

## Multi Tasker™



The MT101-106 is pictured above.

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MANUAL PART NUMBER: 400-0230-002

## MT101-106/107/108

# FRONT PANELS FOR THE 4-SLOT MULTI-TASKER™ ENCLOSURE USER'S GUIDE

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**ALTINEX**

SIGNAL  
MANAGEMENT  
SOLUTIONS

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This manual covers the following front panels designed for the Multi-Tasker™, 4-slot enclosure:

MT101-106	Microprocessor 25 Buttons
MT101-107	Microprocessor No Buttons
MT101-108	No microprocessor No Buttons

## PRECAUTIONS / SAFETY WARNINGS 1

Please read this manual carefully before using your **MT101-106/107/108**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT101-106/107/108** 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 **MT101-106/107/108** 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 your **MT101-106/107/108** carefully. Dropping or jarring can damage the unit. If the **MT101-106/107/108** is not used for an extended period, disconnect the power cord from the power outlet or turn off the main connection.

### 1.3 RACK-MOUNT INSTALLATION

- Use only the ALTINEX supplied **MB1001** rack-mount ears for mounting the **MT101-106/107/108** into a rack.
- The maximum operating ambient temperature is 35°C (95°F).
- When installing the **MT101-106/107/108** into a rack, distribute individual units evenly, otherwise hazardous conditions may be created by an uneven weight distribution. This will reduce heat build up and will prolong the life of the **MT101-106/107/108** should be maintained by connecting using the provided 3-prong power cord only. Furthermore, make sure that the rack is properly grounded.

### 1.4 CLEANING

- Unplug the **MT101-106/107/108** power cord before cleaning.
- Clean surfaces 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 unit.

### 1.5 FCC 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 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

### MT100-106/107/108 FRONT PANELS FOR MULTI-TASKER™ 4 SLOT ENCLOSURE

The **MT101-106**, **MT101-107** and **MT101-108** are front panels designed for use with the Multi-Tasker™ 4-Slot enclosure. The different panel options offer the user the ability to select the level of control required.

The **MT101-108** is a completely blank front panel without any microprocessor control. Use this panel when the Multi-Tasker is populated with cards that require no external control, such as video and audio distribution and signal conditioning.

For applications in which the Multi-Tasker™ will strictly be controlled with a computer or third-party control system, use the **MT101-107**. Although it does not offer any buttons, it does have the main microprocessor for the Multi-Tasker™ installed on the inside of the panel. This is required for external RS-232 control of the **MT100-106**. In addition, the **MT101-107** panel provides an LED to indicate "power on" status, and a 9-pin D sub connector for RS-232 connection from the front of the unit. (This connector is provided mostly for convenience during initial setup of the MultiTasker. The RS-232 connection would typically be made using the 9-pin D sub Control connection on the back panel of the **MT100-106**).

For applications in which the MultiTasker needs to be controlled using front panel buttons, select the **MT101-106** with 25 user-programmable buttons. The buttons on the **MT101-106** offer removable transparent faces, allowing access to removable labels for easy identification of programmed functions. Non-volatile memory protects the programming during power-down. Programming is accomplished through either the front or the back 9-pin RS-232 port.

## TECHNICAL SPECIFICATIONS 3

FEATURES/ DESCRIPTION	MT101-106/107/108
<b>GENERAL</b>	
<b>Compatibility</b>	Designed for use in the Multi-Tasker™ 4-slot Enclosure

Table 1. **MT101-106/107/108** General

MECHANICAL	MT101-106/107/108
T° Operating	10°C-35°C
T° Maximum	50°C
Humidity	90% non-condensing
MTBF (calc.)	65,000 hrs

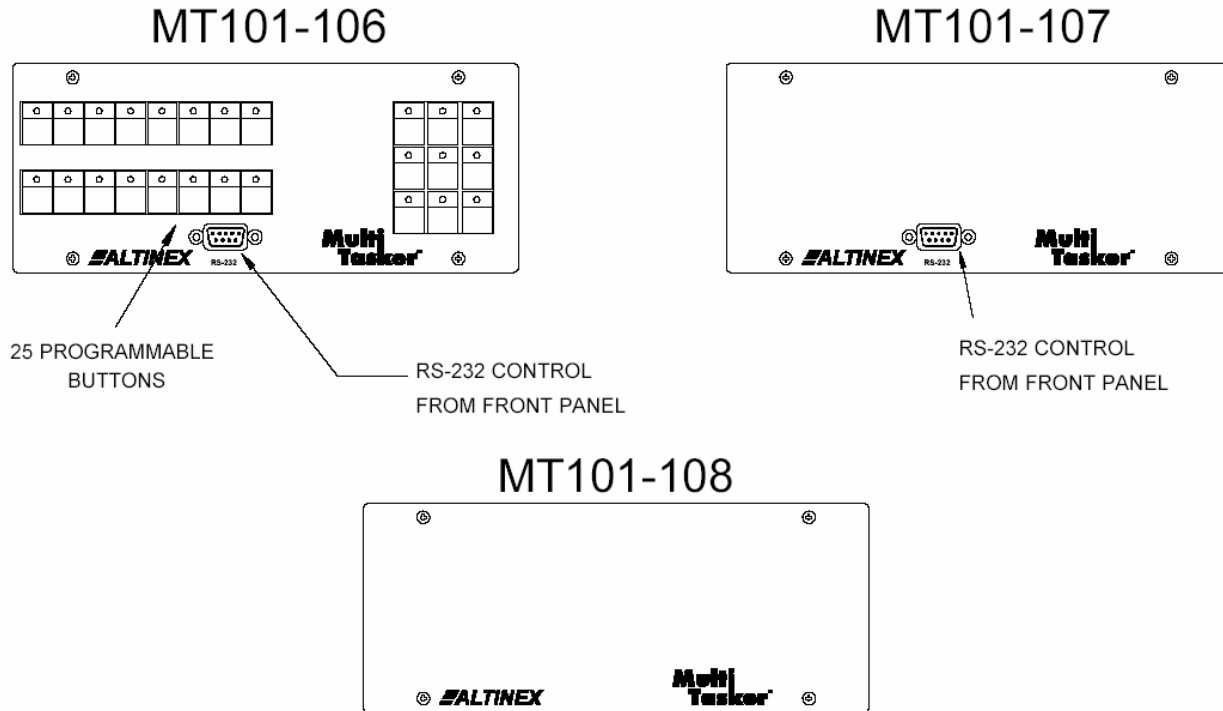
Table 2. **MT101-106/107/108** Mechanical

ELECTRICAL	MT101-106/107/108
<b>Power</b>	
Power	+6V -6V
<b>Power Consumption</b>	.25 watt max.

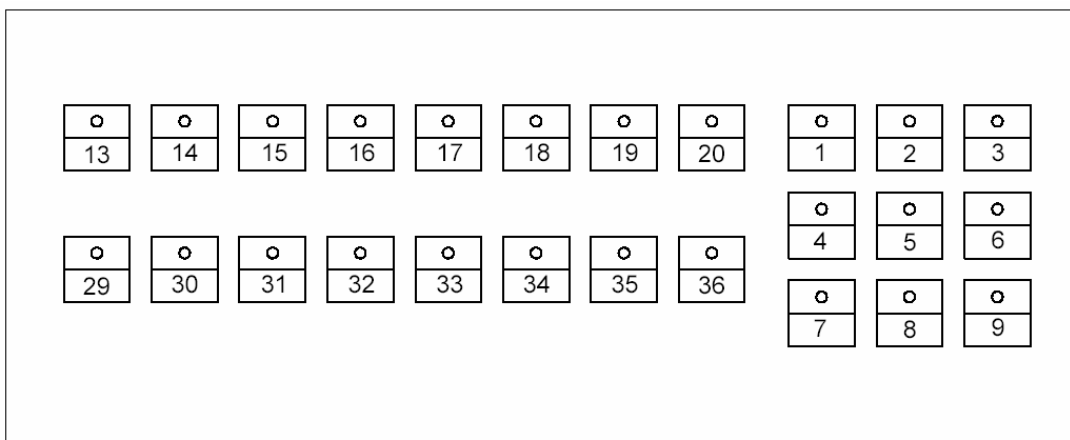
Table 3. **MT101-106/107/108** Electrical

