

MT105-106/109 is shown above.

MANUAL PART NUMBER: 400-0223-002

**MT105-106/MT105-107/MT105-109**

**6X2; 4X4; 2X6 VIDEO/SYNC MATRIX**

**SWITCHER (BNC IN/OUT) FOR**

**MULTI-TASKER**

**USER'S GUIDE**

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## PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT105-106/107/109**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT105-106/107/109** 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 **MT105-106/107/109** 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 **MT105-106/107/109** carefully. Dropping or jarring can damage the card.
- Do not pull the cables that are attached to the **MT105-106/107/109**.
- 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 MULTI-TASKER™ 2

### MT105-106/MT105-109 Re-configurable Video/S-Video Matrix Switcher Cards

The **MT105-106/109** are re-configurable Video Matrix Switcher Card designed for use with the Multi-Tasker™.

The **MT105-106** is designed for Composite Video signals and has BNC input and output connectors.

The **MT105-107** is designed for SYNC Video signals and has BNC input and output connectors.

The **MT105-109** is designed for S-Video signals and has 4 pin Mini DIN input and output connectors.

Both cards can be configured to provide different matrix sizes. There are 2 fixed inputs and 2 fixed outputs. In addition there are 4 re-configurable In/Out ports. These 4 ports can be configured with jumpers to be either input or output ports. For example, the card can be configured as a 2 in 6 output matrix or a 6 in 2 output matrix just by changing jumpers.

Size	I/O set to INPUT	I/O set to OUTPUT
2x6	0	4
3x5	1	3
4x4	2	2
5x3	3	1
6x2	4	0

Multiple **MT105-106** cards can be installed in the enclosure to provide additional functionality. For example, three cards to handle Component Video. If you need to switch signals use **MT105-107**.

The **MT105-106/109** provides an economical application for S-Video type video signals. This card is designed for 220 MHz bandwidth performance.

Inputs are selected through easy-to-use ASCII commands from a control system or computer connected to the RS-232 port of the Multi-Tasker™ Enclosure.

## TECHNICAL SPECIFICATIONS 3

Features/Description	MT105-106	MT105-107	MT105-109
<b>GENERAL</b>			
<b>Inputs</b>	2 to 6	2 to 6	2 to 6
Input Connectors	BNC Female	BNC Female	4 Pin MINI DIN
Internal I/O	4 2-pin Jumpers	4 2-pin Jumpers	12 2-pin Jumpers
<b>Outputs</b>	2 to 6	2 to 6	2 to 6
Output Connector	BNC Female	BNC Female	4 Pin MINI DIN
<b>Compatibility</b>			
Use 1 Card	Composite Video (NTSC, PAL, SECAM)	Sync Video	S-Video
Use 2 Cards	S-Video	N/A	N/A
Use 3 Cards	Component Video RGsB	N/A	N/A
Use 4 Cards	RGBS (MT105-107)	N/A	N/A
Use 5 Cards	RGBHV (MT105-107)	N/A	N/A

Table 1. **MT105-106/107/109** General

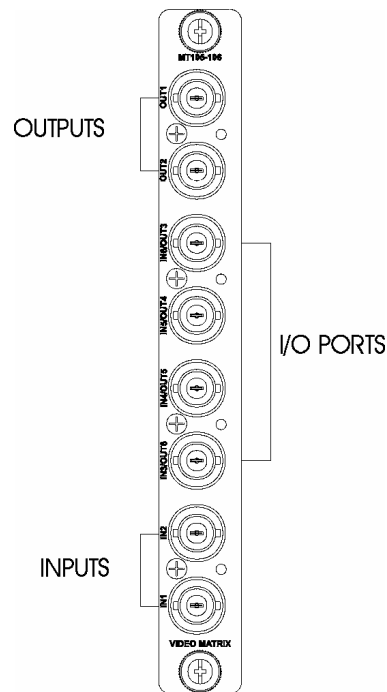
MECHANICAL	MT105-106/107/109
Enclosure Slots Required	1
Weight	1.0 lb (0.45 kg)
Connector Panel	Black
T° Operating	10°C-50°C
T° Maximum	75°C
Humidity	90% non-condensing
MTBF (calc.)	50,000 hrs

