

MANUAL PART NUMBER: 400-0132-005

## MT110-100/102

# 16-IN, 8-OUT AUDIO MATRIX SWITCHER CARD FOR MULTITASKER™ USER'S GUIDE

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## PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT110-100/102**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT110-100/102** 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 **MT110-100/102** 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 **MT110-100/102** carefully. Dropping or jarring can damage the card.
- Do not pull the cables that are attached to the **MT110-100/102**.
- Insert the card carefully into the slots of the Multi-Tasker™ without bending any edges.

### 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 their 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 MT110-100/102 2

### MT110-100/102

#### 16-In 8-Out Audio Matrix Switcher Card

The **MT110-100** and **MT110-102** are balanced input Audio Matrix Switching Cards. Each 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.

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 MultiTasker™ enclosure. Each card consumes two slots in a MultiTasker™ enclosure, and all input and output connections are accomplished via captive screw terminal blocks.

Although designated as a 16x8 matrix switcher, the **MT110-100/102** can be used in a variety of ways to provide different capabilities. For example, one 16x8 card can handle mono audio while two 16x8 cards handle stereo audio, or a single 16x8 card can be used to create an 8x4 stereo audio matrix. Similarly, a single 16x8 card can be used to provide two 4x2 stereo audio matrix switchers. The **MT110-100** is a standard matrix switcher, whereas the **MT110-102** has individual volume trim control on each output.

The HelpInside™ feature allows programmers to have access to command structures and control of the **MT110-100/102** from any terminal using the [HELP] command. In conjunction with Altinex's unique command structure, HelpInside™ provides easier-than-ever control of MultiTasker™ cards with simple keyboard commands. No typing of long keyboard strings is necessary.

## TECHNICAL SPECIFICATIONS 3

FEATURES/DESCRIPTION	MT110-100/102
<b>GENERAL</b>	
<b>Inputs</b>	
Input Connectors	(8) 5-pin Terminal Blocks
<b>Outputs</b>	
Output Connectors	(4) 5-pin Terminal Blocks
<b>Compatibility</b>	Stereo or Mono Audio

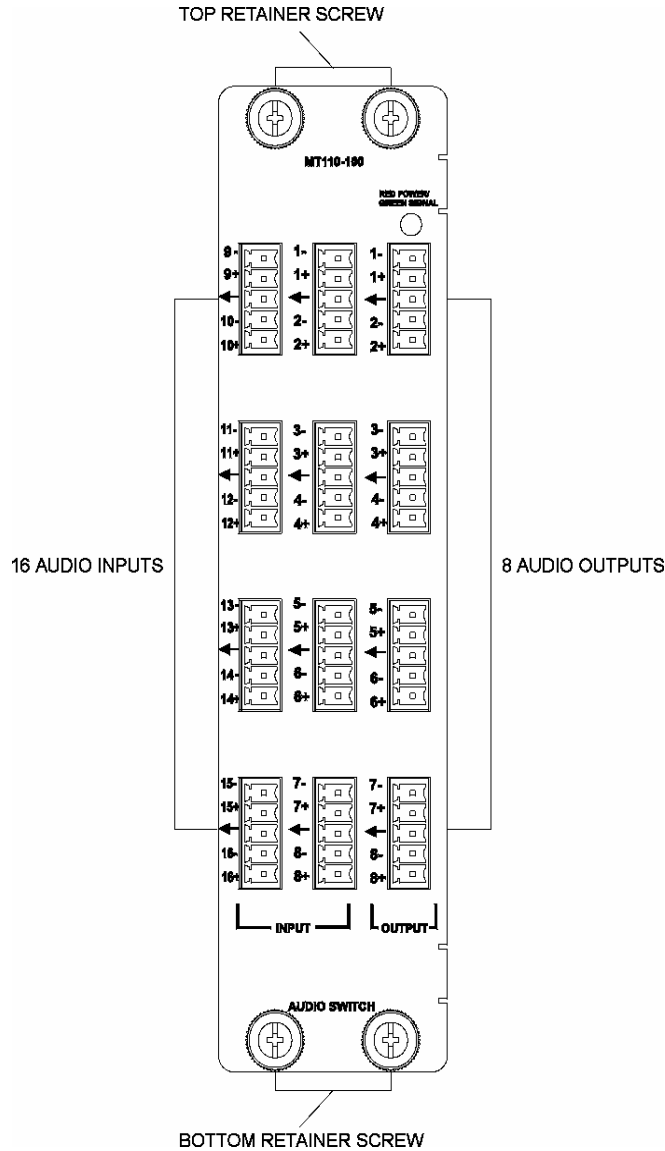
Table 1. **MT110-100/102** General

MECHANICAL	MT110-100/102
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. **MT110-100/102** Mechanical

ELECTRICAL	MT110-100/102
<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 (from MT100-100)</b>	
+6V	160mA
-6V	125mA
Total	1.7 Watts