## DESCRIPTION OF MULTI-TASKER 4

### MT100-106 FRONT PANEL OPTIONS

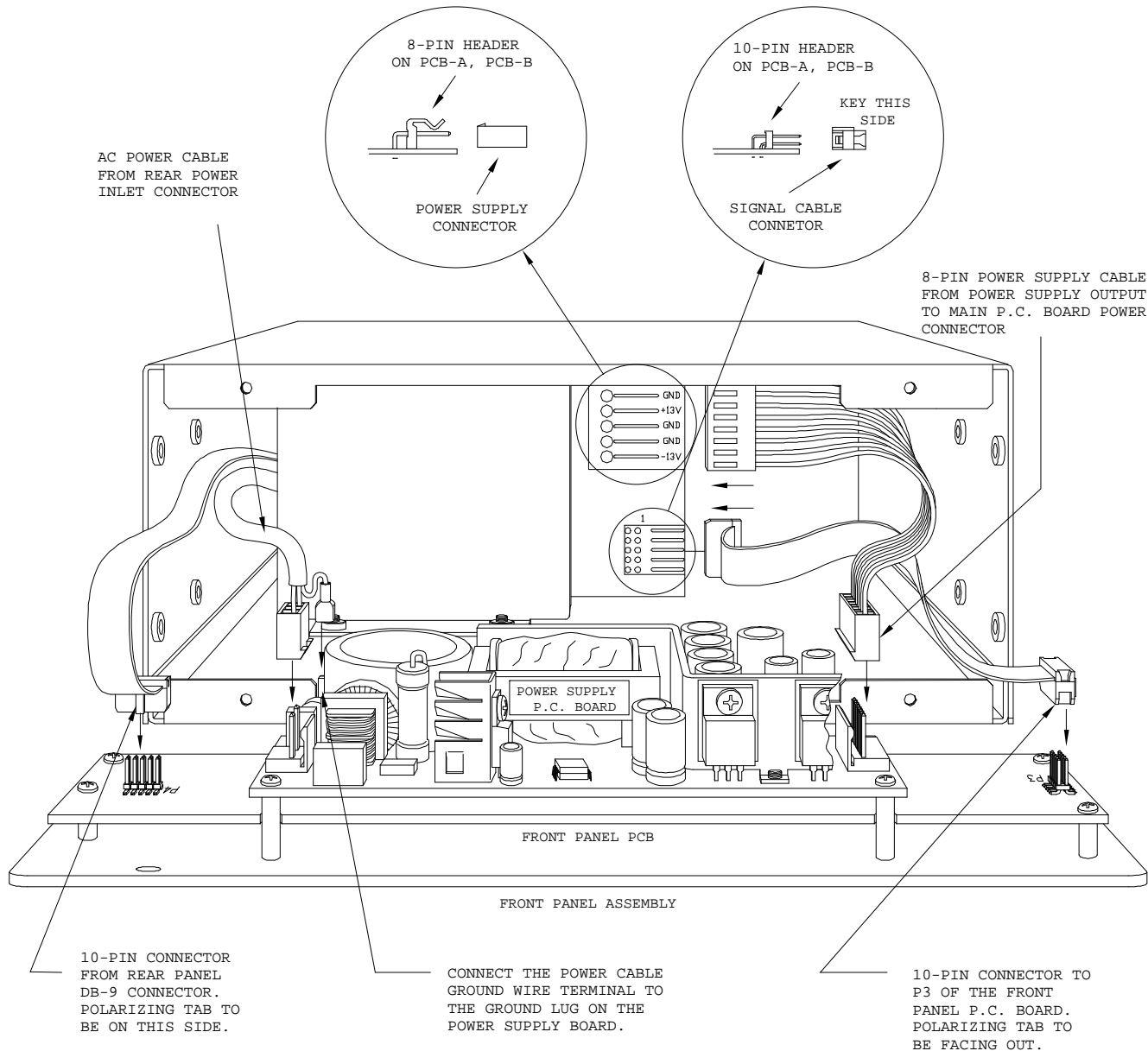


### MT101-106 KEY NUMBER LOCATIONS



## FRONT PANEL INSTALLATION

5



5

## INSTALLING YOUR MULTI-TASKER™ 6

**Step 1.** Connect the **MT101-106/107/108** to the Multi-Tasker Enclosure, as shown in the Installation Drawing and as described in the following steps.

**WARNING!** Disconnect power to the MT enclosure before removing the panel.

**Step 2.** The electronic components inside the enclosure and front panel are static-sensitive. Please take precautions to avoid electrical static discharges.

**Step 3.** Remove the 4 screws on the front panel to access the cables inside the enclosure. Avoid handling the panel by the P.C. boards, handle by the metal panel only.

**Step 4.** Keep one hand touching the metal enclosure when connecting or disconnecting any cables.

**Step 5.** Follow the orientation illustrations shown in the Installation Diagram.

**CAUTION!**

To avoid possible electrical damage, ensure that all header pins are aligned to their respective connectors before restoring power

**Step 6.** If a control system is used to control the cards in the Multi-Tasker™, connect the 9-pin D connector of the **MT101-106/107** to the control system's RS-232 port as shown in Table 4. This step does not apply to the **MT101-108**.

9-Pin D Connector of Multi-Tasker™	Computer or Control System
GND (Ground)	Ground
RXD (Receive)	Transmit
TXD (Transmit)	Receive

Table 4. **MT101-106/107**  
RS-232 control

**Step 7.** Turn on the power switch of the **MT101-106/107/108** Multi-Tasker™. The unit is now operational.

## OPERATION 7

### 7.1 MT101-106/107 OPERATION

The **MT101-106** and **MT101-107** have many advanced remote control capabilities, which are accessible through standard RS-232 communication. The actual controlling can be accomplished through a computer, a control system, or any other device capable of sending RS-232 commands. The factory settings for the RS-232 port are 9600 baud, 8 bits, 1 stop bit and No parity.

The **MT101-106** front panel has programmable keys to control plug-in cards in addition to computer control. Each of the keys has five states. A total of 180 subroutines are available to perform different functions based upon each key state.

State 1	Key is pressed and LED is OFF.
State 2	Key is pressed and LED is ON
State 3	Key is pressed and LED is FLASHING
State 4	Key is Pressed and Held for 2.5 seconds.
State 5	Key is Pressed and Held Key for 2.5 seconds while powering ON.

Table 5. **MT101-106** Key States (5)

### MT101-106 KEY PROGRAMMING

Each key may be programmed to execute one subroutine for each of the five key states.

#### POWER UP SUBROUTINE #1

Subroutine #1 is always executed at power up or on the Reset command. Typically, Subroutine #1 is used to place the system cards to their default settings. See the {WRS} command for further details.

#### MEMORY BUFFER

The memory buffer is used to save key and subroutine programs. It is non-volatile and has a storage capacity of 64,895 bytes. This allows the user to create a single subroutine with 64,895 bytes maximum or many small subroutines that add up to a maximum of 64,895 bytes.

## SAVING CARD CONFIGURATIONS

Commands used for Multi-Tasker™ cards such as [ON], [OFF] and [IO] that end in "S" will be saved to the memory buffer. Commands not ending in "S" will still be executed but will not be restored when the system is reset or powered off and then again.

## SUBROUTINE AND FUNCTION TYPES

Each key may be programmed to execute a complete function "I1O2C3" or a portion of a function. As an example, matrix functions will use one key to select the input number ("I1"), another key to select the output number ("O2") and a final key for the card ID ("C3"). See the {WRS} command for further details.

Complete and incomplete functions mean two different types of subroutines. Subroutines with complete functions and subroutines with matrix functions.

