



MT105-102 is shown above.

MANUAL PART NUMBER: 400-0181-003

MT105-102/MT105-103/MT105-105

8-IN, 8-OUT VIDEO MATRIX SWITCHER

CARDS FOR MULTI-TASKER™

USER'S GUIDE

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PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT105-102/(103)/(105)**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT105-102/(103)/(105)** 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 **MT105-102/(103)/(105)** 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 **MT105-102/(103)/(105)** carefully. Dropping or jarring can damage the card.
- Do not pull the cables that are attached to the **MT105-102/(103)/(105)**.
- 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 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

MT105-102/MT105-103/MT105-105 8-in 8-out Video Matrix Switcher Cards

The **MT105-102/(103)/(105)** is a 8-in 8-out Video Matrix Switcher Card designed for use with the Multi-Tasker™. When installed in the enclosure (**MT100-100**), this card enables 8 composite video sources to be connected and switched to eight different display or recording devices.

Multiple **MT105-102/(103)/(105)** cards can be installed in the enclosure to provide additional functionality. For example, two cards can be used to handle the two components of an S-Video signal (Chroma and Luma), three cards to handle Component Video, and five cards to handle RGBHV.

The **MT105-102** uses solid state switching technology and offers a video bandwidth of 450 MHz, enabling it to pass high-resolution video signals without degradation.

The **MT105-103** provides an economical application that does not involve the use of extremely high-resolution computer video signals. This card is designed for 325 MHz bandwidth performance.

The higher performance **MT105-105** card offers a video bandwidth of 425 MHz, which is capable of handling QXGA resolutions, and for ultra-high bandwidth applications.

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	MT105-102/(103)/(105)
GENERAL	
Inputs	8
External Input Connectors	8 BNC Female
Internal Input Connectors	Two 8-pin Jumpers

Outputs	8
Output Connector	8 BNC Female
Compatibility	
Using 1 Card	Composite Video (NTSC, PAL, SECAM)
Using 2 Cards	S-Video
Using 3 Cards	Component Video
Using 4 Cards	RGBS
Using 5 Cards	RGBHV

Table 1. **MT105-102/(103)/(105)** General

MECHANICAL	MT105-102/ (103)/(105)
Enclosure Slots Required	Two
Weight	1.36 lb (0.62 kg)
Connector Panel	Black
T° Operating	10°C-35°C
T° Maximum	50°C
Humidity	90% non-condensing
MTBF (calc.)	40,000 hrs

