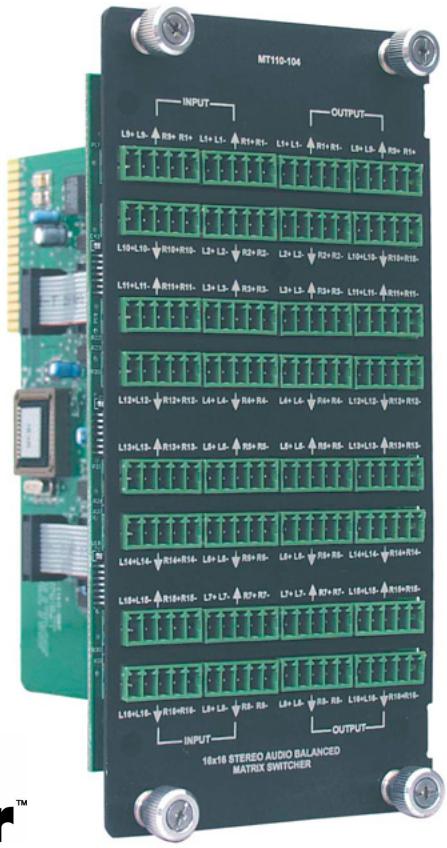

MultiTasker™

MANUAL PART NUMBER: 400-0347-001

MT110-104

16 X 16 BALANCED STEREO AUDIO MATRIX SWITCHER CARD FOR MULTITASKER™

ALTINEX

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PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT110-104**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT110-104** 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 **MT110-104** 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 **MT110-104** carefully. Dropping or jarring can damage the card.
- Do not pull the cables that are attached to the **MT110-104**.
- Insert the card carefully into the slots of the MultiTasker™ without bending any edges.
- The **MT110-104** must be inserted into Slot #4 or higher in a MultiTasker™ enclosure.

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 MT110-104 2

MT110-104
16x16 Balanced Stereo Audio Matrix Switcher Card

The **MT110-104** is a Balanced Stereo Audio Matrix Switching Card designed for use with the MultiTasker™ system. When installed in a MultiTasker™ enclosure, this card allows any input to be independently switched to any of the outputs. Also, any input may simultaneously drive multiple outputs. All outputs can have only one input source. 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 four slots in a MultiTasker™ enclosure and all input and output connections are accomplished via captive screw pluggable terminal blocks.

Although designated as a 16x16 matrix switcher, the **MT110-104** can be used in a variety of ways to provide different capabilities. For example, one **MT110-104** can be used to create two 8x8 stereo audio matrices or a 4x4 and a 2x2 audio matrix. Each stereo pair must be switched together; you cannot switch the left and right channels of an input independently. The **MT110-104** features individual volume trim control on each input via the RS-232 control.

TECHNICAL SPECIFICATIONS 3

NOTE: Specifications are subject to change.
See www.altinex.com for up-to-date information.

FEATURES/DESCRIPTION	
GENERAL	
Inputs	
Input Connectors	(16) 5-pin Terminal Blocks
Outputs	
Output Connectors	(16) 5-pin Terminal Blocks
Compatibility	Stereo Audio

Table 1. **MT110-104** General

MECHANICAL	
Basic Enclosure Slots Required	Four
Weight	1.3lb (0.6kg)
Connector Panel	Black
T° Operating	10°C-35°C
T° Maximum	0 to 50°C
Humidity	90% non-condensing
MTBF (calculated)	40,000 hrs

Table 2. **MT110-104** Mechanical

ELECTRICAL			
Input Signals			
Max Level			0dBu
Impedance			10K Ohms
Audio Throughput			
Gain			-90 to 0dB unbalanced or balanced, adjustable
Frequency Response			10Hz to 20KHz (+/- 0.05dB)
Noise Floor			-100dB @ 20KHz
CMRR			>80dB, 10Hz to 20KHz
Output Signals			
Level			1V p-p
Impedance			Low – drives 600 Ohms
Gain			0dB
Power			
Power from MT100-100, MT100-101, MT100-106	**+6V**	**-6V**	**Power Consumption**
MT110-104	300mA	250mA	3.0 Watts

