

# ELK-M1XSLU

# INSTRUCTIONS

## M1 to Lutron RadioRA2 Serial Interface

### APPLICATION:

The **ELK-M1XSLU** is a dedicated Elk-M1 serial expander for connecting an M1 Control to a Lutron RadioRA2 Main Repeater. RadioRA2 is a wireless multi-room control system for Lights, Shades, and HVAC Thermostats. Interfacing a RadioRA2 system to an M1 allows control in response to security system actions or conditions. With the automation and remote capabilities built into M1 it is possible to control RadioRA2 devices from across the room or across the world. Benefits include energy savings, convenience, and comfort.

Since the M1XSLU is functionally a serial expander (RS485 to RS232), it shares the same TYPE 5 databus ID as standard M1XSP serial expanders. A maximum of seven (7) TYPE 5 serial expanders may be connected to an M1, and the M1XSLU is counted as 1 of these 7.

The M1XSLU should be mounted as close as possible to the RadioRA2 Main Repeater. An 18" 9-pin flat ribbon serial interconnect cable is provided.

### SPECIFICATIONS:

- Activity/Status LED (Orange)
- Auto-Reset Hardware Watchdog Circuit
- Addressable (1-7) TYPE 5 Databus ID
- Operating Voltage: 12 Volts D.C.
- Current Draw: 31mA
- Housing Dimensions: 4.25" x 6.375" x 2.125"
- Circuit Board: 2.75" x 3.95"
- Connection to Main Repeater: RS232 Cable - Included
- Connection to M1: Elevator Screw Terminals (4)



*Specifications are Subject to Change without notice.*

*NOTICE: Drawings, illustrations, diagrams, part numbers, etc. are provided as reference only and are based on equipment available at the time the information was created. All information contained in this document are subject to change without notice.*

*The extent of integration between Elk Products and Partner Mfgs varies, and there may be situations or limitations beyond Elk's control that make certain desirable features unavailable or unusable. Partner products and/or protocols, including Elk's may not contain the capabilities or data definitions to permit additional integration beyond what is currently available. Partners may also, at their option, add, modify, or discontinue features or support without notification.*

© 2012 Elk Products Inc. All rights reserved.

Lutron and RadioRA2 are registered trademarks of Lutron Electronics Co., Inc.

L636 Rev. A 8/1/2013

*For reasons stated herein, Elk Products makes no warranty that it will be able to integrate all available features or operations, nor does it make any express or implied warranties of fitness for a particular purpose or of merchantability. Refer to Elk's Limited Warranty.*

Printed in USA

## **STEP 1 - READ THIS FIRST!**

**DO NOT attempt installation of the ELK-M1XSLU until the Lutron RadioRA2 network of devices have been setup and programmed with the Lutron PC Essentials software. Installers NOT experienced with setting up a Lutron RadioRA2 system will need to obtain Lutron training.**

To integrate an Elk-M1 Control to a Lutron RadioRA2 system the following components will be required:

<u>QTY</u>	<u>Part Number &amp; Description</u>
1	<b>ELK-M1</b> Control (M1G or M1EZ8)
1	<b>ELK-M1XSLU</b> M1 to Lutron RadioRA2 Interface
1	<b>ElkRP</b> Remote Programming Software
1	<b>Lutron RadioRA2 Main Repeater</b> (RR-MAIN-REP-WH) Interface & Plug-in Power Pack
1	<b>Lutron PC Essentials setup and configuration software.</b> <i>This is an absolute REQUIREMENT for third party integration. It is NOT possible to integrate with a Lutron RadioRA2 system unless it was setup and programmed with the PC Essentials software! This is restriction imposed by Lutron, not Elk.</i>
?	<b>Lutron RadioRA2 devices</b> (lights, keypads, etc.)

**Lutron PC Essentials Software:** This software available from Lutron is REQUIRED for third party integration. It is not possible to integrate with the RadioRA2 system unless it was setup and programmed by the PC Essentials software! Lutron Certification training may be required to obtain this software! This is restriction imposed by Lutron, not Elk.