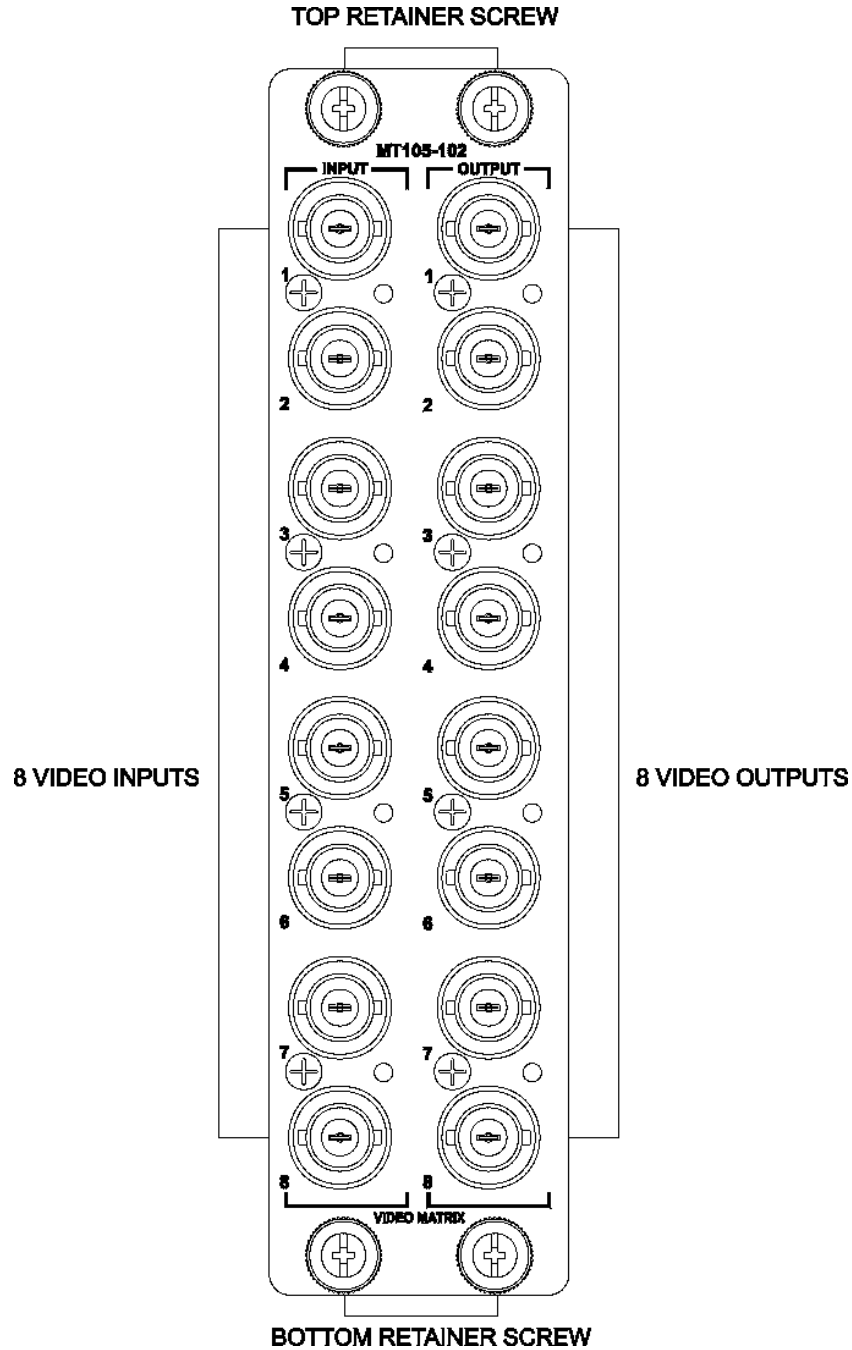
Table 2. **MT105-102/(103)/(105)** Mechanical

ELECTRICAL	MT105-102/(103)/(105)		
Input Signals			
Impedance	75 Ohms		
Analog	1.5V p-p max.		
Output Signals			
Impedance	75 Ohms		
Gain	1.05		
Frequency Compatibility			
Bandwidth			
MT105-102	350 MHz @ -3dB		
MT105-103	200 MHz @ -3dB		
MT105-105	425 MHz @ -3dB		
Power			
Power from	+6V	-6V	Power Consumption
MT100-100			
MT105-102	350mA	280mA	3.8 watts
MT105-103	350mA	280mA	3.8 watts
MT105-105	350mA	280mA	3.8 watts