Table 3. MT110-104 Electrical

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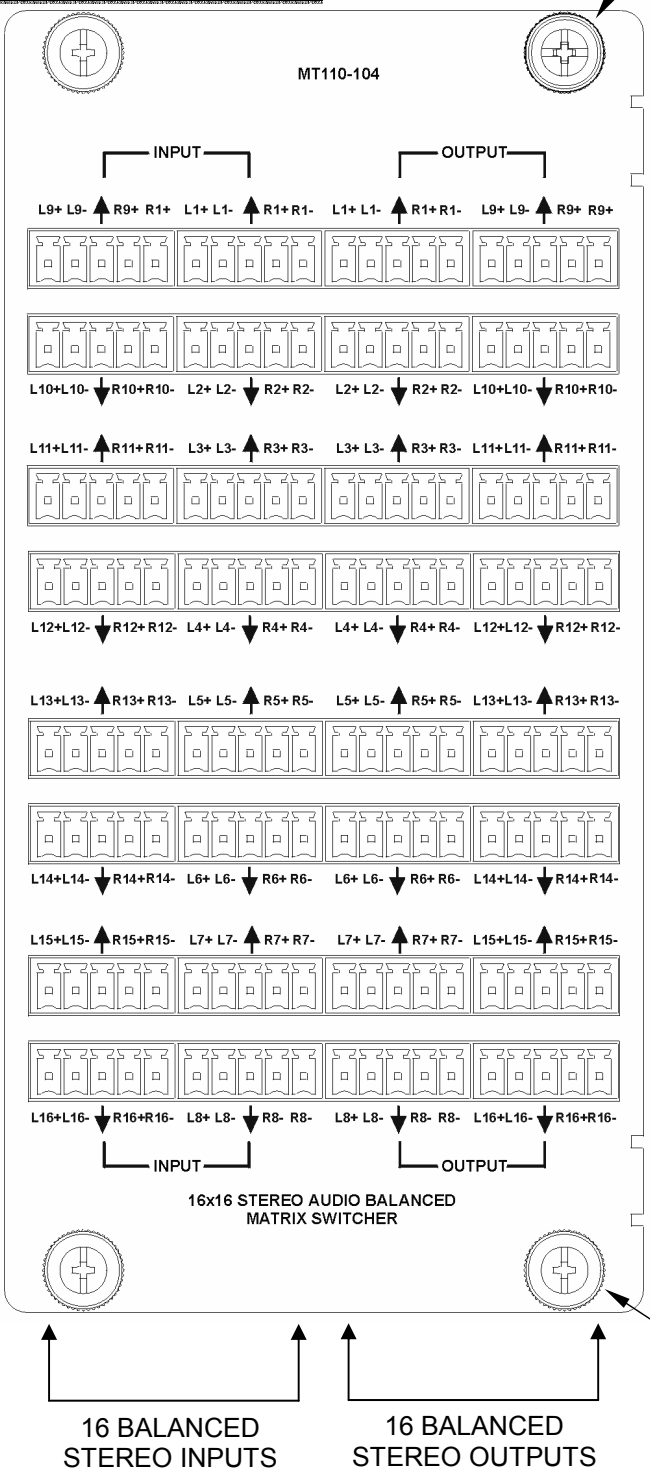
[redacted]

