

MANUAL PART NUMBER: 400-0188-002

MT109-101

**4-IN, 1-OUT STEREO AUDIO SWITCHER
CARD FOR MULTI-TASKER
USER'S GUIDE**

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PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT109-101**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT109-101** 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.
- To prevent fire or shock, do not expose this unit to rain or moisture. Do not place the **MT109-101** 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 **MT109-101** carefully. Dropping or jarring can damage the card.
- Do not pull the cables that are attached to the **MT109-101**.
- 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.

ABOUT YOUR MT109-101 2

MT109-101

4-in 1-out Balanced Stereo Audio Switcher Card

The **MT109-101** is a Stereo Audio Switcher Card. This card allows the connection of 4 balanced stereo audio sources to a single receiving device, such as a cassette recorder, mixer, and/or amplifier for sound reinforcement.

Inputs are selected via easy-to-use ASCII commands from a control system or computer connected to the RS-232 port of a MultiTasker enclosure.

The **MT109-101** is primarily designed to utilize the inputs and output offered on the connector panel. However, it also offers the ability to connect internally to any compatible MultiTasker card, to either send or receive stereo audio signals from the other card.

This feature can be used in a variety of ways to expand the capabilities of the card. For example, two **MT109-101** cards can be installed in the MultiTasker and the output of one can be routed to an input of the other, creating an 8- input, 1-output switcher.

TECHNICAL SPECIFICATIONS 3

FEATURES/DESCRIPTION	MT109-101
GENERAL	
Inputs	
Input Connectors	(4) 5-Pin Terminal Block
Outputs	
Local Monitor Output Connector	(1) 5-pin Terminal Block
Compatibility	Stereo or Mono Audio

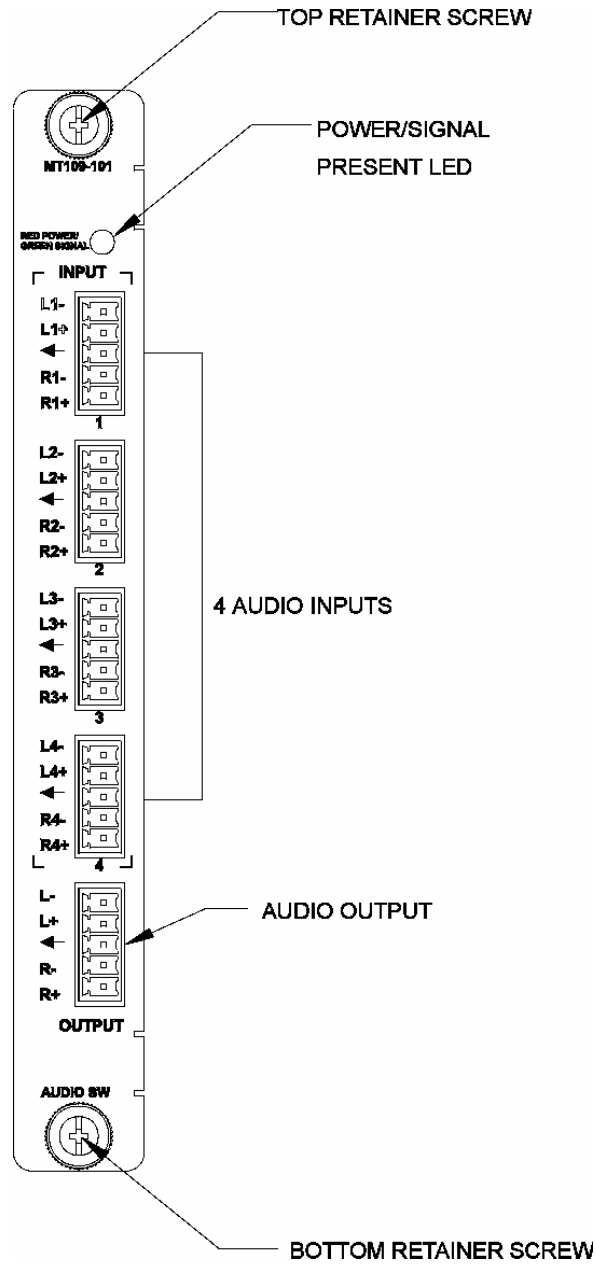
Table 1. **MT109-101** General

MECHANICAL	MT109-101
Basic Enclosure Slots Required	One
Weight	1.0 lb (0.45 kg)
Connector Panel	Black
T° Operating	10°C-40°C
T° Maximum	0 to 50°C
Humidity	90% non-condensing
MTBF (calc.)	55,000 hrs

Table 2. **MT109-101** Mechanical

ELECTRICAL	MT109-101				
Input Signals					
Max Level	0 dBu				
Impedance	10k Ohms				
Audio Throughput					
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				
Output Signals					
Level	1V p-p				
Impedance	Low – drives 600 Ohms				
Gain	0 dB				
Power					
Power from MT100-100	+6V	-6V	+13V	-13V	Power Consumption
MT109-101	20 mA	20 mA	45 mA	40 mA	1.4 watts

Table 3. **MT109-101** Electrical



APPLICATION DIAGRAMS

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DIAGRAM 1: TYPICAL CONFIGURATION