**Integration Capacity:** A single ELK-M1XSLU connected to a RadioRA2 Main Repeater (part # RR-MAIN-REP-WH) can support a single (1) or a dual (2) network Lutron RadioRA2 installation. A single Lutron network can have 100 active physical devices, inclusive of the Main Repeater, up to 4 Auxiliary Repeaters, Dimmers, Switches, Thermostats, etc. A dual (2) Lutron network can add 100 additional active devices, bringing the combined capacity to 200 active devices. It should be noted that a second Main Repeater must be purchased and installed in order to have a dual network. Auxiliary Repeaters (up to 4 per main repeated) may be added to extend the range and coverage in large buildings. IMPORTANT! Each Repeater, Dimmer, Switch, Tabletop Controller, Thermostat, etc. counts as a Device and must be subtracted from the total number of devices.

In addition to supporting the maximum number of devices allowed with a RadioRA2 system, the Elk-M1XSLU can also support and activate up to 100 Phantom Scenes that can be setup and stored in No. 1 RadioRA2 Main Repeater.

**NOTE:** While a single network can have a total of 100 physical Devices, this does not mean that the Device ID numbers are restricted to 1-100, or that a dual network is restricted to 100-200. On the contrary, with installation it will be quite common to find active Devices with ID numbers higher than 100 or even 200. E.G. 101, 115, 180, even 2xx, etc. The reason is that non-hardware entities such as rooms, floors, etc. are also assigned ID numbers, even though they are not physical controllable active devices. One potential issue with RadioRA2 Device numbering is that M1 (ElkRP) Lighting Device numbers stop at 255 (256 is n/a). This means that M1 cannot control or communicate with any physical active Device that has an ID beyond 255. But there is a workable solution for this issue. The Lutron Essentials PC software has a menu option which allows manual re-numbering of Device IDs. The solution is to identify any active physical Device IDs beyond 255, and then use the programming option to change or swap them with lower Device IDs currently assigned to non-hardware entities. In other words, arrange the network so that numbers above 255 are assigned to rooms, floors, etc., and reserve the numbers 255 and lower for active physical Devices.

**M1XSLU vs. M1XSP Serial Expander:** The unique hardware and software configuration of the M1XSLU enables very close to plug-and-play integration with RadioRA2, without the need for special jumper settings or firmware. Elk also produces a standard M1XSP serial interface but it cannot be loaded with the special firmware needed to support RadioRA2. Some customers have found it possible to use the M1XSP in its generic ASCII Text String mode to send basic 1-way integration commands to Lutron RadioRA2. This basic method of interfacing cannot obtain status, track lighting status changes, or support RadioRA2 Thermostats. The M1XSLU is the only method for obtaining true integration with RadioRA2.

## STEP 2 - Setting up the M1XSLU

### Mounting - Connections - Setting the Data Bus Address - Enrolling the Data Bus Device

1. Turn off the M1 Master Power Switch and unplug the power to the Lutron Main Repeater before making any wiring connections.
2. Mount the M1XSLU as close as possible to the Main Repeater. The DB9F to DB9M RS232 Serial ribbon cable supplied is approximately 18 inches long. **DO NOT** use an extension or attempt to make this cord any longer!
3. Follow the wiring recommendations in the M1 Installation Manual to connect the data bus terminals +12V, A, B, and Neg from the M1 Control to the terminals on the M1XSLU. **It may be necessary to install an M1DBH or M1DBHR Data Bus Hub if more than 2 homerun data bus cables are coming into the M1 Control.**
4. Set the data bus address switches on the M1XSLU to a value between 1 and 7 following the diagram below. Make sure the address you select is NOT being used by any other data bus Type 5 (serial expander) device. Each switch has an OFF and On position (binary value 0 or 1). The combination of these switches represents a decimal value of between 0 (all Off) and 15 (all On).