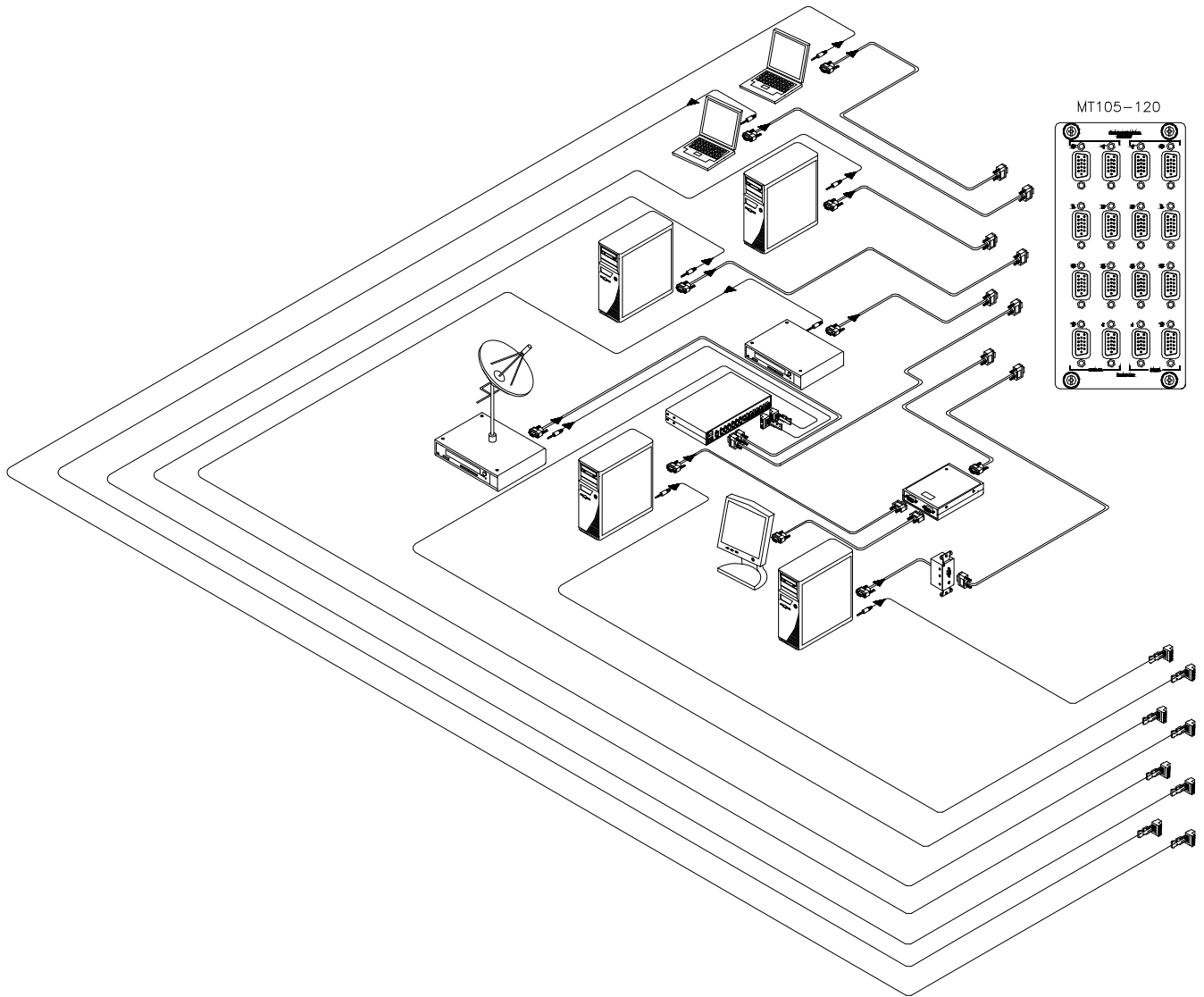
Table 3. **MT110-100/102** Electrical

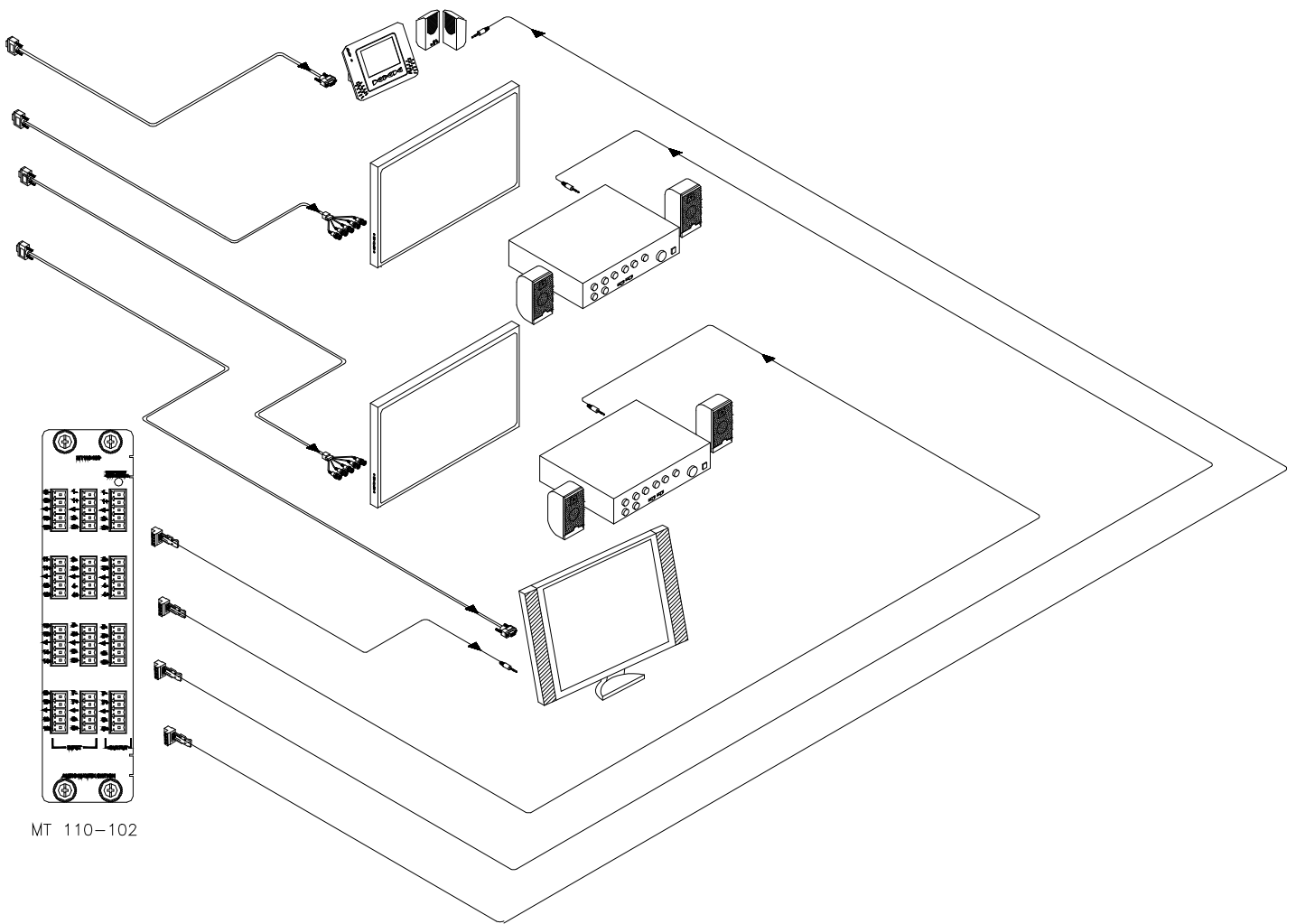


## APPLICATION DIAGRAM

5

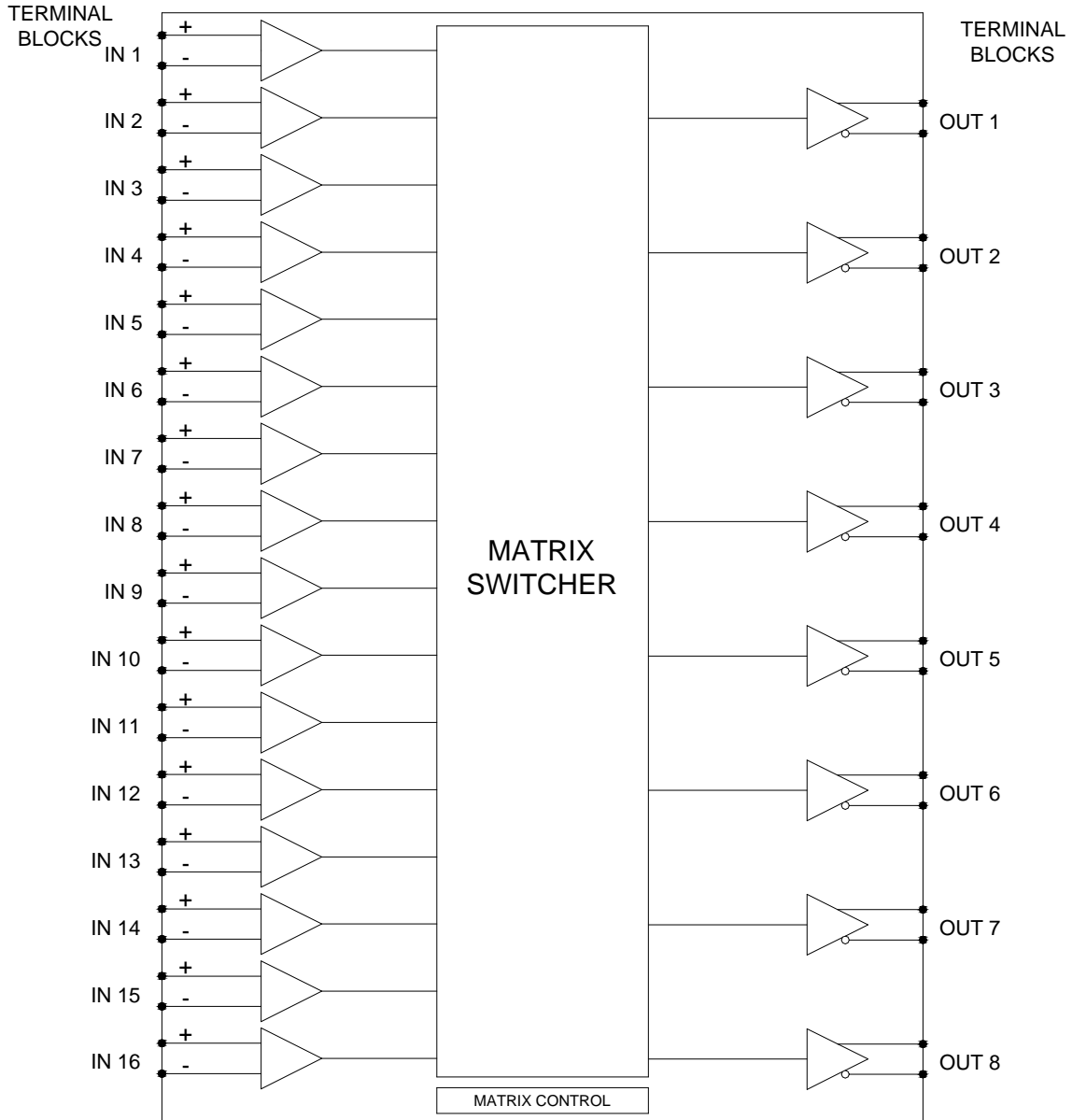
### Diagram 1: TYPICAL SETUP





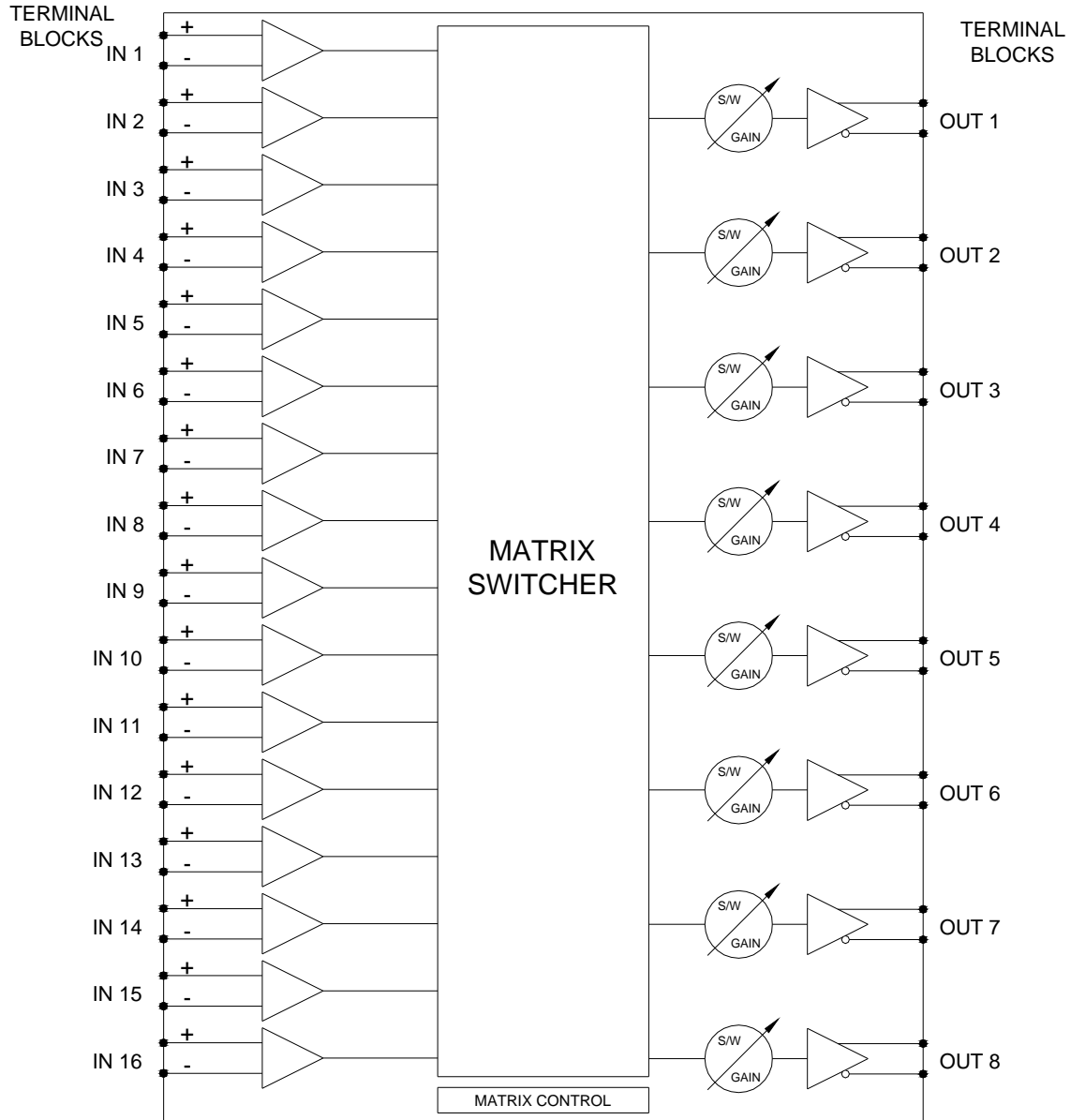
MT 110-102

**Diagram 2: Internal View MT110-100**





**Diagram 3: Internal View MT110-102**



## INSTALLING YOUR MT110-100/102 6

- Step 1.** Turn off power to the MultiTasker™ enclosure.
- Step 2.** Slide the **MT110-100/102** into an available slot in the MultiTasker™ Basic Enclosure in order to connect to the bus. Make sure that the **MT110-100/102** card fits into place. Secure the card to the MultiTasker™ by tightening the retainer screws located on the top and bottom of the **MT110-100/102** card.
- Step 3.** Turn on power to the MultiTasker™ enclosure.
- Step 4.** 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 5.** Connect audio cables from the audio source to the input connector of the **MT110-100/102**. Connect the output connectors of the **MT110-100/102** to the audio equipment through an audio cable.
- Step 6.** Starting from the left, identify the slot number where the **MT110-100/102** card is plugged into the Enclosure and note that it is for RS-232 control.