MT109-101

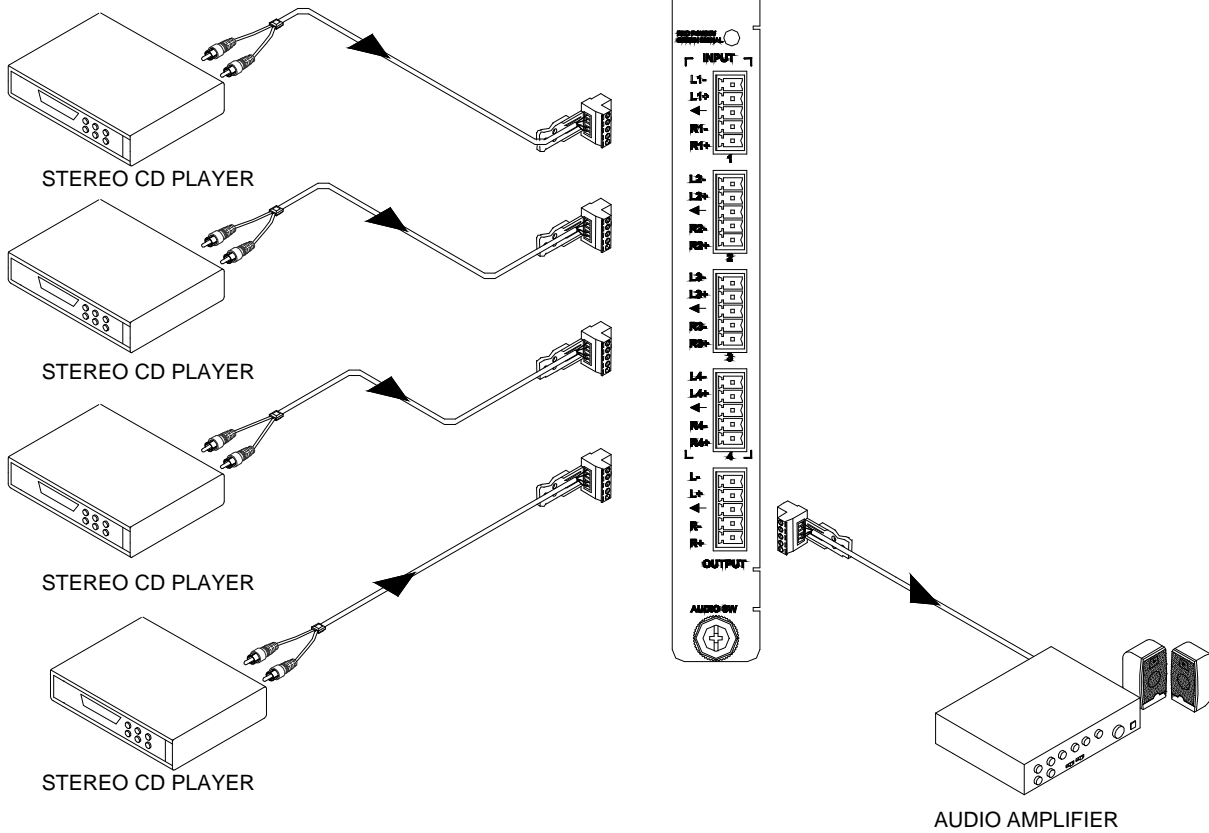


DIAGRAM 2: INTERNAL VIEW

4 IN 1 OUT AUDIO STEREO + SIGNAL DETECT + BALANCED IN/OOUT + EXPANDABLE

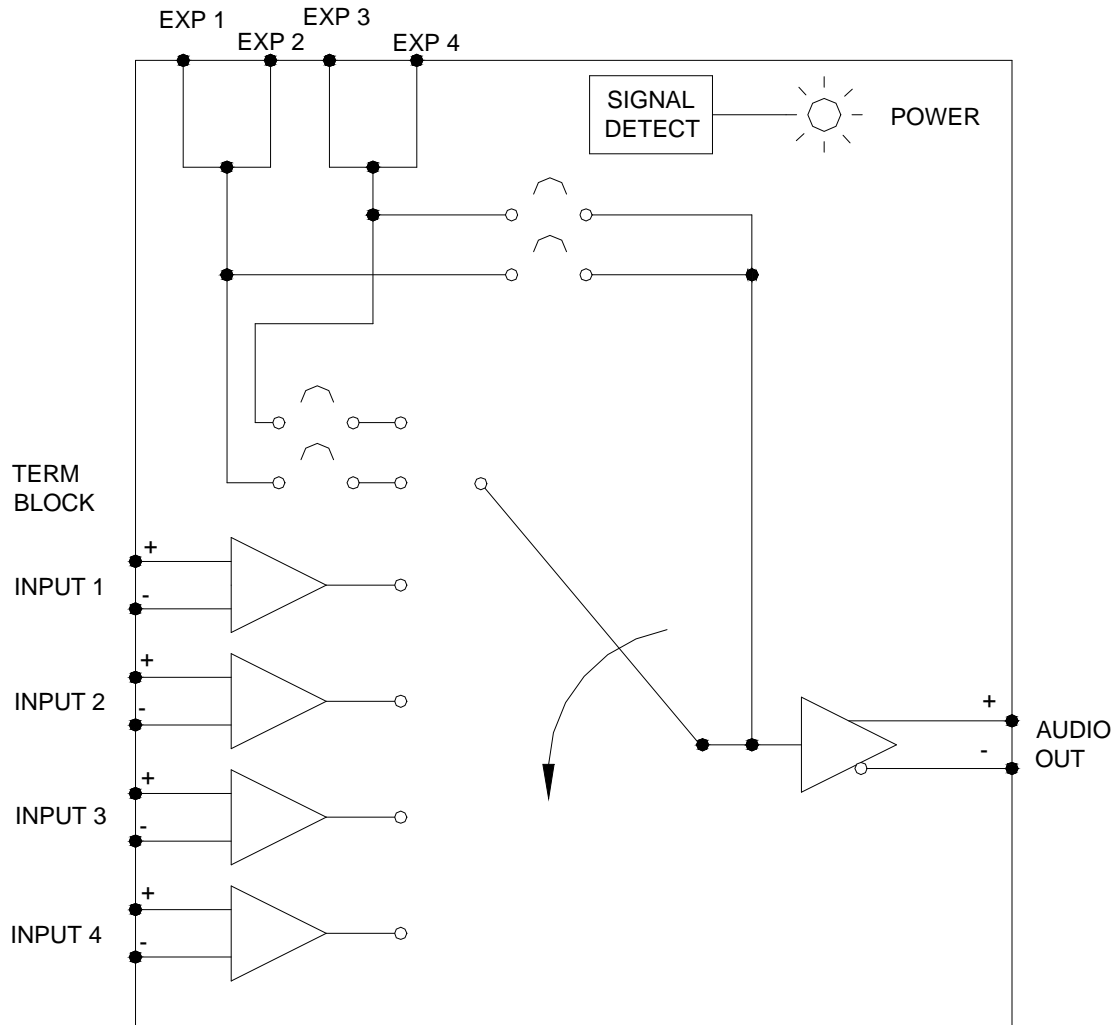
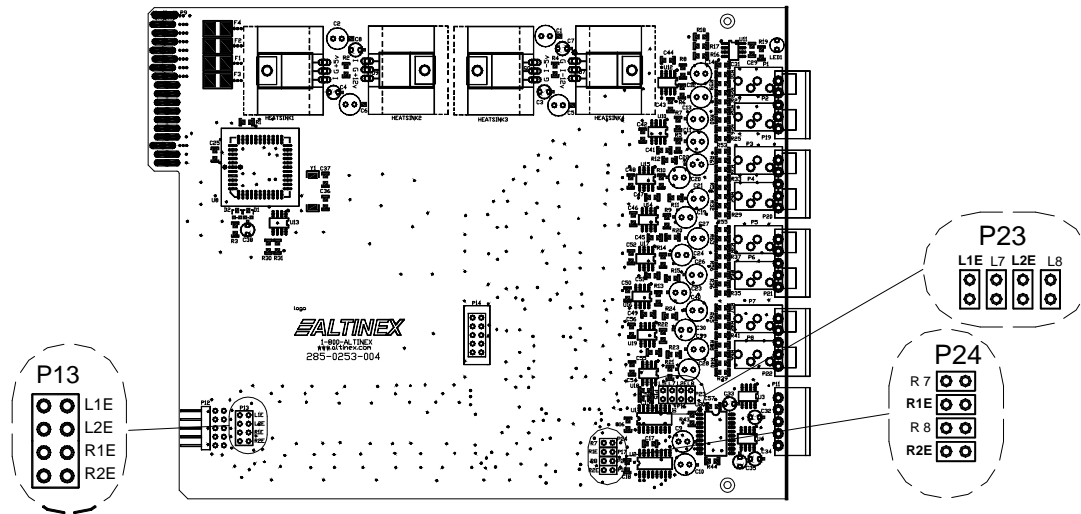