TABLE 1: Data Bus Address Switch Settings							
Address 1	Address 2	Address 3	Address 4	Address 5	Address 6	Address 7	LEGEND
<p><b>For Data Bus Type 5 Devices (Serial Expanders) the only valid Addresses are 1 thru 7 and therefore the maximum number of Type 5 Devices is 7.</b></p> <p><b>Data Bus Terminating Jumper JP1</b> – This engages a 120 Ohm resistor for terminating the M1 RS-485 Data Bus. See Data bus wiring instructions before use.</p>							

5. Connect the Lutron Main Repeater to the M1XSLU using the RS232 ribbon cable. DO NOT use an extension or attempt to make this cord any longer!
6. Once all wire connections are complete plug-in the power for the Lutron Main Repeater into a convenient AC Output that is NOT controlled by a switch (Always On 24hours). Next, turn on the M1 Master Power Switch which will then supply power to the M1XSLU.
7. Enroll the M1XSLU to the M1 Control. **REQUIRED!** This is done either via a Keypad or ElkRP Software. From a Keypad access the Installer level programming and select Menu 01-Bus Module Enrollment. Press the right arrow key to start the enrollment. When complete press the right arrow (edit) key to view the results. The M1XSLU shares the same bus type as other serial expanders and will display as a "SerialPExpdr T5" followed by a specific address (Addr) number. Verify that the address displayed matches the address selected in step 4 above.

Should it become necessary to replace a M1XSLU; set the replacement unit to the same address as the old unit and perform the enrollment process. To permanently remove any data bus device perform the enrollment process **AFTER** disconnecting the device. This will help avoid a "missing device" trouble condition.

TABLE 2: Diagnostic LED Indicator
<p><b>Slow blink (1/2 sec.)</b> = Normal communication with M1.</p> <p><b>Rapid flicker</b> = Discovery Mode. The M1XSLU is synchronizing with the Main Repeater to collect current lighting data. This is automatically performed upon reboot or power up.</p> <p><b>No blink</b> = No communication with M1. Check the wiring with the M1 and that the device has power.</p>

## STEP 3 - Adding Lutron RadioRA2 Lighting Devices to M1

Each Lutron RadioRA2 device must have a unique Device ID from a pool of 100 maximum devices. This pool can be doubled to 200 maximum devices by the addition of second main repeater. Integrating RadioRA2 lighting devices into M1 involves mapping their Lutron Device IDs to corresponding M1 Light Device numbered locations. See Table 3a. Any M1 Light Device locations that do not have a corresponding Lutron Device ID should be left blank (unprogrammed). The steps below outline the programming of M1 Lighting using EikRP > Automation > Lighting.

- 3.1 The Lutron Essentials PC software MUST BE USED to setup the RadioRA2 System. THIS IS A REQUIREMENT! Each device (main repeater, dimmer, keypad, etc. will be assigned a unique DEVICE ID. It is important that the Main Repeater be assigned ID 1. If auxiliary repeaters (max. of 4) are installed we recommend they be assigned as IDs 2, 3, 4, & 5 and not mix them into higher numbers. After all the devices are added to the network the Essentials software is then used to configure their operation, and to assign any programmed Scenes or Phantoms. Multiple devices can be fluidly controlled together using Scenes and Phantoms. The primary difference between a Scene and a Phantom is that Phantoms stored and activated within the Main Repeater, whereas Scenes can be setup to be activated from physical buttons on wall or table mounted keypads.
- 3.2 The Essentials software provides a **Reports > Integration** menu to view a complete listing of all devices IDs, their names, keypad button assignments (scenes), plus any of the phantom assignments. It is also possible to create an XML Project file which EikRP can directly import. Refer to Section 6 for more information about XML importing.
- 3.3 Verify that the M1XSLU is connected to the Main Repeater.
- 3.4 Launch EikRP Software and open or create an account for this job. If this is an existing account file be sure the EikRP file and M1 Panel are synchronized with the same data. If in doubt, connect to M1 and select **Receive All** to bring all the info from M1 into your EikRP account file.
- 3.5 Select the first RadioRA2 Device ID and match it to its M1 Light Device number location. See Table 3a.

