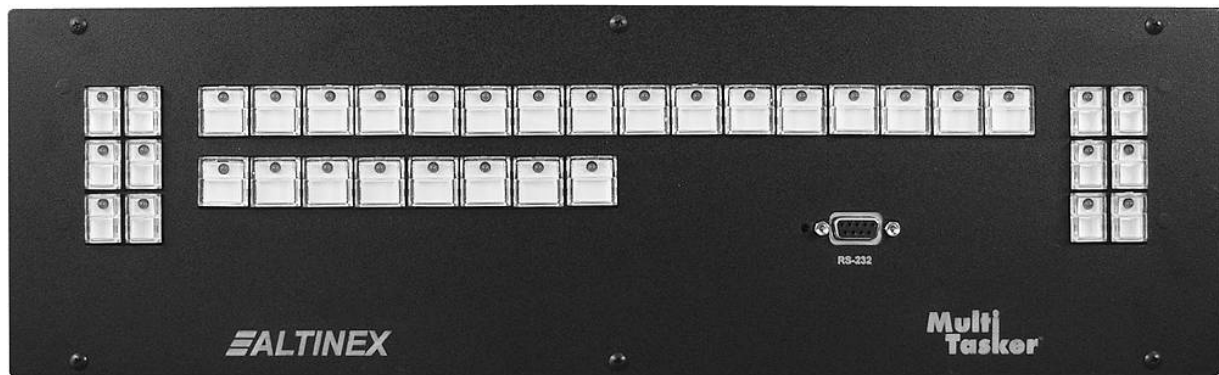# Mult Tasker®

The MT101-115 is pictured above.

MANUAL PART NUMBER: 400-0402-003

MT101-114/115/117

FRONT PANELS
FOR THE 12-SLOT MULTITASKER
USER'S GUIDE

ALTINEX®

SIGNAL MANAGEMENT SOLUTIONS®

MULTITASKER

This manual covers the following front panels for the 12-Slot MultiTasker Enclosure:

MT101-114
  No Keys
  Microprocessor Only
  115W Power Supply

MT101-115
  36 Keys
  Microprocessor
  45W Power Supply

MT101-117
  36 Keys
  Microprocessor
  115W Power Supply

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PRECAUTIONS / SAFETY WARNINGS   1

Please read this manual carefully before using your **MT101-114/115/117**. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT101-114/115/117** and to prevent fire and shock hazards. 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 water or moisture. Do not place the unit 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 front panel carefully. Dropping or jarring can damage the unit. If the front panel is not used for an extended period, disconnect the power cord from the power outlet or turn off the main connection.

1.3 CLEANING

• Unplug the **MT101-114/115/117** 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.

1.4 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 instructions found herein, 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.

MULTITASKER

MT101-114/115/117
Front Panels for the MultiTasker
12-Slot Enclosure

The **MT101-114, MT101-115,** and **MT101-117** are currently the three front panels available for the MT100-108, 12-Slot MultiTasker. The front panel is ordered separately based on the best solution for the particular application.

Select the **MT101-115** panel for applications in which the MultiTasker needs to be controlled from the front panel. This panel provides 36 keys which are user-programmable. This is accomplished by connecting a computer to the **MT101-115** through its 9-pin D-Sub RS-232 communication port and programming the functionality of each key using Windows® software provided by ALTINEX. In applications where more power is required, the **MT101-117** should be used.

Once programmed, the keys can be used to affect the pre-programmed switching functions and operational functions such as press, press-and-hold, and turning LEDs on and off. The keys offer removable transparent faces allowing access to removable labels for easy identification of programmed functions. The key layout on the **MT101-115/117** resembles a typical switcher or matrix switcher configuration with larger keys used for input/output control and smaller keys used for special features.

The **MT101-114** panel can be used for applications in which the MultiTasker will only be controlled with a computer or third-party control system. Although it does not offer any keys, it does have the main microprocessor for the MultiTasker installed on the inside of the panel which is required for external RS-232 control of the MT100-108.

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

FEATURES/ DESCRIPTION	MT101-114/115/117
GENERAL	
Compatibility	Designed for use with MultiTasker 12-Slot Enclosures

Table 1. **MT101-114/115/117** General

MECHANICAL	MT101-114/115/117
T° Operating	10°C-35°C
T° Maximum	50°C
Humidity	90% non-condensing
MTBF (calc.)	65,000 hrs

Table 2. **MT101-114/115/117** Mechanical

ELECTRICAL	MT101-114/115/117
Power Availability MT101-114/117	
Voltage	**Max. Current**
+6V	9.0A
-6V	2.5A
+13V	1.8A
-13V	0.9A
Maximum Total Power (Not the sum of max values.)	115W
Power Availability MT101-115	
Voltage	**Max. Current**
+6V	3.7A
-6V	1.5A
+13V	0.5A
-13V	0.5A
Maximum Total Power (Not the sum of max values.)	45W

Table 3. **MT101-114/115/117** Electrical

ALTINEX®

PRODUCT DESCRIPTION   4

MT101-115/117

36 PROGRAMMABLE
BUTTONS

RS-232 CONTROL
FROM FRONT PANEL

MT101-114

RS-232 CONTROL
FROM FRONT PANEL
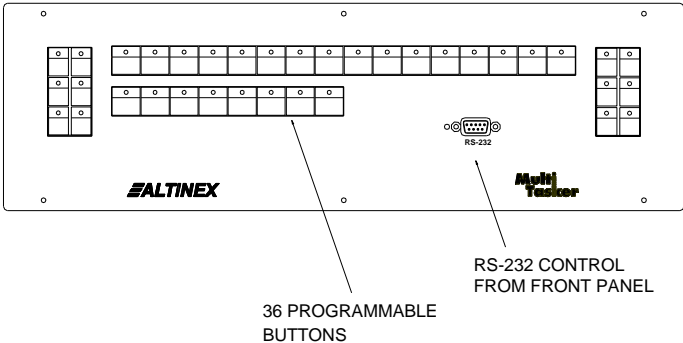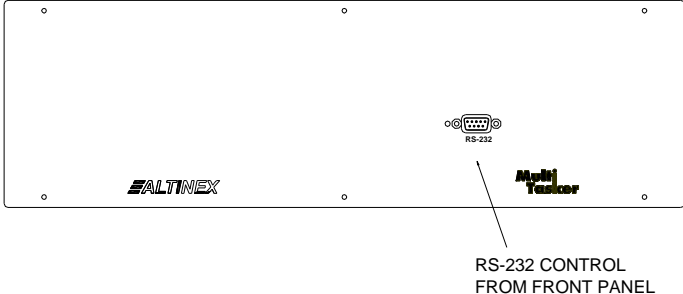
MT101-115/117

KEY NUMBER LOCATIONS

1	2	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	7	8
3	4	29	30	31	32	33	34	35	36									9	10
5	6																	11	12

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APPLICATION DIAGRAMS   5

DIAGRAM 1 – INSTALLATION INSTRUCTIONS

WARNING

Disconnect the AC power cord from the enclosure before making any changes.

