



**Multi  
Tasker™**

MANUAL PART NUMBER: 400-0197-004

**MT110-101/103**

**8 X 8 MONO AUDIO MATRIX SWITCHER**

**CARD FOR MULTI-TASKER™**

**USER'S GUIDE**

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## PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT110-101/103**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT110-101/103** 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 **MT110-101/103** 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 **MT110-101/103** carefully. Dropping or jarring can damage the card.
- Do not pull the cables that are attached to the **MT110-101/103**.
- 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.

## ABOUT YOUR MT110-101/103 2

### MT110-101/103 8-in 8-out Mono Audio Matrix Switcher Card

The **MT110-101/103** is a Balanced Audio Matrix Switching Card designed for use with the Multi-Tasker™ system. When installed in a Multi-Tasker™, this card allows any input to be independently switched to any of the outputs. All inputs and outputs can be wired for unbalanced or balanced audio, allowing longer cable runs and superior noise resistance.

The **MT110-101** is an 8x8 audio matrix with fixed gain of 0db. The **MT110-103** is an 8x8 audio matrix with variable gain for each input.

As “transparent” distribution amplifiers, these cards utilize AC coupling on their inputs for ideal signal transfer characteristics. Switching is controlled with easy-to-use ASCII commands from a control system or computer connected to the RS-232 port of a Multi-Tasker™ enclosure. Each card consumes two slots in a Multi-Tasker enclosure, and all input and output connections are accomplished via captive screw terminal blocks.

Although designated as an 8x8 matrix switcher, the **MT110-101/103** can be used in a variety of ways to provide different capabilities. For example, one 8x8 card can handle mono audio while two 8x8 cards handle stereo audio, or a single 8x8 card can be used to create an 4x4 stereo audio matrix.

## TECHNICAL SPECIFICATIONS 3

FEATURES/DESCRIPTION	MT110-101/103
<b>GENERAL</b>	
<b>Inputs</b>	
Input Connectors	(4) 5-pin Terminal Blocks
<b>Outputs</b>	
Output Connectors	(4) 5-pin Terminal Blocks
<b>Compatibility</b>	Stereo or Mono Audio

Table 1. **MT110-101/103** General

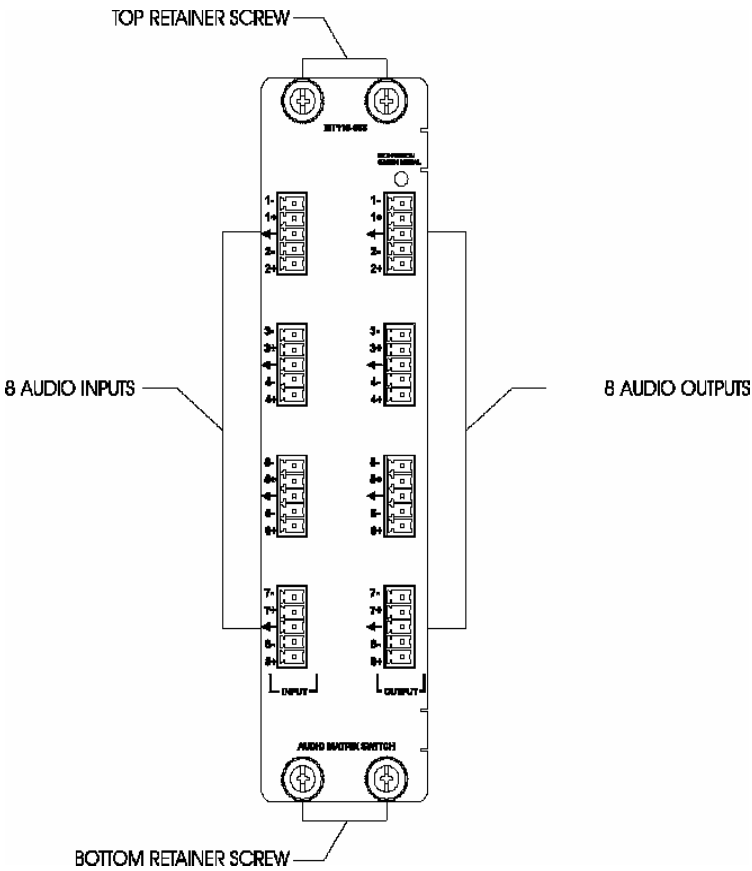
MECHANICAL	MT110-101/103
Basic Enclosure Slots Required	Two
Weight	1.0 lb (0.45 kg)
Connector Panel	Black
T° Operating	10°C-35°C
T° Maximum	0 to 50°C
Humidity	90% non-condensing
MTBF (calc.)	40,000 hrs