FRONT PANEL DIAGRAM OF MT110-104 4



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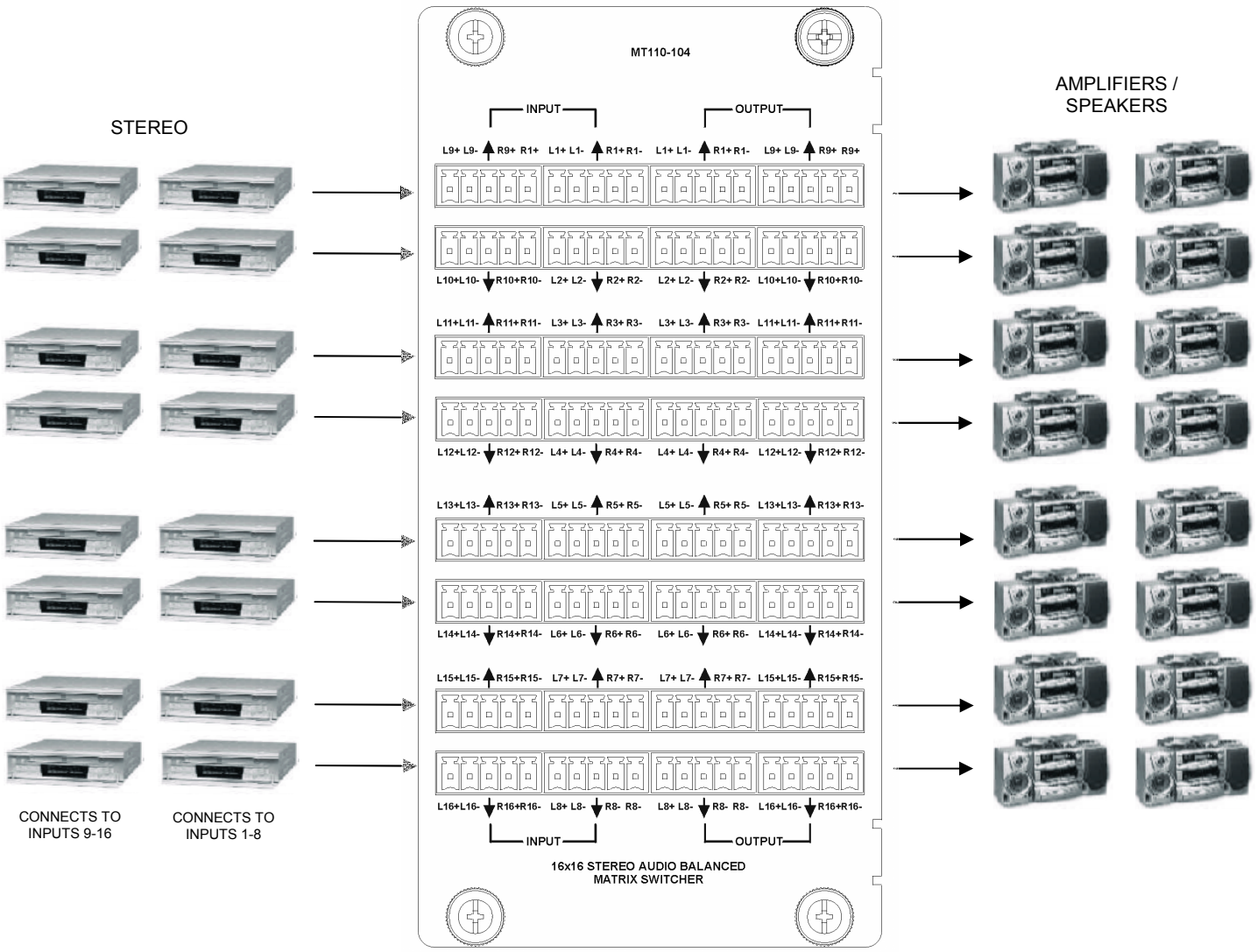
APPLICATION DIAGRAM 5

APPLICATION EXAMPLE:



