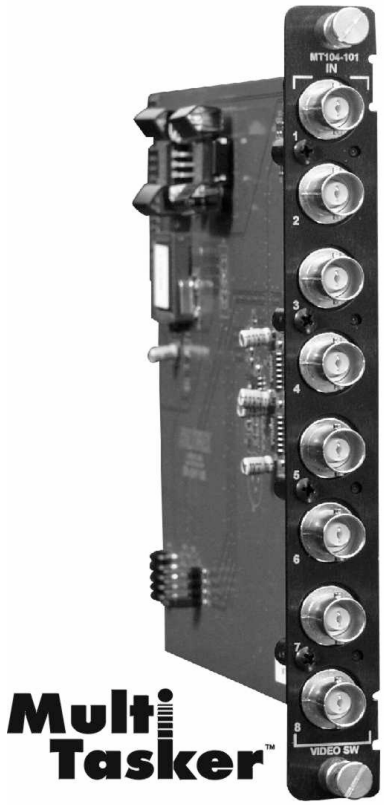

MANUAL PART NUMBER: 400-0083-003

MT104-101

8-IN VIDEO SWITCHER EXPANSION CARD FOR MULTI-TASKER™ ENCLOSURES USER'S GUIDE

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PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT104-101**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT104-101** 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 **MT104-101** 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 **MT104-101** carefully. Dropping or jarring can damage the card.
- Do not pull the cables that are attached to the **MT104-101**.
- Insert the card carefully into the slots of the Multi-Tasker™ without bending any edges.
- When removing a card, please make sure that the 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.

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ABOUT YOUR MULTI-TASKER™ 2

MT104-101
8-in BNC Switcher Expansion Card

The **MT104-101** is an 8-in Video Switcher Expansion Card designed for use together with the **MT104-100** or **MT104-103** in a Multi-Tasker™ enclosure. When installed, this card expands the total number of video inputs by 8. For example, one **MT104-101** used together with one **MT104-100** provides a total of 14 video inputs. Two **MT104-101** cards used with the **MT104-100** provide a total of 22 video inputs. The connection between the **MT104-100** and **MT104-101** is made via an internal cable.

Different signal types can be realized through multiple expansion cards. For example, two **MT104-101** cards with two **MT104-100** cards can be used to handle the two components of an S-Video signal (Chroma and Luma), three to handle Component Video, and five to handle RGBHV.

The video bandwidth the **MT104-101** card is 350 MHz, enabling it to pass high-resolution computer video signals up to QXGA resolution. 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™, as is the “on-off” controllable output. Also available through ASCII control is “on-off” output control. By special order only, you can have VIS (Vertical Interval Switching) capability added. This is a feature that eliminates the "glitch" normally associated with composite video switching.

TECHNICAL SPECIFICATION 3

FEATURES/DESCRIPTION	MT104-101
GENERAL	
Inputs	8
Input Connector	8 BNC Female
Outputs	1
Output Connector	(Internal) 10-pin IDC
Capability	
Using 1 Card	Composite Video (NTSC, PAL, SECAM)

Table 1. **MT104-101** General

MECHANICAL	MT104-101
Enclosure Slots Required	One
Weight	1.0 lb (0.45 kg)
Connector Panel	Black
T° Operating	10°C-35°C
T° Maximum	50°C
Humidity	90% non-condensing
MTBF (calc.)	40,000 hrs

Table 2. **MT104-101** Mechanical

ELECTRICAL	MT104-101		
Input Signals			
Analog	1.5V p-p max.		
Impedance	75 Ohms		
Output Signal			
Gain	1.05		
Impedance	75 Ohms		
Frequency Compatibility			
Typical Bandwidth	350 MHz		
Power			
Power from MT100-100	**+6V**	**-6V**	**Power Consumption**
MT104-101	100 mA	80 mA	1.1 watts
Optional Accessories			
MS8102CA	6ft., 15-pin HD Male to 5 BNC Male		
MS8112CA	6ft., 15-pin HD Female to 5 BNC Male		

