Multi Tasker™
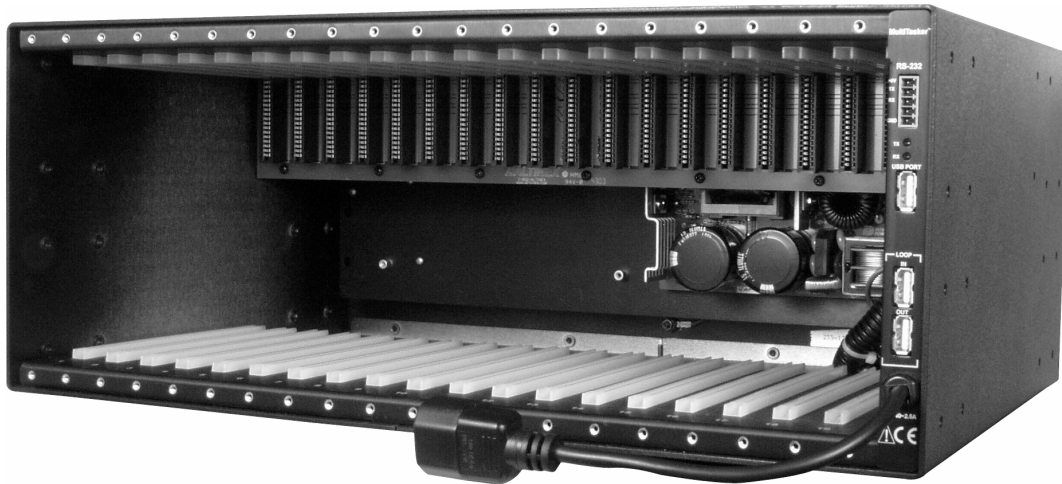

MANUAL PART NUMBER: 400-0361-001

MT100-102

20-SLOT MULTI-TASKER™

ENCLOSURE USER'S GUIDE

TABLE OF CONTENTS

Page

PRECAUTIONS / SAFETY WARNINGS   1

Please read this manual carefully before using your **MT100-102** 20-Slot Multi-Tasker™ Enclosure. Keep this manual handy for future reference. These safety instructions are to ensure the long life of your **MT100-102** 20-Slot Multi-Tasker™ Enclosure 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 **MT100-102** 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 **MT100-102** carefully. Dropping or jarring can damage the unit. If the **MT100-102** 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 ALTINEX supplied **MB1001** rack-mount ears for mounting the **MT100-102** into a rack.

- The maximum operating ambient temperature is 45 degrees Centigrade.

- When installing the **MT100-102** 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 **MT100-102** 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 **MT100-102** 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 MT100-102　　　　　2

MT100-102
Multi-Tasker™ 20-Slot Enclosure

- Empty card-cage with 20 slots available
- Basic foundation of Multi-Tasker™ solutions
- 4U high, full rack wide
- Rack ears included
- RS-232 or USB Control

The **MT100-102** is Multi-Tasker™ 20-Slot Enclosure. ALTINEX offers Front Panel MT101-110 for applications required control from the front panel. This panel provides 36 buttons, which are completely user-programmable. This is accomplished by connecting a PC computer to the MT101-110 through its 9-pin D sub RS-232 communications port and programming the functionality of each button using Windows based software provided by ALTINEX..

TECHNICAL SPECIFICATIONS　　　3

FEATURES/ DESCRIPTION	MT100-102
GENERAL	
RS-232	5-pin Terminal Block (GND, RXD & TXD)
USB	Standard
Compatibility	Cards designed for the Multi-Tasker™ System

Table 1. **MT100-102** General

MECHANICAL	MT100-102
Weight (without cards)	12.5lbs. (5.66kg)
Width	17.4 in. (442mm)
Depth	12 in. (305mm)
Height	7 in. (178mm)
Available Slots	20
Back Panel	Black
T° Operating	10°C-35°C
T° Maximum	50°C
Humidity	90% non-condensing
MTBF (calc.)	40,000hrs