LARGE 8-PIN HEADER
on PCB-A and PCB-B
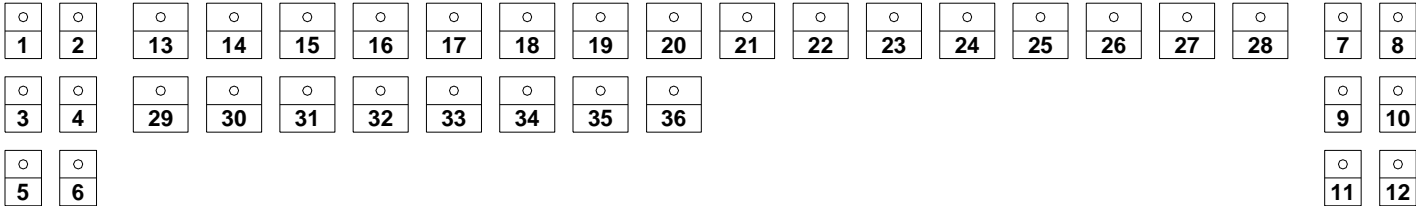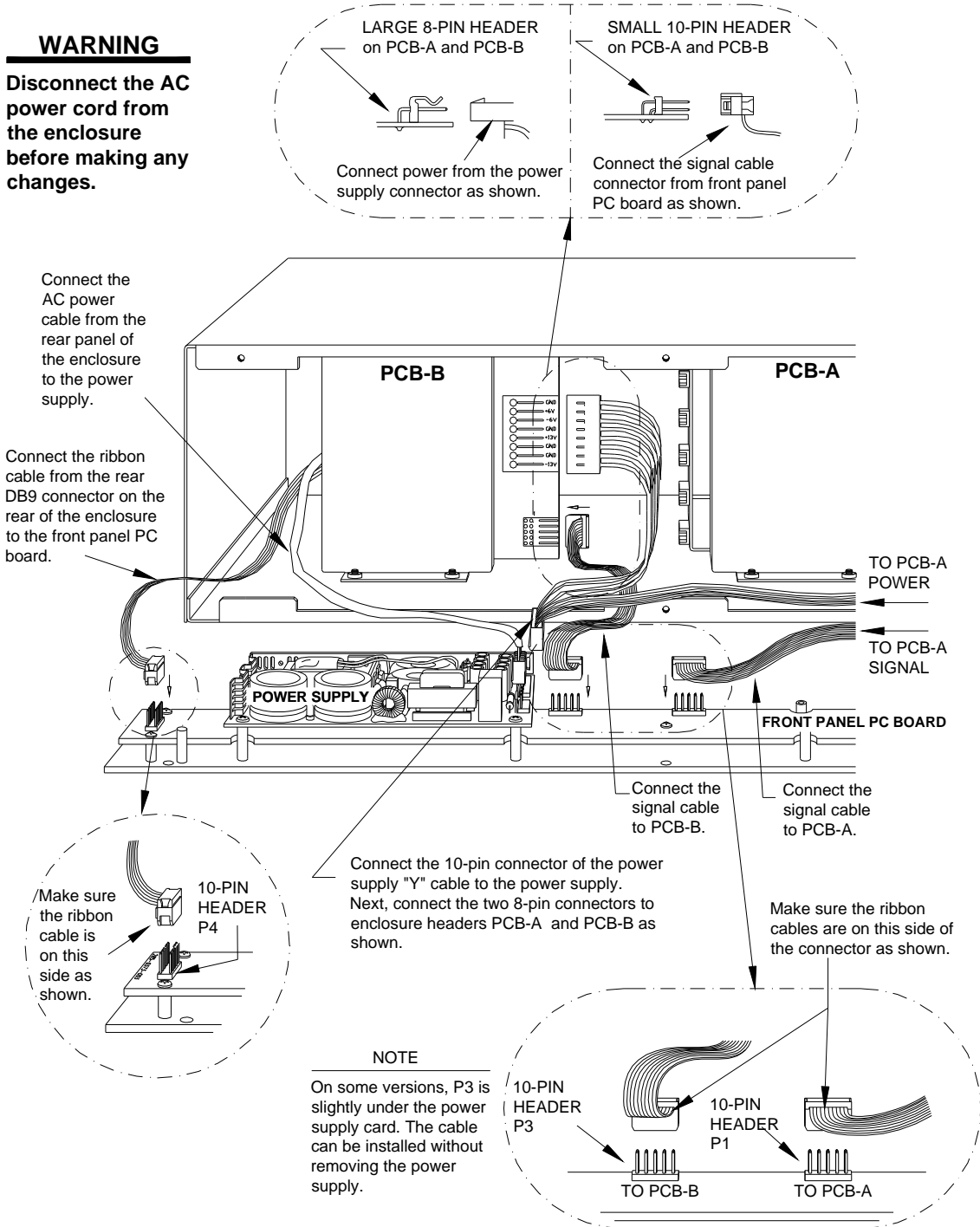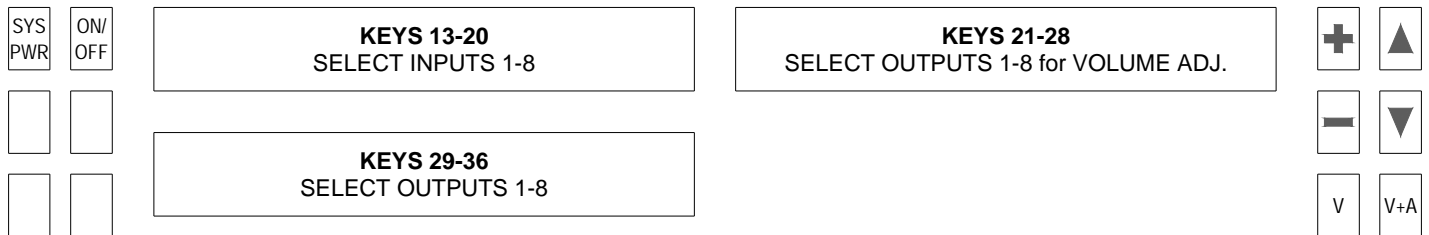
Connect power from the power supply connector as shown.

SMALL 10-PIN HEADER
on PCB-A and PCB-B

Connect the signal cable connector from front panel PC board as shown.

Connect the AC power cable from the rear panel of the enclosure to the power supply.

Connect the ribbon cable from the rear DB9 connector on the rear of the enclosure to the front panel PC board.

PCB-B

PCB-A

GND
+6V
-6V
GND
+13V
GND
-13V

TO PCB-A POWER

TO PCB-A SIGNAL

POWER SUPPLY

FRONT PANEL PC BOARD

Connect the signal cable to PCB-B.

Connect the signal cable to PCB-A.

Make sure the ribbon cable is on this side as shown.

10-PIN HEADER P4

Connect the 10-pin connector of the power supply "Y" cable to the power supply. Next, connect the two 8-pin connectors to enclosure headers PCB-A and PCB-B as shown.

Make sure the ribbon cables are on this side of the connector as shown.

NOTE

On some versions, P3 is slightly under the power supply card. The cable can be installed without removing the power supply.