Table 2. **MT105-106/109** Mechanical

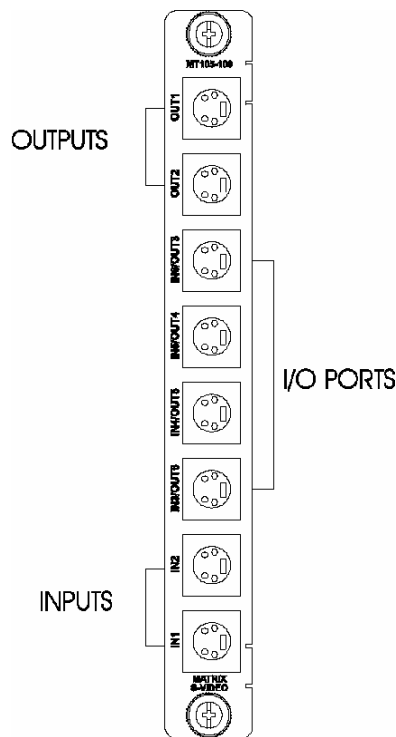
ELECTRICAL	MT105-106/109	MT105-107
<b>Input Signals</b>		
Impedance	75 Ohms	10 KOhms
Analog	1.5V p-p max.	TTL/Analog
<b>Output Signals</b>		
Impedance	75 Ohms	22 Ohms
Gain	1.05	N/A
Bandwidth		
<b>MT105-106</b>	220 MHz @ -3dB	
<b>MT105-109</b>	100 MHz @ -3dB	