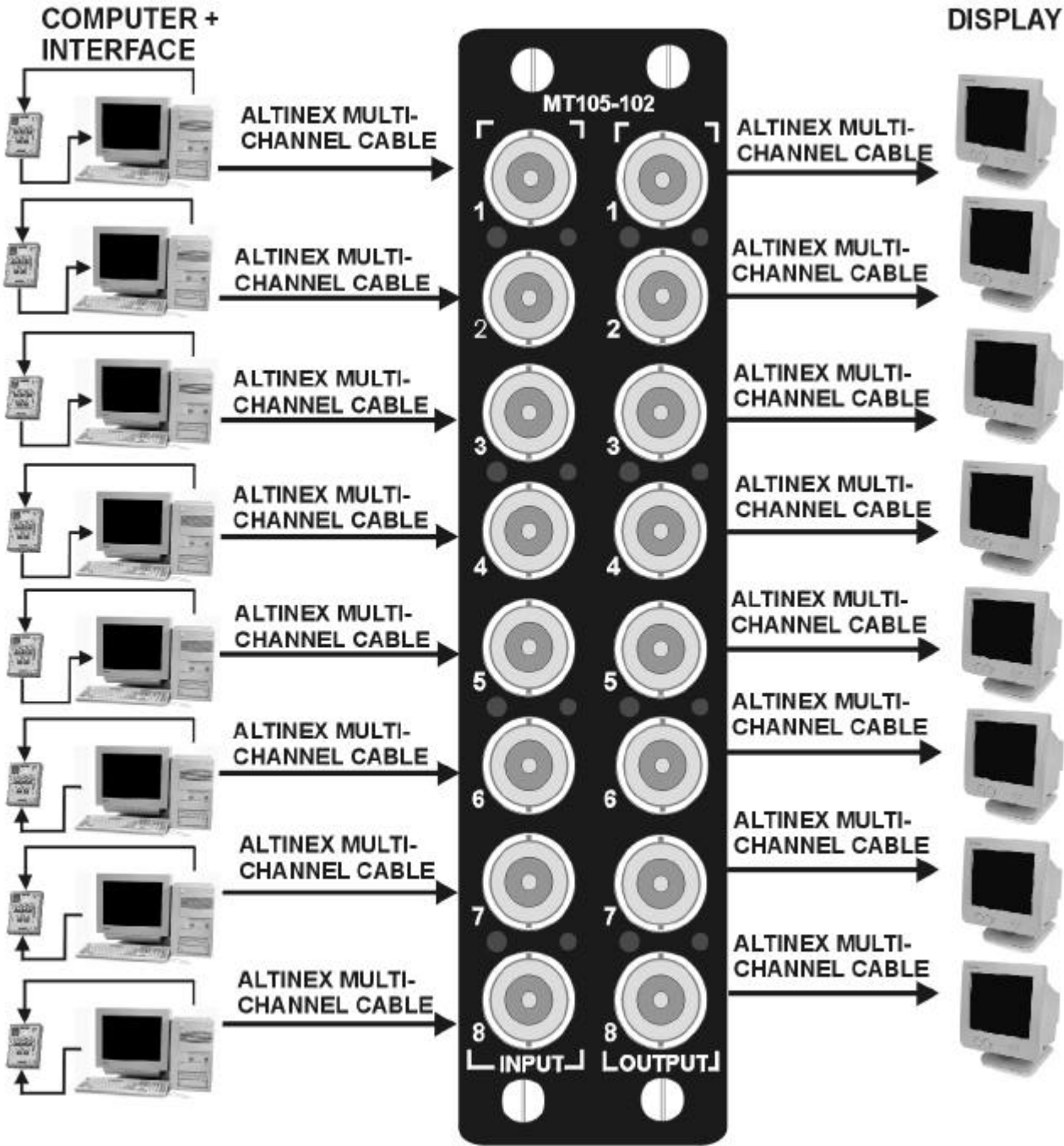
Table 3. **MT105-102/(103)/(105)** Electrical