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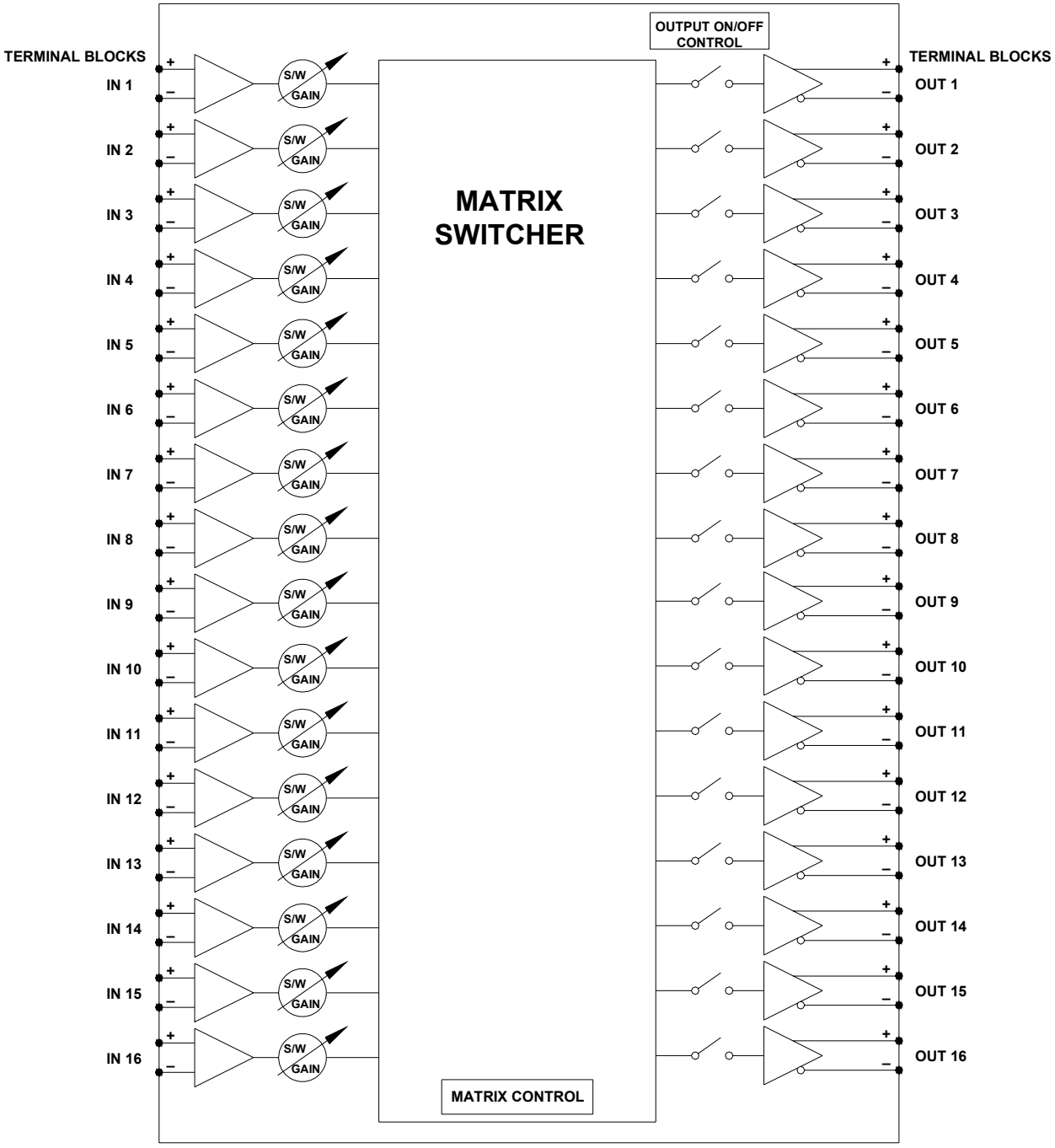
BLOCK DIAGRAM:



INSTALLING YOUR MT110-104 6

Step 1. Slide the **MT110-104** into an available slot in the MultiTasker™ enclosure in order to connect to the bus. Make sure that the **MT110-104** card fits into place. Secure the card to the MultiTasker™ by tightening the retainer screws located on the top and bottom of the **MT110-104** card.

Step 2. Connect audio cables from the audio source to the input connectors of the **MT110-104**. Connect the output connectors of the **MT110-104** to the audio equipment through an audio cable.

Step 3. Starting from the left, identify the slot number where the **MT110-104** card is plugged into the enclosure; take note of that slot number for RS-232 control purposes.

OPERATION 7

7.1. RS-232 CONTROL

When used in the MultiTasker™ Enclosure, the **MT110-104** has many advanced remote control capabilities, which are accessible through standard RS-232 communication. The actual control can be accomplished through a computer control system or any other device capable of sending RS-232 commands.

7.2. RS-232 COMMANDS

The RS-232 commands for the **MT110-104** 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

7.3. DESCRIPTION OF COMMANDS

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

(Note: All of the following examples use the 19-slot MT100-100 enclosure for reference only).

Example:

[VERC8U2]

VER = function

C8 = Card ID

U2 = Unit ID

For detailed information regarding RS-232 functions, see each command description or enter the command **[HELPCi]**, where "i" is the card ID number.

Card ID is an assigned value from 4 to 19, which represents the slot's number. 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.

Example:

[VERC8]: for unit ID zero; equivalent to [VERC8U0]

[VERC8Ui]: for unit ID other than zero.

"Ui" = unit ID number from 1 to 9; used only if more than 1 unit is connected.

7.3.1. [HELPCi]

This command displays all the RS-232 commands available for control.

Ci = card ID number (i = number from 4 to 19)

7.3.2. [Ci]

This command displays the input/output status of the card.

Command Format: [Ci]

Ci = card ID number (i = number from 4 to 19)

Example:

If one **MT110-104** card is in slot #8 with outputs 1, 2 & 3 ON:

When sending command **[C8]**, feedback will be returned as:

OFFSET: INPUT=0 OUTPUT=0

In01 Out1 VOLn = ON/OFF

In03 Out2 VOLn = ON/OFF

In06 Out3 VOLn = ON/OFF

In02 Out4 VOLn = ON/OFF

In09 Out5 VOLn = ON/OFF

In16 Out6 VOLn = ON/OFF

In13 Out7 VOLn = ON/OFF

In10 Out8 VOLn = ON/OFF

Note that for volume setting VOLn, "n" will be a value from 0 to 16 (see [VOL] command).