Table 3. MT105-106/107/109 Electrical

## PRODUCT DESCRIPTION 4



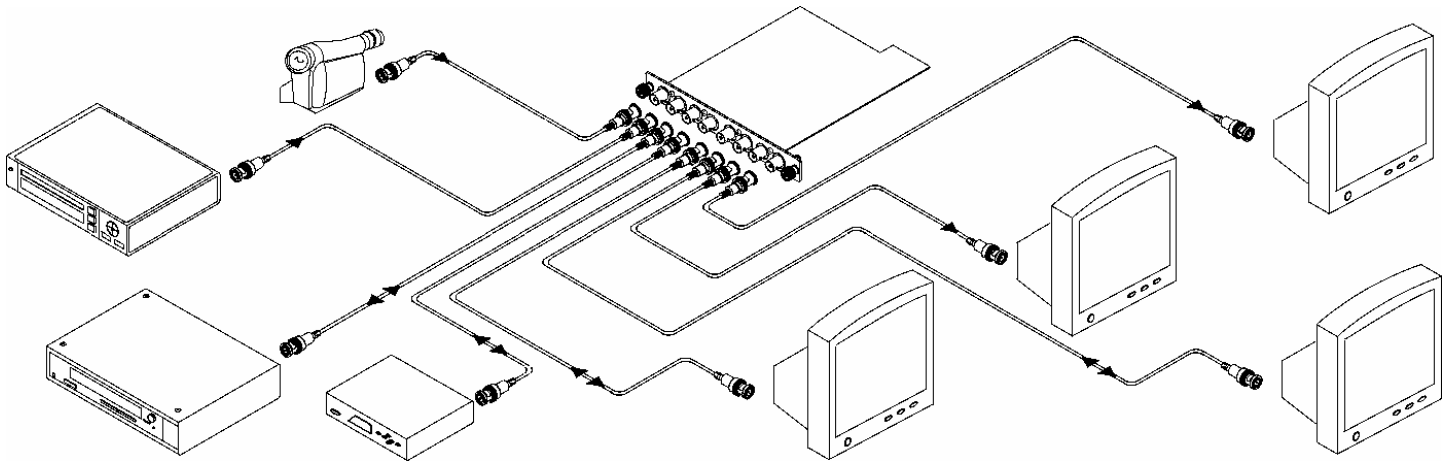
MT105-106/107 Back Panel



MT105-109 Back Panel

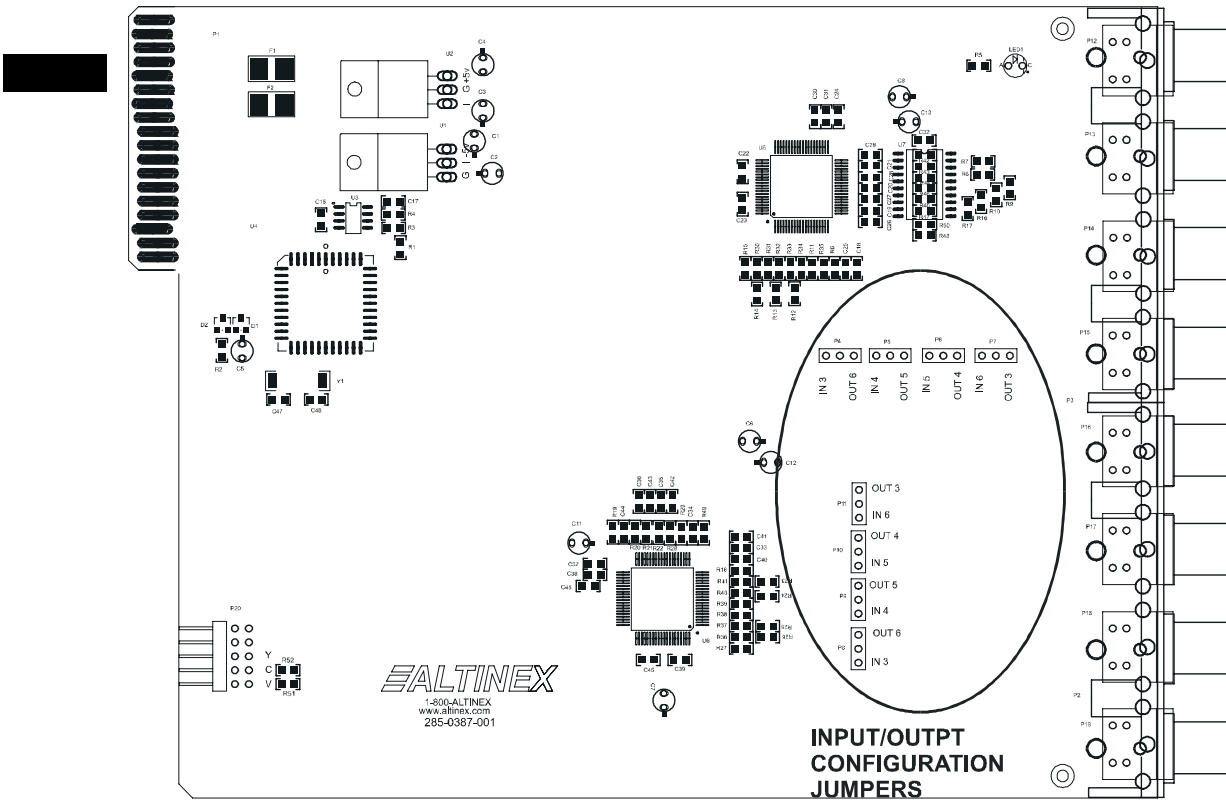
## APPLICATION DIAGRAM

5



## SETTING INPUTS AND OUTPUTS

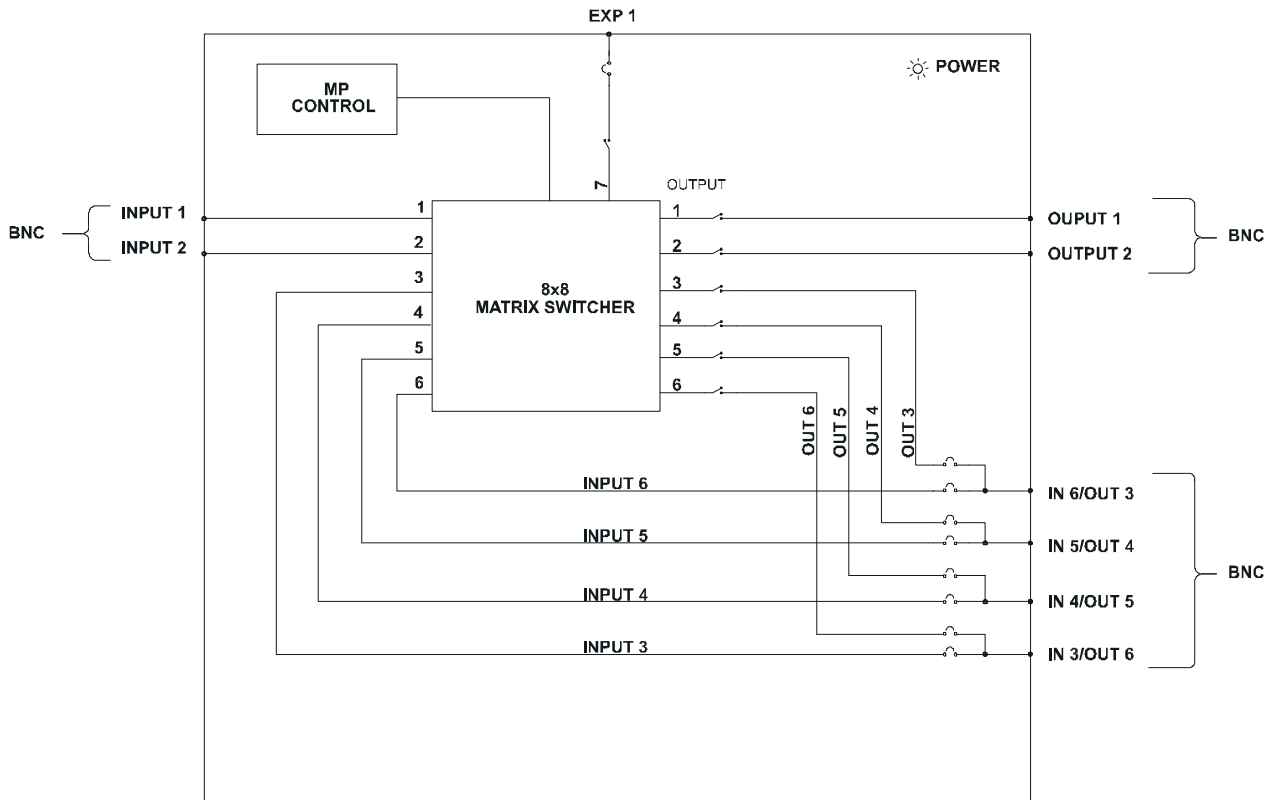
6



Location of configuration jumpers

6

## BLOCK DIAGRAM 7



## INSTALLING YOUR MULTI-TASKER™ 8

- Step 1.** Slide the **MT105-106/107/109** into an available slot in the Multi-Tasker™ Enclosure in order to connect to the bus. Make sure that the **MT105-106/107/109** card fits into place. Secure the card to the Multi-Tasker™ by tightening the retainer screws located on the top and bottom of the **MT105-106/107/109**.
- Step 2.** Connect a coaxial cable from the video source to the input connector of the **MT105-106/107/109**. Connect the output connectors of the **MT105-106/107/109** to the display devices through a coaxial cable.
- Step 3.** Starting from the left, identify the slot number where the **MT105-106/109** card is plugged into the Enclosure and note that it is for RS-232 control.

## OPERATION 9

### 9.1 RS-232 CONTROL

When used in the Multi-Tasker™ Enclosure, the **MT105-106/107/109** 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.