DIAGRAM 3: JUMPER LOCATIONS



The **MT109-101** has 4 external inputs with 1 internal input and 1 output.

The internal input is from the Expansion card through a 10-pin ribbon cable. The ribbon cable is connected between P12 of the Expansion card and P12 of the Master card.

The 4 external inputs are configured as Inputs 1 through 4.

The 1 internal input is configured as Input 7 or Input 8. Only one of two internal inputs may be used at a time and depends on how the jumpers on the Expansion are set.

Setting Jumpers:

1) As an Expansion card:

Set P13 as Port 7 by jumpering L1E and R1E

Set P13 as Port 8 by jumpering L2E and R2E.

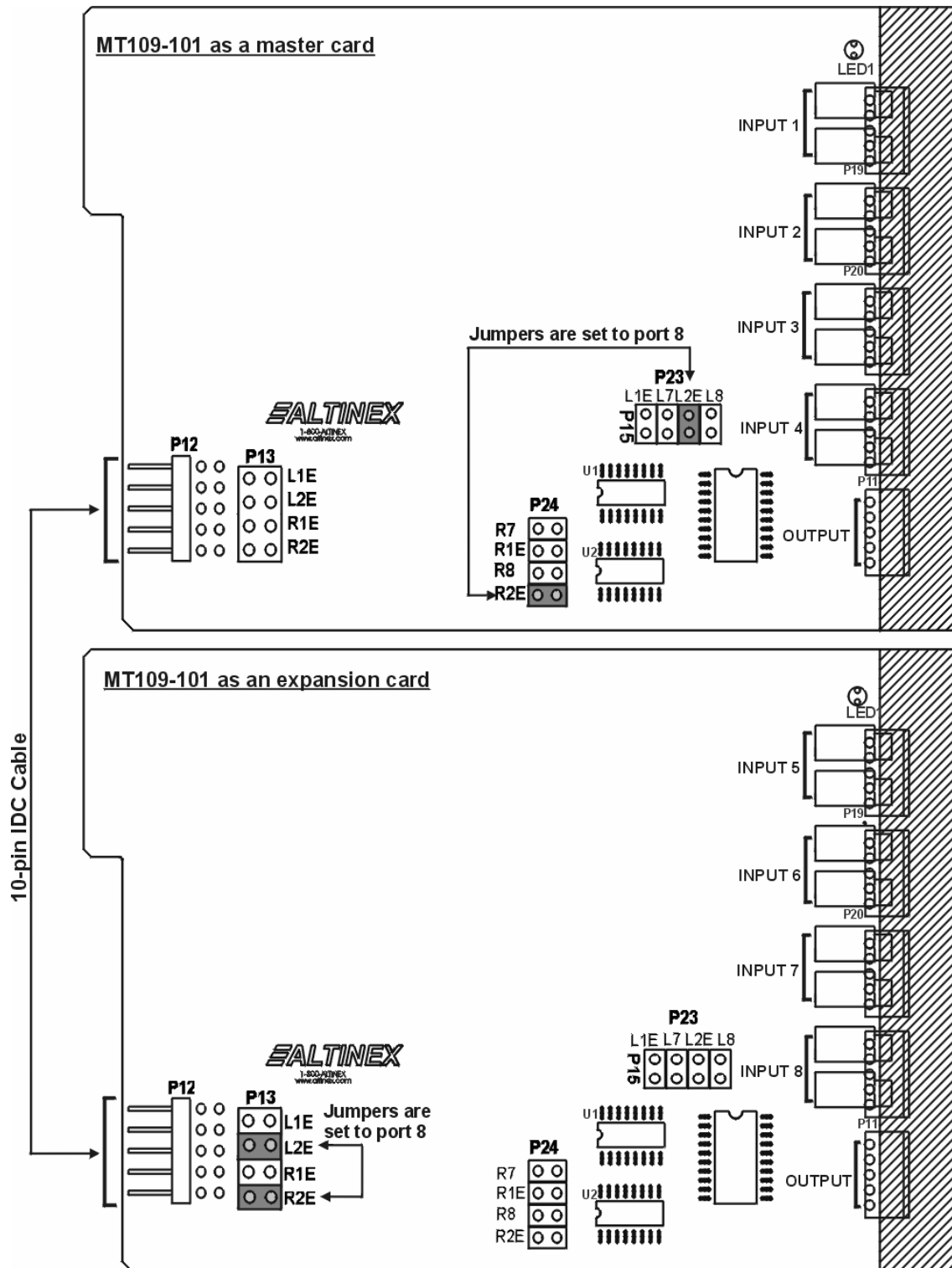
2) As a Master card, set jumpers on P23 and P24 as described below.