Table 3. **MT104-101** Electrical

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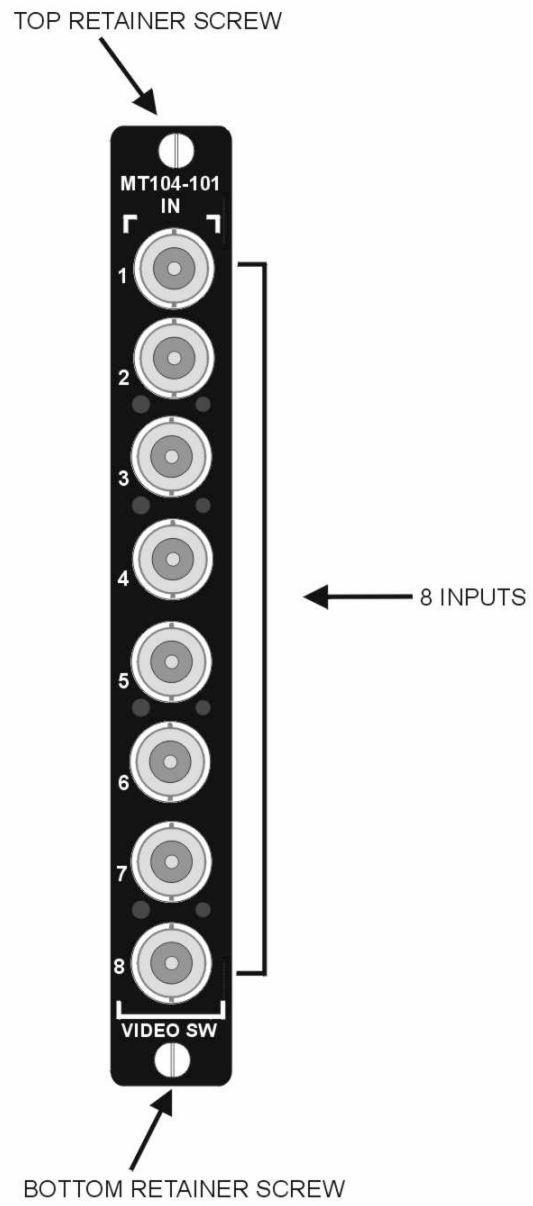
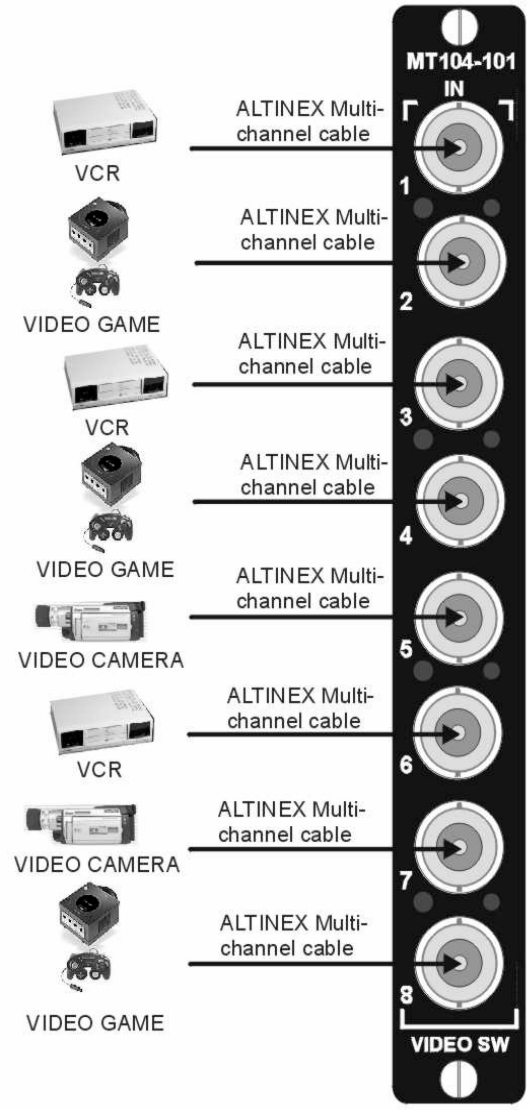
PRODUCT DESCRIPTION 4