PRODUCT DESCRIPTION

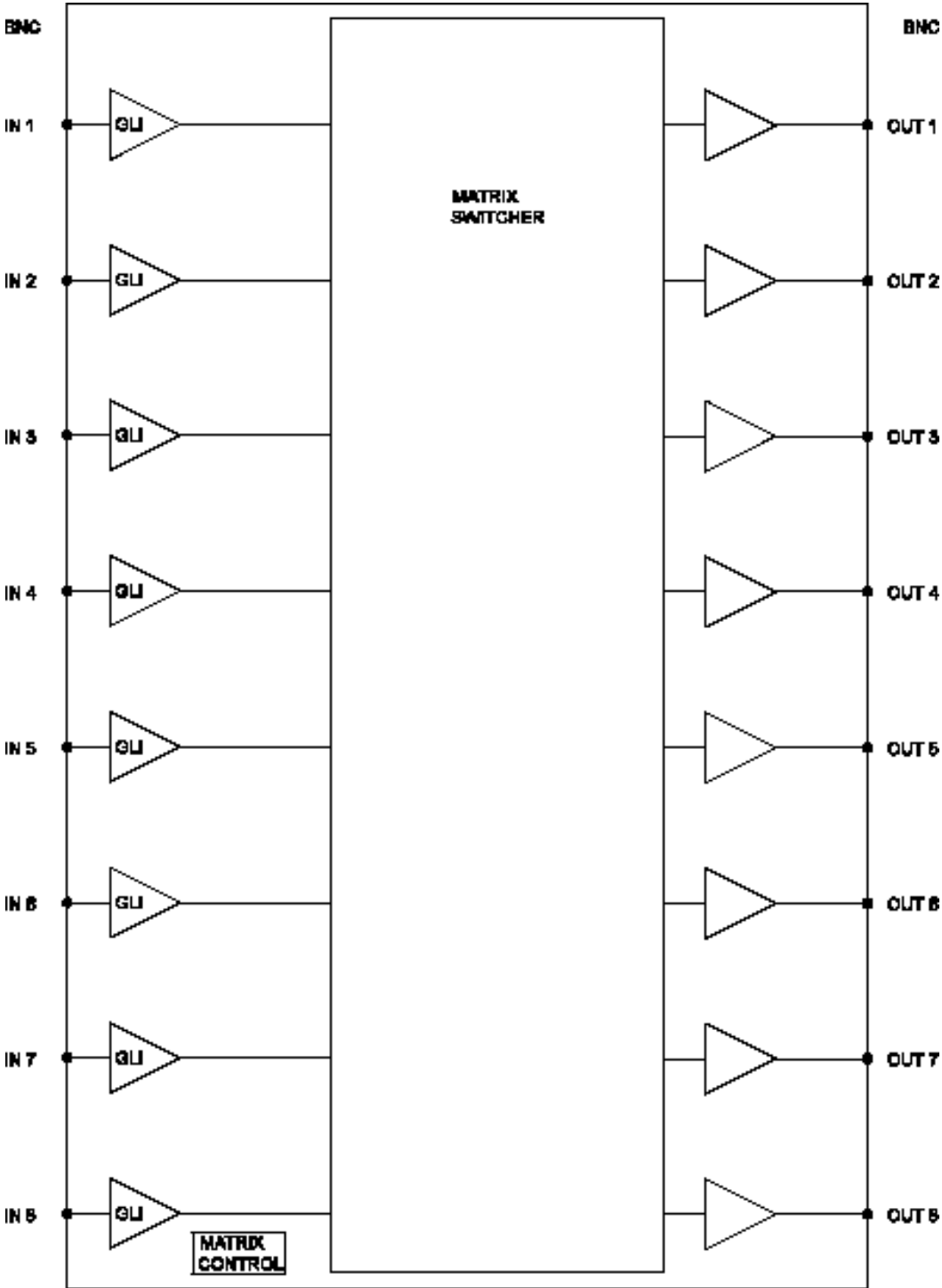
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Block Diagrams: Internal View of MT105-102



INSTALLING YOUR MULTI-TASKER™ 6

- Step 1.** Slide the **MT105-102/(103)/(105)** into an available slot in the Multi-Tasker™ Enclosure in order to connect to the bus. Make sure that the **MT105-102/(103)/(105)** card fits into place. Secure the card to the Multi-Tasker™ by tightening the retainer screws located on the top and bottom of the **MT105-102/(103)/(105)**.
- Step 2.** Connect a coaxial cable from the video source to the input connector of the **MT105-102/(103)/(105)**. Connect the output connectors of the **MT105-102/(103)/(105)** to the display devices through a coaxial cable.
- Step 3.** Starting from the left, identify the slot number where the **MT105-102/(103)/(105)** card is plugged into the Enclosure and note that it is for RS-232 control.

OPERATION (for MT105-102 & MT105-103 only) 7

7.1 RS-232 CONTROL

The outputs of the **MT105-105** card are always enabled; therefore, no RS-232 control is necessary.

When used in the Multi-Tasker™ Enclosure, the **MT105-102/(103)** has many advanced remote control capabilities, which are accessible through standard RS-232 communication. The actual controlling can be accomplished through a computer control system or any other device capable of sending RS-232 commands.

7.2 RS-232 INTERFACE

The RS-232 commands for the **MT105-102/(103)** are in a simple ASCII character format.

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

After processing a command, an OK or ER 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).

7.2 DESCRIPTION OF COMMANDS

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

Example:

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

For 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 (equivalent to [VERC3U0])
[VERC3Ui]: for unit ID other than zero

1. [VER]

This command displays the software version and card type for the **MT105-102/(103)** card.

Command Format: [VERCnUi]

Cn = card ID (n = slot # from 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-103)

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

Example:

If one **MT105-102** card is in slot #4 of unit 3:
When sending command **[VERC4U3]**, the Multi-Tasker™ Enclosure will return feedback as:
MT105-102 690-0126-011.

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 MT100-103)

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

Example:

If one **MT105-102/(103)** card is in slot #2 of unit 3 with output 1, 2 and 3 ON:

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

Config:8X8

In1 Out1 ON

In2 Out2 ON

In1 Out3 ON

In2 Out4 OFF

In8 Out5 OFF

In7 Out6 OFF

In2 Out7 OFF

In5 Out8 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

Input5 is connected to Output8 and Output8 is disabled

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

ERROR CODES

ER01: CPU Error

This type of error indicates that the CPU is not working properly.