A) If the Expansion card's jumpers on P13 are set on L1E and R1E, the Master card must select internal input 7 on P23 (L1E) and P24 (R1E).

B) If the Expansion card's jumpers on P13 are set on L2E and R2E, the Master card must select internal input 8 on P23 (L2E) and P24 (R2E).

NOTE: The configuration of the **MT109-101** is a 4-in, 1-out stereo audio switcher. For an 8-in, 1-out switcher configuration, use two **MT109-101** cards. Use one card as a Master card and the other as an Expansion card. (See [DIAGRAM 4](#), page 7 for details.)

DIAGRAM 4: 8-IN, 1-OUT CONFIGURATION



INSTALLING YOUR MT109-101 6

Step 1. Determine if the **MT109-101** is to be used as an Expansion card or a Master card and set the jumpers per DIAGRAM 4.

For Example:

In Application DIAGRAM 4 on page 8, the Master card has external inputs 1-4, and the Expansion card has external inputs 5-8. However, for RS-232 commands the external inputs of the Expansion card are still identified as inputs 1-4, but on another card. If the Master card is at slot 1 and the Expansion card is at slot 2, the inputs are selected as follows:

MASTER Input 1: [ON1C1]
 2: [ON2C1]
 3: [ON3C1]
 4: [ON4C1]

EXPANSION Input 5: [ON8C1] [ON1C2]
 6: [ON8C1] [ON2C2]
 7: [ON8C1] [ON3C2]
 8: [ON8C1] [ON4C2]

Step 2. If installing a Master and Expansion card, set jumpers per Step 1. Then attach the cards using the 10 pin ribbon cable.

Step 3. Slide the **MT109-101** into an available slot in the Multi-Tasker™ Basic Enclosure in order to connect to the bus. Make sure that the **MT109-101** fits into place. Secure the card to the Multi-Tasker™ by tightening the retainer screws located on the top and bottom of the **MT109-101**.

Step 4. Turn on power to the Multi-Tasker™ system.

Step 5. 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 6. Connect audio cables from the audio source to the input connector of the **MT109-101**. Connect the output connectors of the **MT109-101** to the audio equipment through an audio cable.

Step 7. Starting from the left, identify the slot number where the **MT109-101** 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 **MT109-101** 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 **MT109-101**, 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.

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 an assigned value. It is equal to the enclosure slot number in which the card is installed. The value can range from 1 to 4 up to 1 to 20 depending on the enclosure.

Card ID 0 (C0) is used for the controller. See the MT100-100 User's Guide for details.

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 [VERC2] to check the version of the **MT109-101** in slot 2. The system will return the following feedback:

MT109-101 690-0179-004

MT109-101 = card type

690-0179-004 = software version

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 = # from 0 to 9)

Example:

There is an **MT109-101** card in slot #4. Input 1 is ON and all volume levels are set to the maximum of 32 out of 32. Sending the command [C4] to the Multi-Tasker™ will yield the following feedback:

ON1C04
OUTVOL=32/32
INVOL1=32/32
INVOL2=32/32
INVOL3=32/32
INVOL4=32/32

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

3. [CnS]

This command saves the selected input as well as input and output volume settings. This 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:

Input 1 of the card in slot 4 is enabled. Save the card's state by sending the command [C4S]. The feedback will be as follows:

ON1C04 Saved
OUTVOL=16/32
INVOL1=32/32
INVOL2=32/32
INVOL3=32/32
INVOL4=32/32

4. [?Ui]

This command will return general information about the Multi-Tasker™ and cards installed in the unit.

Command Format: [?Ui]

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

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

Example:

A Multi-Tasker™ with Unit ID #1 has a front panel with part number MT101-101 and contains an **MT109-101**. Send the command [?U1] and receive the following feedback:

```
[+MT101-101U1+MT109-101C04]
```

MT101-101U1 = Panel Number and Unit ID
MT109-101C04 = An MT109-109 is in slot 4

5. [?Cn]

This command will return general information about the card and its status. It is a function of both the card and the front panel and is only available with Multi-Tasker™ 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.

NOTE: In MTSetup™, send the command [VER] from the Terminal Window. The system will respond with feedback similar to 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.

Command Format: [?CnUi]

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

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

Example:

The **MT109-101** in slot #4 has Input 1 turned ON. Send the command [?C4] to receive the feedback status.

Each status field begins with a '+' and ends with the card slot number (ex: C04). The feedback will be similar to the following:

```
[+MT109-101C04+VR690-0179-004C04  
+IN1C04+VO12C05+VI11323232C04+VM0C04]
```

MT109-101	= Card Type
VR690-0179-004	= Firmware version
IN1	= Input 1 Selected
VO12	= Output Volume Level
VI32323232	= Input Volume Levels
VM0	= Mute (0=OFF, 1=ON)

The Input Volume levels are read left to right, representing outputs one through four. The first two digits show the input volume for Input 1 or in this case 32. The next two digits are for Input 2 and so on.