As an example, if there is an 8x8-matrix switcher, in Slot 3 (C3), the user can program keys and subroutines in two different ways, Complete Functions or Matrix Functions.

### COMPLETE FUNCTIONS

Press Key 13: Switch input 1 to output 1.

Press Key 14: Switch input 2 to output 1.

In the examples above, the functions are performed in State 1 of all keys, or when LED's are OFF. Keys 13 and 14 will be programmed as in the following example.

#### Key Programming

{WRK13 = 13,0,0,0,0}

{WRK14 = 14,0,0,0,0}

In the program above, when Key 13 is pressed while the LED is OFF, Subroutine 13 will be executed. If Key 14 is pressed while the LED is OFF, Subroutine 14 will be executed.

Subroutines 13 and 14 must be programmed as in the following example for card 3.

#### Subroutine Programming

{WRS13 = I1O1C3}

{WRS14 = I2O1C3}

In the programs above, if Subroutine 13 is executed, Input 1 will be switched to Output 1. When Subroutine 14 is executed, Input 2 will be switched to Output 1.

### MATRIX FUNCTIONS

In the following example, the system contains five 8-in, 8-out matrix switcher cards. The cards are in slots 2, 4, 6, 8 and 10 of Unit ID 0. Each card requires two slots.

The user may assign 8 keys for 8 inputs, 8 keys for 8 outputs and 5 keys for 5 cards. It is best to layout the keys as described in the MATRIX KEY CONVENTIONS section, or as follows:

Keys 13 through 20 for INPUTS 1 through 8.  
Keys 29 through 36 for OUTPUTS 1 through 8.  
Keys 2 through 6 for Card ID's 2, 4, 6, 8 and 10.

Card/slot 2 = Key 2

Card/slot 4 = Key 3

Card/slot 6 = Key 4

Card/slot 8 = Key 5

Card/slot 10 = Key 6

In the above configuration, the user must press three keys to execute a complete function.

Example: I1O1C4

Press Key 13 to send I1  
Press Key 29 to send O1  
Press Key 3 to send C4

Or

Example: I2O8C10

Press Key 14 to send I2  
Press Key 36 to send O8  
Press Key 6 to send C10

#### Key Programming

{WRK2 = 2,0,0,0,0}

{WRK3 = 3,0,0,0,0}

...

{WRK13 = 13,0,0,0,0}

{WRK14 = 14,0,0,0,0}

...

{WRK36 = 36,0,0,0,0}

In the programs above, when Key 13 is pressed and LED #13 is OFF, Subroutine 13 will be executed. When Key 14 is pressed and LED #14 is OFF, Subroutine 14 will be executed.

## Subroutine Programming

A trailing "&" must be used to mark the continuity of functions for functions that are not complete functions, but are the beginning of a command.

```
{WRS13= I1&}
{WRS14= I2&}
...
{WRS20= I8&}
```

Two "&"s must be used to mark the continuity of functions that do not represent the beginning or ending of a function. The following commands require an "&" before and after the partial function.

```
{WRS9= &O1&}{
WRS10= &O2&}
...
{WRS16= &O8&}
```

A leading "&" is needed at the beginning of the last part of the incomplete function, but no "&" is needed at the end of the function.

```
{WRS17= &C1}
{WRS18= &C2}
...
{WRS36= &C20}
```

Example:

Switch Input 1 to Output 1 of C3. The command string required to perform this operation is "I1O1C3". The following three steps will build the proper command function.

Press key 1	I1&	<i>Start Command</i>
Press key 9	&O1&	<i>Build Command</i>
Press key 19	&C3	<i>End/Execute Command</i>

The command string built will be "I1&&O1&&C3", but the function will be executed as "I1O1C3".

## MATRIX KEY CONVENTIONS

The front panel is designed to use the center group of keys for Matrix card input and output selections.

Input Selection = Keys 13-28

Output Selection = Keys 29-36

Card Selection = Keys 1-12

Using these conventions, the LED's will flash automatically showing each connection after a completed input to output command has been issued. The user should NOT issue LED commands to these LED's during these sequences.

## LOCKING KEYS

Keys can be locked or unlocked for protection against accidental changes in the system configuration.

Example:

Pressing Key 36 locks all the keys except Key 36 and turns OFF the LED for Key 36. Pressing Key 36 again unlocks all the keys and turns ON the LED for Key 36.

If the LED is OFF (State 1) when Key 36 is pressed, Subroutine 36 will be executed. Use the following commands:

```
{WRK36 = 36,86,0,0,0}
{WRS36= UNLKÜ, LED36=1}
```

Note: Subroutine 36 contains a function to unlock all the keys and turn ON the LED.

If the LED is ON (State 2) when Key 36 is pressed, Subroutine 86 will be executed. Use the following commands:

```
{WRS86= LOCKÜ, UNLOCK36,LED36=0}
```

**NOTE:** Subroutine 86 contains a function to lock all keys, unlock Key 36 and turn LED 36 OFF.

The user can send the {RDKÜ} command to display the status (locked/unlocked) of all keys. If there are any mistakes to the program in which all keys are locked, the user can unlock the keys using the {UNLOCK} command. See the LOCK & UNLOCK commands for more information.

## ASSIGNING UNIT ID

If there is more than one **MT101-106/107** being used and sharing the same RS-232 port, a different Unit ID should be assigned for each of the units. The Unit ID is a number from 0 to 9. Ten is the maximum number of **MT101-106/107** units that may be on the same RS-232 port.

### UNIT ID for ONE UNIT

If only one **MT101-106/107** is being used, Unit ID zero should be used to simplify the RS-232 command formats. The Unit ID is not required in the command string for Unit ID Zero. For example, [ON1C3U0] is the same as [ON1C3].

## 7.2 RS-232 CONNECTION

### COMMUNICATION

If a control system is used to control the cards in the Multi-Tasker™ Basic Enclosure, connect the 9-pin D connector of the **MT101-106/107** to the control system's RS-232. To connect the Multi-Tasker™ (MT) to a computer or a terminal, you must have the proper interface cable.

The interface cable must also have the appropriate connector on each end and the internal wiring must be correct. Connectors typically have 9 pins (DB-9 connector) or 25 pins (DB-25 connector) with a "male" or "female" pin configuration.

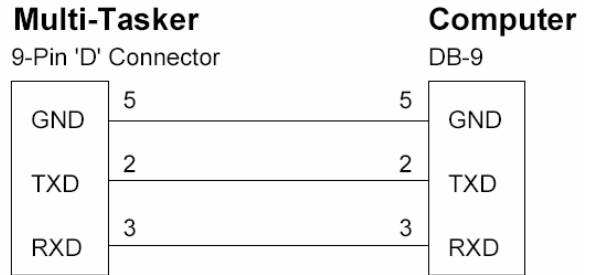


Figure 1 DB-9 Serial Connection

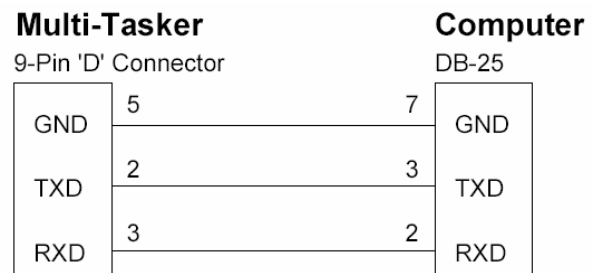


Figure 2 DB-25 Serial Connection

## 7.3 RS-232 PROTOCOL

The RS-232 protocol for the **MT101-106/107** uses a simple ASCII character format.

1. Brackets “[ ]” are part of the command for the controller or plug-in card.
2. Brackets “{ }” are part of the command for the panel display commands.
3. Use uppercase letters for all commands.

The input buffer is a volatile 256-character ring buffer with a storage capacity of 256 bytes. Use caution when sending consecutive commands from a computer or control system. To avoid an overflow of the command buffer, the user may send commands with a delay.