10-PIN HEADER P3

10-PIN HEADER P1

TO PCB-B

TO PCB-A

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DIAGRAM 2 – SAMPLE MATRIX SETUP

SYS PWR	ON/ OFF	**KEYS 13-20** SELECT INPUTS 1-8	**KEYS 21-28** SELECT OUTPUTS 1-8 for VOLUME ADJ.	✚	▲

		KEYS 29-36 SELECT OUTPUTS 1-8	—	▼

| V | V+A |

SUBROUTINES

{WRS1=LED*=0}	// Turn all LEDs OFF
{WRS1=LED1=1}	// Turn LED1 ON
{WRS1=WRC4C8G1}	// Assign Group 1
{WRS2=ONG1,LED2=1}	// Turn Group 1 ON
{WRS52=OFFG1,LED2=0}	// Turn Group 1 OFF
{WRS13=I1&}	// Select Input: 1
{WRS14=I2&}	// 2
{WRS15=I3&}	// 3
{WRS16=I4&}	// 4
{WRS17=I5&}	// 5
{WRS18=I6&}	// 6
{WRS19=I7&}	// 7
{WRS20=I8&}	// 8
{WRS29=&O1&}	// Select Output:1
{WRS30=&O2&}	// 2
{WRS31=&O3&}	// 3
{WRS32=&O4&}	// 4
{WRS33=&O5&}	// 5
{WRS34=&O6&}	// 6
{WRS35=&O7&}	// 7
{WRS36=&O8&}	// 8
{WRS11=&C4}	// Select Video Only
{WRS12=&G1}	// Select Video+Audio
{WRS7=+}	// Increment Volume
{WRS9=-}	// Decrement Volume
{WRS8=RUPC8}	// Ramp Up
{WRS10=RDNC8}	// Ramp Down
{WRS108=RSTC8}	// Stop Ramping
{WRS21=SEL1C8}	// Select Output:1
{WRS22=SEL2C8}	// (for vol. adj.) 2
{WRS23=SEL3C8}	// 3
{WRS24=SEL4C8}	// 4
{WRS25=SEL5C8}	// 5
{WRS26=SEL6C8}	// 6
{WRS27=SEL7C8}	// 7
{WRS28=SEL8C8}	// 8

KEYS

{WRK1=0,0,0,1,0}	// Press&Hold to clear LEDs
{WRK2=2,52,0,0,0}	// Turn Group 1 On/Off
{WRK13=13,0,0,0,0}	// Select Input: 1
{WRK14=14,0,0,0,0}	// 2
{WRK15=15,0,0,0,0}	// 3
{WRK16=16,0,0,0,0}	// 4
{WRK17=17,0,0,0,0}	// 5
{WRK18=18,0,0,0,0}	// 6
{WRK19=19,0,0,0,0}	// 7
{WRK20=20,0,0,0,0}	// 8
{WRK29=29,0,0,0,0}	// Select Output: 1
{WRK30=30,0,0,0,0}	// 2
{WRK31=31,0,0,0,0}	// 3
{WRK32=32,0,0,0,0}	// 4
{WRK33=33,0,0,0,0}	// 5
{WRK34=34,0,0,0,0}	// 6
{WRK35=35,0,0,0,0}	// 7
{WRK36=36,0,0,0,0}	// 8
{WRK11=11,0,0,0,0}	// Select Video Card (C4)
{WRK12=12,0,0,0,0}	// Select Group 1 (G1)
{WRK7=7,0,0,0,0}	// + (increment)
{WRK9=9,0,0,0,0}	// - (decrement)
{WRK8=8,108,0,0,0}	// Ramp Up/Stop
{WRK10=10,108,0,0,0}	// Ramp Down/Stop
{SETVK8}	// Key 8 = volume key
{SETVK10}	// Key 10 = volume key
{WRK21=21,0,0,0,0}	// Select Output: 1
{WRK22=22,0,0,0,0}	// (for vol. adj.) 2
{WRK23=23,0,0,0,0}	// 3
{WRK24=24,0,0,0,0}	// 4
{WRK25=25,0,0,0,0}	// 5
{WRK26=26,0,0,0,0}	// 6
{WRK27=27,0,0,0,0}	// 7
{WRK28=28,0,0,0,0}	// 8

MULTITASKER

Step 1. Turn off power to the MultiTasker enclosure and disconnect from AC power.

> **WARNING!** ALWAYS DISCONNECT THE AC POWER CORD BEFORE OPENING THE ENCLOSURE.

Step 2. The electronic components inside the enclosure and front panel are static-sensitive. Please take precautions to avoid electrostatic discharge (ESD).

Step 3. Remove the 6 screws on the front panel to access the cables inside the enclosure. Avoid handling the panel by the circuit boards; handle by the metal panel only.

Step 4. Follow the connector orientation illustrations shown in the Installation Instructions on page 5.

> **CAUTION!** Avoid possible electrical damage by ensuring that all header pins are aligned properly before restoring power.

Step 5. After connecting the cables, fasten the panel to the enclosure with the 6 screws removed previously. Be careful not to pinch any cable between the panel and the enclosure.

Step 6. If a PC or control system is used to control the cards in the MultiTasker, connect the 9-pin D connector of the **MT101-114/115/117** to the control system's RS-232 port.

MultiTasker	Computer/ Control System
GND (Ground)	Ground
RXD (Receive)	Transmit
TXD (Transmit)	Receive

Step 7. Turn on the power switch of the **MT101-114/115/117** MultiTasker. The unit is now operational.

The key programs and subroutines described in this section may be programmed on-the-fly or saved in a text file and downloaded to the MultiTasker using communication software such as MTSetup or AVSnap®. The sample program file shown in <u>DIAGRAM 2</u> is a simple matrix control including volume control for an audio card. Use this example to see how keys and subroutines are typically programmed and organized.

7.1 TERMINOLOGY

The terms below are used to increase the legibility of the descriptions used in this section of the manual.

C*n*   This term refers to a MultiTasker card where the ID number is *n*. Typically, "n" is the slot number of the card, but may also be an assigned value. Example: C1, C2, C3, etc.

G*k*   This term refers to a group of cards where "k" is the group number. Groups are defined using the write group command [WR]. The possible groups are G1-G8.

U*i*   This term refers to the ID number of a MultiTasker enclosure. The value of "i" may be a value from 0 to 20 where 0 is the default value in single MultiTasker systems.

string   A string is one or more text characters that form a command, describe output data, or refer to incoming feedback.

feedback   Feedback refers to text data that is received from the MultiTasker or any of the cards installed in the enclosure.

Sub   This term is an abbreviated form for subroutine. A subroutine is a section of memory used to store commands that control the cards within the enclosure. Example: SUB1, SUB2, etc.

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7.2 MT101-114/115/117 OPERATION

This section describes the programming and control functions for the **MT101-114, MT101-115,** and **MT101-117**. The **MT101-114** has the same programming capabilities as the **MT101-115/117** with the exception of the key and LED functions.

On the **MT101-115/117**, the front panel uses 36 programmable keys to control plug-in cards. Each of the 36 keys has five states. A total of 180 subroutines are available to perform different functions based upon each key's state.

IDENTIFY UNIT ID

The [IDUi] and [IDU] commands can be used to locate a specific unit on the RS-232 bus. See the [IDUi] and [IDU] commands for details.

POWER-UP SUB1 (U0/U1)

SUB1 is always executed at power-up or on the reset command, [RES]. Typically, SUB1 is used to place the system cards to default settings. See the {WRS} command for programming details.