6. [STA]

This command enables/disables automatic feedback from the front panel. The command affects any card with auto-feedback capability, not just the **MT109-101**. The default at power on or reset is STA0, OFF.

Command Format [STA1] = ON

Command Format [STA0] = OFF

Feedback Prefix Definitions:

+VR = Firmware Version

+IN = Input Selected

+VO = Output Volume

+VI = Input Volume

+VM = Mute Control

Example 1:

Command = [ON1C4]

Feedback = [+IN1C04]

+IN = Input Select

1 = Selected Input

C04 = Card slot number

Example 2:

Command = [VLOA22C4]

Feedback = [+VO22C04]

+VO = Output Volume

22 = Volume Level

C04 = Card slot number

7. [+] and [-]

These commands allow the output volume or input volumes to be adjusted from keyboard commands or programmed front panel buttons.

Command Format: [+], [-]

[+] = Increment level by one step

[-] = Decrement level by one step

Example:

See the [SEL] and [SELM] commands for details.

8. [SEL]

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

Command Format: [SELCnUi]

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

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

[+] = Increment level by one

[-] = Decrement level by one

Example:

An **MT109-101** is in slot #4. Adjust the output volume. The current volume level is set to 10. After sending the following commands, a better volume level of 15 is obtained:

1. [SELC4]
The current volume level is 10.
2. [-][-][-]
The level is now 7 and is too quiet.
3. [+] [+] [+] [+] [+] [+] [+] [+]
The level is now 15 and no further adjustments are required.

9. [SELM]

This command is the INPUT volume select command. It sets the path to adjust the input volume level of a specified input and is used in conjunction with the [+] and [-] commands.

Command Format: [SELMCnUi]

m = Input (m # from 1 to 4)

1 = input 1 volume

2 = input 2 volume

3 = input 3 volume

4 = Input 4 volume

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

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

[+] = Increment level by one

[-] = Decrement level by one

Example:

An **MT109-101** is in slot #4. Adjust the volume on Input 4. The current volume level is set to 10. After sending the following commands, a better volume level of 15 is obtained:

1. [SEL4C4]
The current volume level is 10.
2. [-][-][-]
The level is now 7 and is too quiet.
3. [+] [+] [+] [+] [+] [+] [+] [+]
The level is now 15 and no further adjustments are required.

10. [VLOAn]

This command sets the absolute volume level for the OUTPUT volume.

Command Format: [VLOAnCnUi]

An = Volume Level (# from 01 to 32)

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

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

Example:

Set the output volume level, of the card in slot #4, to a level of 16 using the command [VLOA16C4].

11. [VLImAv]

This command sets the absolute volume level for a specified INPUT.

Command Format: [VLImAnCnUi]

m = Input (m # from 1 to 4)
 1 = input 1 volume
 2 = input 2 volume
 3 = input 3 volume
 4 = Input 4 volume

An = Volume Level (# from 01 to 32)
 Cn = Card ID (n = # from 1 to max slots)
 Ui = Unit ID (i = # from 0 to 9)

Example:

Set the volume level for Input 2, of the card in slot #4, to a level of 16 using the command [VL12A16C4].

12. [RUP]

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 from a starting level of 10 to the maximum level of 32 for the card in slot #8. Send the command [RUPC8] and the system will respond with the following feedback:

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

13. [RUP=xx]

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

Command Format: [RUP=xxCnUi]

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 from a starting level of 1 to a level of 20 for the card in slot #8. Send the command [RUP=20C8] and the system will respond with the following feedback:

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

14. [RDN]

This command ramps the output volume down to a level of 1 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)

VOLUME RAMPING FEATURE

The following 7 commands are used to control the volume of the **MT109-101**. 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 and subroutine 10 starts ramping down when key 10 is pressed. Subroutine 108 stops ramping when either key is released.

```
{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.
```

Example:

Ramp the output volume from a starting level of 32 down to 1 for the card in slot #4. Send the command [RDNC4] and the system will respond with the following feedback:

[31][30][29]...[01]

15. [RDN=xx]

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

Command Format: [RDN=xxCnUi]

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 from a starting level of 32 down to 16 for the card in slot #4. Send the command [RDN=16C4] and the system will respond with the following feedback:

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

16. [RAMP]

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 #4 by sending the command [RAMPC4]. The system will respond with feedback similar to the following:

RAMPTIME = 6 SECONDS

17. [RAMP=x]

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 **MT109-101** in slot #4. Send the command [RAMP=16C4] to set the ramp rate to 16 seconds. After this is set, any ramping will occur at a rate of 32 steps in 16 seconds, or 0.50 seconds per step. Confirm the setting by sending the command [RAMPC4] and receiving the feedback:

RAMPTIME = 16 SECONDS

18. [RST]

This command stops ramping and maintains the last volume setting.

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.

19. [CLR]

This command resets the card configuration to the factory defaults. After the [CLR] command, Input 1 will be selected, the output volume will be at maximum and all input volumes will be at maximum.

Command Format: [CLRCnUi]

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

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

Example:

Send the command [CLRC4] to reset the card in slot #4 to its factory defaults. The feedback will be as follows:

```
ON1C04
OUTVOL=32/32
INVOL1=32/32
INVOL2=32/32
INVOL3=32/32
INVOL4=32/32
```

20. [ONm]

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

SINGLE CARD OPERATION

Command Format: [ONmCnUi]

m = Input number (m = # from 1 to 4)

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

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

Example:

There is an **MT109-101** card in slot #4. Send the command [ON2C4] to select (turn on) input 2.