**NOTE:** The delay may be sent on 100ms intervals. See the {WAIT} command for further details.

Each character requires 1ms to reach the buffer. Each command will be executed every 50ms. After the first 50ms interval, the first command has been executed and removed, therefore the buffer has extra space available to accept another command. The user may send consecutive commands if the total number of characters does not exceed 300.

There are three ways to send commands, see the examples below.

- 1) Always send commands with a delay time of 50ms whether it is needed or not.

```
[ON123456C2U1]
Delay 50ms
[OFF123C2U1]
Delay 50ms
[OFF6C2U1]
```

- 2) Send consecutive commands without any delay up to 300 characters. Then send the rest of the commands with a 50ms delay as shown above.

```
[ON123456C2U1]
[OFF123C2U1]
... 300 characters in 10 commands
Delay 50ms X 10 commands
[OFF6C2U1]
Delay 50ms
[OFF5C3U1]
```

- 3) Calculate the time to execute all commands in the buffer by multiplying the number of commands by 50ms. After the execution time, the user can send another 300-character string without delay.

```
[...300 characters equaling 20 commands]
Delay 50ms X 20
[...300 characters equaling 25 commands]
Delay 50ms X 25
```

## 7.4 RS-232 COMMANDS

### 7.4.1 COMMANDS FOR CONTROLLER

#### 1. [RES]

The [RES] command resets the Enclosure. The controller and all cards in the Enclosure will be reset to either their default or saved configurations.

If the Unit ID is zero, the unit will beep once and display "READY" when the initialization is complete. This will let the user know that the unit is ready for operation. Units other than ID0 will beep once with no display feedback.

#### 2. [VER]

This command displays the current version of the firmware for the controller unit located in the **MT101-106/107**.

Command Format: [VERUi]

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

Example:

Query the enclosure with Unit ID 1 for the installed firmware version. Send the command [VERU1] to the enclosure and the unit will return feedback similar to the following:

```
[690-0122-017 690-0123-005 690-0124-019]
```

```
690-0122-017: Control CPU software version.
690-0123-005: Process CPU software version.
690-0124-019: Panel CPU software version.
```

Note: The Controller card has 3 different CPU's: (1) Control CPU, (2) Process CPU, and (3) Panel CPU (LED/KEY).

#### 3. [SET]

This command sets the Unit ID number for the **MT101-106/107** Multi-Tasker™ Enclosure.

Command Format: [SETUi]

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

Example: ID Zero

Assign a Unit ID of zero to a Multi-Tasker™ System. First, turn off all the systems. Next, turn ON the unit receiving the new ID. All other units must remain OFF. Send the command [SETU0]. After this command is executed, the Unit ID will be changed to zero and the system will return the following feedback:

```
Unit ID = 0
```

```
READY
```

All commands for this unit with an ID of zero may either include U0 or not.

```
[VERCn] = [VERCnU0]
[ON123Cn] = [ON123CnU0]
```

Example: ID 6

Only the unit to receive the new ID should be ON. Set the Unit ID to 6 by sending the command [SETU6]. After this command is executed, all commands for this unit must include U6 (i.e. [CnU6], [VERCnU6], etc).

Example: ID *n*

This command can be used for single or multiple unit operation. If there are 3 enclosures being used, set the Unit ID's using the following procedure:

- 1) Turn OFF all units.
  - a) Turn ON the unit that you want to assign Unit ID #1.
  - b) Send the command [SETU1].
- 2) Turn OFF all units.
  - a) Turn ON the unit that you want to assign Unit ID #2.
  - b) Send the command [SETU2].
- 3) Turn OFF all units.
  - a) Turn ON the unit that you want to assign Unit ID #3.
  - b) Send the command [SETU3].
- 4) Turn all units ON. The new Unit ID's will now be set.

#### 4. [RATE]

This command is used to adjust the rate commands are sent between the Control Panel and cards installed in the system. The maximum RATE is zero, or 0 mSec per command. The minimum rate is 20, or 1 Sec per command.

Command Format: [RATE] and [RATE=*n*S]

[RATE] returns the current setting.

[RATE=*n*] sets the communication rate.

RATE = *n* x 50mS (Default=1, 50mS/command)

Example:

Set the communication rate for maximum speed by sending the command [RATE=0S]. Then send the command [RATE] to verify the setting for zero seconds.

#### 5. [STA]

This command enables/disables automatic feedback from the front panel. The command affects any card with auto-feedback capability. The default at power on or reset is STA0, OFF.

Command Format [STA1] = ON

Command Format [STA0] = OFF

Send the command [STA1] to enable automatic feedback. As commands are sent to system cards with auto-feedback capability, the system will receive feedback from each card and display it in the terminal window. See the [?] command for further details.

Example 1:

Command = [ON1C5]

Feedback = [+IN1C05]

+IN = Input Select

1 = Selected Input

C05 = Card slot number

#### 6. [?]

This command is for system cards and will return general information about the card and the status. The command works with any card having auto-feedback capability.

Command Format: [?CnUi]

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

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

Example:

Send the command [?C5] to receive the feedback for the card in slot #5. Each status field begins with a '+' and ends with the card slot number (ex: C05). The feedback will be similar to the following:

[+MT103-127C04+VR690-0197-001C04]

MT103-127 = Card Model No  
VR690-0197-001 = Firmware version

NOTE: Each card has its own set of commands and protocols. See the individual user guides for details.

## 7. [BAUD]

This command may be used to either display the current BAUD rate setting or to set the BAUD rate. The BAUD rate may be set from the front panel or over the RS-232 bus.

If the baud rate is changed more than once, it must be changed the same way as it was originally changed. If the baud rate is set to 4800 baud over the RS-232 bus and then changed back to 9600 baud, it must be changed back over the RS-232 bus.

### DISPLAY BAUD RATE

Command Format: [BAUDUi]

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

### SET BAUD RATE RS-232

Command Format: [BAUDUi=n]

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

n = 1200 or  
= 2400 or  
= 4800 or  
= 9600

Example 1 RS-232:

Set the BAUD rate to 9600 using the RS-232 interface. Send the command [BAUDU1=9600] to set the BAUD rate on Unit ID 1 to 9600. The system will return the following feedback:

BAUD=9600

Example 2 Front Panel:

Change the BAUD rate using the front panel keys. Choose from 1200, 2400, 4800 or 9600. Each rate is a key on the front panel.

Key 1 / LED 1	1200 BAUD
Key 2 / LED 2	2400 BAUD
Key 3 / LED 3	4800 BAUD
Key 4 / LED 4	9600 BAUD

In order to change the BAUD rate, perform the following steps:

- 1) Simultaneously Press & Hold keys 5 and 6 for at least 2.5 second.
- 2) LED's 1,2,3 and 4 will illuminate and one of the four will be flashing. The flashing LED represents the current BAUD setting.
- 3) Press & Hold for 2.5 seconds the key representing the desired BAUD rate.
- 4) After 2.5 seconds, the LED's will extinguish.
- 5) The new BAUD rate is set.

NOTE: If the baud rate does not change as expected, the front panel may be out of sync with the RS-232 settings. Use the above procedure to set the front panel to the same baud rate that was set over the RS-232 bus. Then the baud rate may be changed from the front panel.

## 8. [TXR]

This command is used to send command strings to the RS-232 bus, through the Multi-Tasker™.

Command Format: [TXRxyzUi]

xyz = text string ("abc","123",...)

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

Example:

Send the text string "HELLO" to the RS-232 bus. The string will be ignored by the Multi-Tasker™, but not the unit receiving the command. To do this, send the command [TXRHELLOUi] and the following will be sent to the remaining devices connected to the RS-232 bus:

HELLO

## 9. [TXM]

This command is used to send command strings to the RS-232 bus, through the Multi-Tasker™, but it adds opening and closing brackets to the command string.

Command Format: [TXRxyzUi]

xyz = text string ("abc", "123", ...)