Device	Name	Format	Type	Opt	Show
1 (A1)	MAIN_REPEATER	Serial Expander *	Dimmer	<input type="checkbox"/>	<input type="checkbox"/>
2 (A2)	Foyer Lights	Serial Expander *	Dimmer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3 (A3)	Flood Lights	Serial Expander *	Dimmer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4 (A4)				<input type="checkbox"/>	<input type="checkbox"/>
5 (A5)	Living Rm Spot	Serial Expander *	Dimmer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6 (A6)	Living Rm Lamp	Serial Expander *	Dimmer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7 (A7)	Kitchen Ceiling	Serial Expander *	Dimmer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8 (A8)	Cabinet Lights	Serial Expander *	Dimmer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9 (A9)	Pantry	Serial Expander *	Dimmer	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10 (A10)				<input type="checkbox"/>	<input type="checkbox"/>

**NOTE: Any M1 Lighting Device location that does not have a matching RadioRA2 Device ID to be mapped should be left blank (unprogrammed).**

- 3.6 Program a Name (up to 15 characters) describing the location or name of the device.
- 3.7 Set the Format to "Serial Expander" for all Lutron Devices that are controllable. Note: Lutron assigns Device IDs to almost everything, and some IDs are only rooms or area names which are not controllable devices. To avoid confusion with controllable devices we recommend programming these as Format=Standard and Type=Other.
- 3.8 Set the Type according to the particular device. (Dimmer or On/Off Switch) Appliance is not applicable.
- 3.9 DO NOT put a check mark in the Opt. location.
- 3.10 Put a check mark in the Show box IF the light needs to be displayed on touchscreens or keypads.
- 3.11 Voice Description is optional. Up to 6 words may be used to provide a spoken description for each light.
- 3.12 Make sure that EikRP is connected to the M1 Control and then click **Send to Control** to transfer all of the above programming into the M1.

**DISCOVERY MODE:** When the M1XSLU is powered up it starts a Discovery Mode to obtain the current status of all existing programmed lighting devices from the RadioRA2 Main Repeater. For this reason, we recommended power cycling the M1XSLU after any programming changes have been made to either the M1 or the RadioRA2 system. Discovery takes approximately ~2 1/4 minutes to complete, during which the status LED will flash rapidly, momentarily stop, and then rapid flash again for about ~16 seconds. (the 2nd rapid flash will only occur if a <TS thermostat status is sent by the M1. See section 5. **Please wait until the M1XSLU Discovery Mode is complete. DO NOT TOUCH OR DISTURB anything until the rapid flashing changes to a slow 1 sec. flash.**