GROUP OPERATION

Command Format: [ONmGkUi]

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

m = Input number (m = # from 1-4)

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

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

Example:

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

PATH OPERATION

Command Format: [ONmCnUiP]

This command will set the path for the input, 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.

m = Input number (m = # from 1 to 4)

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

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

P = Path

Example:

There are two **MT109-101** cards in slots 6 and 7. Enable Input 1 of card 6 and Input 3 of card 7 simultaneously. To do this, send the following commands:

```
[ON1C6P]
[ON3C7P]
[SW]
```

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

FEEDBACK OPERATION

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

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

Example:

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


21. [ON]

This command turns ON the output volume without changing the input port selected and without changing any volume settings. It is equivalent to the MUTE OFF command.

Command Format: [ONCnUi]

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

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

Example:

Send the command [ONC4] to turn on the output volume for the card in slot #4.

22. [OFF]

This command turns OFF the output volume without changing the input port selected and without changing any volume settings. It is equivalent to the MUTE ON command.

Command Format: [OFFCnUi]

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

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

Example:

Send the command [OFFC4] to turn off the output volume for the card in slot #4.

23. [MUT0]

This command turns ON the output volume 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 turn on the output volume for the card in slot #4.

24. [MUT1]

This command turns OFF the output volume without changing the input port selected and without changing any 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 turn off the output volume for the card in slot #4.

25. [...S] – SAVE

This command will save the configuration command being sent in memory. When sending the command [ON1C4S], after reset or power up, Input 1 on C4 will be enabled.

26. [...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.

27. [...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 loaded. See examples in ON and OFF commands.

Example:

There is an **MT109-101** in slot #4. Currently, Input 1 is ON. The PATH command has been used to set Input 2 to ON. If checking the status prior to sending the [SW] command, the feedback will appear as follows:

```
ON1C03 P=2
OUTVOL=32/32
INVOL1=32/32
INVOL2=32/32
INVOL3=32/32
INVOL4=32/32
```

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

28. [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:

[ON1C6P]

[OFF3C7P]

[SW]

29. [TEST]

This command performs a test on the internal memory. Upon completion, the system will display the results. If there are no problems, the system will display the following:

MEMORY IS GOOD

Otherwise, failures will be indicated.

Command Format: [TESTCnUi]

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

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

Example:

There is an **MT109-101** in slot #4. In order to test the internal memory, send the command [TESTC4].

30. [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.

CARD ID COMMANDS

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.

The ID commands work with all Multi-Tasker™ Front Panel systems. However, front panels that have firmware releases prior to the following will not be able to address Card ID's 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.

NOTE: In MTSetup™, send the command [VER] from the Terminal Window. The system will respond with feedback similar to the following:

[690-0122-015 690-0123-005 690-0124-019]

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

Some cards require more than one slot in the Multi-Tasker™ system. As an example, some matrix switcher cards require 4 slots. If there are 5 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.

31. [RSI]

This command resets the card ID's in the system. After sending this command, each card ID in the system will match the slot number of the card. Use this command along with the SID commands that follow. The [RSI] command MUST be used prior to changing Card ID's once they have already been set.

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.

32. [SIDn]

This command sets all the cards installed in the Multi-Tasker™ 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.

33. [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.

34. [SID+]

This command sets the Card ID of all the cards in a system 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 Card ID defaults which are equal to their slot numbers. The second unit will have the same Unit ID, but will have the card ID's offset by 20.

Connect the computer to the second unit only and send the command [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 ID's 1-20 and the cards in the second unit will be referenced by Card ID's 21-40.

35. [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 takes up four slots in the enclosure. Its ID was set to 1 since it is the first card installed in the system, reading from left to right. Send the command [RSNC1] to find the slot number of this card. The system responds with the following feedback:

4

36. [HELP]

This command displays information available for the Multi-Tasker 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 **MT109-101** card in slot #4, send the command [HELPC4]. The commands along with a brief description will be displayed in the Terminal Window.

37. [WR]

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

In Multi-Tasker™ 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

If assigning group commands to button functions, it is best to use the "Press and Hold on Power Up" to make group settings.

Command Format: [WRCn₁Cn₂...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:

To group cards 1, 2, and 3 as group 5 of Unit ID 1, send the command [WRC1C2C3G5U1]. After executing this command, cards 1, 2 and 3 will be grouped together as group 5 of Unit ID 1. The system will return the following feedback:

G1=C1C2C3

Now, when a command is sent to G1, each board in G1 will execute the same command.

38. [RD]

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

Command Format: [RDGkUi]

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

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

Example:

The cards in slots 1, 2 and 19 are part of group 5. Read the member data for group 5, by sending the command [RDG5]. The system will return feedback as follows:

G1=C1C2C19

The feedback shows G1 (Group 1) and then the cards that make up Group 1. In this case, Group 1 includes C1, C2 and C19.

39. [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: [RMCn₁Cn₂...GkUi]

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

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

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

Example:

Group 1 consists of the cards located in slots numbered 1, 2, 3, 4 and 5. Remove just cards #4 and #5 from the group by sending the command [RMC4C5G1]. The system will return the following feedback:

G1=C1C2C3

40. [RMG]

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

REMOVE ONE GROUP MEMBERS

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

Command Format: [RMGkUi]

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

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

Example:

Group 1 consists of the cards located in slots number 1, 2 and 3. Remove all cards from the group by sending the command [RMG1]. The system will return the following feedback:

G1=EMPTY

REMOVE ALL GROUPS

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

Command Format: [RMGÜUi]

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

Example:

Group 1 consists of cards 1 and 2. Group 2 consists of cards 1, 2, 3, 4 and 5. Delete all the groups by sending the command [RMGÜ]. The system will return the following feedback:

G1-G8:EMPTY

41. [CLM]

This command removes the members in a group and leaves the group empty. It is equivalent to sending the [RMGkUi] command without card references.