Table 2. **MT100-102** Mechanical

ELECTRICAL	MT100-102
Power Input	100VAC - 240VAC @ 50/60Hz

Table 3. **MT100-102** Electrical

PRODUCT DESCRIPTION   4

FRONT PANEL OPTIONS
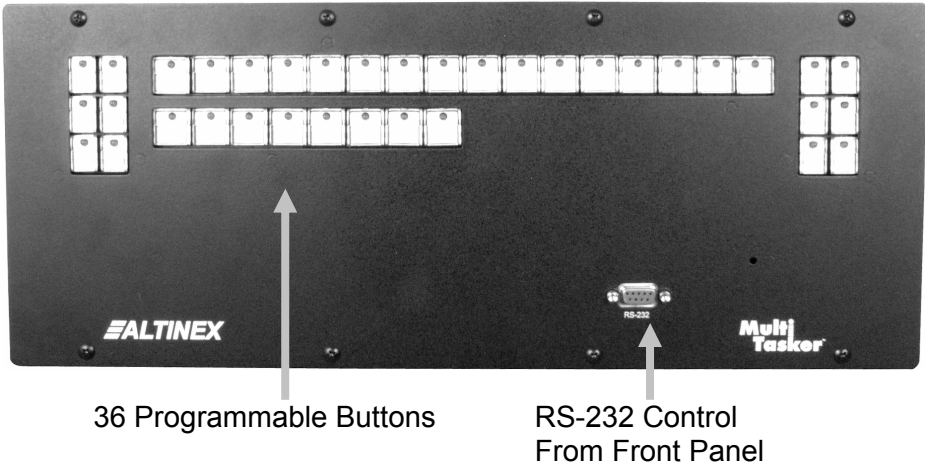
36 Programmable Buttons   RS-232 Control
From Front Panel

The MT101-110.

BACK PANEL

RS-232 Port

USB Port

USB Loop IN
USB Loop OUT

AC Power

1   20

SLOT NUMBER FROM 1 TO 20

APPLICATION DIAGRAM   5

Unit 1
MT101-110/111

PC ── USB Cable ── USB Port

Loop In
Loop OUT

Unit 2
MT101-110/111

USB Port

Loop In
Loop OUT

Unit 3
MT101-110/111

USB Port

Loop In
Loop OUT

...