APPLICATION DIAGRAM 5

Application Diagram 1



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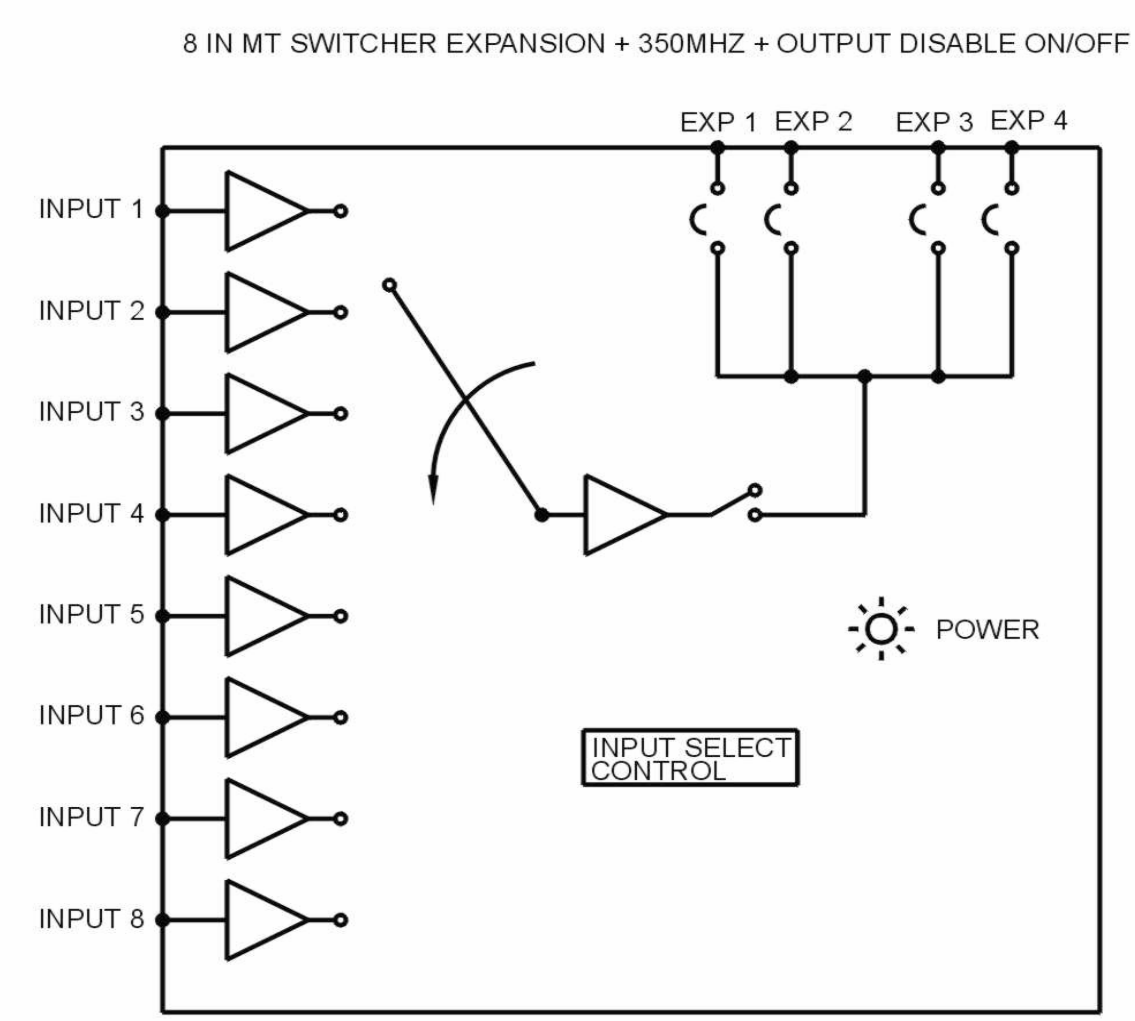
Application Diagram 2: Internal View of the MT104-101 Card



INSTALLING YOUR MULTI-TASKER™ 6

Step 1. Locate the MT104-100 to which the internal output cable from the **MT104-101** will be connected. Connect the 10-pin jumper of the MT104-100 to the 10-pin jumper located on the **MT104-101** using a 10-pin IDC cable.

