 user's guide for explanation*)

Example:

If one **MT104-102** card is in slot #2 of unit 3 with input 1 ON:

To send command **[C2U3]**, the Multi-Tasker™ Enclosure will return feedback as **[On1C2]** or **[On1ER03C2]** if there is error number 3 (see error code list).

If there is no card in slot #2 of unit 3, sending the **[C2U3]** command will not return any feedback.

ERROR CODES

ER01: CPU Error

This error indicates that the CPU is not working properly.

ER02: I²C Communication Error

This means that the communication between the **MT104-102** card and its serial device has failed.

ER03: RS485 Communication Error

This type of error is a communication error between the **MT104-102** card and the controller of the Multi-Tasker™ Enclosure.

[CiS]

This command saves card status, such as Input number connected to the output, as a default configuration of the card.

3. [ON]

This command enables one input of a single card or a group of cards.

- **[ONmCnUiS]: for a single card**

This command enables input "m" and disables all other inputs.

Default when plugged in = Input 1 is ON

m = Input number (m = 1 to 6)

Cn = Card ID No. (n = slot # from 1 to 19)
(1-8 for MT100-101 or 1-4 for MT100-106)

Ui = Unit ID number (i = 0 to 9)

S = saves command to memory

Example:

If all of the inputs on the **MT104-102** card are OFF and the card is in slot #5 of unit 3:

1) **[ON1C5U3]**: Turns ON only input 1 of the MT104-102 card.

2) **[ON3C5U3]**: Turns ON only input 3 (input 1 is now OFF).

- **[ONmGkUiS]: for a group of cards**

This command enables input "m" for each card in group "k" of unit "i".

m = card input (m = # from 1-6)

Gk = group number (k = # from 1-9)

Ui = unit number (i = # from 0-9)

S = saves command to memory

Example:

[ON1G1U1]: Turns ON input 1 for each card in group 1 of unit 1.

- **[ON...P]: sets path**

This command will set the path for the output, but it is not active until the switch command is executed ([SW]). Commands ending in "P" are not executed immediately. The path for outputs on multiple cards or the same card can be loaded.

Command Format: **[ONmCnUiP]**

m = input number (m = 1 to 6)

Cn = card ID no. (n = slot # from 1 to 19)
(1-8 for MT100-101 or 1-4 for MT100-106)

Ui = Unit ID number (i = 0 to 9)

P = path

Example:

If there are two **MT104-102** cards in slot 6 and 7 of unit 3: To enable input 1 of card 6 and input 3 of card 7 simultaneously, use the following commands:

```
[ON1C6U3P]
[ON3C7U3P]
[SW]
```

If "F" is included use the [ONmCnUiPF] command or the [ONmCnUiFP] command.

- **[ON...F]: feedback**

After processing a command, an OK or ER will be returned as feedback if "F" is included at the end of a command string or if the unit ID is zero.

Example:

```
[ON1C2U3F]: if path is not set
[ON1C2U3PF]: if path is set
```

4. [OFF]

This command disables one or all inputs of a single card or a group of cards.

- **[OFFmCnUiS]: for a single card**

This command disables input "m" or all inputs. **[OFFC5CnUi]**: Turns OFF all inputs of the MT104-102 card.

m = Input number (m = 1 to 6)
Cn = Card ID number (n = slot # from 1 to 19)
(1-8 for MT100-101 or 1-4 for MT100-106)
Ui = Unit ID number (i = 0 to 9)
S = saves command to memory

Example:

If card 5 of unit 3 has input 1 ON, the following commands can be used to turn OFF the input.

- 1) **[OFF1C5U3]**: Turns OFF only input 1.
- 2) **[OFFC5U3]**: All inputs are OFF.