ER02: I²C Communication Error

This means that the communication between the **MT105-102/(103)** card and its serial device has failed.

ER03: RS485 Communication Error

This type of error is a communication error between the **MT105-102/(103)** card and the controller of the Multi-Tasker™ Enclosure.

[CiS] -This command saves card status settings, such as output ON/OFF, IN/OUT connections.

3. [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 8)

Oy = connect to output y (y is from 1 to 8)

Cn = card ID number (n is from 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-103)

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

[ImO*...] –This command connect input m to all outputs.

4. [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 8)

n = Card ID number (n = 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-103)

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 **MT105-102/(103)** card located in slot #5 of the MT100-100 Enclosure with unit ID3.

2) **[ON3C5U3]**: Turns ON only output 3 of the **MT105-102/(103)** card located in slot #5 of the MT100-100 Enclosure with unit ID3.

After the **[ON12C5U3]** and **[ON3C5U3]** commands have been executed, output 1, 2 and 3 will be ON.

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

- **[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 1-8)

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 group5 of unit 1.

2. **[ONG5U1]**: Turns ON all outputs for each card in group5 of unit 1.

- **[ON... P]: sets path**

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

Command Format: **[ONmCnUiP]**

m = output number (m = 1 to 8)

n = card ID No. (n = a slot # from 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-103)

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

5. [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 8)

n = card ID No. (n = slot # from 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-103)

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, 6, 7 and 8 ON:

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

- **[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 1-8)

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 group5 of unit 1.
2. **[OFFG5U1]:** Turns OFF all outputs for each card in group5 of unit 1.

- **[OFF...P]: sets path**

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

Command Format: **[OFFmCnUiP]**

m = number (m = 1 to 8)

n = card ID No. (n = a slot # from 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-103)

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

6. **[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.

7. **[CLRCn]**

This command reset card Configuration (all Outputs are connected with Input1)

8. **[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 MT100-103)

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.

9. **[CLMGk]**

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

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

n = Card ID number (n = 1 to 19) (1 to 8 for MT100-101 or 1 to 4 for MT100-103)

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

Note that all outputs will be connected to input1.

- **[CLMGkUi]: 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.

10. [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]**.

11. [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 MT100-103)

Example:

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

12. [MATmmXnn]

This command allows changes in the configuration of the matrix. User can configure the MT105-102, MT105-103 and MT105-105 Matrix Switcher as 8x8, 5x5, 4x4, or 2x2

8x8

Input	Output
O1a	O1a
O2a	O2a
O3a	O3a
O4a	O4a
O5a	O5a
O6a	O6a
O7a	O7a
O8a	O8a

4x4

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

2x2

Input	Output
O1a	O1a
O1b	O1b
O1c	O1c
O1d	O1d
O2a	O2a
O2b	O2b

O_{2c} O_{2c}
O_{2d} O_{2d}

13. [HELP]

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

7.3. SUMMARY OF COMMANDS

- 1) [VER]: Displays software version
- 2) [C]: Displays status of the card
- 3) [IO]: Connects the input to the output
- 4) [ON]: Turns on one or more outputs for a single card or a group of cards
- 5) [OFF]: Turns off one or more outputs for a single card or a group of cards
- 6) [SW]: Switch (outputs the preloaded buffer)
- 7) [CLR]: Reset card configuration
- 8) [WR]: Groups multiple cards
- 9) [CLM]: Clears members of a single group or all groups
- 10) [G]: Requests group data
- 11) [RD]: Displays the members in each group
- 12) [MATmXnCi]: Allows changes in the configuration of the matrix.
- 13) [HELP]: Displays all available commands

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.

B) 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.

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 display present, see Cause 4.

D) 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.

TROUBLESHOOTING GUIDE

8

We have carefully tested and have found no problems in the supplied **MT105-102/(103)/(105)**; however, we would like to offer suggestions for the following:

- **8.1 NO DISPLAY**

A) Cause 1: The source has a problem.

ALTINEX POLICY

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9.1 LIMITED WARRANTY

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

9.2 RETURN POLICY

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

9.3 CONTACT INFORMATION

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