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

Example:

Send the text string "HELLO" to the RS-232 bus. The string will be ignored by the Multi-Tasker™, but not the unit receiving the command. Additionally, it will add opening and closing brackets. To do this, send the command [TXRHELLOUi] and the following will be sent to the RS-232 bus:

```
[HELLO]
```

## 10. <x[y]z>

This command is used to send ISM5000 command strings to the RS-232 bus, through the Multi-Tasker™. It adds opening and closing symbols to the command string and allows bracket commands within the command string.

Command Format: <x[y]zUi>

x[y]z = text string ("a[b]c" or "1[2]3" or...)

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

Example:

Send the command string "<abc[123]xyz>" to the RS-232 bus. The string will be ignored by the Multi-Tasker™, but not the unit receiving the command. Additionally, it will add opening and closing brackets. To do this, send the command <abc[123]xyz> and the following will be sent to the RS-232 bus:

```
<abc[123]xyz>
```

## 11. <@x[y]z>

This command is used to send ISM5000 command strings to the RS-232 bus, through the Multi-Tasker™. It removes the opening and closing symbols in the command string and allows bracket commands within the command string.

Command Format: <x[y]zUi>

x[y]z = text string ("a[b]c" or "1[2]3" or...)

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

Example:

Send the command string "abc[123]xyz" to the RS-232 bus. The string will be ignored by the Multi-Tasker™, but not the unit receiving the command. Additionally, it will remove the opening and closing brackets. To do this, send the command <@abc[123]xyz> and the following will be sent to the RS-232 bus:

```
abc[123]xyz
```

## 12. [TEST]

This command is a non-destructive test of the internal memory.

Command Format: [TESTUi]

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

Example:

In order to test the Multi-Tasker™ internal memory on Unit ID 0, send the command [TEST]. The system will respond with "OK" if the tests pass. Otherwise, failures will be indicated.

## 13. [HELP]

This command displays information available for the Multi-Tasker™ interface commands or card commands. Sending the command without a card reference returns help for the interface.

Command Format: [HELPCnUi]

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

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

Example 1:

In order to view the RS-232 commands available for the Multi-Tasker™, send the command [HELP]. The commands along with a brief description will be displayed in the Terminal Window.

Example 2:

In order to view the RS-232 commands available for the card in slot #2, send the command [HELPC2]. The commands along with a brief description will be displayed in the Terminal Window.

## 14. [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: [WRCn<sub>1</sub>Cn<sub>2</sub>...GkUi]

- Cn = Card ID (n = slot # from 1 to max slots)
- Gk = Group number (k = # from 1-8)
- Ui = Unit ID (i = # from 0-9)

Example:

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.

## 15. [RM]

This command may be used to remove individual group members, delete whole groups, or to delete all groups.

### REMOVE ONE OR MORE MEMBERS

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

### REMOVE ALL 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

## 16. [RD]

This command 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 in Unit ID 1. Read the member data for group 5 of Unit ID 1, by sending the command [RDG5U1]. 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.

## 17. [CLRG]

This command clears the members for a single group or for all groups. The clear command restores the cards to default settings.

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, send the [CLRG1U1] command. This command clears the members for the specified group only.
- 2) To clear all groups of Unit ID 1, send the [CLRGÜU1] command.

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

## 18. [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 - PLEASE RESET THE SYSTEM WHEN FINISHED

## 7.4.2 COMMANDS FOR LED CONTROL

### 19. {LED}

This command activates the LED.

Command Format: {LEDnUi=s}

n = # from 1 to 36 for a single LED

= # - ## for a sequential range from 1 to 36

= Ü for all LED's

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

s = # from 0 to 2

= 0 for OFF

= 1 for ON

= 2 for FLASH

Examples:

Command	LED#	Results
{ LED36Ui=2 }	36	FLASH
{ LED10Ui=1 }	10	ON
{ LEDÜUi=0 }	ALL	OFF
{ LEDÜUi=1 }	ALL	ON
{ LEDÜUi=2 }	ALL	FLASH
{ LED1-10Ui=1 }	1 to 10	ON
{ LED13-36U1=0 }	13 to 36	OFF

## 20. {CLF}

This command clears the memory of input to output connections used to flash the LED's for a single Matrix card or a group of Matrix cards. This command is used in conjunction with the {STA} command.

Command Format: {CLFCn} or {CLFGk}

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

Gk = Group number (k = # from 1-9)

Example:

Key 2 on the front panel is programmed with the {STA} command. (See {STA} command for details.)

A user connects Input 1 to Outputs 1, 2 and 3 on the card in slot 2 from the front panel. The connection is verified by pressing Key 2 and then the Input 1 key. The LED's for Input 1 and Outputs 1, 2 and 3 all flash.

Later, another user connects Input 8 to outputs 1, 2 and 3 over the RS-232 bus.

**WARNING:** The user controlling the Multi-Tasker™ from the RS-232 bus must send the command {CLFC2} to clear the status LED information.

The original user begins experiencing problems and checks the status from the front panel using Key 2. None of the LED's will flash. This indicates there has been a change in the setup.

**NOTE:** If the {CLF} command is not used, the front panel LED's will continue to indicate the last setup made using the front panel. Any changes over the RS-232 bus will be not be indicated.

## 21. {STA}

This command is used to show the input to output connections for Matrix cards/groups as set from the front panel only. The LED's on the front panel flash to show connections.

The {STA} command must be programmed into a subroutine for the front panel.

**NOTE:** This command is used in conjunction with the {CLF} command.

Command Format: {WRSy=LED\*=0,STA}

Sy = subroutine (n is a # from 1 to 180)

Example:

There is an 8X8-matrix card in slot 4 and the following is programmed into the front panel:

- Keys 13-20 select inputs for card 4.
- Keys 29-36 select outputs for card 4.
- Subroutine 2 contains the following: {WRS2=LED\*=0,STA}.
- Key 2 is programmed to perform subroutine 2: {WRK2=2,0,0,0,0}.

Connect Input 1 to Outputs 1 and 2 on the card in slot 4 and verify the connection. Use the following steps:

1. From the front panel, connect Input 1 (Key 13) to Output 1 (Key 29). LED's 13 and 29 flash.
2. Next, the user connects Input 1 (Key 13) to Output 2 (Key 30). LED's 13 and 30 flash.
3. Press any key and the last two LED's stop flashing.
4. Press Key 2 and then Key 13. LED's 13, 29 and 30 flash indicating Input 1 is connected to Outputs 1 and 2.

**NOTE:** The user may select either an input or output key to see connections. In either case, all connections would be indicated.

## 7.4.3 COMMANDS FOR KEY CONTROL

### 22. {RDK}

This command displays the contents of one or more key programs. The subroutines defined will be displayed first. Then the key label, if any. Next, if the key is defined as volume control, the work VOLUME will be displayed. Lastly, if the key is locked, the work LOCKED will be displayed.

Command Format: {RDKnUi}

Kn = key program (n = # of key program)

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

{RDKn}: Display the contents of a single key program.

{RDKÜ}: Display the contents of all the keys.

Example 1:

Display the program definition for Key 1 of Unit ID 2. Send the command {RDK1U2} and the system will display the program in the following format:

KEY1 : 2,5,10,20,30 LABEL VOLUME LOCKED

KEY1      The key number requested.  
 2            Go to subroutine 2 for key state 1.  
 5            Go to subroutine 5 for key state 2.  
 10          Go to subroutine 10 for key state 3.  
 20          Go to subroutine 20 for key state 4.  
 30          Go to subroutine 30 for key state 5.  
 LABEL      The key label text will be displayed if a label was defined using [WRLK].  
 VOLUME    VOLUME will be displayed if the key was set using [SETVK].  
 LOCKED    LOCKED will be displayed if the key was locked using [LOCK].