- **[OFFmGkUiS]: for a group of cards**

This command disables input "m" for each card in group "k" of unit "i".

m = card input (m = # from 1-6)
Gk = group number (k = # from 1-9)
Ui = unit number (i = # from 0-9)
S = saves command to memory

Example:

1. **[OFF1G1U1]**: Turns OFF input 1 for each card in group 1 of unit 1.
2. **[OFFG1U1]**: Turns OFF all inputs for each card in group 1 of unit 1.

- **[OFF...P]: sets path**

This command will set the path for the output, but it is not active until the switch command is executed ([SW]). Commands ending in "P" are not executed immediately. The path for outputs on multiple cards or the same card can be loaded.

Command Format: [OFFmCnUiP]

m = input number (m = 1 to 6)
Cn = card ID no. (n = slot # from 1 to 19)
(1-8 for MT100-101 or 1-4 for MT100-106)
Ui = unit number (i = # from 0-9)
P = path

Example:

If there are two **MT104-102** cards in slot 6 and 7 of unit 3: To enable input 1 of card 6 and input 3 of card 7 simultaneously, use the following commands:

```
[OFF1C6U3P]
[OFF3C7U3P]
[SW]
```

If "F" is included use the [OFFmCnUiPF] command or the [OFFmCnUiFP] command.

- **[OFF...F]: feedback**

After processing a command, an OK or ER will be returned as feedback if "F" is included at the end of a command string or if the unit ID is zero.

Example:

```
[OFF1C2U3F]: if path is not set
[OFF1C2U3PF]: if path is set
```

5. [SW]

The switch command immediately connects inputs and outputs, which were previously set with the path command on this card and all other cards in the MT100-100.

Example:

```
[ON1C6U3P]
[ON3C7U3P]
```

[SW]

The system will return feedback as OK if the unit ID is zero.

6. [WR]

This command groups multiple cards in the MT100-100 Enclosure. Each unit contains a maximum of nine groups.

Command Format: [WRCn...GkUi]

n = card ID No. (n = slot # from 1 to 19)
(1-8 for MT100-101 or 1-4 for MT100-106)

k = group number (k = # from 1-9)

i = unit number (i = # from 0-9)

Example:

To group card #1, 2, and 3 as group 5 of unit #1, send the [WRC1C2C3G5U1] command. After executing this command, cards 1, 2, and 3 of unit 1 will be grouped together as group 5.

7. [CLR]

This command clears the members for a single group or for all nine groups.

Command Format: [CLRGkUi]

k = group number (k = # from 1-9)

i = unit number (i = # from 0-9)

Example:

a) To clear group #1, send the [CLRG1U1] command. This command clears the members for the specified group only.

b) To clear all groups of unit 1, send the [CLR G*U1] command.

8. [G]

This command is used to request group data. With the command, the user can identify which input or output of a particular group is on. Command Format: [GkUi]

k = group number (k = # from 1-9)

i = unit number (i = # from 0-9)

Example:

If group 1 has DA Cards with output 1 and 2 on, while group 2 has SW Cards with input 2 on:

[G1]: will return feedback as [On12G1].

[G2]: will return feedback as [On2G2].

9. [RD]

This command displays the members in each group. Command Format: [RDGkUi]

k = group number (k = # from 1-9)

i = unit number (i = # from 0-9)

member = C1 - C19 (card 1 to 19)
(1-8 for MT100-101 or 1-4 for MT100-106)

Example:

To read member data for group 1 of unit 1, send the [RD] command. The system will return feedback as C1C2C3 G5U1.

10. [SIGCi]

This command checks if signal on input is present. Command format [SIGCi]

Example:

If MT 104-102 is in slot#4. Feedback for command [SIGC4] -0, it means that signal on input1 is not presents.

11. [HELP]

This command displays available for RS-232 control commands.