### 9.2 RS-232 INTERFACE

The RS-232 commands for the **MT105-106/107/109** are in a simple ASCII character format.

**1. Square brackets “[ ]” are part of the command.**

Use uppercase letters for all commands.



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

Commands such as [ON], [OFF], and [IO] that end 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 (power off & power on again).

## 9.3 DESCRIPTION OF COMMANDS

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

### Example:

[VERC3U2]  
VER = function  
C3 = Card ID  
U2 = Unit ID

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

Card ID is an assigned value from 1 to 19, (1 to 8 or 1 to 2 depending on which enclosure is being used); based on which slot the card is put in. Card ID 0 (C0) is used for the controller (see user's guide for the **MT100-100**). Changing the position of a card will significantly affect the commands recorded on software definitions or a third party control system.

Unit ID has a value from 0 to 9. Unit ID 0 should be used for single unit operation. If the Unit ID is set to 0, then each command can be used without Ui (use command [SETU0]; see user's guide for the MT100-100).

### Example:

[VERC3]: for unit ID zero  
[VERC3Ui]: for unit ID other than zero  
[VERC3]: equivalent to [VERC3U0]

## 1. [VER]

This command displays the software version and card type for the **MT105-106/107/109** card.

Command Format: [VERCnUi]

Cn = card ID (n = slot # from 1 to 19)  
(1 to 8 for MT100-101 or 1 to 4 for MT100-106)  
Ui = Unit ID (i = # from 0 to 9) (refer to MT100-100 user's guide for explanation)

### Example:

If one **MT105-106/107/109** card is in slot #2 of unit 3. When sending command [VERC2U3], the Multi- Tasker™ Enclosure will return feedback as:

**MT105-106 690-0126-011**

MT105-106 = card type  
690-0126-011 = software version

## 2. [C]

This command displays the status of the card and connections of the Matrix Switcher.

Command Format: [CnUi]

Cn = card ID (n = a slot # from 1 to 19)  
(1 to 8 for MT100-101 or 1 to 4 for MT100-106)

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

### Example:

If one **MT105-106/107/109** card is in slot #2 of unit 3 with output 1, 2 and 3 ON:

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

In1 Out1 ON  
In2 Out2 ON  
In1 Out3 ON  
In2 Out4 OFF  
In8 Out5 OFF  
In7 Out6 OFF  
In2 Out7 OFF

Description of Feedback:

Input1 is connected to Output1 and Output1 is enabled

Input2 is connected to Output2 and Output2 is enabled

Input1 is connected to Output3 and Output3 is enabled.

Input2 is connected to Output4 and Output4 is disabled



Input8 is connected to Output5 and Output5 is disabled

Input7 is connected to Output6 and Output6 is disabled

Input2 is connected to Output7 and Output7 is disabled

Note: If there is no card in slot #2 of unit 3, sending the **[C2U3]** command will not return any feedback.

### 3. [CnS]

This command will display and save the card On/Off and I/O status for card in slot n. This ensures the card returns to the current configuration after system power has been turned off.

#### Example:

If one **MT105-106/107/109** card is in slot #2 of unit 3 with output 1, 2 and 3 ON:

When sending the command **[C2U3S]**, the feedback will be as follows:

In1 Out1 ON  
In2 Out2 ON  
In1 Out3 ON  
In2 Out4 OFF  
In8 Out5 OFF  
In7 Out6 OFF  
In2 Out7 OFF

Card Status Saved

### 4. [IO]

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

Command Format: **[IxOyCnUiS]**

Ix = select input x (x is from 1 to 6)

Oy = connect to output y (y is from 1 to 6)

Cn = card ID number (n is from 1 to 19)  
(1 to 8 for MT100-104 or 1 to 4 for MT100-106)

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

S = saves command to memory

#### Example:

1. **[I2O1C4U2]**: Connects Input2 to Output1 for Card 4 in Unit 2. Output1 is NOT enabled by making this connection.