## OPERATION 7

### 7.1 RS-232 CONTROL

The **MT110-100/102** has many advanced remote control capabilities, which are accessible through standard RS-232 communication. Actual control may 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 **MT110-100/102**, are in a simple ASCII character format.

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

The cards in a MultiTasker™ system are capable of performing various functions, as well as providing feedback to the user or control system. Commands instruct a card to perform specific actions or request information about the status of the card. Some commands do both simultaneously.

A command that instructs the card to simply perform an action will generate feedback of “[ ]”. The open bracket immediately followed by a close bracket indicates the card received a valid command. If the command requested information from the card, the feedback generated by the card is the acknowledgement of having received a valid command. Invalid commands generate feedback of “[ERR001]”.

After processing a command, an “OK” or [ERR001] will be returned as feedback if ‘F’ is included at the end of a command string.

Commands ending 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 or powered off, then on.

### 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 or Group ID  
U2 = Unit ID

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

The Card ID is a unique identifier. It is equal to the enclosure slot number, or it may be an assigned value. As the slot number, the value can range from 1 to 4 up to 1 to 20 depending on the enclosure. If the value is assigned, the ID may be a maximum of 99.

Card ID 0 (C0) is used for the controller and cannot be reassigned.

The Group ID is a number representing a group of cards defined with the [WR] command. When using the Group ID, all cards in the group will perform the given instruction.

Changing the position of a card will significantly affect the commands recorded on software definitions or third-party control systems.

The 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 zero, each command may be used without Ui. Use the command [SETU0], as explained in the MT100-100 User's Guide.

Example:

[VERC3]: For Unit ID Zero  
[VERC3Ui]: For Unit ID other than Zero  
[VERC3]: Equivalent to [VERC3U0]

## 1. [VER]

This command displays the software version and card type for the card.

Command Format: [VERCnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Send the command [VERC4] to check the version of the **MT110-102** with card ID #4. The system will return the following feedback:

```
[MT110-102 690-0152-011 C04]
MT110-102    = model number
690-0152-011 = software version
C04         = card ID
```

## 2. [C]

This command receives the status of the card.

Command Format: [CnUi]

Cn = card ID (n = # from 1 to max slots)

Ui = unit id (i = 0 to 9)

Example:

There is an **MT110-102** card in slot 4. Sending the command [C4] to the MultiTasker™ will yield feedback similar to the following:

CONFIGURATION:

Matrix:16x8, In-Offset=0, Out-Offset=0

CONNECTION OUTPUT VOLUME

In01-Out01 ON 32/32

In02-Out02 ON 32/32

In01-Out03 ON 32/32

In01-Out04 ON 32/32

In01-Out05 ON 32/32

In01-Out06 ON 32/32

In01-Out07 ON 32/32

In01-Out08 ON 32/32

In this example, Input 1 is connected to all outputs except for Output 2, which is connected to Input 2. All outputs are turned on, or enabled.

The volume level for each output is shown next to its connection. The maximum level is 32 out of 32 which is equal to a gain of one.

If there is no card in slot 4, sending the [C4] command will not return any feedback.

## 3. [CnS]

This command saves the input to output connections, on/off status and output volume settings for each output. The saved configuration will be restored after the system is reset or powered off, then on.

Command Format: [CnSUi]

Cn = Card ID (n = # from 1 to max slots)

S = Save configuration

Ui = Unit ID (i = # from 0 to 9)

Example:

If Input 1 is connected to all outputs, but only 1 through 4 are on, the feedback after sending the command [C4S], for slot 4, would be similar to the following:

CONFIGURATION:

Matrix:16x8, In-Offset=0, Out-Offset=0

CONNECTION      OUTPUT VOLUME

In01-Out01 ON    32/32

In01-Out02 ON    32/32

In01-Out03 ON    32/32

In01-Out04 ON    32/32

In01-Out05 OFF   32/32

In01-Out06 OFF   32/32

In01-Out07 OFF   32/32

In01-Out08 OFF   32/32

[SAVED]

FEEDBACK COMMANDS ?, ?Cn, STA1 & STA0

The next four commands are a function of both the card and the front panel and are only available with MultiTasker™ Front Panel systems that have the following firmware:

690-0122-015      = Version 015 or later.

690-0123-004      = Version 004 or later.

690-0124-018      = Version 018 or later.

Send the command [VER], and the system will respond with feedback that includes the following:

690-0122-015 690-0123-004 690-0124-018

Check the last three digits against the numbers above to determine if the option is available.

#### 4. [?]

This command will return information about the MultiTasker™ and cards installed in the unit.

Command Format: [?Ui]

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

Example:

A MultiTasker™ with Unit ID #1 has a front panel with part number MT101-105 and contains an **MT110-102**. Send the command [?U1] and receive the following feedback:

[(MT101-105U1)(MT110-102C04)]

MT101-105U1 = Panel Number and Unit ID

MT110-102C04 = An MT110-102 is in slot 4

#### 5. [?C]

This command will return general information about the card and its status.

Command Format: [?CnUi]

Cn = Card ID (n = # from 1 to max slots)

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

Example:

The **MT110-102** in slot 4 has Input 1 connected to all outputs. All outputs are on. Send the command [?C4] to receive feedback status similar to the following.

[(MT110-102C04)(VR690-0152-011C04)  
(ON11111111C04)(MA0101010101010101C04)  
(MX16x8C04)(VO3232323232323232C04)  
(MU0C04)]

All status feedback is enclosed in brackets, “[ ]”. Each data field within the status is enclosed in parentheses. The first two characters identify the status type. The last three characters are the card’s ID.

MT110-102	= Card Model Number
VR690-0152-011	= Firmware version
ON11111111	= Output ON/OFF status
MA0101010101...	= Matrix I/O connections
MX16x8	= Matrix Configuration
VO32323232...	= Output Volume Levels
MU0C04	= Mute On/Off Status

The ON/OFF status line is read from left to right as outputs 1-8. A ‘1’ indicates the output is on and a ‘0’ indicates the output is off.

The matrix I/O connections are also read left to right representing outputs 1-8 and the input to which each is connected. The first two digits show the input number to which Output 1 is connected. The third and fourth digits are for Output 2 and so on.

The matrix configuration shows the current configuration of the matrix, either 16x8, 8x4 or 4x2.

The output volume levels are read the same as the matrix connections. The first two digits are the volume level for Output 1, the third and fourth are for Output 2 and so on.

The mute status is either a '1' or a '0'. A '1' indicates the card outputs are muted. A '0' means the outputs are on.

## 6. [STA1]

This command enables automatic feedback from the front panel. The command affects any card with auto-feedback capability, not just the **MT110-102**. The default at power on or reset is STA0, off. For more details, see the [?Cn] command definition.

Command Format [STA1] = On

Feedback Prefix Definitions:

MT	Card Model Number
VR	Firmware Revision
ON	Output On/Off Status
MA	Matrix Connections
MX	Matrix Configuration
VO	Output Volume
MU	Mute On/Off

Example 1:

Command = [I2O\*C4]

Feedback = (MA020202...C04)

MA	=	Matrix Connections
0202..	=	Input 2 to Output 1 Input 2 to Output 2 etc...
C04	=	Card/Slot number

## 7. [STA0]

This command disables automatic feedback from the card and front panel. The command affects any card with auto-feedback capability, not just the **MT110-102**. The default at power on or reset is STA0, OFF.