Unit *n*
MT101-110/111

USB Port

Loop In
Loop OUT
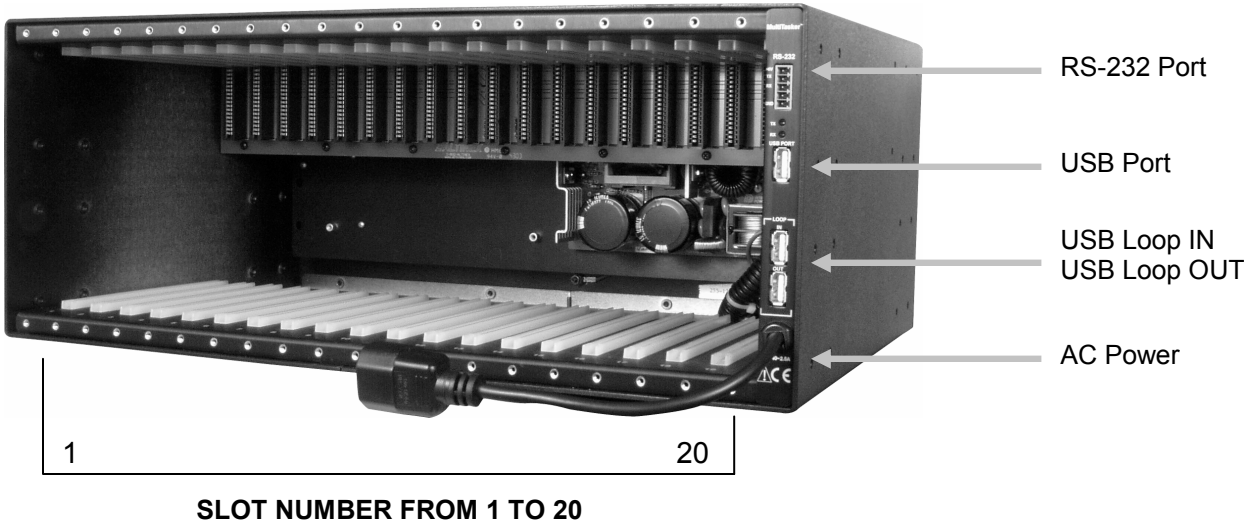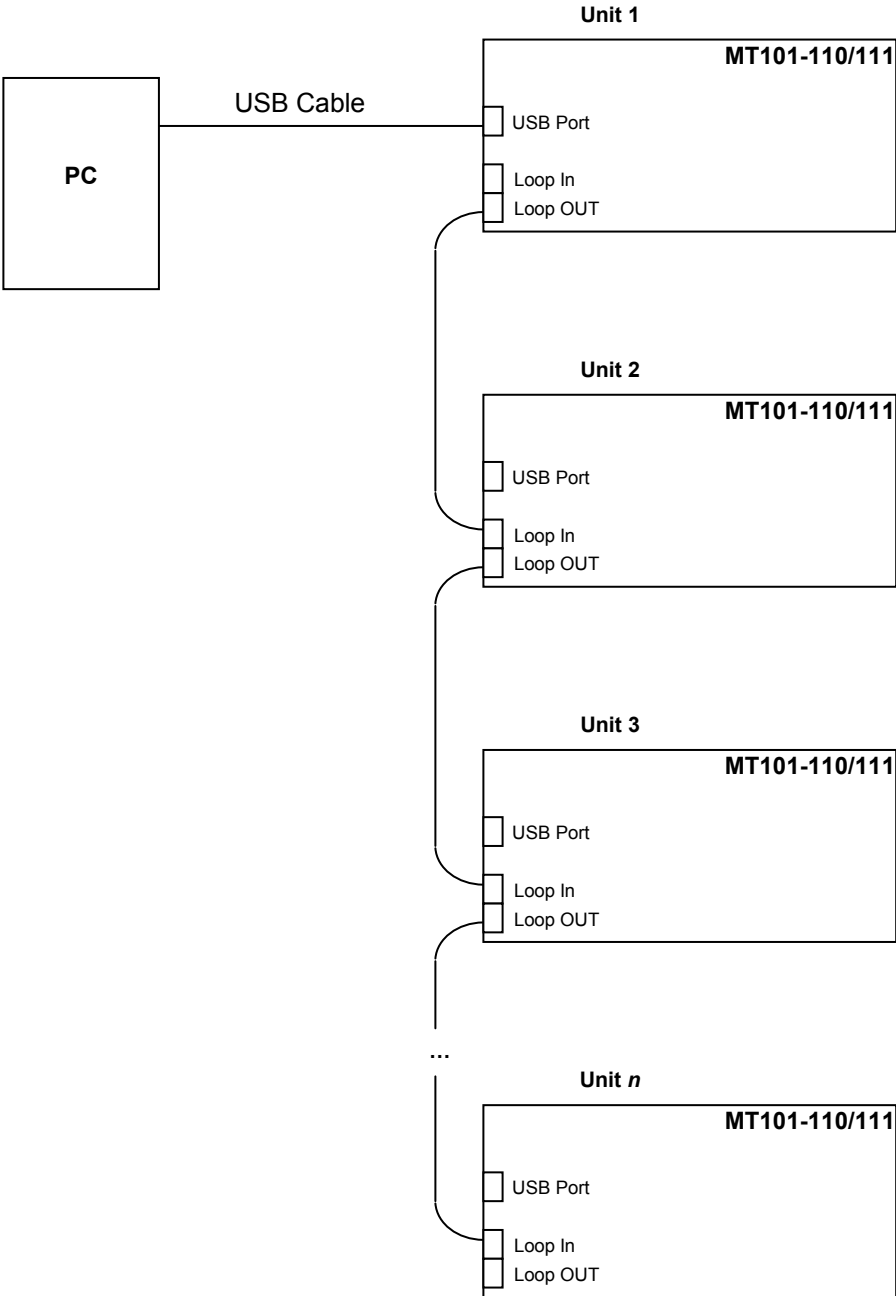
Step 1. Connect the power entry connector of the **MT100-102** to the power outlet with the provided power cord.

> **NOTE:** The power supply is universal and will work throughout the world with voltages from 85V to 264VAC.

Step 2. As soon as the system is plugged in, the power is on. Immediately after applying power, there should be a single beep. After 3 seconds, there should be 2 beeps. This indicates the system is ready for operation.

Step 3. If a control system is used to control the cards in the **MT100-102** Multi-Tasker™, connect the RS-232 connector of the **MT100-102** to the control system's RS-232 port as shown in Table 4.

Terminal Block Connector of Multi-Tasker™	Computer or Control System
GND (Ground)	Ground
RXD (Receive)	Transmit
TXD (Transmit)	Receive

Table 4. **MT100-102** RS-232 control

> **NOTE:** Make sure that the transmit pin of the control unit is connected to the receive pin of the **MT100-102**. Also, make sure that the receive pin of the control unit is connected to the transmit pin of the **MT100-102**. See Figures 1 and 2.

Step 4. If the system is going to be controlled using a USB port, connect the USB cable to the USB input on the **MT100-102** control card

Step 5. The MT100-102 is now ready for operation.

The **MT100-102** has 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.

Commands used for MultiTasker cards such as [ON], [OFF], and [IO] that end in "S" will be saved to memory. Commands not ending in "S" will still be executed but will not be restored when the system is reset (power off & power on again).