Command Format: [CLMGkUi]

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

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

Example:

Group 5 of Unit ID 1 contains the cards in slots 1, 2 and 19. Read the member data for group 5 of Unit ID 1. Send the command [RDG5U1] and receive the following feedback:

G1=C1C2C19

Now, clear group 5 by sending the command [CLMG5U1]. Reread the member data as above and note the following feedback:

G1=EMPTY

42. [CLRG]

This command clears the members for a single group or for all groups. The clear command restores the cards to default settings and is the equivalent to sending the [CLR] command to each individual card.

NOTE: Since this command is sending the [CLR] command to its group members, each card will display its own reset message, if any.

Command Format: [CLRGkUi]

Gk = Group ID (k = # from 1-8, or Ü for all)

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

Example:

- 1) To clear group 1 of Unit ID 0, send the [CLRG1] command. This command clears the members for the specified group only.
- 2) To clear all groups of Unit ID 1, send the [CLRGÜU1] command.

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 status/ general information
- 6) [STA] Enable/disable auto feedback
- 7) [+], [-] Increment/Decrement a setting
- 8) [SEL] Select output volume to adjust
- 9) [SELM] Select input volume to adjust
- 10) [VLO] Set absolute output volume level
- 11) [VLIm] Set absolute input volume level
- 12) [RUP] Ramp volume UP to max (32)
- 13) [RUP=] Ramp volume UP to a value
- 14) [RDN] Ramp volume DOWN to min (1)
- 15) [RDN=] Ramp volume DOWN to a value
- 16) [RAMP] Return ramp rate
- 17) [RAMP=] Set ramp rate
- 18) [RST] Stop ramping
- 19) [CLR] Reset card to default values
- 20) [ONm] Select input signal
- 21) [ON] Output Volume ON
- 22) [OFF] Output Volume OFF
- 23) [MUT0] Output Volume ON
- 24) [MUT1] Output Volume OFF
- 25) [...S] Save the command configuration
- 26) [...F] Provides feedback upon sending
- 27) [...P] Sets the path, preload for [SW]
- 28) [SW] Switch preloaded output buffer
- 29) [TEST] Test internal memory IC's
- 30) [FBD] Feedback delay on/off

- 31) [RSI] Reset Card ID's
- 32) [SIDn] Set all Card ID's
- 33) [SIDnCi] Set one Card ID
- 34) [SID+n] Set Card ID offset
- 35) [RSN] Read Card slot number
- 36) [HELP] Display available commands

Group Commands

- 37) [WR] Groups multiple cards
- 38) [RD] Displays group members
- 39) [RMC] Remove members from group
- 40) [RMG] Delete group
- 41) [CLM] Remove all group members
- 42) [CLRG] Clears group members

7.4 MENU MODE

MENU MODE commands are RS-232 commands that allow virtually the same functionality as programming commands. Unlike the programming commands in the previous sections, 7.2 and 7.3, MENU commands prompt the user to select from a list of available options. The system then responds based upon selections made by the user.

MENU commands may be issued in response to prompts from within MTSetup™ or other RS-232 communication software.

The MENU driven commands are only available with Multi-Tasker™ 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.

NOTE: In MTSetup™, send the command [VER] from the Terminal Window. The system will respond with feedback similar to the following:

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

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

7.4.1 MENU COMMAND DEFINITIONS

Refer to section 7.2 for details on card functions and examples. Following is a cross-reference of menu mode sections versus programming commands.

MENU	COMMAND
Control	
SELECT	n/a
SAVE	[CnS]
CLEAR	[CLR]
SWITCH	[ON]
VOLUME	[VLO], [RUP], [RDN], [RST]
MUTE	[MUT0], [MUT1], [OFF], [ON]
Setup	
Set Group ID	[WR],[CLM],[RMG]
Set Input Volume	[VLI]
Set Ramp Time	[RAMP]
Status	[VER], [C]
Help	[HELP]
Not Available	[?], [STA], [...S], [...F], [...P], [SW], [TEST], [CLRG], [RD], and [SEL] with [+], [-]

7.4.2 USING MENU MODE

SUGGESTION: Before using the menu mode, it is best to disable the automatic feedback feature. The values and current settings will be displayed in the menu mode, but the automatic feature will display after each setting change making the menus difficult to read.

1. In order to enter MENU mode, the system needs to be connected to a computer running MTSetup™ or other RS-232 control software.
2. Insert the card into an empty slot and push in all the way for a secure fit.
3. Reset the system or power the system OFF and then ON.

4. In MTSetup™, click the cursor in the Terminal Window and press the ENTER key.
5. The system will interrogate the enclosure and return a list of cards installed and their slot locations.

Example: 08 (Slot 8): **MT109-101**

NOTE: Only cards supporting the MENU feature will be displayed.

5. Find the alphanumeric characters representing the card whose setup requires changing. It will be the first one or two characters in the line.
6. Press the number or letter associated with the card, and a menu with options available for that card will appear on the screen. In the example above, press "08".

WARNING: Do NOT enter any characters except the one relating to the desired menu. Pressing ENTER or RETURN after "08" will force the system back to the original prompt.
7. After selecting the **MT109-101** as described above, the system will prompt for selections specific to that card.
8. Read each menu carefully, and continue selecting keys as prompted for further functions. (Example prompt: "Key= ")

7.4.3 MENU TYPES

1. MAIN MENU

The first menu displayed after selecting the card is the Main Menu. This menu provides access to the main functions related to the card. Press the key representing the menu item for access. A sub menu will appear next.

2. SUB MENUS

Each sub menu will display either another menu (sub menu) or a list of available options or settings. Press the key corresponding to the menu choice to change a setting or select the next menu.

NOTE: Pressing the ESCAPE (ESC) key in most menus will take you up to the previous menu without making changes in the current menu.

7.4.4 MT109-101 MENUS

Following are the menus available to the **MT109-101**. The first menu is the Main Menu only. The second listing is an expansion of all the menu items available.