Example 2:

If the key status is currently locked, the system will return the following:

KEY1= 2,5,10,20,30 LOCKED

Example 3:

The key label is SPEAKERS, it is set for volume control, and it is unlocked. The system will return the following:

KEY1= 2,5,10,20,30 SPEAKERS VOLUME

Example 4:

Display the contents of all the keys for Unit ID 2. Send the command {RDKÜU2} and the system will display the key programs in the following format:

KEY 01: 000,000,000,000,000 LOCKED  
 KEY 02: 000,000,000,000,000 VOLUME  
 KEY 03: 000,000,000,000,000 VCR\_ON  
 KEY 04: 000,000,000,000,000 VCR\_OFF  
 KEY 05: 000,000,000,000,000

...

KEY 34: 000,000,000,000,000  
 KEY 35: 000,000,000,000,000  
 KEY 36: 000,000,000,000,000

**NOTE:** Unlike the subroutines, all key programs will be displayed even if they are not programmed. Keys that have not been programmed will be defined with all states equal to zero (000,000,000,000,000).

## 23. {WRK}

This command writes or programs a key by assigning a subroutine ID to each of key's five states.

**CAUTION:** If programming Key 1 to perform functions from the front panel, remember Subroutine 1 is a special case and is always performed on power up or reset. Use another subroutine number, but make sure it can be recognized as relating to Key 1. An example would be Subroutine 101.

A key may have up to five different states so it can be assigned to execute five different subroutines. The following table shows the state number and the condition a key must be in for the subroutine assigned to a particular state to be executed.

State	What to do when a key is pressed and...
1	the LED is OFF
2	the LED is ON
3	the LED is FLASHING
4	HELD for at least 2.5 seconds
5	HELD for 2.5 seconds while powering ON or after Reset

Format: {WRKnUi=s<sub>1</sub>,s<sub>2</sub>,s<sub>3</sub>,s<sub>4</sub>,s<sub>5</sub>}

Kn = Key # (n = # from 1 to 36)

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

s<sub>1</sub> = subroutine ID (#0 to 180) for state 1

s<sub>2</sub> = subroutine ID (#0 to 180) for state 2

s<sub>3</sub> = subroutine ID (#0 to 180) for state 3

s<sub>4</sub> = subroutine ID (#0 to 180) for state 4

s<sub>5</sub> = subroutine ID (#0 to 180) for state 5

**NOTE:** Use subroutine zero if nothing should happen for a particular state. The key definition {WRK2=2,0,0,0,0} tells the controller to do perform subroutine 2 for state 1 and nothing for the remaining states.

Example: Key 6 Unit ID 2

{WRK6U2=10,20,30,40,0}

**10** - State 1: Go to subroutine 10 when key 6 is pressed and LED6 is **OFF**.

**20** - State 2: Go to subroutine 20 when key 6 is pressed and LED6 is **ON**.

**30** - State 3: Go to subroutine 30 when key 6 is pressed and LED6 is **FLASHING**.

**40** - State 4: Go to subroutine 40 when key 6 is **PRESSED and HELD** for 2.5 seconds.

**00** - State 5: Do nothing if key 6 is **PRESSED and HELD** for 2.5 seconds on power up or reset.

**NOTE:** If there are any discrepancies or if the buffer has not been initialized, the user will receive a message such as PLEASE PERFORM BUFFER TEST. Use the {TEST} command to initialize the buffer. Please refer to the {TEST} command for more information.

## 24. {CLRK}

This command clears the key program for one key or for all the keys.

Command Format: {CLRKnUi}

Kn = Key # (n = # from 1 to 36, Û for all)

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

Example 1:

{CLRK3}: Clears key number 3 program.

Example 2:

{CLRKÛ}: Clears all 36 key programs.

## 25. {LOCK}

This command will lock either one key or all keys for Key Press protection.

Command Format: {LOCKnUi}

Kn = Key # (n = # from 1 to 36, Û for all)

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

Example 1: (Lock Key #1)

The command {LOCK1} locks Key 1. This command will not affect any other keys.

Example 2: (Lock ALL keys)

The command {LOCKÛ} locks all the keys.

**CAUTION:** This will effectively lock the user out of any front panel control. The only way to unlock the keys at this point will be through one of three ways. The first way is to use RS-232 control. The second is to program an unlock subroutine that is activated by Press & Hold during power up. Lastly, program an unlock function into Subroutine 1 that will unlock the keys automatically whenever power is turned off and then on.

Example 3: (Lock ALL keys except one)

The commands {LOCKÛ} and {UNLK2} will lock all the keys and then unlock Key 2. Key 2 may then be used to unlock all the keys without using an RS-232 control or having to power the system off and then on or reset the system.

**NOTE:** Use the {RDK} command to check the locked/unlocked status of the keys.

## 26. {UNLK} or {UNLOCK}

This command will unlock one specified key or all keys.

Command Format1: {UNLK $n$ U $i$ } or

Command Format2: {UNLOCK $n$ U $i$ }

$K_n$  = Key # ( $n$  = # from 1 to 36,  $\ddot{U}$  for all)

$U_i$  = Unit ID ( $i$  = # form 0 to 9)

Example 1:

The command {UNLK1} unlocks Key 1 only. No other keys are affected.

Example 2:

The command {UNLK $\ddot{U}$ } unlocks all the keys.

**NOTE:** Use the {RDK} command to check the status of locked or unlocked keys.

## 27. {KEY}

This command simulates a key press through RS-232 control.

Command Format: {KEY $n$ U $i$ }

$n$  = Key # ( $n$  = # from 1 to 36)

$U_i$  = Unit ID ( $i$  = # form 0 to 9)

Example:

The command {KEY36} simulates pressing Key 36. The simulation will perform the correct subroutine depending upon the state of the LED, either OFF, ON or FLASHING. If LED #36 is OFF, the subroutine for State 1 will be performed. If the LED is ON, the system will go to the State 2 subroutine and if the LED is Flashing the system will go to State 3 subroutine.

## 28. {KFB}

This command is used to enable or disable key feedback on the RS-232 bus.

Command Format: {KFB= $n$ }

$n$  = 1 to Enable key feedback

= 0 to Disable key feedback

Feedback Format:  $K_n$ X $S_y$

$K_n$  = key number ( $n$  = # from 1 to 36)

$x$  = key state when pressed

N = LED was OFF when pressed

O = LED was ON when pressed

F = LED was Flashing when pressed

H = key was pressed and held for 2.5 seconds

R = key was pressed and held for 2.5 seconds during power up or reset

$S_y$  = subroutine number performed after pressing key ( $y$  = # from 1 to 180)

Example:

Key 1 is ON and Key 36 is OFF. Key 1 is programmed to perform subroutine number 10 when pressed with the LED ON (State 2). Key 36 is programmed to perform subroutine 160 when the LED is OFF (State 1).

Send the command {KFB=1} to enable key feedback. Press Key 1 and then press Key 2. The feedback will be as follows:

K1OS10 K36NS160

**NOTE:** The keys do not have to be programmed in order to return feedback. If they are not programmed or there is no subroutine defined for the state when they are pressed, the subroutine number returned will be "0".

## 29. {RDLK}

This command displays the key label for any key. Labels are user defined text strings used to help identify key functions.

Command Format: {RDLK $n$ U $i$ }

$n$  = Key # ( $n$  = # from 1 to 36)

$U_i$  = Unit ID ( $i$  = # form 0 to 9)

Example:

Key 1 has its label defined as "STATUS". Send the command {RDLK1} and the system will return "STATUS" otherwise, if no label is assigned, the system will return "NO LABEL".

## 30. {WRLK}

This command assigns a text label to any key. The label may be used to help identify the key's function.

Command Format: {WRLKnUi=T}

Kn = Key # from 1 to 36

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

T = Text String (15 characters max)

Example:

Set Key 12's label to "CONF RM MON" representing Conference Room Monitor. In order to do this, send the command {WRLK12=CONF ROOM MON}. Next, confirm by sending the command {RDK12} and verifying the feedback is as follows:

KEY 12: 000,000,000,000,000 CONF RM MON

## 31. {CLRLK}

This command is used to clear the key label for one key or for all keys.