In this section, "Basic Enclosure" or "Unit" has the same meaning. The basic enclosure is a complete and independent card cage that has a controller and 20 slots for plug-in cards. Each unit or basic enclosure has its own unit ID that is based on a number from 0 to 9. Each plug-in card also has its own unit ID that is a number from 1 to 20.

7.1 RS232 CONNECTION

If a control system is used to control the cards in the **MT100-102** Multi-Tasker™ Basic Enclosure, connect the terminal block connector of the **MT100-102** to the control system's RS-232 port. 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.
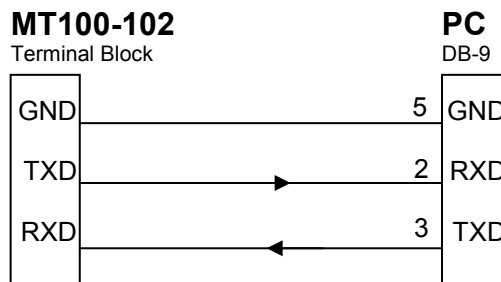

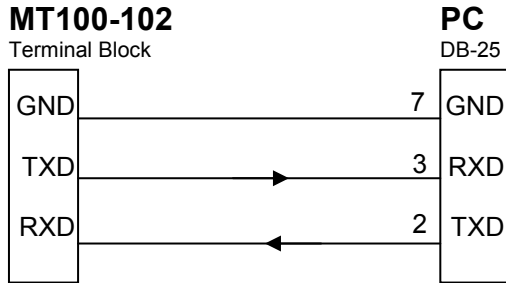
Figure 1: DB-9 Serial Connection

MT100-102
Terminal Block

PC
DB-25

GND ──────────── 7 | GND

TXD ──────────► 3 | RXD

RXD ──────────◄ 2 | TXD

Figure 2: DB-25 Serial Connection

7.2 RS-232 PROTOCOL

The RS-232 protocol for the **MT100-102** uses a simple ASCII character format.

1. **Square brackets "[   ]" are part of the command.**
2. **Use uppercase letters for all commands.**
3. **One command may carry up to 40 characters including brackets.**

The input buffer is a 256-character ring buffer for 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 the delay time.

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

7.3 RS-232 COMMANDS

[RES], [VER C0], [C0], [SET], [ID]

If there is only one **MT100-102** Basic Enclosure being used, unit ID 0 should be used to simplify sending commands (no Ui in the command). Use command **[SETUi]** to assign ID 0 to the Basic Enclosure. If multiple **MT100-102** Enclosures are used in the same system under a common RS-232 control port, then a unit ID from 1 to 9 should be used to distinguish which Enclosure is being sent the command.

[RES]

The [RES] command resets the Enclosure. The controller and all cards in the Enclosure will be reset.

If the unit has a unit ID of zero, it will beep once and return feedback to the controller or computer in the form of ASCII text that says PLEASE WAIT. After 3 seconds when all initializations are complete, the unit will beep twice and return feedback to the controller or computer in the form of ASCII text that says **READY**. This will let the user know that the unit is ready for operation. The reset process will take 3 seconds.

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SIGNAL
MANAGEMENT
SOLUTIONS

If the unit ID is any number other than zero (# from 1 -9), the unit will beep once. After 3 seconds when all initializations are complete, the unit will beep two times.

[VERC0Ui]

This command displays the current version of the firmware for the controller unit located in the **MT100-102**.

C0 = card ID (0 is for controller card)
Ui = Unit ID (i = # from 0 to 9)

Example:

The command [VERC0U1] will return feedback as follows:

[690-0122-012 690-0123-003 690-0124-016]

690-0122-012: Control CPU software version.
690-0123-003: Process CPU software version.
690-0124-016: Panel CPU software version.

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

[C0Ui]

This command receives the status of the controller card.

C0 = ID 0 is for the controller card of the **MT100-102**.

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

Example:

To see the status of Controller Unit ID 1, send the command [C0U1]. The Multi-Tasker™ system will return the following feedback if the control card is working properly:

[CONTROL:OK]

Otherwise, the system will indicate an error.

[SETUi]

This command sets the Unit ID number for the **MT100-102** Multi-Tasker™ Enclosure.

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

To assign an ID for a unit, first turn ON that particular unit leaving other units OFF.

Example: [SETU0]

After this command is executed, all commands for this unit may either include U0 or not include U0.

[Cn]= [CnU0]
[VERCn] = [VERCnU0]
[ON123Cn] = [ON123CnU0]

Example: [SETU6]

After this command is executed, all commands for this unit must include U6 (i.e. **[CnU6]**, **[VERCnU6]**, etc). This command can be used for single or multiple unit operation. If there are 3 enclosures being used, set unit ID's using the following procedure:

1) Turn OFF all units.

   a) Turn ON the unit that will receive Unit ID number 1.

   b) Send the **[SETU1]** command.