KEY PROGRAMMING

Each key may be programmed to execute one subroutine for each of the five key states. See the {WRK} command for details.

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 sec.
State 5	Key is Pressed and Held for 2.5 sec during power-up.

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 7-12

Using these conventions, the LEDs 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 LEDs during these sequences.

MEMORY

The memory is used to save key and subroutine programs. It is non-volatile and has a storage capacity of 64KB. The only size restriction of an individual subroutine is that of overall available memory.

SAVING CARD CONFIGURATIONS

Commands used for MultiTasker cards such as [ON], [OFF], and [IO] that end in "S" will be saved to the memory of each card. Commands not ending in "S" will be executed but not restored when the system is reset or powered off, and then on again.

SUBROUTINES AND FUNCTION TYPES

The subroutine for a 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 group/card ID, "C3". See the {WRS} command for further details.

Complete and incomplete functions mean two different types of subroutines. Subroutines with complete functions contain one or more stand-alone functions which are all executed with a single key press. Subroutines with matrix functions require two or more keys to be pressed to complete a single executable function.

7.3 RS-232 CONNECTION

7.3.1 RS-232 COMMUNICATION

If a control system is used to control the cards in the MultiTasker, connect the 9-pin D connector of the **MT101-114/115/117** to the control system's RS-232 port. In order to connect the MultiTasker (MT) to a computer or a terminal, you must have the proper interface cable such as the ALTINEX RC5201RS.

The cable must have the appropriate connector on each end and the internal wiring must be correct. Connectors typically have 9 pins (DB-9) or 25 pins (DB-25).

Figure 1 shows the typical pinout and connections for a DB-9 computer serial port and Figure 2 shows the typical pinout and connections required for a DB-25 computer serial port.
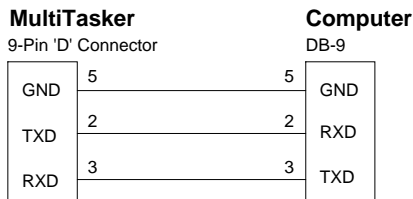
MultiTasker
9-Pin 'D' Connector

Computer
DB-9

GND	5 ————— 5	GND
TXD	2 ————— 2	RXD
RXD	3 ————— 3	TXD

Figure 1: DB-9 Serial Connection

MultiTasker
9-Pin 'D' Connector

Computer
DB-25

GND	5 ————— 7	GND
TXD	2 ————— 3	RXD
RXD	3 ————— 2	TXD

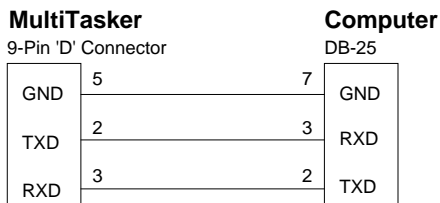Figure 2: DB-25 Serial Connection

7.4 RS-232 PROTOCOL

The RS-232 protocol for the **MT101-114/115/117** 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 **MT101-114/115/117** have many advanced remote control capabilities which are accessible through standard RS-232 communication. Control can be accomplished using a computer, a control system, or any other device capable of sending RS-232 commands. The factory settings for the RS-232 port are as follows:

Baud Rate	=	9600
Data Bits	=	8
Stop Bits	=	1
Parity	=	None

The enclosure and cards in a MultiTasker are capable of performing various functions, as well as providing feedback to the user or control system. Commands instruct a card to perform specific actions, request status information, and some do both simultaneously.

A command that does not request specific information will generate feedback of "[ ]". The open bracket immediately followed by a closed bracket indicates the card or unit received a valid command. If the command requested information from the card or enclosure, the feedback generated is the acknowledgement of having received a valid command. Invalid commands generate feedback that includes "ERR" plus an error code.

Example: [ERR001]

Commands ending in "S" will be saved into memory. Commands not ending in "S" will still be executed, but will not be restored when the system is reset or powered-off, then on.

7.4.1 DESCRIPTION OF COMMANDS

Each command can consist of up to three parts: Function, Card/Group, and Unit. Card commands require the card/group ID, whereas enclosure commands do not.

[Function , Card/Group ID , Unit ID]

Example: [VERC3U2]

VER = Function
C3 = Card ID or Group ID
U2 = Unit ID (optional for Unit ID 0)

The card ID is a unique identifier. It is equal to the enclosure slot number, or it may be an assigned value. The group ID represents a group of cards defined with the [WR] command. All cards in a group perform the given instruction.

NOTE: Changing the position of a card will significantly affect control programs and third-party control systems.

The unit ID may range from U0 to U20 where U0 is used for single-unit operation. If the ID is U0, each command may be used without the unit ID. See the command [SET] for details.

Example:

[VERC3]: For U0
[VERC3Ui]: For U1-U20
[VERC3]: Equivalent to [VERC3U0]

7.5 RS-232 COMMANDS

See the COMMAND SUMMARY (section 7.6) for a one-line description of each command. The RS-232 available commands in this section are organized into the following groups:

System Commands
Group Commands
Configuration Commands
Special Commands
LED Commands
Key Commands
Subroutine Commands

SYSTEM COMMANDS

System commands provide information about the front panel, control feedback, and allow unit IDs to be changed or identified.

1. **[VER]**

   This command displays the current version of the firmware for the controller unit located in the **MT101-114/115/117**.

   Command Format: [VERUi]

   Ui = Unit ID (i = # from 0 to 20)

   Example:

   Query U1 for the installed firmware version. Send the command [VERU1] to the enclosure and the unit will return feedback similar to the following:

   [MT101-115 690-0122-030 690-0123-007 690-0124-027]

   MT101-115: Front panel model number

   690-0122-030: Control firmware version

   690-0123-007: Process firmware version

   690-0124-027: Panel firmware version

2. **[SET]**

   This command sets the ID number of a front panel and may be directed to any unit connected to the RS-232 bus.

   Command Format: [SETUxUi]

   Ux = New unit ID (x = # from 0 to 20)

   Ui = Current unit ID (i = # from 0 to 20, optional)

   Example 1: ID U0

   Assign U0 to a single **MT101-115** by sending the command [SETU0]. After the command is executed, the ID will be changed to U0 and the system will return the following feedback:

   Unit ID = 0

   [ ]

   READY

3. **[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.

Units with IDs U0 and U1 will beep once and display "READY" after their initialization is complete and all the functions stored in SUB1 have been executed. This will let the user know that the unit is ready for operation. Units with other IDs will beep once, but will not display any feedback.

4. **[?]**

This command displays general information about the MultiTasker and the cards installed.

Command Format: [?]

Example:

A MultiTasker has a front panel with part number **MT101-115** and contains an MT103-121, MT103-122, and MT103-123. Send [?] and receive the following feedback:

[(MT101-115U0)(MT103-121C02) (MT103-122C03)(MT103-123C04)]

MT101-115U0   = Panel model and unit ID
MT103-121C02 = An MT103-121 is in slot 2
MT103-122C03 = An MT103-122 is in slot 3
MT103-123C04 = An MT103-123 is in slot 4

5. **[?C]**

This command displays general information about a card and its status.