Command Format: {CLRLKnUi}

Kn = Key # (n= # from 1 to 36, 0 for all)

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

Example:

Clear the label from Key 12 by sending the command {CLRLK12}.

## 32. {RDSK}

This command displays all the subroutines associated with a front panel key. These are the subroutines defined in the {WRK} command.

Command Format: {RDSKnUi}

n = Key # (n = # from 1 to 36)

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

Example:

Key 2 is defined as {WRK2=2,20,21,0,0}. Subroutine 2 is programmed with "ONC5" and subroutine 20 is programmed with "OFFC5".

Send the command {RDSK2} and receive the following feedback:

KEY 02: 002,020,021,000,000

SUB002: ONC5.....

SUB020: OFFC5.....

SUB021: EMPTY

NOTE: If a subroutine is assigned but not programmed, it will be displayed as EMPTY.

## 33. {SETVK}

This command defines a key as a volume control key. It is used with audio cards that support the Volume Ramp Up/Down features such as the MT109-100. As volume control, only the first two states are recognized in the key program. The first state subroutine is performed when the key is pressed down. The second state subroutine is performed when the key is released. Keys defined as volume control will have the word VOLUME displayed when using the command {RDK}.

Command Format: {SETVKnUi}

Kn = Key # (n = # from 1 to 36)

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

Example:

There is an MT109-100 in slot #2. The Key 2 program is {WRK2=10,20,0,0,0}. Subroutine 10 is programmed with "RUPC2" and subroutine 20 is programmed with "RSTC2". Pressing Key 2 instructs the MT109-100 to begin ramping its output volume up at a predefined rate. Releasing Key 2 instructs the MT109-100 to stop ramping the output volume when the desired output volume is obtained.

## 34. {CLRVK}

This command resets a key to normal function.

Command Format: {CLRVKnUi}

Kn = Key # (n = # from 1 to 36)

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

Example:

Change Key 2 in the previous example back to a normal key. Send the command {CLRVK2} and Key 2 will now support the normal 5 states of operation instead of just press and release.

## 35. {UPLK}

This command uploads a key program from the panel so it may be saved and edited as a text file. The same file may be downloaded back into the panel. Subroutines and Labels are saved, but VOLUME and LOCKED settings are not.

Before Uploading or Downloading, the rate must be set to zero, [RATE=0], and the Unit ID must be set to zero, [SETU0].

There are two parts to the key program file. The first part contains the subroutine information for each key as programmed using the {WRK} command. The format is as follows:

{\$,Key #: , 5 Subroutines} ex: {\$01:1,51,0,0,0}

The second part contains the key label information and is in the following format:

{%,Key #: , Label} ex: {%01:VIDEO CAMERA}

Command Format: {UPLK}

n = Key # (n = # from 1 to 36)

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

Example: Using HyperTerminal

Upload the key program file from the panel and save it into a text file. Edit the text file using a text editor and then download the new key program into the control panel.

### SETUP HYPERTERMINAL

Start a new connection in HyperTerminal as Direct to Com. Make the following settings:

Bits Per Second = 9600 baud

Date Bits = 8 bits

Parity = None

Stop Bits = 1

Flow Control = None

### UPLOAD

1. Set the Unit ID to zero, [SETU0].

2. Set the rate to zero, [RATE=0].

3. Click Transfer > Capture Text

4. Enter the file name (ex: MTKKeys.txt).

NOTE: If the file already contains text, HyperTerminal will append the file.

5. Click Start.

6. Send {UPLK} to upload the program.

7. Click Transfer > Capture Text > Stop.

### EDIT

1. Use a text editor to modify the file MTKKeys.txt as saved above.

### DOWNLOAD

1. Set the Unit ID to zero, [SETU0].

2. Set the rate to zero, [RATE=0].

3. Open the text file and select all the text.

4. Click Edit > Copy from the menu.

5. Select HyperTerminal.

6. Click Edit > Paste to Host.

7. Send the command {RDK\*} and verify modifications were saved.

## 7.4.4 COMMANDS FOR SUBROUTINES

### 36. {RDS}

This command reads and displays the content of one or all subroutines.

Command Format: {RDSnUi}

Sn = Sub ID (n = # from 1 to 180, Ü for all)

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

Example 1: (Display one subroutine.)

Display the contents of Subroutine 1. Send the command {RDS1} and the system will display the subroutine number and its contents. The display will be in the following format:

SUB 1: ON1C2, OFFC3, LED36=1...

Subroutine number: SUB 1

Functions defined: ON1C2,OFFC3,LED36-1...

Example 2: (Display all subroutines.)

Display all the subroutines. Send the command {RDSÜ} and the display will be in the following format:

SUBROUTINES:

SUB1: ON1C2, OFFC3, LED36=1...

SUB2: ON2C2, OFF3C3, LED2=...

SUB5: ON3C2, OFF6C3, LED3=0...

NOTE: Only defined subroutines will be displayed. Empty subroutines will NOT be displayed.

### 37. {WRS}

This command writes/programs a subroutine by adding functions to the subroutine.

When writing subroutines for front panel control, subroutines are most often used to perform actions when a key is pressed. It is good programming practice to make the subroutine number relate to the key number.

For example, Key 12 is used to perform functions stored in subroutines 12 or 112 depending on the state the key is in. The control may be passed to Subroutine 12 if the key is pressed when the LED is OFF and the control will be passed to Subroutine 112 if the key is pressed when the LED is ON.

#### COMPLETE FUNCTIONS

Command Format: {WRSnUi=F<sub>1</sub>,F<sub>2</sub>,...}

Sn = Subroutine ID (n = # from 1 to 180)

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

F<sub>1</sub>,F<sub>2</sub>... = Functions: functions must be separated by a comma. The only restriction on the number of functions are those defined in the RS-232 PROTOCOL section of this manual.

Complete Functions, Example 1:

Program Subroutine 1 with the following functions: ON1C3, ON2C3 and LED1=1. Send the following command :

{WRS1=ON1C3, ON2C3, LED1=1}

NOTE: A comma must be used between functions.

Add more functions such as ON3C3 and ON4C3 to the subroutine. Subroutines are written accumulatively. That is, each command is appended to the functions that are already part of the subroutine. Therefore, to add the functions ON3C3 and ON4C3, it is only necessary to send the following command:

{WRS1=ON3C3, ON4C3}

After sending the command above, the contents of Subroutine 1 will be as follows:

ON1C3, ON2C3, LED1=1, ONC3, ON4C3

Complete Functions, Example 2:

The {WRS} command length is virtually unlimited. It is only limited to the buffer size, or 64,895 bytes. The user can add as many functions as desired. Again, keep in mind memory timing constraints defined in the RS-232 PROTOCOL section of this manual.

The next subroutine defines commands for several cards within various Unit ID's. The actual subroutine, Subroutine 2, resides in the system with Unit ID 2. However, the commands stored in that subroutine may control other cards in other Units.

{WRS2U2 = ON1C1U2, ON2C2U2, I1O1C3U4, I2O2C5U6, LED2=2, LED1=0, ON3C4U19, ON5C18U18, LED3=1, OFFC7U1, ONC2U3, OFF2C4U4...}

NOTE: If there are any discrepancies or if the buffer has not been initialized, the user will receive a message such as PLEASE PERFORM BUFFER TEST. Use the {TEST} command to initialize the buffer. Please, refer to the {TEST} command for more information.

To verify the contents of Subroutine 2, send the command {RDS2U2}.

## MATRIX FUNCTIONS

Command Format: {WRSnUi=&...&}

Sn = Subroutine ID (n = # from 1 to 180)

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

& = continuity of the function

NOTE: The "&" is NOT needed at the beginning or end of a function definition, and should NOT be used.