2) Turn OFF all units.

   a) Turn ON the unit that will receive Unit ID number 2.

   b) Send the **[SETU2]** command.

3) Turn OFF all units.

   a) Turn ON the unit that will receive Unit ID number 3.

   b) Send the **[SETU3]** command.

[HELP]

This command displays information available for the Multi-Tasker™ interface commands.

Command Format: [**HELPUi**]

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

Example:

In order to view the RS-232 commands available for the unit with ID #2, send the command **[HELPU2]**. The commands along with a brief description will be displayed in the Terminal Window.

[WR]

This command groups multiple cards in the Enclosure. Each unit contains a maximum of nine 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…GkUi]

Cn = Card ID (n = slot # from 1 to max slots)
Gk = Group number (k = # from 1-9)
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.

[CLR]

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

Command Format: [CLRGkUi]

Gk = Group number (k = # from 1-9)
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 [CLRG✳U1] command.

[G]

This command requests group data and identifies whether an input or output of a particular group is on.

Command Format: [GkUi]

Gk = Group number (k = # from 1-9)
Ui = Unit ID (i = # from 0-9)

Example:

In Unit ID 0, if group 1 has DA Cards with Outputs 1 and 2 ON, while group 2 has SW Cards with Input 2 ON:

[G1]: will return feedback as **ON12 G1U0.**
[G2]: will return feedback as **ON2 G2U0.**

[RD]

This command displays the members in each group.

Command Format: [RDGkUi]

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

C1C2C19 G5U1

C1 = Card in Slot 1
C2 = Card in Slot 2
C19 = Card in slot 19
G5 = Group 5
U1 = Unit ID 1

[CLM]

This command removes the members in a group and leaves the group empty.

Command Format: [CLMGkUi]

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

C1C2C19 G5U1

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

NONE G5U1

7.4 ONE UNIT ID for MULTIPLE UNITS

When there is more than one unit being used, unit ID 0 to 9 can be used for each unit. If identical units are used, the user may assign the same Unit ID in order to operate these units simultaneously with the same commands.

Example:

Assign Unit ID 1 for three different units.

a)   Turn on only these 3 units.

b)   Send the command [SETU1].

After sending the command, all of the 3 units that were powered ON will have Unit ID=1.

The command [ON1C2U1] will turn on Input/Output #1 on card 2 of these 3 units simultaneously.

WARNING: Caution must be used when multiple units are assigned the same unit ID.

1)   Do not use the following commands for multiple units with the same unit ID:

   [Ci], [VER] and [RD]

   These commands will request feedback such as card status, card version or content of a register.

2)   Do not use the suffix "F" in a command for multiple units with the same unit ID. (Note: using "F" will request feedback)

NOTE: Using commands [Ci], [VER] and [RD] or suffix "F" for multiple units with the same unit ID may return an unwanted response because more than one card will be sending feedback at the same time.

7.5 SUMMARY OF COMMANDS

1)   **[RES]**   **Resets the Enclosure and card inside the enclosure.**

2)   **[VER]**   **Displays the current firmware version for the controller unit.**

3)   **[C]**   **Receives the status the controller card.**

4)   **[SET]**   **Sets unit ID number for the Enclosure.**

5)   **[HELP]**   **Displays available commands.**

6)   **[WR]**   **Groups multiple cards**

7)   **[CLR]**   **Clears members of a single group or all groups**

8)   **[G]**   **Requests group data**

9)   **[RD]**   **Displays group members**

10) **[CLM]**   **Removes members from group.**

7.6 CONTROL SOFTWARE for WINDOWS

This Windows 95/98/NT based control software is available from the ALTINEX website at www.altinex.com in the Download section.

We have carefully tested and have found no problems in the supplied **MT100-102**. 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 card cage in. If the card cage works, the problem is solved. If the card still does not work, see Cause2.

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: **The 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.

8.2 CARD IS NOT WORKING

Cause 1: **Card is not plugged in all the way.**

Solution 1: Push the card in all the way. If the card still does not work, see Solution 2.

Solution 2: See the troubleshooting section of each Multi-Tasker™ Card user's guide or call ALTINEX at (714) 990-2300.

ALTINEX POLICY 9

9.1 LIMITED WARRANTY/RETURN POLICY

Please see the Altinex website at www.altinex.com for details on warranty and return policy.

9.2 CONTACT INFORMATION

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