The expanded menu contains some values that indicate the current setting or value of that parameter. In some areas, additional comments are provided for clarification.

System prompts requiring specific values for volume, card number etc... are not shown. See the examples following the menus for details.

CAUTION: Pay special attention to the top of the CONTROL menu. After selecting the CONTROL menu, THIS CARD or a group will be identified at the top of the sub menu. Since group functions may be modified from this menu, make sure the desired card or group is selected.

MT109-101 MAIN MENU

PRESS KEY TO SELECT

- 1: CONTROL
- 2: SETUP
- 3: STATUS
- 4: HELP
- ESC: GO BACK

KEY =

MT109-101 EXPANDED MENUS

1. CONTROL: THIS CARD

1: SELECT (Card/Group)

CURRENT SELECTION: THIS CARD

0: This Card

1: Group 1

2: Group 2

3: Group 3

4: Group 4

5: Group 5

6: Group 6

7: Group 7

8: Group 8

ESC: GO BACK

2: SAVE

SAVE THIS SETTING?

1: YES

2: NO

KEY =

3: CLEAR

RESET CARD TO FACTORY DEFAULT:

* Switch to Input 1

* Set Input Volumes to maximum (32)

* Set Output Volume to maximum (32)

* Set Mute Off

* Set Ramp Time to 6 SEC

1: YES

2: NO

KEY=

4: SWITCH

SWITCH: (INPUT2)

1: INPUT1 (InVol=32)

2: INPUT2 (InVol=32)

3: INPUT3 (InVol=32)

4: INPUT4 (InVol=32)

ESC: GO BACK; S:STATUS

5: VOLUME

CHANGE OUTPUT VOLUME(32)

1: SET ABSOLUTE VOLUME

2: RAMP VOLUME UP

3: RAMP VOLUME DOWN

ESC: GO BACK

6: MUTE

MUTE: OFF

1: MUTE ON

2: MUTE OFF

ESC: GO BACK

2: SETUP

1: SET GROUP ID

SET GROUP ID: (G1)

1: ASSIGN GROUP ID

Use this command to add the card to a group. If the groups is not defined yet, it will be created.

1: Group 1

2: Group 2

3: Group 3

4: Group 4

5: Group 5

6: Group 6

7: Group 7

8: Group 8

2: DELETE GROUP ID

Use this command to remove all the members from a group.

1: Group 1

2: Group 2

3: Group 3

4: Group 4

5: Group 5

6: Group 6

7: Group 7

8: Group 8

ESC: GO BACK

2: SET INPUT VOLUME

SET INPUT VOLUME:

1: INVOL1 (32)

2: INVOL2 (32)

3: INVOL3 (32)

4: INVOL4 (32)

SELECT INPUT: ENTER A NUMBER,
ESC: GO BACK

INPUT

3: SET RAMP TIME

CURRENT RAMP TIME: 6 SEC

1: 04 SEC

2: 06 SEC

3: 08 SEC

4: 10 SEC

5: 12 SEC

6: 14 SEC

7: 16 SEC

8: 18 SEC

ESC: GO BACK

KEY=

3: STATUS

Equivalent to the [C] command.

Returns the card status.

4: HELP

Equivalent to the [HELP] command.

Displays a list of commands available for the **MT109-101** along with a brief description.

ESC

Returns to the parent menu.

7.4.5 MENU MODE EXAMPLES

All MENU MODE examples assume an **MT109-101** is installed in slot #1. Start by clicking the mouse in the Terminal window. Press ENTER and a list of available cards will be displayed.

NOTE When entering numeric values (not selecting menu items) the system may echo each character as it is typed depending on your communication software settings. For example, entering a delay time of 03 may appear as 0033 on the screen.

1. Select An Input

Follow the keystrokes below to select Input 3 as the source input.

Enter	List available cards
1	Select MT109-101 in slot #1
1	Select CONTROL Menu
1	Select Card/Group Select
0	Select This Card (card #1)
ESC	Accept this selection
4	Select SWITCH sub menu
3	Select Input 3
ESC	Return to CONTROL Menu
ESC	Return to the MAIN Menu

2. Set Input 3 Input Volume

Starting from the main menu, set Input 3 volume level to 16. Follow the keystrokes below.

2	Select SETUP Menu
2	Select Set Input Volume
3	Select Input 3 Volume
16	Enter 16
	The new setting is made and the values are redisplayed.

NOTE: The system may echo the 1 and the 6 entries.

ESC	Return to the SETUP
ESC	Return to the MAIN Menu

3. Set Output Volume

Starting from the main menu, set the output volume level to 16. Follow the keystrokes below.

1	Select CONTROL Menu
5	Select VOLUME
1	Select SET ABSOLUTE VOLUME
16	Enter 16
	The new setting is made and the menu is redisplayed with the new output volume shown.
ESC	Return to the CONTROL menu
ESC	Return to the MAIN Menu

4. Set Ramp Time

Starting from the Main Menu, set the ramp time to 10 seconds. Follow the keystrokes below.

2	Select SETUP Menu
3	Select SET RAMP TIME
4	Select Ramp Time = 10 seconds
ESC	Return to the SETUP menu
ESC	Return to the MAIN Menu

5. Display Card Status

Starting from the Main Menu, follow the keystrokes below.

3	Displays card status
---	----------------------

NOTE: The status will be displayed, followed by the Main Menu being redisplayed.

TROUBLESHOOTING GUIDE

8

We have carefully tested and have found no problems in the supplied **MT109-101**; 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 IC's 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 wrong card is 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 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: 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

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.

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 Input volume is low.

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 card from between the source and the destination amplifier. If problem persists, call ALTINEX at (714) 990-2300.

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

ALTINEX, INC

592 Apollo Street

Brea, CA 92821 USA

TEL: 714 990-2300

TOLL FREE: 1-800-ALTINEX

WEB: www.altinex.com

E-MAIL: solutions@altinex.com