2. **[I6O2C4U2S]**: Connects Input6 to Output2 for Card 4 in Unit 2 and saves that I/o connection to memory.

### 5. [IO\*]

This command enables the one input to be connected to all outputs with a single command.

#### Example:

**[I2O\*C2]**: Connects Input2 to all outputs on Card 2 of Unit 0.

### 6. [ON]

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

**[ONmCnUiS]**: for a single card

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

Default when plugged in = Input 1 is ON

m = Output number (m = 1 to 6)

n = Card ID number (n = 1 to 19)  
(1 to 8 for MT100-104 or 1 to 4 for MT100-106)

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

S = saves command to memory

#### Example:

1) **[ON12C5U3]**: Turns ON only output 1 and 2 of the **MT105-106/107/109** card located in slot #5 of the MT100-100 Enclosure with unit ID3.

2) **[ON3C5U3]**: Turns ON only output 3 of the **MT105-106/107/109** card located in slot #5 of the MT100-100 Enclosure with unit ID3. After the **[ON12C5U3]** and **[ON3C5U3]** commands have been executed, output 1, 2 and 3 will be ON.

3) **[ONC5U3]**: Turns ON all outputs of the card.

## [ONmGkUiS]: for a group of cards

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

m = card output (m = # from 1-6)

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

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

S = saves command to memory

### Example:

1. [ON1G5U1]: Turns ON output 1 for each card in group 5 of unit 1.
2. [ONG5U1]: Turns ON all outputs for each card in group 5 of unit 1.

## [ON..... P]: sets path

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

Command Format: [ONmCnUiP]

m = output number (m = 1 to 6)

n = card ID No. (n = a slot # from 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-106)

P = path

### Example:

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

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

```
[ON12C6U3P]
[ON34C7U3P]
[SW]
```

If "F" is included use the [ONmCnUiPF] command or the [ONmCnUiFP] command.

## [ON.....F]: feedback

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

### Example:

[ON1C2U3F]: if path is not set

[ON1C2U3PF]: if path is set

## 7. [OFF]

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

[OFFmCnUiS]: for a single card

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

m = output number (m = 1 to 6)

n = card ID No. (n = slot # from 1 to 19)  
(1 to 8 for MT100-101 or 1 to 4 for MT100-106)

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

S = saves command to memory

[OFFCnUi]: Turns OFF all outputs of the card

### Example:

- 1) If card 5 of unit 3 has output 1, 2 and 3 ON:
  - a) [OFF1C5U3]: Turns OFF output 1 while output 2 and 3 remain ON.
  - b) [OFF23C5]: Turns OFF output 2 and 3.
- 2) If card 5 of unit 3 has output 1, 2, 3, 4, 5, and 6 ON:
  - a) [OFFC5U3]: Turns OFF all outputs, which is equivalent to [OFF123456C5U3].

## [OFFmGkUiS]: for a group of cards

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

Command Format: [OFFmCnUiP]

m = card output (m = # from 1-6)

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

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

S = saves command to memory

### Example:

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

2. [OFFG5U1]: Turns OFF all outputs for each card in group 5 of unit 1.

## [OFF.....P]: sets path

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

Command Format: [OFFmCnUiP]

m = number (m =1 to 6)

n = card ID No. (n = a slot # from 1 to 19)  
(1 to 8 for MT100-101 or 1 to 4 for MT100-106)

P = path

## Example:

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

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

```
[OFF12C6U3P]
[OFF34C7U3P]
[SW]
```

If "F" is included use the [OFFmCnUiPF] command or the [OFFmCnUiFP] command.

## [OFF.....F]: feedback

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

## Example:

```
[OFF1C2U3F]: if path is not set
[OFF1C2U3PF]: if path is set
```

## 8. [SW] – Switch

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

## Example:

```
[ON12C6U3P]
[ON34C7U3P]
[SW]
```

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

## 9. [CLR]

This command clears the members for a single group or for all nine groups.