Step 2. Slide the (previously connected) MT104-100 and the **MT104-101** into available slots in the Multi-Tasker™ Enclosure. Make sure that the **MT104-101** and the MT104-100 fit into place. Secure the cards to the Multi-Tasker™ by tightening the retainer screws located on the top and bottom of each card.

Step 3. Connect an output cable from the video source to the input connector of the **MT104-101**. Connect the output connector of the MT104-100 to the display devices through an input cable.

Step 4. Starting from the left, count the slot number of the MT100-100 where the **MT104-101** 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 **MT104-101** 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 **MT104-101** are in a simple ASCII character format.

1.	**Square brackets "[ ]" are part of the command.**
2.	**Use uppercase letters for all commands.**
3.	**Commands may be executed with or without a space.**

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.

7.2 DESCRIPTION OF COMMANDS

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

Example:

[ON1C3U2]
ON1 = 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 **MT104-101** card.

Command Format: [VERCnUi]

Cn = card ID number (n = # from 1 to 19)
(1-8 for MT100-101 or 1-2 for MT100-102)
Ui = Unit ID (i = # from 0 to 9) (*refer to the MT100-100 user's guide for explanation)*

Example:

If one **MT104-101** card is in slot #2 of unit 3:

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To send command **[VERC2U3]**, the Multi-Tasker™ Enclosure will return:
[**Ver A1 EXP-SW C02]**

A1 = software version
EXP-SW = card type: **MT104-101**
C02 = Card ID # 2 (slot 2)

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 1-2 for MT100-102)
Ui = unit id (i = from 0 to 9) (*refer to the MT100-100 user's guide for explanation)*

Example:

If one **MT104-101** card is in slot #2 of unit 3 with input 1 ON:

To send command **[C2U3]**, the Multi-Tasker™ Enclosure will return feedback as [**On1 C02]** or [**On1 ER03 C02]** 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 **MT104-101** card and its serial device has failed.

ER03: RS485 Communication Error

This type of error is a communication error between the **MT104-101** card and the controller of the Multi-Tasker™ Enclosure.

3. [ON]

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

- **[ONmCnUi]: 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 8)
n = Card ID No. (n = slot # from 1 to 19)
(1-8 for MT100-101 or 1-2 for MT100-102)
i = Unit ID number (i = 0 to 9)

Example:

If all of the inputs on the **MT104-101** card are OFF and the card is in slot #5 of unit 3:

1) **[ON1C5U3]:** Turns ON only input 1 of the **MT104-101** card.
2) **[ON3C5U3]:** Turns ON only input 3 (input 1 is now OFF).

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

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

m = card input (m = # from 1-8)
k = group number (k = # from 1-9)
i = unit number (i = # from 0-9)

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 8)
n = card ID no. (n = slot # from 1 to 19)
(1-8 for MT100-101 or 1-2 for MT100-102)
P = path

Example:

If there are two **MT104-101** 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:

[ON1C6U3**P**]
[ON3C7U3**P**]
[SW]

If "F" is included use the [ONmCnUi**PF**] command or the [ONmCnUi**FP**] 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:

[ON1C2U3**F**]: if path is not set
[ON1C2U3**PF**]: if path is set

4. [OFF]

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

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

  This command disables input “m” or all inputs.