Command Format [STA0]

## 8. [ON]

This command will enable an output of a single card, or a group of cards.

### SINGLE CARD OPERATION

Command Format: [ONmCnUi]

m = Output No. (m = # from 1 to 8)

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

There is an **MT110-102** card in slot 5. All of the outputs on the card are off.

1) [ON1C5]: Turns on only Output 1 of the **MT110-102** card.

2) [ONC5]: Turns on all outputs of the **MT110-102** card.

### GROUP OPERATION

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

Command Format: [ONmGkUi]

m = Output number (m = # from 1-8)

Gk = Group number (k = # from 1-8)

Ui = Unit ID (i = # from 0-9)

Example:

[ON1G1]: Turns ON Output 1 for each card in Group 1. See the GROUP commands for a detailed explanation.

## PATH OPERATION

The path for outputs on the same or multiple cards may be preloaded. This will set the path for the output, but it is not active until the switch command, [SW], is executed. Commands ending in 'P' are not executed immediately.

Command Format: [ONmCnUiP]

m = Output No. (m = # from 1 to 8)

Cn = Card ID (n = slot # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

P = Path

Example:

An **MT110-102** card is in slot 4 and another in slot 8. Enable Output 1 of C4 and Output 3 of C8 simultaneously by sending the following:

```
[ON1C4P]
[ON3C8P]
[SW]
```

If "F" is included, use the [ONmCnPF] command or the [ONmCnFP] command.

## FEEDBACK OPERATION

After processing a command, an "OK" or "[ERR001]" will be returned as feedback if 'F' is included at the end of a command string.

Command Format: [ON.....F]

Example:

```
[ON1C2F]: if path is not set
[ON1C2PF]: if path is set
```

## 9. [OFF]

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

## SINGLE CARD OPERATION

Command Format: [OFFmCnUi]

m = Output No. (m = # from 1 to 8)

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Card 5 has Output 1 on. The following commands may be used to turn off the input.

- 1) [OFF1C5]: Turns off only Output 1.
- 2) [OFFC5]: Turns off all outputs.

## GROUP OPERATION

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

Command Format: [OFFmGkUi]

m = Output No. (m = # from 1-8, \* for all)

Gk = Group ID (k = # from 1-8)

Ui = Unit ID (i = # from 0-9)

Example:

1. [OFF1G1]: Turns off Output 1 for each card in Group 1.
2. [OFFG1]: Turns off all outputs for each card in Group 1.

## PATH OPERATION

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

Command Format: [OFFmCnUiP]

m = Output (m = # from 1 to 8, \* for all)

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

P = Path

Example:

There are two **MT110-102** cards in slots 4 and 8. Disable Output 1 of card 4 and Output 3 of card 8 simultaneously using the following commands:

```
[OFF1C4P]
[OFF3C8P]
[SW]
```

If 'F' is included, use the [OFFmCnPF] command or the [OFFmCnFP] command.

## FEEDBACK OPERATION

After processing a command, an "OK" or "[ERR001]" will be returned as feedback if 'F' is included at the end of a command string.

Command Format: [OFF.....F]

Example:

[OFF1C2F]: if path is not set

[OFF1C2PF]: if path is set

## 10. [...S] – SAVE

This command will save the configuration command being sent in memory. When sending the command [I1O1C4S], after reset or power up, Input 1 will be connected to Output 1 on C4. This command only saves the Input 1 to Output 1 connection above. In order to save all the current settings, use the [CnS] command.

## 11. [...F] – FEEDBACK

After processing a command, an "OK" or "[ERR001]" will be returned as feedback if 'F' is included at the end of a command string.

## 12. [...P] – PATH

This command will set the path for the output, but it is not active until the switch command, [SW], is executed. Commands ending in 'P' are not executed immediately. The path for outputs on multiple cards or the same card can be preloaded. See the examples for the [ON] and [OFF] commands.

Example:

There is an **MT110-102** in slot 4. Input 1 is connected to all outputs and all outputs are on. The PATH command has been used to set Input 2 to Output 1 and turn off Outputs 2 and 3 simultaneously. If checking the status prior to sending the [SW] command, the feedback will appear as follows for the above connection settings:

```
In01-Out01 ON 32/32 P=02
In01-Out02 ON 32/32 P=OFF
In01-Out03 ON 32/32 P=OFF
etc...
```

The notation "P=" at the end of the line indicates the path condition is active. "P=02" on the Output 1 line indicates that after the [SW] command, Input 2 will be connected to Output 1.

The notation "P=OFF" on lines 2 and 3 indicates that Outputs 2 and 3 will be turned off after the [SW] command is executed.

## 13. [SW] – SWITCH

This command immediately connects inputs and outputs previously set with the PATH command. The command switches all paths set on this card and all other cards in the enclosure.

Example:

```
[ON1C4P]
[OFF3C8P]
[SW]
```

## 14. [IO]

This command connects a single input to a single output in the current matrix configuration.

Command Format: [ImOxCnUi]

m = Input (m = # from 1 to 8)

x = Output (x = # from 1 to 8)

Cn = Card ID (n = slot # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Connect Input 1 to Output 1 for the **MT110-102** in slot 5. Send the command [I1O1C5] and Input 1 will be connected to Output 1.

## 15. [IO\*]

This command connects a single input to all the outputs in the current matrix configuration.

Command Format: [ImO\*CnUi]

m = Input (m = # from 1 to 8)

Cn = Card ID (n = slot # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Connect Input 1 to all outputs for the **MT110-102** in slot 5. Send the command [I1O\*C5] and Input 1 will be connected to all outputs.

## 16. [CLR]

This command clears the card, restoring the default settings. In this case, Input 1 to all outputs, all outputs on and all input levels to maximum.

Command Format: [CLRCnUi]

Cn = Group ID (n = # from max slots)

Ui = Unit ID (i = # from 0-9)

Example:

To clear the card in slot 4, send the [CLRC4] command. The card in slot 4 is now set to its default values.

## 17. [OSI]

This command sets the input offset value that is applied to all inputs. The default is zero, or Input 1 equals Input 1. An offset of 16 would make Input 1 equal to Input 17.

Command Format: [OSImCi]

m = Offset (m = # from 0 to 128)

Ci = Card ID (i = # from 1 to max slots)

Example:

[OSI16C8] sets the input offset value to 16 for the card in slot 8. The inputs on card 8 will now be their physical number plus the offset value. In this case, Input 1 would now be Input 17.

## 18. [OSO]

This command sets the output offset value that is applied to all outputs. The default is zero, or Output 1 equals Output 1. An offset of 16 would make Output 1 equal to Output 17.

Command Format: [OSOmCi]

m = Offset (m = # from 0 to 128)

Ci = Card ID (i = # from 1 to max slots)

Example:

[OSO16C8] sets the output offset value to 16 for the card in slot 8. The outputs on card 8 will now be addressed by the value of their physical number plus the offset value. In this case, Output 1 would now be Output 17.