[CLRCnUi]: for a single card

n = Card ID number (n = 1 to 19)  
(1 to 8 for MT100-101 or 1 to 4 for MT100-106)

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

Note that all outputs will be connected to Input1.

## 10. [...S]

This command used at the end of and ON/OFF or I/O setup command saves that configuration to memory.

## 11. [...F]

This command, used at the end a command will provide feedback in the form of "OK" if the command was received and accepted.

## 12. [...P]

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 "ON" command for examples.

## 13. [HELP]

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

## 14. [WR]

This command groups multiple cards in the MT100-100 Enclosure. Each unit contains a maximum of nine groups.

Command Format: [WRCn...GkUi]

n = card ID No. (n = slot # from 1 to 19)  
(1 to 8 for MT100-101 or 1 to 4 for MT100-106)

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

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

### Example:

To group card #1, 2 and 3 as group 5 of unit #1, send the [WRC1C2C3G5U1] command. After executing this command, card 1, 2, and 3 will be grouped as group 5 of unit 1.

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.

[CLRGkUi]: for a group of cards

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

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

### Example:

a) To clear group #1, send the [CLRG1U1] command. This command clears the members for the specified group only.

b) To clear all groups of unit 1, send the [CLRG\*U1] command.

OK or ER will be returned as feedback if "F" is included at the end of a command string or if the unit ID is zero.

## 15. [G]

This command is used to request group data. With the command, the user can identify which input or output of a particular group is on.

Command Format: [GkUi]

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

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

### Example:

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

1) **[G1]:** will return feedback as **[On123G1]**.

2) **[G2]:** will return feedback as **[On2G2]**.

## 16. [RD]

This command displays the members in each group.

Command Format: [RDGkUi]

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

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

member = C1 - C19 (card 1 to 19)

(1 to 8 for MT100-101 or 1 to 4 for MT100-106)

### Example:

To read member data for group 5 of unit 1, send the [RDG5U1] command. The system will return feedback as C1C2C3 G5U1.

## 9.4 SUMMARY OF COMMANDS

- 1) **[VER]** Receives software version.
- 2) **[C]** Receives status of the card.
- 3) **[CnS]** Displays and save configuration.
- 4) **[IO]** Connects the input to the output.
- 5) **[IO\*]** Connects a single input to all outputs.
- 6) **[ON]** Turns on one or more outputs for a single card or a group of cards.
- 7) **[OFF]** Turns off one or more outputs for a single card or a group of cards.
- 8) **[SW]** Switch (outputs the preloaded buffer).
- 9) **[CLR]** Clears members of a single group or all groups.
- 10) **[...S]** Save setting of command.
- 11) **[...F]** Provide feedback after command is sent.
- 12) **[...P]** Set PATH for use with switch [SW] command.
- 13) **[HELP]** Displays all commands.
- 14) **[WR]** Groups multiple cards.
- 15) **[G]** Requests group data.

- 16) [RD] Displays the members in each group.

## 11.2 CONTACT INFORMATION

### ALTINEX, INC

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## TROUBLESHOOTING GUIDE 10

We have carefully tested and have found no problems in the supplied **MT105-106/107/109**; however, we would like to offer suggestions for the following:

### NO DISPLAY

- Cause 1:** The source has a problem.  
Solution: Check the source and make sure that there is a signal present and all source connections are correct. If the source is working and there is still no display, see Cause 2.
- Cause 2:** The card input is not selected.  
Solution: Select the card input. See RS-232 accessible commands in section 7. If no display is present, see Cause 3.
- Cause 3:** Cable connections to the destination are incorrect.  
Solution: Make sure that cables are connected properly. Also, make sure that the continuity and wiring are good. If there is still no display present, see Cause 4.
- Cause 4:** The display has a problem.  
Solution: Make sure that the display is powered. If there is still no display, call ALTINEX at (714) 990-2300.

## ALTINEX POLICY 11

### 11.1 LIMITED WARRANTY / RETURN POLICY

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