Table 2. **MT110-101/103** Mechanical

ELECTRICAL	MT110-101/103		
<b>Input Signals</b>			
Max Level	0 dBu		
Impedance	10k Ohms		
<b>Audio Throughput</b>			
Gain	0 dB unbalanced, 6dB balanced		
Frequency Response	10 Hz to 20 kHz (+/- 0.05 dB)		
Noise Floor	-100 dB @ 20 kHz		
CMRR	>80 dB, 10 Hz to 20 kHz		
<b>Output Signals</b>			
Level	1V p-p		
Impedance	Low – drives 600 Ohms		
Gain	0 dB		
<b>Power</b>			
Power from MT100-100	<b>+6V</b>	<b>-6V</b>	<b>Power Consumption</b>
MT110-101/103	135mA	110mA	1.5 watts

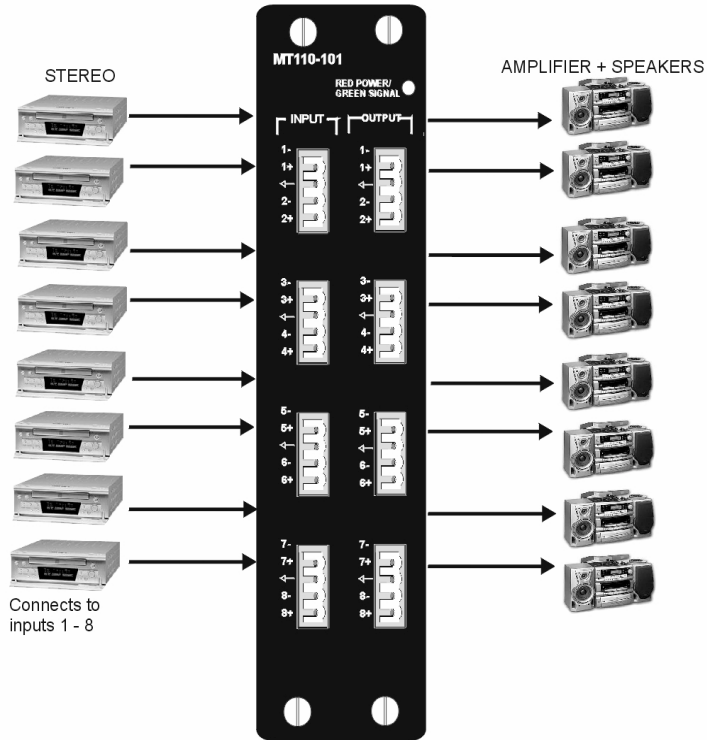
Table 3. **MT110-101/103** Electrical

DESCRIPTION OF MT110-101/103 4

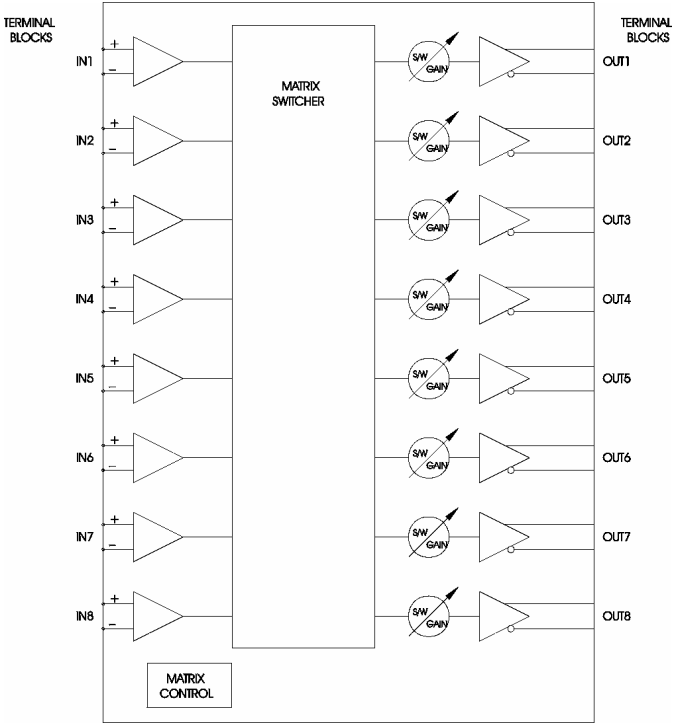


APPLICATION DIAGRAM 5

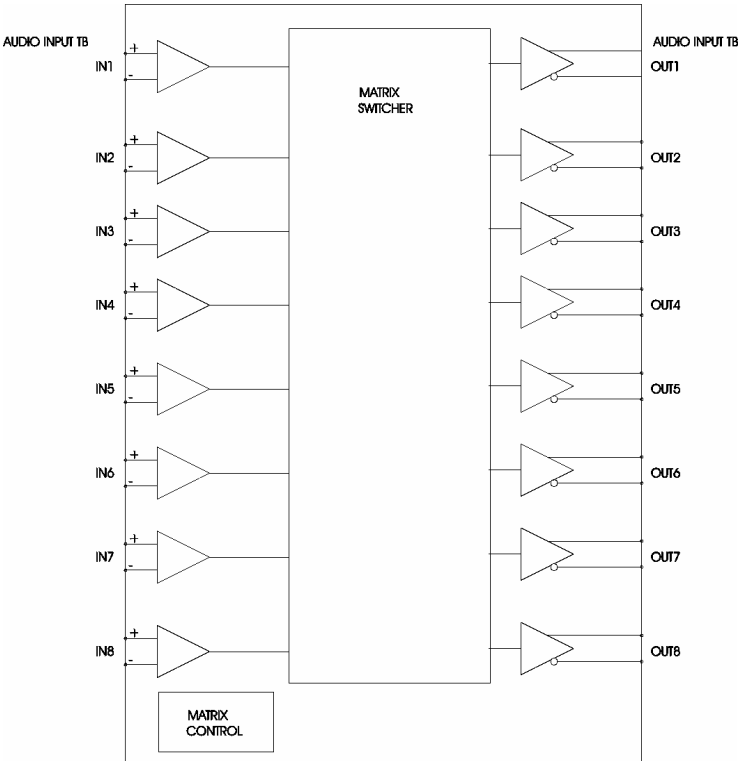
Application 1



**Application 2: Internal View of MT110-103**



**Application 2: Internal View of MT110-101**



## INSTALLING YOUR MT110-101/103 6

- Step 1.** Slide the **MT110-101/103** into an available slot in the Multi-Tasker™ Basic Enclosure in order to connect to the bus. Make sure that the **MT110-101/103** card fits into place. Secure the card to the Multi-Tasker™ by tightening the retainer screws located on the top and bottom of the **MT110-101/103** card.
- Step 2.** The LED on the card panel will turn red indicating that the card is in full operation. 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 audio cables from the audio source to the input connector of the **MT110-101/103**. Connect the output connectors of the **MT110-101/103** to the audio equipment through an audio cable.
- Step 4.** Starting from the left, identify the slot number where the **MT110-101/103** 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 **MT110-101/103** 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 **MT110-101/103** 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.