## 19. [FBD]

This command turns feedback delay on or off. It is necessary when installing some newer cards in older systems. If the system does not receive all of the feedback from the card, the card may be communicating too fast. This command will slow down the card's communication rate.

Command Format: [FBDmCnUi]

m = Delay (0= no delay, 1= delay 100mS)

Cn = Card ID (n = # from 1 to max slots)

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

Example:

The command [HELPC4] is sent to the card in slot 4. Some of the HELP file is displayed on the screen, but most is missing. Send the command [FBD1C4] to slow down the rate at which the card sends feedback to the system.

---

ID COMMANDS: RSI, SIDn, SIDnCi, SID+, RSN

The default Card ID is the same as the card slot number. The next several commands allow the user to change the Card ID to a value other than the slot number. Once the ID is changed, moving the card to another slot will not change the card ID. If a card in slot 4 is set to ID 1, then moved to slot 10, its ID will remain 1. The RSI command forces each installed card to take its slot number as its ID number, regardless of the slot in which it is installed.



Some cards require more than one slot in the MultiTasker™ system. As an example, some matrix switcher cards require 4 slots. If there are five of these cards installed, they would be numbered C4, C8, C12, C16 and C20. Changing the Card ID allows the user to define the cards as C1, C2, C3, C4 and C5.

Another use for changing the Card ID is to be able to use multiple systems without having to set each unit to a different Unit ID. All systems may be left as Unit ID 0 for ease of programming. The cards in the first unit may be numbered 1-10 and in the second unit 11-20.

The ID commands work with all MultiTasker™ Front Panel systems. However, front panels that have firmware releases prior to the following will not be able to address Card IDs greater than the number of slots in the system:

690-0122-019 = Version 019 or later.

690-0123-005 = Version 005 or later.

690-0124-019 = Version 019 or later.

Send the command [VER], and the system will respond with feedback that includes the following:

690-0122-019 690-0123-005 690-0124-019

Check the last three digits against the numbers above to determine if the Card ID commands can address all 99 Card IDs.

## 20. [RSI]

This command resets the card IDs in the system. After sending this command, each card ID in the system will match the slot number of the card. If the card is moved to another slot, its ID number will be the new slot number.

Command Format: [RSI]

Example:

Send the command [RSI] to the system with Unit ID 0. The card in slot 1 will have ID 1, the card in slot 2 will have ID 2 and so on. If the card in slot 1 is then moved to slot 4, the card ID will then be 4.

## 21. [SIDn]

This command sets all the cards installed in the MultiTasker™ system to the same Card ID. After sending this command, all cards will be addressed with the same ID. Use caution when sending this command to a system with multiple board types.

Command Format: [SIDn]

n = Card ID (n = # from 1 to 99)

Example:

Send the command [SID1] to the system. All the cards in the system now have ID 1. Any commands that are sent to Card ID 1 will be received and executed by each card.

## 22. [SIDnCi]

This command sets the Card ID of a single card to a number from 1 to 99.

Command Format: [SIDnCi]

n = Card ID (n = # from 1 to 99)

Ci = Slot Number (i = # from 1 to max slots)

Example:

Send the command [SID50C10] to set the ID of the card in slot 10 to an ID of 50.

## 23. [SID+]

This command sets the Card ID of all cards to their slot number plus the offset value.

Command Format: [SID+n]

n= Offset amount (n = # from 0 to 99)

The maximum Card ID is 99, so subtract the highest slot number from 99 to find the maximum offset. For example, in an 8 slot enclosure, the maximum offset would be 91. The slot number, 8, plus the offset, 91, equals 99.

Example:

There are two, 20 slot enclosures to be connected together during normal operation. The first unit will use the default card IDs where the card ID is equal to its slot numbers. The second unit will have the same Unit ID, but each card ID will be offset by 20.

Connect the computer to the second unit only and send [SID+20] to set the ID of all the cards in the enclosure to their slot number plus 20. Reconnect both units to the computer.

The cards in the first unit will be referenced as card IDs 1-20 and the cards in the second unit will be referenced by card IDs 21-40.

## 24. [RSN]

This command reads the slot number of the card with a specified ID number, and returns the value to the system to be displayed in the terminal window. If more than one card has the same ID, each slot number will be displayed.

Command Format: [RSNCi]

Ci = Card ID (i = # from 1 to 99)

Example:

The card in slot 4 uses four slots. Its ID was set to C1 since it is the first card in the system, reading from left to right. Send the command [RSNC1] to find the slot number of C1. The system will respond with the following:

[4]

## GROUP COMMANDS

The next few commands are group commands. The use of groups allows several boards, with the same functions, to be controlled simultaneously with a single command. These commands apply to all cards, not only the **MT110-102**.

## 25. [WR]

This command groups multiple cards in the enclosure allowing all the group members to be controlled simultaneously with the same command. Each MultiTasker™ unit may define a maximum of eight groups.

In MultiTasker™ systems with audio and video cards, boards are typically grouped as follows:

Group 1 = Video Cards

Group 2 = Audio Cards

Group 3 = Video and Audio Cards

Command Format: [WRCn<sub>1</sub>Cn<sub>2</sub>...GkUi]

Cn = Card ID (n = slot # from 1 to max slots)

Gk = Group number (k = # from 1-8)

Ui = Unit ID (i = # from 0-9)

Example:

Group cards 2, 4, and 6 as group 5 of Unit ID 1 by sending the command [WRC2C4C6G5U1]. After executing this command, cards 2, 4 and 6 will be grouped together as group 5 of Unit ID 1. The system will return the following feedback:

[G5=C2C4C6]

Now, when a command is sent to G5, each board in G5 will execute the same command.

## 26. [RMC]

This command may be used to remove one or more group members from a group. Reset the system after using this command for all changes to take effect.

Command Format: [RMCn<sub>1</sub>Cn<sub>2</sub>...GkUi]

Cn = Card ID (n = # from 1 to max slots)

Gk = Group ID (k = # from 1-8)

Ui = Unit ID (i = # from 0-9)

Example:

Group 5 consists of the cards located in slots numbered 2, 4, and 6. Remove just cards 4 and 6 from the group by sending the command [RMC4C6G1]. The system will return the following feedback:

[G5=C2]

## 27. [RMG]

This command may be used to delete an entire group, or all groups.

### REMOVE A GROUP

Remove all the members from the group, effectively deleting the group.

Command Format: [RMGkUi]

Gk = Group ID (k = # from 1-8)

Ui = Unit ID (i = # from 0-9)

Example:

Group 5 consists of the cards located in slots number 2, 4 and 6. Remove all cards from the group by sending the command [RMG5]. The system will return the following feedback:

[G5=0]

## REMOVE ALL GROUPS

Remove all the members from every group, effectively deleting all groups.

Command Format: [RMG\*Ui]

Ui = Unit ID (i = # from 0-9)

Example:

Group 5 consists of cards 2, 4 and 6. Group 2 consists of cards 1, 2, 3, 4 and 5. Delete all the groups by sending the command [RMG\*].