7.3. SUMMARY OF COMMANDS

- 1) [VER]: Receives software version
- 2) [C]: Receives status of the card
- 3) [ON]: Turns on one input for a single card or a group of cards
- 4) [OFF]: Turns off one input for a single card or a group of cards
- 5) [SW]: Switch (activates the preset path)
- 6) [WR]: Groups multiple cards
- 7) [CLR]: Clears a single group or multiple groups
- 8) [G]: Requests group data
- 9) [RD]: Displays the members in each group
- 10) [SIG]: Checks if signal presents.
- 11) [HELP]: Display commands.

TROUBLESHOOTING GUIDE 8

We have carefully tested and have found no problems in the supplied **MT104-102**; however, we would like to offer suggestions for the following:

8.1 LED IS NOT LIT

- Cause 1: Card cage is not plugged in.
Solution: Plug card cage in. If the LED lights, the problem is solved. If the LED is still not lit, see Cause 2.
- Cause 2: Card is not plugged in all the way.
Solution: Push the card in all the way. If the LED is still not lit, see Cause 3.
- Cause 3: Card cage slot has a problem.
Solution 1: Test the card in other slots of the card cage. If the slot was damaged, the card may work in other slots. If other slots work and the LED lights, the problem is the card cage slot. The card cage may require service. Call ALTINEX at (714) 990-2300. If the other slots do not work and the LED is still not lit, see Solution 2.
Solution 2: Take any other known good card with an LED and verify that the slot used is good by seeing if the other card's LED lights in that slot. If it lights, then the original card may be the source of the problem. Call ALTINEX at (714) 990-2300.

8.2 LED IS BLINKING RED

If the LED on the card is blinking red, find the error code. For example, if you are using card 5 of unit 1, send the **[C5U1]** command to see the status and error code. Note that card 5 refers to slot 5.

- Cause 1: The CPU on the card is not working properly. If the CPU is not working, you will receive an ER01 message. The system will return feedback as **[On1 ER01 C05]** when using card 5 of unit 1. ER01 Code: CPU error

Solution 1: Look at the card and verify that there is no damage. If there is no damage, see Solution 2.

Solution 2: Verify that all IC's are seated in their sockets. If the LED is still blinking red, see Solution 3.

Solution 3: Call ALTINEX at (714) 990-2300.

Cause 2: The MT104-102 card and its serial device are not communicating. If there is no communication between the MT104-102 card and its serial device, you will receive an ER02 message. The system will return feedback as [On1 ER02 C05] when using card 5 of unit 1. ER02 Code: Communication error between the MT104-102 **card and its serial device.**

Solution 1: Turn the system OFF and then ON again. If there is still an error message, see Solution 2.

Solution 2: Call ALTINEX at (714) 990-2300.

Cause 3: RS485 communication error

If there is an RS485 communication error, you will receive an ER03 message. The system will return feedback as [On1 **ER03 C05**] when using card 5 of unit 1. ER03 Code: RS485

communication error

Solution 1: Make sure that the card is pushed all the way into the slot. If there is still an ER04 message, see Solution 2.

Solution 2: Turn the system OFF and then ON again. If there is still an error message, see Solution 3.

Solution 3: If there is still a problem, call ALTINEX at (714) 990-2300.

8.3 NO DISPLAY

Cause 1: The source has a problem.

Solution: Check the source and make sure that there is a signal present and all

source connections are correct. If the source is working and there is still no display, see Cause 2.

Cause 2: The card input is not selected.

Solution: Select the card input. See RS-232 accessible commands in section 7. If no display is present, see Cause 3.

Cause 3: Cable connections to the destination are incorrect.

Solution: Make sure that cables are connected properly. Also, make sure that the continuity and wiring are good. If there is still no display present, see Cause 4.

Cause 4: The display has a problem.

Solution: Make sure that the display is powered. If there is still no display, call ALTINEX at (714) 990-2300.

ALTINEX POLICY

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9.1 LIMITED WARRANTY

See Altinex Inc. web site for complete details.

9.2 RETURN POLICY

See Altinex web site for complete details.

9.3 CONTACT INFORMATION

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