### 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 detailed information regarding function, see each command description.

Card ID is an assigned value from 1 to 19, 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 **MT110-101/103** card.

Command Format: [VERCnUi]

Cn = card ID number (n = # from 1 to 19)

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

### Example:

If one **MT110-101** card is in slot #2 of unit 3:

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

MT110-101 690-0152-004

## 2. [C]

This command receives the status of the card.

Command Format: [CnUi]

Cn = card id (n = 1 to 19)

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

### Example:

If one **MT110-101/103** card is in slot #2 of unit 3 with output 1, 2 & 3 ON:

When sending command [C2U3], feedback will be returned as:

Config. 8x8 offset: IN=0 OUT=0

In1 Out1 ON

In3 Out2 ON

In6 Out3 ON

In2 Out4 OFF

In4 Out5 OFF

In5 Out6 OFF

In7 Out7 OFF

In8 Out8 OFF

### Description of Feedback:

Input1 is connected to Output1 and Output1 is enabled

Input3 is connected to Output2 and Output2 is enabled

Input6 is connected to Output3 and Output3 is enabled

Input2 is connected to Output4 and Output4 is disabled

Input4 is connected to Output5 and Output5 is disabled

Input5 is connected to Output6 and Output6 is disabled

Input7 is connected to Output7 and Output7 is disabled

Input8 is connected to Output8 and Output8 is disabled

Note: 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: I<sup>2</sup>C Communication Error

This means that the communication between the **MT110-101/103** card and its serial device has failed.

### ER03: RS485 Communication Error

This type of error is a communication error between the **MT110-101/103** card and the controller of the Multi-Tasker™ Enclosure.