The system will return the following feedback:

G1-G8:EMPTY

## 28. [RD]

This command reads and then displays the members in each group.

Command Format: [RDGkUi]

Gk = Group ID (k = # from 1-8)

Ui = Unit ID (i = # from 0-9)

Example:

The cards in slots 2, 4 and 6 are part of group 5. Read the member data for group 5, by sending the command [RDG5]. The system will return feedback as follows:

[G5=C2C4C6]

The feedback shows G5 (group 5) and then the cards that make up group 5. In this case, group 5 includes C2, C4 and C6.

## 29. [TEST]

This command performs a series of tests on the internal memory of the card.

Upon completion, the system will display following:

Command Format: [TESTCn]

Cn = Card ID (n = # from 1 to 99)

Example:

Test the internal memory of the **MT110-102** in slot 4 by sending the command [TESTC4]. The card will respond with the feedback similar to the following:

MEMORY IS GOOD

Otherwise, failures would be indicated in the feedback from the card.

## 30. [VLO] MT110-102 ONLY

This command sets the absolute volume level for a given output.

Command Format: [VLOmAvCnUi]

m = Output (m = # from 1 to 8)

v = Volume Level (v = # from 1 to 32)

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

There is an **MT110-102** card in slot 8. Set the output volume on Output 2 to 16 by sending the command [VLO2A16C8].

## 31. [SEL] MT110-102 ONLY

This command is the output select command. It sets the path to adjust the output volume level for the current matrix. It is used in conjunction with the [ + ] and [ - ] commands.

Command Format: [SELMnCnUi]

m = Input No. (m = # from 1 to 16)

Cn = Engine Card Slot Number

Ui = Unit ID (i = # from 0 to 9)

[+] = Increment level by one

[-] = Decrement level by one

Example:

There is an **MT110-102** card in slot 8. Adjust the volume level on Output 2. The current level is set to 10. After sending the following commands, a better level of 15 is obtained:

1. [SEL2C8]  
The current output level is 10.
2. [-][-][-]  
The level is now 7 and is too low.
3. [+++++]  
The level is now 15 and no further adjustments are required.

### 32. [ + ] MT110-102 ONLY

This command increments a selected property to be adjusted from the keyboard or front panel.

Command Format: [ + ]

[+] = Increment level by one-step

Example:

See the [SEL] command example.

### 33. [ - ] MT110-102 ONLY

This command decrements a selected property to be adjusted from the keyboard or front panel.

Command Format: [ - ]

[-] = Decrement level by one-step

Example:

See the [SEL] command example.

### VOLUME RAMPING FEATURE: MT110-102 ONLY

The following 7 commands are used to control the volume of the **MT110-102**. They may be used with computer control, but also are designed to be used with the {SETVK} command using keys on the Front Panel. The following code sample sets front panel keys 8 and 10 to Ramp Up and Ramp Down respectively. See your Front Panel User's Guide for more details.

When defined as a volume control key, the key will respond to two conditions: press and release. Below, subroutine 8 starts ramping up when key 8 is pressed. Subroutine 10 starts ramping down when key 10 is pressed. Subroutine 108 stops ramping when either key is released.

Since there are multiple outputs on this card, the output to ramp must first be selected using the [SEL] command. For example, send [SEL2C4] and then [RDNC4] to ramp down the volume level on Output 2 of C4. Then, send the [SEL2C4] and [RUPC4] commands to ramp the level back up.

```
{WRS8=RUPC4} //Ramp Up
{WRK8=8,108,0,0,0} //Press= start, release= stop
{WRS10=RDNC4} //Ramp Down
{WRK10=10,108,0,0,0} //Press= start, release= stop
{WRS108=RSTC4} //STOP RAMPING
{SETVK8} //Set key 8 as volume key
{WRLK8=VOL_UP} //Define Key 8 Label
{SETVK10} //Set key 8 as volume key
{WRLK10=VOL_DN} //Define Key 8 Label
[RAMP=10C4] //Set the ramp rate.
```

### 34. [RUP] MT110-102 ONLY

This command ramps the output volume to its maximum level at the rate defined using the [RAMP] command.

Command Format: [RUPCnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Ramp the output volume on Output 1 from a starting level of 10 to the maximum level of 32 for the card in slot 8. Send the commands [SEL1C8] then [RUPC8] and the system will respond with the following feedback:

```
[11][12][13][14]...[32]
```

## 35. [RDN] MT110-102 ONLY

This command ramps the output volume down to a level of 00 at a rate defined using the [RAMP] command.

Command Format: [RDNCnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Ramp the output volume on Output 1 from a starting level of 32 down to 00 for the card in slot 8. Send the commands [SEL1C8] then [RDNC8] and the system will respond with the following feedback:

[31][30][29]...[00]

## 36. [RUPm] MT110-102 ONLY

This command ramps UP the output volume for the specified output on the card. The ramping will continue to its maximum level at the rate defined using the [RAMP] command. The ramping may be stopped at any time using the [RST] command.

Command Format: [RUPmCnUi]

Cn = Card ID (n = # from 1 to max slots)

m = Output No. (n = # from 1 to 8)

Ui = Unit ID (i = # from 0 to 9)

Example:

Ramp the output volume for Output 2 from a starting level of 10 to the maximum level of 32 for the card in slot 8. Send the command [RUP2C8] and the system will respond with the following feedback:

[11][12][13][14]...[32]

## 37. [RUPm=xx] MT110-102 ONLY

This command ramps a specified output's volume to a user defined level at a rate defined using the [RAMP] command.

Command Format: [RUPm=xxCnUi]

m = Output No. (m = # from 1-8)

xx = Stop Level (xx = # from 01-32)

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Ramp the output volume on output 7 from a starting level of 1 to a level of 20 for the card in slot 8. Send the command [RUP7=20C8] and the system will respond with the following feedback:

[02][03][04]...[20]

## 38. [RDNm] MT110-102 ONLY

This command ramps DOWN the output volume for the specified output on the card. The ramping will continue to its minimum level at the rate defined using the [RAMP] command. The ramping may be stopped at any time using the [RST] command.

Command Format: [RDNmCnUi]

Cn = Card ID (n = # from 1 to max slots)

m = Output No. (n = # from 1 to 8)

Ui = Unit ID (i = # from 0 to 9)

Example:

Ramp the output volume for output number 8 from a starting level of 32 down to 00 for the card in slot 8. Send the command [RDN8C8] and the system will respond with the following feedback:

[31][30][29]...[00]

## 39. [RDNm=xx] MT110-102 ONLY

This command ramps a specified output's volume down to a user defined level at a rate defined using the [RAMP] command.

Command Format: [RDN=xxCnUi]

m = Output No. (xx = # from 1-8)

xx = Stop Level (xx = # from 01-32)

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Ramp the output volume for output number 8 from a starting level of 32 down to 16 for the card in slot 8. Send the command [RDN8=16C8] and the system will respond with the following feedback:

```
[31][30][29]...[16]
```

## 40. [RST] MT110-102 ONLY

This command stops ramping and maintains the last volume setting. It may be used as a stand-alone command, but is designed to be used along with a volume key assignment on the front panel. As a volume key, the ramping action begins when the key is depressed and then stops when the key is released. See the code sample at the beginning of the volume ramping section.