If there is no card in slot #8, sending the **[C8U3]** command will not return any feedback.

7.3.3. [VER]

This command receives the firmware version and card type for the **MT110-104** card.

Command Format: [VERCi]

Ci = card ID number (i = number from 4 to 19)

Example:

If one **MT110-104** card is in slot #8 of unit #3:

Send command **[VERC8U3]**; the MultiTasker™ enclosure will return:

MT110-104 690-0167-001

(The last 3 numbers of the firmware number will indicate version 001 or higher)

7.3.4. [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: [ImOnCi]

Im = select Input m (m = 1 to 16)

On = connect to output n (n = from 1 to 16)

Ci = card ID (i = a slot number from 4 to 19)

Example:

To connect input 4 to output 2 on the card in slot #8, use the [I4O2C8] command.

To connect input 4 to all of the outputs on the card in slot #8, use [I4O*C8]

7.3.5. [ON]

This command enables the selected output without affecting any other outputs.

Default when plugged in = ALL OFF

Command Format: [ONnCi]

n = Output number from 1 to 16

Ci = card ID (i = a slot number from 4 to 19)

Examples:

[ON12C5]: Turns ON only output #12 of the card located in slot #5.

[ON3C5]: Turns ON only output #3 of the card located in slot #5. After the [ON12C5] and [ON3C5] commands have been executed, outputs #1, #2 and #3 will be ON.

[ONC5]: Turns ON all outputs of the card in slot #5.

7.3.6 [OFF]

This command disables the selected output without affecting any other outputs.

Command Format: [OFFnCi]

n = Output number from 1 to 16

Ci = card ID (i = a slot number from 4 to 19)

Examples:

[OFF12C5]: Turns OFF only output #12 for the card located in slot #5.

[OFFC5]: Turns OFF all outputs of the card located in slot #5.

7.3.7. [OSI]

This command sets the input offset value.

Command Format: [OSImCi]

m = offset value from 0 to 128

Ci = card ID number (i = number from 4 to 19)

Example:

[OSI128C16] sets the input offset value to 128 for the card in slot #16.

7.3.8. [OSO]

This command sets the output offset value.

Command Format: [OSOnCi]

n = offset value from 0 to 128

Ci = card ID number (i = number from 4 to 19)

Example:

[OSO128C16] sets the output offset value to 128 for the card in slot #16.

7.3.9. [SEL]

Select input to adjust gain with +/- commands.

This command allows you to program front panels on the MultiTasker™ to control the gain of each channel.

m = input number from 1 to 16

Ci = card ID number (i = number from 4 to 19)

[+] to increase volume for selected input

[–] to decrease volume for selected input

7.3.10. [VOL]

This command allows you to set absolute gain of each channel.

Command Format: [VOLmAnCi]

m = input number from 1 to 16

An = Absolute value number from 0 to 16

Ci = card ID number (i = number from 4 to 19)

7.3.11. [MAT]

This command allows changes in the configuration of the matrix. User can configure the MT110-104 Matrix Switcher as 16x16, 8x8, 4x4 or 2x2

Command Format: [MATmXnCi]

mXn = matrix size: 16X16, 8X8, 4X4 or 2X2

Ci = card ID number (i = number from 4 to 19)

16x16

Input	Output
O_9 O_1	O_1 O_9
O_{10} O_2	O_2 O_{10}
O_{11} O_3	O_3 O_{11}
O_{12} O_4	O_4 O_{12}
O_{13} O_5	O_5 O_{13}
O_{14} O_6	O_6 O_{14}
O_{15} O_7	O_7 O_{15}
O_{16} O_8	O_8 O_{16}

8x8

Input	Output
O_{5a} O_{1a}	O_{1a} O_{5a}
O_{5b} O_{1b}	O_{1b} O_{5b}
O_{6a} O_{2a}	O_{2a} O_{6a}
O_{6b} O_{2b}	O_{2b} O_{6b}
O_{7a} O_{3a}	O_{3a} O_{7a}
O_{7b} O_{3b}	O_{3b} O_{7b}
O_{8a} O_{4a}	O_{4a} O_{8a}
O_{8b} O_{4b}	O_{4b} O_{8b}