## 3. [CiS]

This command is to save card status such as ON/OFF, IN/OUT, and volume control.

## 4. [IO]

This command will connect input x with output y, but the user needs to use the [ON] command to enable this output.

Command Format: [IxOyCnUi]

Ix: select input x, x is from 1 to 8

Oy: connect to output y, y is from 1 to 8

Cn: card ID number, n is from 1 to 19

Ui: unit ID, i is from 0 to 9. (*Refer to MT100-100 user's guide to set Unit ID*).

### Example:

To connect input 4 to output 2 (card 2 of unit 3), use the [I4O2C2U3] command.

### [ImO\*Ci]

Connect Input m to all Outputs

## 5. [OSImCi]

This command is set Input offset



m -from 0 to 128.

## 6. [OSOnCi]

This command is set Output offset

n - from 0 to 128

## 7. [ON]

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

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

This command enables output "m" without affecting any other outputs.

Default when plugged in = ALL OFF

m = Output number (m = 1 to 8)

n = Card ID number (n = 1 to 19)

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

### Example:

- 1) **[ON12C5U3]:** Turns ON only output 1 and 2 of the **MT110-101/103** card located in slot #5 of the MT100-100 Enclosure with unit ID3.
- 2) **[ON3C5U3]:** Turns ON only output 3 of the **MT110-101/103** card located in slot #5 of the MT100-100 Enclosure with unit ID3. After the **[ON12C5U3]** and **[ON3C5U3]** commands have been executed, output 1, 2 and 3 will be ON.
- 3) **[ONC5U3]:** Turns ON all outputs of the card.

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

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

m = card output (m = # from 1-8)

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

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

### Example:

1. **[ON1G5U1]:** Turns ON output 1 for each card in group 5 of unit 1.
2. **[ONG5U1]:** Turns ON all outputs for each card in group 5 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 = output number (m =1 to 8)

n = card ID No. (n = a slot # from 1 to 19)

P = path

### Example:

If 2 cards are at slot 6 and 7 of unit 3:

To enable output 1 and 2 of card 6 and output 3 and 4 of card 7 simultaneously, use the following commands:

[ON12C6U3P]

[ON34C7U3P]

[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

## 8. [OFF]

This command disables one or more outputs of a single card or a group of cards.

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

This command disables output "m" without affecting any other outputs.

m = output number (m = 1 to 8)

n = card ID No. (n = slot # from 1 to 19)

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

**[OFFCnUi]:** Turns OFF all outputs of the card

### Example:

- 1) If card 5 of unit 3 has output 1, 2 and 3 ON:
  - a) **[OFF1C5U3]:** Turns OFF output 1 while

output 2 and 3 remain ON.

b) **[OFF23C5]**: Turns OFF output 2 and 3.

2) If card 5 of unit 3 has output 1, 2, 3, 4, 5, 6, 7 and 8 ON:

a) **[OFFC5U3]**: Turns OFF all outputs, which is equivalent to **[OFF12345678C5U3]**.

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

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

Command Format: **[OFFmCnUiP]**

m = card output (m = # from 1-8)

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

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

**Example:**

1. **[OFF1G5U1]**: Turns OFF output 1 for each card in group 5 of unit 1.

2. **[OFFG5U1]**: Turns OFF all outputs for each card in group 5 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 = number (m =1 to 8)

n = card ID No. (n = a slot # from 1 to 19)

P = path

**Example:**

If 2 cards are at slot 6 and 7 of unit 3:

To enable output 1 and 2 of card 6 and output 3 and 4 of card 7 simultaneously, use the following commands:

**[OFF12C6U3P]**

**[OFF34C7U3P]**

**[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

## 9. **[SW]** – Switch

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

**Example:**

**[ON12C6U3P]**

**[ON34C7U3P]**

**[SW]**

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

## 10. **[SIGCi]**

This command checks if signal is present.

**Example:**

If signal on IN1 for the **MT110-101/103** in slot 4 after sending command string **[SIGC4]** received feedback will be 1.

## 11. **[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)

## 12. **[VOLnAkCi]**

This command sets volume for each input in the MT110-103 only.

n = output number (n = # from 1-8)

k = gain level (k=1 to 16)

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

## 13. **[SELMcN]**

This command sets path to adjust the individual volume level for single card. Command Format: [SELMn] [-] [-] [-] [-] or [+] [+] [+] [+]

m = Input number (m = 1 to 8)

n = Card ID number (n = slot # from 1 to 19)

+ = increases volume.(maximum of 15 levels for audio).