Command Format: [RSTCnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

The card in slot 8 is ramping from 1 to 32 at a rate of 32 steps in 18 seconds. Send the command [RSTC8] and the card will stop ramping the output volume. The last displayed volume setting will remain the current volume level.

## 41. [RAMP] MT110-102 ONLY

This command displays the ramping time for 32 steps. The time between each step is equal to the time in seconds divided by 32.

Command Format: [RAMPCnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Display the ramp rate setting for the card in slot 8 by sending the command [RAMPC8]. The system will respond with feedback similar to the following:

```
RAMPTIME = 6 SECONDS
```

## 42. [RAMP=x] MT110-102 ONLY

This command sets the ramp rate for 32 steps. The settings range from 4 to 18 seconds, in two-second intervals.

Command Format: [RAMP=xCnUi]

x = Rate in Seconds

4 = 0.13 seconds/step

6 = 0.19 seconds /step

8 = 0.25 seconds /step

10 = 0.31 seconds /step

12 = 0.38 seconds /step

14 = 0.44 seconds /step

16 = 0.50 seconds /step

18 = 0.56 seconds /step

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

There is an **MT110-102** in slot 5. Send the command [RAMP=16C5] to set the ramp rate to 16 seconds. After this is set, any ramping will occur at a rate of 32 steps in 10 seconds, or 0.50 seconds per step. Confirm the setting by sending the command [RAMPC5] and receiving the feedback:

```
RAMP TIME = 16 SECONDS
```

#### 43. [MUT0] MT110-102 ONLY

This command turns on the all the outputs without changing the input port selected and without changing any volume settings.

Command Format: [MUT0CnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Send the command [MUT0C4] to enable the outputs for the card in slot 4.

#### 44. [MUT1] MT110-102 ONLY

This command turns off all the outputs without changing the input port selected and without changing any output volume settings.

Command Format: [MUT1CnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

Send the command [MUT1C4] to mute all the outputs for the card in slot 4.

#### 45. [MATmXy]

The matrix command allows the matrix switcher to be setup for different matrix sizes. The following tables show how the inputs and outputs will be configured when the matrix is changed. The input and output layouts are as viewed from the front of the card.

Example:

In the 8x4 configuration, when Input 1 is connected to Output 4, the entire channel, 1a and 1b, will be switched to outputs 4a and 4b respectively.

Command Format: [MATmXyCnUi]

m = number of inputs (m = 16, 8 or 4)

y = number of outputs (y = 8, 4 or 2)

Cn = Card ID (n = slot # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

16 x 8		
INPUTS		OUTPUTS
9	1	1
10	2	2
11	3	3
12	4	4
13	5	5
14	6	6
15	7	7
16	8	8

8 x 4		
INPUTS		OUTPUTS
5 a	1 a	1 a
5 b	1 b	1 b
6 a	2 a	2 a
6 b	2 b	2 b
7 a	3 a	3 a
7 b	3 b	3 b
8 a	4 a	4 a
8 b	4 b	4 b

4 x 2		
INPUTS		OUTPUTS
3 a	1 a	1 a
3 b	1 b	1 b
3 c	1 c	1 c
3 d	1 d	1 d
4 a	2 a	2 a
4 b	2 b	2 b
4 c	2 c	2 c
4 d	2 d	2 d

#### 46. [HELP]

This command displays information available for the MultiTasker™ interface commands.

Command Format: [HELPCnUi]

Cn = Card ID (n = # from 1 to max slots)

Ui = Unit ID (i = # from 0 to 9)

Example:

In order to display the RS-232 commands available for the **MT110-102** card in slot 2, send the command [HELPC2]. The commands along with a brief description will be displayed in the terminal window.

## 7.3. SUMMARY OF COMMANDS

### Card Commands

- 1) [VER] Receives software version
- 2) [C] Receives status of the card
- 3) [CnS] Save card settings
- 4) [?] Show system cards
- 5) [?C] Show card information
- 6) [STA1] Enable auto feedback
- 7) [STA0] Disable auto feedback
- 8) [ON] Turn on one or more outputs
- 9) [OFF] Turn off one or more outputs
- 10) [...S] Save the command being sent
- 11) [...F] Show command feedback
- 12) [...P] Sets the path, preload for [SW]
- 13) [SW] Switch preloaded output buffer
- 14) [IO] Connect an input to output
- 15) [IO\*] Connect an input to all outputs
- 16) [CLR] Reset card to default values
- 17) [OSI] Set input offset
- 18) [OSO] Set output offset
- 19) [FBD] Feedback delay on/off

### ID Commands

- 20) [RSI] Reset Card IDs
- 21) [SIDn] Set all Card IDs
- 22) [SIDnCi] Set one Card ID
- 23) [SID+] Set Card ID offset
- 24) [RSN] Read Card slot number

### Group Commands

- 25) [WR] Groups multiple cards
- 26) [RMC] Remove members from group
- 27) [RMG] Delete group
- 28) [RD] Displays group members

### Volume/Matrix Commands

- 29) [TEST] Test internal memory ICs
- 30) [VLO] Set absolute output volume
- 31) [SEL] Select input volume to adjust
- 32) [ + ] Increment volume
- 33) [ - ] Decrement volume
- 34) [RUP] Ramp UP to max (32)
- 35) [RDN] Ramp DOWN to min (0)
- 36) [RUPm] Ramp volume UP to max (32)
- 37) [RUPm=] Ramp volume UP to a value
- 38) [RDNm] Ramp volume DOWN to min (0)
- 39) [RDNm=] Ramp volume DOWN to a value
- 40) [RST] Stop ramping
- 41) [RAMP] Display ramp rate
- 42) [RAMP=] Set ramp rate
- 43) [MUT0] Output Volume ON
- 44) [MUT1] Output Volume OFF
- 45) [MAT] Matrix Configuration
- 46) [HELP] Display available commands



## TROUBLESHOOTING GUIDE 8

We have carefully tested and have found no problems in the supplied **MT110-100/102**; 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 ON, 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 ON, 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

**Cause 1: The CPU on the card is not working properly.**

*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 ICs are seated in their sockets. If the LED is still blinking red, see Cause 2.

**Cause 2: The card and its serial device are not communicating.**

*Solution 1:* Turn the system off and then on again. If there is still an error, see Cause 3.

**Cause 3: RS485 communication error**

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

*Solution 2:* Turn the system off and then on again. If there is still an error, see Solution 3.

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

### 8.3. NO SOUND

**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.

**Cause 2: The proper input card 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.

**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.

**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. DISTORTED SOUND

### **Cause 1: The source level is above 1Vp-p**

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

### **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

### **Cause 1: 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.

### **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 the **MT110-100/102** card from between the source and the destination amplifier. If the problem persists, call ALTINEX at (714) 990-2300.

## ALTINEX POLICY

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### 9.1 LIMITED WARRANTY/RETURN POLICY

Please see the Altinex website at [www.altinex.com](http://www.altinex.com) for details on warranty and return policies.

### 9.2 CONTACT INFORMATION

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