**WARNING:** No other functions may be defined while building a function using multiple keys. Once the controller encounters an "&", it will join the function pieces together until an end of function is encountered. The end of function can be the end of any function or comma. For example, the subroutine {WRS12=I1&,OFF1C4} would turn OFF Output 1 of C4, but the beginning of the matrix command would no longer be valid. Likewise, the following subroutines would not work for matrix functions:

{WRS22=&O1&,ON1C2} or  
{WRS32=LED1=1,&C4}

Matrix Functions, Example 1:

Split the function for I1O2C3 into 2 different subroutines, S13 and S30. Use the following commands to connect Input 1 to Output 2 on the card in slot 3:

{WRS13=I1&} and {WRS30=&O2C3}.

Press two keys to execute the function. The first key pressed should be assigned to Subroutine 13. The second key pressed should be assigned to Subroutine 30. The command will build as follows:

I1& + &O2C3 = I1O2C3

The "&" informs the controller that the function pieces are to be joined together. When joined together, the function pieces must define a legal command or the function will be ignored.

Matrix Functions, Example 2:

Split the function for I1O2C3 into three different subroutines, S13, S30, S3. Use the following commands:

{WRS13=I1&}  
{WRS30=&O2&}  
{WRS3=&C3}

Press three keys to execute the function. The first key pressed should be assigned to Subroutine 13. The second key should be assigned to Subroutine 30 and the third key to Subroutine 3. The command will build as follows:

I1& + &O2& + &C3 = I1O2C3

The "&" informs the controller that the function pieces are to be joined together. When joined together, the function pieces must define a legal command or the function will be ignored.

**NOTE:** Once again, if any other commands are issued anytime before a legal command is completed, the matrix command in process will be destroyed and ignored.

## 38. {SUB}

This command executes a subroutine through RS-232 control.

Command Format: {SUBnUi}

n = subroutine ID (n = # from 1 to 180)

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

Example:

The command {SUB10U1} executes Subroutine 10 of Unit ID 1.

## 39. {CLRS}

This command clears one or all subroutines.

Command Format: {CLRSnUi}

Sn = Sub ID (n = # from 1 to 180, 0 for all)

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

**NOTE:** The system will display a warning when the {CLRSÜ} command begins. When the system is ready, OK will be displayed at the end of the original warning. The warning and ready text will be as follows:

PLEASE\_WAIT\_20\_SECONDS OK.

Example 1:

{CLRS80U2}: Clears Subroutine number 80 of the system with Unit ID 2.

Example 2:

{CLRSÜ}: Clears all 180 subroutines of the system with Unit ID 0.

## 40. {TEST}

This command performs tests on the memory buffer, keys, and LED's. All subroutines will be erased during this test.

Command Format: {TESTUi}

Example:

The command {TESTU1} tests the panel display for Unit ID 1. The {TESTU1} command will display the following notification:

BUFFER TEST (PLEASE\_WAIT\_90\_SECONDS):

After approximately 90 seconds, the system will display the buffer test results. For example:

BUFFER\_IS\_GOOD

After the results are displayed, the system will prompt the user for the KEY/LED test:

KEY-LED TEST: PRESS A KEY TO TURN ON ITS LED - TO EXIT: SEND RES OR TURN OFF THE UNIT

Test each key by pressing it once. As each key is pressed, its LED should turn ON and the previous LED should turn OFF.

For example, at the beginning of the test, all the LED's should be OFF. Start by pressing Key 1. Key 1's LED should turn ON. Next, press Key 2. Key 2's LED should turn ON and Key 1's LED should turn OFF. Then press Key 3 and so on until Key 36 LED is the only one ON.

If any of the keys or LEDs do not behave as just described, the key or its LED is bad.

To EXIT this test, the system must be turned OFF and then ON.

## 41. {WAIT}

This command tells the controller to delay or pause before the next command is executed. See Section 6.3 for more details.

Command Format: {WAITn}

n = delay time (1=100ms, 2=200ms...)

Example:

Sent the command {WAIT2} to cause a delay of 200ms in the controller.

## 7.5 SUMMARY OF COMMANDS

### Card Commands

- 1) [RES] Resets the enclosure, same as power off and then on.
- 2) [VER] Show firmware version of IC's.
- 3) [SET] Sets Enclosure Unit ID number.
- 4) [RATE] Sets the communication speed.
- 5) [STA] Enable/disable auto-feedback.
- 6) [?] Prompt for card status.
- 7) [BAUD] Set RS-232 bits per second.
- 8) [TXR] Bypass command. Pass a text string to RS-232 bus.
- 9) [TXM] Bypass command. Pass a text string to RS-232 bus, add [ ].
- 10) <x[y]z> Bypass command for ISM5000 commands and with "< >".
- 11) <@x[y]z> Bypass command for ISM5000 commands and with no "< >".
- 12) [TEST] Test panel memory, subroutines are not overwritten.
- 13) [HELP] Display available commands

## Group Commands

- 14) [WR] Groups multiple cards
- 15) [RM] Remove members or groups.
- 16) [RD] Displays group members
- 17) [CLRG] Clears members of a single group or all groups.
- 18) [CLM] Remove groups.

## LED Commands

- 19) {LED} Turn ON/OFF/Flash an LED.
- 20) {CLF} Clear memory buffer of input to output connection status.
- 21) {STA} Show input to output connection status.

## KEY Commands

- 22) {RDK} Read/display a key program.
- 23) {WRK} Write/program a key program.
- 24) {CLRK} Clear a key's program.
- 25) {LOCK} Locks one key or all keys.
- 26) {UNLK} Unlocks one key or all keys.
- 27) {KEY} Activate a key via RS232.
- 28) {KFB} Enable/disable key feedback.
- 29) {RDLK} Read/display a key label.
- 30) {WRLK} Write/program a key label.
- 31) {CLRLK} Remove a key label.
- 32) {RDSK} Display subroutines for a key.
- 33) {SETVK} Set key as volume control.
- 34) {CLRVK} Reset key to normal function.
- 35) {UPLK} Upload key program file.

## SUBROUTINE Commands

- 36) {RDS} Read/display a subroutine.
- 37) {WRS} Writes/programs a subroutine.
- 38) {SUB} Activate a subroutine via RS232.
- 39) {CLRS} Clear a subroutine.
- 40) {TEST} Tests memory buffer/keys/LEDs.
- 41) {WAIT} Delay for command buffer.

## 7.6 CONTROL SOFTWARE (Windows Based)

This Windows 95/98/NT based control software is available from the ALTINEX website at [www.altinex.com](http://www.altinex.com) in the Download section.

## 7.7 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, 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.
- 690-0124-015 = 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.

## 7.7.1 MENU COMMAND DEFINITIONS

Each type of Multi-Tasker™ card has unique Menu functions and capabilities. The commands accessed in Menu Mode vary depending on the card type. See the individual User Guide's to determine if Menu Mode is available for that card and what functions are available.

## 7.7.2 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: 8 (Slot 8): MT109-100

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

5. Find the alphanumeric character representing the card whose setup requires changing. It will be the first character 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 "8".

**WARNING:** Do NOT enter any characters except the one relating to the desired menu. Pressing ENTER or RETURN after "8" will force the system back to the original prompt.

7. After selecting the MT109-100 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= ")

## 7.7.3 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 MENU

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.

## TROUBLESHOOTING GUIDE 8

We have carefully tested and have found no problems in the supplied front panel **MT101-106/107/108**. However, we would like to offer suggestions for the following:

### 8.1 CARD CAGE IS NOT WORKING

**Cause 1: Card cage is not plugged in.**

*Solution:* Plug the card cage in. If the card cage works, the problem is solved. If the card still does not work, see Cause 2.

**Cause 2: 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, 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, 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. If the original card was not the source of the problem, see Cause 3.

**Cause 3: Input power/voltage is incorrect.**

*Solution:* Make sure that the input power range is within 85-264VAC and also make sure that the power is connected to the input power connector. If there is still a problem, call ALTINEX at (714) 990-2300.

## ALTINEX POLICY 9

### 9.1 LIMITED WARRANTY/RETURN POLICY

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

### 9.2 CONTACT INFORMATION

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