Command Format: [?Cn]

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

Example:

The MT103-121 in slot 2 is on, its equalization is set to 10, and there is a signal detected. Send the command [?C2] to receive the following status:

[(MT103-121C02)(VR690-0197-005C02) (ONC02)(EQ10C02)(SI1C02)]

All status feedback is enclosed in brackets, "[ ]." Each data field within the status is enclosed in parentheses. The first two characters identify the status type. The last three characters are the card's ID.

MT103-121   = Card model number
VR690-0197-005   = Firmware version
ON   = Output is enabled
EQ10   = Equalization is set to 10
SI1   = Signal detect (1=yes)

6. **[DFB]**

This command disables all feedback from one or all MultiTasker units connected together on a single bus; it is designed for use with 19 and 20 slot MultiTasker enclosures.

7. **[EFB]**

This command enables feedback from one MultiTasker unit only and disables feedback from all other units connected on the bus; it is designed for use with 19 and 20 slot MultiTasker enclosures.

8. **[IDUi]**

This command identifies a single MultiTasker unit within a MultiTasker system of several units. The requested unit will flash its front panel LED and sound its buzzer to match its ID; it is designed for use with 19 and 20 slot MultiTasker enclosures.

9. **[IDU]**

This command instructs each MultiTasker connected to the RS-232 bus to flash its front panel LED and sound its buzzer to match its ID; it is designed for use with 19 and 20 slot MultiTasker enclosures.

10. **[STA1]**

This command enables automatic feedback from the cards installed in the system and affects any card with auto-feedback capability. The default at power-on or reset is STA0 or off. For more details, see the [?Cn] command definitions for individual cards.

Command Format [STA1]: = On

11. **[STA0]**

This command disables automatic feedback from the cards and affects any card with auto-feedback capability. The default at power-on or reset is STA0 or off.

Command Format: [STA0]

GROUP COMMANDS

Group commands allow several cards with the same functions to be controlled simultaneously with a single command. Up to 8 groups (G1-G8) may be defined.

12. **[WR]**

This command adds cards to a group. In MultiTasker systems with audio and video cards, the groups are typically as follows:

Group 1 = Video Cards

Group 2 = Audio Cards

Group 3 = Video and Audio Cards

Command Format: [WRCn_1Cn_2…Gk]

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

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

Example:

Add C2, C4, and C6 to G5 by sending the command [WRC2C4C6G5]. After executing this command, G5 will consist of C2, C4, and C6.

Now add C8 to G5 by sending [WRC8G5]. C8 is added to G5, and G5 is not overwritten. View the contents of G5 by sending [RDG5] and receiving the following feedback:

[G5=C2C4C6C8]

13. **[RMC]**

This command removes one or more cards from a group.

Command Format: [RMCn_1Cn_2…Gk]

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

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

Example:

G5 consists of the C2, C4, C6, and C8. Remove C6 and C8 by sending [RMC6C8G5]. View the contents of G5 by sending [RDG5] and receiving the following feedback:

[G5=C2C4]

14. **[RMG]**

This command deletes one or all groups.

Command Format: [RMGk]

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

Example:

Remove all cards from G52 by sending [RMG5]:

[G5=0]

Example 2:

Remove all cards from all groups, effectively deleting all groups, by sending [RMG*]. The system will return the following feedback:

G1-G8: EMPTY

15. **[RD]**

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

Command Format: [RDGk]

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

Example:

C2, C4, and C6 make up G5. Read the member data for G5 by sending the command [RDG5]:

[G5=C2C4C6]

The feedback shows G5 and then the cards that make up G5. In this case, G5 includes C2, C4, and C6.

CONFIGURATION COMMANDS

These commands allow some basic communication properties to be changed as well as access to internal processor functions like BEEP and PING. Use caution when changing RATE and BAUD settings as changes may result in unforeseen problems.

16. **[RATE]**

This command displays the communication rate between the **MT101-114/115/117** and the cards in the system. Each command that is stored in a subroutine will be sent out to the cards at the defined rate. Only skilled programmers should use this command.

Command Format: [RATE]

Example:

Check the communication rate by sending the command [RATE] and receiving feedback similar to the following:

RATE=0(0ms)

17. **[RATE=]**

This command sets the communication rate between the **MT101-114/115/117** and the cards in the system. If more than one command is stored in a subroutine, each command will be sent out at the defined rate. Increasing the rate effectively adds a delay between each command stored in a subroutine. Only skilled programmers should use this command.

Command Format: [RATE=n]

n   = rate, x100msec (n= # from 0-20)

Example:

Set the communication rate to 0 by sending the command [RATE=0] and receiving feedback similar to the following:

RATE=0(0ms)

18. **[RATE=S]**

This command is the same as the [RATE=] command but it also saves the communication rate to memory. This saved rate will be restored after power-up or reset. Only skilled programmers should use this command.

Command Format: [RATE=nS]

n   = rate, x100msec (n= # from 0-20)

19. **[BEEPn]**

This command sounds the front panel's internal buzzer for a specified duration.

Command Format: [BEEPn]

n   = multiple of 100msec (n = # from 1-9)

Example:

Sound the buzzer for a half-second by sending the command [BEEP5].

20. **[BEEP]**

This command sounds the front panel's internal buzzer for a short, fixed beep.

Command Format: [BEEP]

Example:

Sound the buzzer for a very short beep by sending the command [BEEP].

21. **[PING]**

This command displays the "[ ]" characters and may be used to verify communication with the front panel.

Command Format: [PING]

Example:

Send the command [PING] and the panel will respond with the following feedback:

[ ]

22. [BAUD]

This command displays the current BAUD rate setting.

Command Format: [BAUD]

Example:

Display the BAUD rate setting by sending the command [BAUD] and receiving feedback similar to the following:

BAUD=9600

23. [BAUD=]

This command sets the baud rate via the RS-232 bus. The baud rate may also be set from the front panel keys.

Command Format: [BAUD=n]

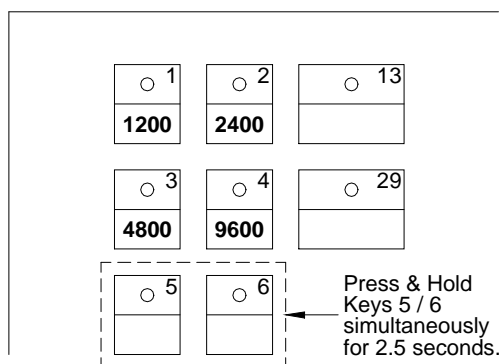n = 1200, 2400, 4800, or 9600

Example 1: RS-232 BUS

Set the baud rate to 9600 by sending [BAUD=9600]. The system will return feedback similar to the following:

?w3%baud=9600$#7f&changed?

Example 2: FRONT PANEL

Each rate is represented by one of the following front panel keys:

  Key 1 = 1200   Key 2 = 2400
  Key 3 = 4800   Key 4 = 9600

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

1) Press & Hold both keys 5 and 6 simultaneously for 2.5 seconds.

2) LEDs 1, 2, 3, and 4 will turn on and one of the four will be flashing. The flashing LED represents the current baud rate setting.

3) Press & Hold for 2.5 seconds the key representing the desired baud rate.

4) After 2.5 seconds, all 4 LEDs will be extinguished.