  [OFFC5CnUi]: Turns OFF all inputs of the **MT104-101** card.

  m = Input number (m = 1 to 8)
  n = Card ID number (n = slot # from 1 to 19)
  (1-8 for MT100-101 or 1-2 for MT100-102)
  i = Unit ID number (i = 0 to 9)

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.

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

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

  m = card input (m = # from 1-8)
  k = group number (k = # from 1-9)
  i = unit number (i = # from 0-9)

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 8)
  n = card ID no. (n = slot # from 1 to 19)
  (1-8 for MT100-101 or 1-2 for MT100-102)
  P = path

Example:

If there are two **MT104-101** 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:

[OFF1C6U3**P**]
[OFF3C7U3**P**]
[SW]

If "F" is included use the [OFFmCnUi**PF**] command or the [OFFmCnUi**FP**] 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:

[OFF1C2U3**F**]: if path is not set
[OFF1C2U3**PF**]: if path is set

5. [SW] – Switch

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 1-2 for MT100-102)
k = group number (k = # from 1-9)
i = unit number (i = # from 0-9)

Example:

To group card #1, 2 and 19 of group 5 and unit #1, send the [WRC1C2C19G5U1] command. After executing this command, card 1, 2 and 19 of group 5 and unit 1 will be grouped together.

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.

7. [CLR]

This command clears a single group or 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 [CLRG*U1] command.

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.

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 SW Cards with input 2 on, while group 2 has DA Cards with output 1, 2 and 3 on:

1) **[G1]:** will return feedback as **[On2G1].**
2) **[G2]:** will return feedback as **[On123G2].**

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 1-2 for MT100-102)

Example:

To read member data for group 5 of unit 1, send the [RDG5U1] command. The system will return feedback as C1C2C19 G5U1.

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

TROUBLESHOOTING GUIDE 8

We have carefully tested and have found no problems in the supplied **MT104-101**; however, we would like to offer suggestions for the following:

- **8.1 ERROR MESSAGE**
- **8.2 NO DISPLAY**

8.1 ERROR MESSAGE

If there is an error message, 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.

A) 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 there is still an ER01 message, see Solution 3.

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

B) Cause 2: The MT104-101 and its serial device are not communicating.

- If there is no communication between the **MT104-101** 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 **MT104-101** card and its serial device.

Solution 1: Turn the system OFF and then ON again. If there is still an error message, see Solution 3.

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

C) 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 ER03 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.

8.2 NO DISPLAY

A) 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.

B) 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.

C) 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.

D) 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 9

9.1 LIMITED WARRANTY

ALTINEX warrants that its products and cables are free from defects in materials under normal use and service. This warranty is limited to repairing at company's factory any part or parts of the product, which upon company's examination shall disclose to be, thus defective. Products considered defective should be returned to company with transportation charges pre-paid within 2 years (90 days for cables) from date of shipment to the purchaser. The warranty is expressly instead of all other warranties expressed or implied. ALTINEX neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of the products. This warranty shall not apply to any product that shall have been repaired or altered outside of company's factory in any way so as, in its judgment, to affect its stability or reliability, or that has been subject to misuse, negligence or accident.

9.2 RETURN POLICY

It is very important to ALTINEX that you receive the products that you have ordered and that this product fulfills your need. In the unlikely event, that an ALTINEX product needs to be returned please follow the policies below:
ALTINEX will accept product returns for a period of 30 days from authorized ALTINEX dealers. Products must be returned in an unopened package.
If a product has been opened, the restocking fees will apply. For the restocking fee amount, please contact an ALTINEX Sales Representative.
If the product is in your possession for more than 30 days, the restocking fees will apply.
ALTINEX will not accept any returns on cables or custom products.
If your product is in warranty and needs service, contact the ALTINEX Sales Department for an RMA (Return Material Authorization). Products returned without an RMA number may experience a delay in service.
If your product is out of warranty and needs service, contact the ALTINEX Sales Department for an RMA (Return Material Authorization). Products returned without an RMA number may experience a delay in service. The service charges will be quoted to you before the actual repairs are done.

9.3 CONTACT INFORMATION

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