- = decreases volume.(maximum of 15 levels for audio).

## 14. [MATmXnCi]

This command allows changes in the configuration of the matrix. User can configure the MT110-101 and MT110-103 Audio Matrix Switcher as 8x8, 4x4, or 2x2.

8x8

Input	Output
O1a	O1a
O2a	O2b
O3a	O3b
O4a	O4b
O5a	O5b
O6a	O6b
O7a	O7b
O8a	O8b

4x4

Input	Output
O1a	O1a
O1b	O1b
O2a	O2a
O2b	O2b
O3a	O3a
O3b	O3b
O4a	O4a
O4b	O4b

2x2

Input	Output
O1a	O1a
O1b	O1b

O1c	O1c
O1d	O1d
O2a	O2a
O2b	O2b
O2c	O2c
O2d	O2d

## 15. [HELPCi]

This command displays all available for user Multi-Tasker interface commands.

### 7.3. SUMMARY OF COMMANDS

- 1) [VER]: Receives software version
- 2) [C]: Receives status of the card
- 3) [CiS]: Save card status
- 4) [IO]: Connects the input to the output
- 5) [OSI]: Set input offset
- 6) [OSO]: Set output offset
- 7) [ON]: Turns on one input for a single card or a group of cards
- 8) [OFF]: Turns off one or more inputs for a single card or a group of cards
- 9) [SW]: Switch (outputs the preloaded buffer)
- 10) [SIG]: Checks if signal present
- 11) [CLR]: Clears members of a single group or all groups
- 12) [VOL]: Sets volume
- 13) [SEL]: Select input to adjust volume
- 14) [MATmXnCi]: Change configuration of matrix.
- 15) [HELPCi]: Display commands.

## TROUBLESHOOTING GUIDE 8

We have carefully tested and have found no problems in the supplied **MT110-101/103**; however, we would like to offer suggestions for the following:

- 8.1 LED IS NOT LIT

- 8.2 LED IS BLINKING RED
- 8.3 NO SOUND
- 8.4 SOUND DISTORTION
- 8.5 SOUND LEVEL IS LOW

## 8.1 LED IS NOT LIT

### A) 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.

### B) 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.

### C) 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.

### 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 the LED is still blinking red, see Solution 3.

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

### B) Cause 2: The MT110-101/103 card and its serial device are not communicating.

- If there is no communication between the **MT110-101/103** 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 **MT110-101/103** 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.

## 8.3 NO SOUND

### A) Cause 1: The source has a problem.

*Solution:* Check the source and make sure that it is working at an appropriate volume level and all source connections are correct. If the source is working and there is still no sound, see Cause 2.

### B) Cause 2: The proper card input may not be selected.

*Solution:* Select the card input that is used, by RS-232 accessible commands in section 7. If no sound 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 sound present, see Cause 4.

**D) Cause 4: The destination amplifier has a problem.**

*Solution 1:* Make sure that the destination amplifier is powered. If there is still no sound, see Solution 2

*Solution 2:* Set the volume of the destination amplifier to a reasonable level. If there is still no sound, call ALTINEX at (714) 990-2300.

## 8.4 SOUND DISTORTION

**A) Cause 1: The source level is above 1V p-p.**

*Solution:* Make sure that the source level is below 1V p-p. If the sound is still distorted, see Cause 2.

**B) Cause 2: The destination amplifier provides excessive amplification.**

*Solution 1:* Make sure that the source signal level is high enough so that the destination amplifier does not have to provide excessive amplification and thereby distort the signal. If there is still sound distortion, see Solution 2.

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

## 8.5 SOUND LEVEL IS LOW

**A) Cause 1: The volume levels are inappropriate.**

*Solution 1:* Turn up the source volume. If

sound level is still low, see Solution 2.

*Solution 2:* Turn up the destination amplifier volume. If the sound level is still low, see Cause 2.

**B) Cause 2: Poor signal transmission.**

*Solution:* Check the cables for continuity and make sure that connections are wired properly to verify that there is good signal transmission.

**Note:** Test the system by removing **MT110-101** card from between the source and the destination amplifier. If problem persists, call ALTINEX at (714) 990-2300.

## ALTINEX POLICY

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### 9.1 LIMITED WARRANTY

Please refer to Altinex web site for details on product warranty.

### 9.2 RETURN POLICY

Please refer to Altinex web site for details on return policy.

### 9.3 CONTACT INFORMATION

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