5) The new baud rate is set.

SPECIAL COMMANDS

These commands allow special character strings to be sent to external devices. The strings may be used to issue commands to custom equipment connected to the MultiTasker. Also included in this section are commands to test the internal memory and display all available RS-232 commands.

24. [TXR]

This command is used to send command strings to the RS-232 bus through the MultiTasker.

Command Format: [TXRxyz]

xyz = text string ("abc","123",…)

Example:

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

HELLO

25. [TXM]

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

Command Format: [TXRxyz]

xyz = text string ("abc","123",…)

Example:

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

[HELLO]

26. **<x[y]z>**

This command is used to send ISM5000 command strings to the RS-232 bus through the MultiTasker. It transmits the "< >" symbols with the command string and allows bracket commands within the command string.

Command Format: <x[y]z>

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

Example:

Send the command string "<abc[123]xyz>" to the RS-232 bus. The string will be ignored by the MultiTasker, but not the unit receiving the command. Additionallly, 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>

27. **<@x[y]z>**

This command is used to send ISM5000 command strings to the RS-232 bus, through the MultiTasker. It removes the "< >" symbols in the command string and allows bracket commands within the command string.

Command Format: <x[y]z>

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

Example:

Send the command string "abc[123]xyz" to the RS-232 bus. The string will be ignored by the MultiTasker, but not the unit receiving the command. Additionallly, 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

28. **[TEST]**

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

Command Format: [TEST]

Example:

In order to test the MultiTasker internal memory, send the command [TEST]. The system will respond as follows if the test passes:

[ ] [ ]

Otherwise, failures will be indicated.

29. **[HELP]**

This command displays information available for the MultiTasker interface commands or card commands. Sending the command without a card reference returns help for the interface.

Command Format: [HELPCn], [HELPUi]

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

Ui = Unit ID (i = # from 0 to 20)

Example 1:

In order to view the RS-232 commands available for the MultiTasker, 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 C2, send the command [HELPC2]. The commands along with a brief description will be displayed in the Terminal Window.

LED COMMANDS

LED commands apply to the **MT101-115/117** only and are used to control the LED states and retrieve matrix settings based upon key entries. The LED states (on, off, flashing) may be controlled directly over the RS-232 bus or through the use of subroutines programmed into the front panel.

30. **{LEDn=}**

This command activates a single key's LED or all LEDs.

Command Format: {LEDn=s}

n   = # from 1 to 36 for a single LED

   = * for all LEDs

s   = # from 0 to 2

   = 0 for OFF

   = 1 for ON

   = 2 for FLASH

Examples:

Command	LED#	Results
{ LED36=2 }	36	FLASH
{ LED10=1 }	10	ON
{ LED*=0 }	ALL	OFF
{ LED*=1 }	ALL	ON
{ LED*=2 }	ALL	FLASH

31. **{LEDm-n}**

This command activates the LEDs for a sequential range of keys.

Command Format: {LEDm-n=s}

m,n = # - ## for a sequential range from 1 to 36

   = * for all LEDs

s   = # from 0 to 2

   = 0 for OFF

   = 1 for ON

   = 2 for FLASH

Examples:

Command	LED#	Results
{ LED1-10=1 }	1 to 10	ON
{ LED13-36=0 }	13 to 36	OFF

32. **{CLFC}**

This command is a debug tool that clears the memory of input-to-output connections used to flash the LEDs for a single matrix card. This command is used in conjunction with the {STA} command.

Command Format: {CLFCn}

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

Example:

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

A user connects Input 1 to Outputs 1, 2, and 3 on C2 from the front panel. The connection is verified by pressing Key 2 and then the Input 1 key. The LEDs 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. The original user begins experiencing problems and checks the status from the front panel using Key 2. None of the LEDs will flash. This indicates there has been a change in the setup.

NOTE: If the {CLF} command is not used, the front panel LEDs will continue to indicate the last setup made using the front panel. Any changes over the RS-232 bus will be not be indicated. The user controlling the MultiTasker from the RS-232 bus must send the command {CLFC2} to clear the status LED information.

33. **{CLFG}**

This command is the same as the {CLFC} command except that it clears the memory of input-to-output connections used to flash the LEDs for a group of matrix cards.

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Command Format: {CLFGk}

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

See the {CLFC} command for details.

34. {STA}

This command is used to show the input-to-output connections for Matrix cards/groups as set from the front panel only. The LEDs 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:

C4 is an 8X8 matrix card and the following is programmed into the front panel:

- Keys 13-20 select inputs for C4.
- Keys 29-36 select outputs for C4.
- Sub 2 contains the following: {WRS2=LED*=0,STA}.
- Key 2 is programmed as follows: {WRK2=2,0,0,0,0}.

Connect Input 1 to Outputs 1 and 2 on C4 and verify the connection. Use the following steps:

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

NOTE: An input or output key can be selected to see its connections. In either case, all connections would be indicated. Selecting an input key will show all the outputs to which the input is connected. An output key will show only the one input to which it is connected.

KEY COMMANDS

Key commands define which subroutines will be performed when a key is pressed under various conditions and how it will respond to activation. Keys may also be given labels to help identify their usage.

35. {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 word VOLUME will be displayed. Lastly, if the key is locked, the word LOCKED will be displayed.

Command Format: {RDKn}

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

{RDKn}:   Display a single key program.

{RDK*}:   Display all key programs.

Example 1:

Display the program definition for Key 1 by sending {RDK1} 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 SUB2 for key state 1.
5	Go to SUB5 for key state 2.
10	Go to SUB10 for key state 3.
20	Go to SUB20 for key state 4.
30	Go to SUB30 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:

The Key 8 label is SPEAKERS; it is set for volume control, and it is unlocked. The system will return the following:

KEY8= 8,108,0,0,0 SPEAKERS VOLUME

Example 3:

Display the contents of all the keys by sending {RDK*} 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 06: 000,000,000,000,000
KEY 07: 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).

36. **{WRK}**

This command writes a key by assigning a subroutine ID to each of the 5 key states.

CAUTION: If programming Key 1 to perform functions from the front panel, remember SUB1 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 SUB101.

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 2.5s
5	HELD for 2.5s at power-up

Format: $\{WRKn=s_1,s_2,s_3,s_4,s_5\}$

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

s_1 = Sub ID (#0 to 180) for state 1

s_2 = Sub ID (#0 to 180) for state 2

s_3 = Sub ID (#0 to 180) for state 3

s_4 = Sub ID (#0 to 180) for state 4

s_5 = Sub 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 execute SUB2 if Key 2 is pressed when its LED is off and nothing for the remaining states.

Example: Key 6

{WRK6=10,20,30,40,0}

10 - State 1: Execute SUB10 when Key 6 is pressed and LED6 is **OFF**.

20 - State 2: Execute SUB20 when Key 6 is pressed and LED6 is **ON**.

30 - State 3: Execute SUB30 when Key 6 is pressed and LED6 is **FLASHING**.

40 - State 4: Execute SUB40 when Key 6 is **PRESSED and HELD** for 2.5s.

00 - State 5: Do nothing if Key 6 is **PRESSED and HELD** for 2.5s on power-up.

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.