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4x4

Input	Output
O_{3a} O_{1a}	O_{1a} O_{3a}
O_{3b} O_{1b}	O_{1b} O_{3b}
O_{3c} O_{1c}	O_{1c} O_{3c}
O_{3d} O_{1d}	O_{1d} O_{3d}
O_{4a} O_{2a}	O_{2a} O_{4a}
O_{4b} O_{2b}	O_{2b} O_{4b}
O_{4c} O_{2c}	O_{2c} O_{4c}
O_{4d} O_{2d}	O_{2d} O_{4d}

2x2

Input	Output
O_{2a} O_{1a}	O_{1a} O_{2a}
O_{2b} O_{1b}	O_{1b} O_{2b}
O_{2c} O_{1c}	O_{1c} O_{2c}
O_{2d} O_{1d}	O_{1d} O_{2d}
O_{2e} O_{1e}	O_{1e} O_{2e}
O_{2f} O_{1f}	O_{1f} O_{2f}
O_{2g} O_{1g}	O_{1g} O_{2g}
O_{2h} O_{1h}	O_{1h} O_{2h}

The 16x16 configuration will switch each individual input to each individual output,

e.g. : [I2O1C5] will connect input2 with output1.

The 8x8 configuration will switch 2 inputs to 2 outputs at the same time,

e.g. : [I2O1C5] will connect input2a with output1a and input2b with output1b, etc.

The 4x4 configuration will switch 4 inputs to 4 outputs at the same time.

e.g. : [I3O2C5] will connect input3a to output2a, 3b to 2b, 3c to 2c, and 3d to 2d.

The 2x2 configuration will switch 8 inputs to 8 outputs at the same time.

e.g. : [I1O2C5] will connect input1a to output2a, 1b to 2b, 1c to 2c, and 1d to 2d, 1e to 2e, 1f to 2f, 1g to 2g, and 1h to 2h.

7.3.12. [CLR]

This command resets the card selected to the factory default configuration (Input 1 to all Outputs, all Outputs ON).

Command Format: [CLRCi]

Ci = card ID number (i = number from 4 to 19)

7.3.13. [....S]: Save Output Default Status

Include the “S” option at the end of the command string to save the output default status.

Examples:

[ON1C8U3**S**]

[OFF12C6U3**S**]

7.3.14. [....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:

[ON1C8U3**F**]: if path is not set

[ON1C8U3**PF**]: if path is set

7.3.15. [….P]: Path

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

Command Format example: [OFFmCnUiP]

m = number (m =1 to 16)

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

P = path

Example:

If 2 cards are at slot #6 and #17 of unit #3:

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To enable output 1 and 2 of card #6 and output 3 and 4 of card #17 simultaneously, use the following commands:

[OFF12C6U3**P**]

[OFF34C17U3**P**]

[SW]

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

7.3.16. [SW]

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 MultiTasker™.

Example:

[ON12C6U3**P**]

[ON34C7U3**P**]

[SW]

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

7.4. SUMMARY OF COMMANDS

[HELPCi]: Displays all RS-232 commands.

[Ci]: Displays the card's Input/Output status.

[VERCi]: Displays the card's firmware version.

[IO]: Connects the input to the output

[ON]: Turns on one or more outputs for a single card or a group of cards.

[OFF]: Turns off one or more outputs for a single card or a group of cards.

[OSI]: Set the Input offset.

[OSO]: Set the Output offset.

[SEL]: Select inputs to adjust gain with +/- commands.

[VOL]: Set absolute gain level on the input

[MAT]: Set matrix size.

[CLR]: Reset to Factory defaults.

[…S]: Save Output default status.

[…F]: Enable feedback.

[…P]: Set path for Input to Output connection.

[SW]: Switch (outputs the preloaded buffer)

TROUBLESHOOTING GUIDE 8

We have carefully tested and have found no problems in the supplied **MT110-104.** However, we would like to offer suggestions for the following:

8.1. 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 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.

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. or 1-800-ALTINEX.

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8.2. DISTORTED SOUND

A) 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.

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 or 1-800-ALTINEX.

8.3. SOUND LEVEL IS LOW

B) 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 the **MT110-104** card from between the source and the destination amplifier. If problem persists, call ALTINEX at (714) 990-2300 or 1-800-ALTINEX.

ALTINEX POLICY 9

9.1. LIMITED WARRANTY / RETURN POLICY

Please see the Altinex website at www.altinex.com for details on warranty and return policy.

9.2. CONTACT INFORMATION

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