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37. {CLRK}

This command clears the subroutines associated with one or all the keys by setting each to 000. Other key settings remain unchanged: labels, volume control, and locked.

Command Format: {CLRKn}

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

Example:

{CLRK3}   : Clear Key 33 programming
{CLRK*}   : Clear all 36 key programs

38. {LOCK}

This command locks one key or all keys and can be used to prevent accidental changes from the front panel.

Command Format: {LOCKn}

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

Example 1: Lock Key 1

Send the command {LOCK1} to locks Key 1 only. This command will not affect any other keys.

Example 2: Lock ALL keys

The command {LOCK*} locks all the keys.

CAUTION: This will lock the user out of any front panel control. The lockout can be corrected using RS-232 control or by programming an unlock function into SUB1 and then resetting power.

Example 3: Lock ALL keys (except one)

The commands {LOCK*} and {UNLK2} will lock all the keys and then unlock Key 2. Key 2 may then be used to unlock all the keys.

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

39. {UNLK} or {UNLOCK}

This command will unlock one key or all keys.

Command Format: {UNLKn} or {UNLOCKn}

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

Example 1:

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

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

40. {KEY}

This command simulates a key press through RS-232 control and is useful when verifying key programs and subroutines.

Command Format: {KEYn}

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

Example:

The command {KEY36} simulates pressing Key 36. The simulation will perform the correct subroutine depending upon the state of the LED.

41. {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: KnxSy

Kn = Key # (n = # from 1 to 36)
x   = Key state when pressed
          N = LED was OFF
          O = LED was ON
          F = LED was Flashing
          H = Key was pressed and held for 2.5s
          R = Key was pressed and held for 2.5s
                  during power-up
y   =   Subroutine number performed after
          pressing key (y = # from 1 to 180)

Example:

Key 1's LED is on and Key 36's LED is off. Key 1 is programmed to execute SUB10 when pressed with the LED on (State 2) and Key 36 is programmed to execute SUB36 when the LED is off (State 1).

Send the command {KFB=1} to enable key feedback. Press Key 1 and then press Key 36. The feedback will be as follows:

K01OS10 K36NS36

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."

42. {RDLK}

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

Command Format: {RDLKn}

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

Example:

Key 1 has its label defined as "STATUS." Send the command {RDLK1} and the system will return the following feedback:

STATUS

If there is no label defined, the system will return the following:

NO LABEL

43. {WRLK}

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

Command Format: {WRLKn=T}

Kn = Key # from 1 to 36

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: 012,000,000,000,000 CONF_RM_MON

44. {CLRLK}

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

Command Format: {CLRLKn}

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

Example:

Clear the label from Key 12 by sending the command {CLRLK12} and then read back the key by sending {RDK12} and receiving the following:

KEY 12: 000,000,000,000,000

45. {RDSK}

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

Command Format: {RDSKn}

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

Example:

Key 2 is programmed with {WRK2=2,20,21,0,0}. SUB2 contains "ONC5", SUB20 contains "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.

46. {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 sub is performed when the key is pressed down and the second is performed when the key is released.   Keys defined as volume will have the word VOLUME displayed when using the command {RDK}.

Command Format: {SETVKn}

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

Example:

C2 is an MT109-100 and Key 8 is programmed {WRK8=8,108,0,0,0}. SUB8 = "RUPC2" and SUB108 = "RSTC2." Pressing Key 8 begins ramping up the MT109-100's output volume. Releasing Key 8 stops the ramping.

47. {CLRVK}

This command resets a key to normal function.

Command Format: {CLRVKn}

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

Example:

Change Key 8 in the previous example back to a normal key by sending {CLRVK8}. Key 8 will now support the normal 5 states of operation.

48. {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. Sub numbers and labels are saved, but VOLUME and LOCKED settings are not.

Before uploading or downloading, the rate must be set to the default zero, [RATE=0]. There is no unit ID information in the key program. The key program may be uploaded from any unit, for example {UPLKU2}. However, when downloading a key program all units connected to the bus will receive the same key program.

There are two parts to the key program file. The first contains the subroutine information and the second the label information.

SUBROUTINE:

Format: { *$* , *Key#* , *:* , *subroutines* }

Example: { $ 0 1: 1 , 5 1 , 0 , 0 , 0 }

LABEL:

Format: { *%* , *Key#* , *:* , *Label* }

Example: { % 0 1 : VIDEO_CAMERA }

Command Format: {UPLK}

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

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 rate to zero, [RATE=0].

2. Click Transfer > Capture Text

3. Enter the file name (ex: MTKeys.txt).

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

4. Click Start.

5. Send {UPLK} to upload the program.

6. Click Transfer > Capture Text > Stop.

EDIT

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

DOWNLOAD

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

2. Click Edit > Copy from the menu.

3. Select HyperTerminal.

4. Click Edit > Paste to Host.

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

SUBROUTINE COMMANDS

49. {RDS}

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

Command Format: {RDSn}

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

Example 1: (Display one subroutine.)

Display the contents of SUB1 by sending {RDS1} and the system will display the subroutine number and its contents. The display will be in the following format:

SUB001: LED*=0, LED1=1...............
OK

SUB001 = subroutine number

LED*=0, LED1=1 = stored functions

OK = done

Example 2: (Display all subroutines.)

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

SUB001: ON1C2, OFFC3, LED36=1.........

SUB002: ON2C2, OFF3C3, LED2=1.........

SUB005: ON3C2, OFF6C3, LED3=0.........

OK

NOTE: Empty subroutines will NOT be displayed. If all the subroutines are empty, the following will be displayed:

ALL SUBROUTINES ARE EMPTY

50. {WRS}

This command appends functions to a subroutine. The subroutine contents may be cleared using the {CLRS} command. The command length is limited only by available memory, but no more than 30 characters should be sent in a single write statement.

Subroutines for front panel control most often perform actions when a key is pressed. It is a 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. The control may be passed to SUB12 if the key is pressed when the LED is off and the control will be passed to SUB112 if the key is pressed when the LED is flashing.

Example:

Key # = SUB# ....LED is OFF

= SUB#+50 .....LED is ON

= SUB#+100 ...LED is FLASHING

= SUB#+150 ...Key is Pressed & Held

Key 10 = SUB10 ....LED is OFF

= SUB60 ....LED is ON

= SUB110 ....LED is FLASHING

= SUB160 ....Key is Pressed & Held

Key 10 = {WRK10=10,60,110,160,0}

COMPLETE FUNCTIONS

Command Format: {WRSn=F_1,F_2,…}

Sn = Subroutine ID (n = # from 1 to 180)
F_1,F_2… = Functions must be separated by a comma.

Example 1:

Program SUB1 with the following functions: ON1C3, ON2C3, and LED1=1. Send the following command :

{WRS1=ON1C3, ON2C3, LED1=1}

Add more functions such as ON3C3 and ON4C3 to the subroutine. Each write statement is appended to the functions that are already stored in 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,ON3C3, ON4C3

<u>MATRIX FUNCTIONS</u>

Command Format: {WRSn=&…&}

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

& = 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. For example, {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 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, SUB13 and SUB30. Use the following commands to connect Input 1 to Output 2 on C3:

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

Press two keys to execute the function. First press Key 13 for SUB13 and then Key 30 for SUB30. The command will build as follows:

I1& + &02C3 = 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, and S11. Use the following commands:

{WRS13=I1&}

{WRS30=&O2&}

{WRS11=&C3}

Press 3 keys to execute the function. The first key pressed should be assigned to SUB13, the second to SUB30 and the third to SUB11. The command will build as follows:

I1& + &02& + &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.

51. **{WRS=S}**

This command allows a subroutine to call the functions stored in other subroutines instead of writing the functions to the subroutine.

Command Format: {WRSn=S$_1$,S$_2$...}

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

S$_1$,S$_2$... = Sub no. (reference up to 10 subs)

Example:

Set SUB100 to execute subroutines 10, 20, 30, 40, and 50 by sending the command {WRS100=S10,S20,S30,S40,S50}. When SUB100 is executed, all the functions stored in subroutines 10, 20, 30, 40, and 50 will be executed.

52. {PING}

This command displays "OK", but not until after is has been processed through the incoming memory buffer. After downloading a program file to the MultiTasker, this command can be used to indicate when the MultiTasker has finished writing everything to memory. This is only necessary if the auto-feedback, "[ ]", is disabled using the [DFB] command.

Command Format: {PING}

Example:

The command {PING} instructs the MultiTasker to display "OK."

53. {SUB}

This command executes a subroutine through RS-232 control.

Command Format: {SUBn}

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

Example:

The command {SUB10} executes the functions stored in SUB10.

54. {CLRS}

This command clears one or all subroutines.

Command Format: {CLRSn}

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

Example:

Clear SUB80 by sending the command {CLRS80}.

NOTE: The system will display a warning when the {CLRS*} command begins. This will be followed by periods indicating progress until the final message is displayed as follows:

PLEASE WAIT 20 SECONDS....................

SUBROUTINES ARE CLEARED

55. {TEST}

This command performs a destructive test of the memory buffer, keys, and LEDs. All subs will be erased during this test.

Command Format: {TEST}

Example:

The command {TEST} tests the front panel and will display a notification when started, followed by a progress indicator, and finally a completion notice as follows:

1) MEMORY BUFFER TEST: (TIME=90 SECONDS)

0%........25%.........50%.........75%........100%

BUFFER TEST: PASSED

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

2) 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. If any of the keys or LEDs do not behave as just described, the key or its LED is bad. To exit this test, turn the system off, and then back on again.

56. {WAIT}

This command instructs the controller to delay or pause before the next command is executed.

Command Format: {WAITn}

n   = delay time (1=100ms, 2=200ms…)

Example:

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

7.6. SUMMARY OF COMMANDS

System Commands

1) [VER]   Display firmware version
2) [SET]   Set Unit ID number
3) [RES]   Reset the system
4) [?]   Display system status
5) [?C]   Display card status
6) [DFB]   Display card/unit feedback
7) [EFB]   Enable card/unit feedback
8) [IDUi]   Identify a single unit ID
9) [IDU]   Identify all unit IDs
10) [STA1]   Enable auto-feedback
11) [STA0]   Disable auto-feedback

Group Commands

12) [WR]   Write cards to a group
13) [RMC]   Remove group members
14) [RMG]   Remove entire groups
15) [RD]   Display group members

Configuration Commands

16) [RATE]   Display communication rate
17) [RATE=]   Set communication rate
18) [RATE=S]   Save communication rate
19) [BEEPn]   Sound beep of set length
20) [BEEP]   Sound short beep
21) [PING]   Display "[ ]"
22) [BAUD]   Display RS-232 baud rate
23) [BAUD=]   Set RS-232 baud rate

Special Commands

24) [TXR]   Bypass command
25) [TXM]   Bypass command - [ ]
26) <x[y]z>   Bypass command for ISM5000
27) <@x[y]z>   Bypass command for ISM5000
28) [TEST]   Test memory, nondestructive
29) [HELP]   Display available commands

LED Commands

30) {LEDn=}   Set a single LED
31) {LEDm-n}   Set a range of LEDs
32) {CLFC}   Clear card memory buffer
33) {CLFG}   Clear group memory buffer
34) {STA}   Show LED I/O connection

Key Commands

35) {RDK}   Display a key program
36) {WRK}   Write a key program
37) {CLRK}   Clear a key program
38) {LOCK}   Lock one or all keys
39) {UNLK}   Unlock one or all keys
40) {KEY}   Simulate a key press
41) {KFB}   Enable/disable key feedback
42) {RDLK}   Display a key label
43) {WRLK}   Write a key label
44) {CLRLK}   Clear a key label
45) {RDSK}   Display subroutines for a key
46) {SETVK}   Set key as volume control
47) {CLRVK}   Reset key to normal function
48) {UPLK}   Upload key program file

Subroutine Commands

49) {RDS}   Display a subroutine
50) {WRS}   Write a subroutine
51) {WRS=S}   Write a subroutine
52) {PING}   Display "OK" (from buffer)
53) {SUB}   Execute a subroutine
54) {CLRS}   Clear/erase a subroutine
55) {TEST}   Test memory, destructive
56) {WAIT}   Pause before next command

7.7 CONTROL SOFTWARE

Windows-(95/98/NT)-based control software is available from the ALTINEX website at www.altinex.com in the Software section.

7.8 MENU MODE

Menu Mode commands 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 user selections.

7.8.1 MENU COMMAND DEFINITIONS

Each type of MultiTasker card has unique menu functions and capabilities. The commands accessed in Menu Mode vary depending on the card type. See each individual User's Guide for available functions and detailed instructions.

7.8.2 USING MENU MODE

Do NOT press any keys except those relating to the current menu. If you press the ENTER key after entering a letter or digit, the original list of systems will be displayed.

1. In order to enter Menu Mode, the system needs to be connected to a computer running RS-232 control software.

2. In the Terminal Window, press the ENTER key on the keyboard.

3. The system displays a list of available MultiTaskers.

   Example: 1: U1
                2: U2
                3: U3

4. Enter the ID number of the desired system. In the example above, enter a "1" for the MultiTasker with unit ID 1.

5. The system then interrogates all the cards in its enclosure and then lists the cards.

   Example: 01: MT103-122
                02: MT103-123
                04: MT104-130

6. Enter the 2-digit ID and a menu for the card will be displayed. In the example above, enter "04" for the MT104-130.

7. The system will prompt for selections specific to the selected card.

8. Read each menu carefully, and continue selecting keys as prompted.

7.8.3 MENU TYPES

1. MAIN MENU

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

2. SUB-MENUS

   Each menu item will display either a sub-menu, or a list of options. Press the key corresponding to the desired choice.

TROUBLESHOOTING GUIDE   8

We have carefully tested and have found no problems in the supplied **MT101-114/115/117**; however, we would like to offer suggestions for the following:

8.1 CARD IS NOT WORKING

Cause 1:   The card cage is not plugged in.

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

Cause 2:   The 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 and verify the questionable slot is good by seeing if its 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: The input power voltage is incorrect.

Solution: Make sure that the input power range is within 85-264 VAC 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 POLICIES 9

9.1 LIMITED WARRANTY/RETURN POLICIES

Please see the ALTINEX website at www.altinex.com for details on warranty and return policies.

9.2 CONTACT INFORMATION

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