**TABLE 3a: M1 Lighting Devices Mapped to Lutron RadioRA2**

ELK Light Device	PLC (X-10) Ref.	Lutron Device ID	ELK Light Device	PLC (X-10) Ref.	Lutron Device ID	ELK Light Device	PLC (X-10) Ref.	Lutron Device ID	ELK Light Device	PLC (X-10) Ref.	Lutron Device ID
1	A01	1 - Main Repeater	69	E05	69	137	I09	137	205	M13	205
2	A02	2 - Aux. Repeater ++	70	E06	70	138	I10	138	206	M14	206
3	A03	3 - Aux. Repeater ++	71	E07	71	139	I11	139	207	M15	207
4	A04	4 - Aux. Repeater ++	72	E08	72	140	I12	140	208	M16	208
5	A05	5 - Aux. Repeater ++	73	E09	73	141	I13	141	209	N01	209
6	A06	6	74	E10	74	142	I14	142	210	N02	210
7	A07	7	75	E11	75	143	I15	143	211	N03	211
8	A08	8	76	E12	76	144	I16	144	212	N04	212
9	A09	9	77	E13	77	145	J01	145	213	N05	213
10	A10	10	78	E14	78	146	J02	146	214	N06	214
11	A11	11	79	E15	79	147	J03	147	215	N07	215
12	A12	12	80	E16	80	148	J04	148	216	N08	216
13	A13	13	81	F01	81	149	J05	149	217	N09	217
14	A14	14	82	F02	82	150	J06	150	218	N10	218
15	A15	15	83	F03	83	151	J07	151	219	N11	219
16	A16	16	84	F04	84	152	J08	152	220	N12	220
17	B01	17	85	F05	85	153	J09	153	221	N13	221
18	B02	18	86	F06	86	154	J10	154	222	N14	222
19	B03	19	87	F07	87	155	J11	155	223	N15	223
20	B04	20	88	F08	88	156	J12	156	224	N16	224
21	B05	21	89	F09	89	157	J13	157	225	O01	225
22	B06	22	90	F10	90	158	J14	158	226	O02	226
23	B07	23	91	F11	91	159	J15	159	227	O03	227
24	B08	24	92	F12	92	160	J16	160	228	O04	228
25	B09	25	93	F13	93	161	K01	161	229	O05	229
26	B10	26	94	F14	94	162	K02	162	230	O06	230
27	B11	27	95	F15	95	163	K03	163	231	O07	231
28	B12	28	96	F16	96	164	K04	164	232	O08	232
29	B13	29	97	G01	97	165	K05	165	233	O09	233
30	B14	30	98	G02	98	166	K06	166	234	O10	234
31	B15	31	99	G03	99	167	K07	167	235	O11	235
32	B16	32	100	G04	100	168	K08	168	236	O12	236
33	C01	33	101	G05	101 **	169	K09	169	237	O13	237
34	C02	34	102	G06	102	170	K10	170	238	O14	238
35	C03	35	103	G07	103	171	K11	171	239	O15	239
36	C04	36	104	G08	104	172	K12	172	240	O16	240
37	C05	37	105	G09	105	173	K13	173	241	P01	241
38	C06	38	106	G10	106	174	K14	174	242	P02	242
39	C07	39	107	G11	107	175	K15	175	243	P03	243
40	C08	40	108	G12	108	176	K16	176	244	P04	244
41	C09	41	109	G13	109	177	L01	177	245	P05	245
42	C10	42	110	G14	110	178	L02	178	246	P06	246
43	C11	43	111	G15	111	179	L03	179	247	P07	247
44	C12	44	112	G16	112	180	L04	180	248	P08	248
45	C13	45	113	H01	113	181	L05	181	249	P09	249
46	C14	46	114	H02	114	182	L06	182	250	P10	250
47	C15	47	115	H03	115	183	L07	183	251	P11	251
48	C16	48	116	H04	116	184	L08	184	252	P12	252
49	D01	49	117	H05	117	185	L09	185	253	P13	253
50	D02	50	118	H06	118	186	L10	186	254	P14	254
51	D03	51	119	H07	119	187	L11	187	255	P15	255
52	D04	52	120	H08	120	188	L12	188	256	P16	N/A
53	D05	53	121	H09	121	189	L13	189			
54	D06	54	122	H10	122	190	L14	190			
55	D07	55	123	H11	123	191	L15	191			
56	D08	56	124	H12	124	192	L16	192			
57	D09	57	125	H13	125	193	M01	193			
58	D10	58	126	H14	126	194	M02	194			
59	D11	59	127	H15	127	195	M03	195			
60	D12	60	128	H16	128	196	M04	196			
61	D13	61	129	I01	129	197	M05	197			
62	D14	62	130	I02	130	198	M06	198			
63	D15	63	131	I03	131	199	M07	199			
64	D16	64	132	I04	132	200	M08	200			
65	E1	65	133	I05	133	201	M09	201			
66	E2	66	134	I06	134	202	M10	202			
67	E3	67	135	I07	135	203	M11	203			
68	E4	68	136	I08	136	204	M12	204			

++ Up to 4 Auxiliary Repeaters may be added for extended range and coverage.

\*\* A 2<sup>nd</sup> Main Repeater is needed in order to have more than 100 active device IDs. The max. system size is 200 active device IDs. And with a 2<sup>nd</sup> Main Repeater you can have up to 4 additional Auxiliary Repeaters.

**TABLE 3c: Conversion table from M1 Lighting Command Fade "Dim" Rate Commands**

Fade Rate 0 = No fade or ramp  
 Fade Rate 1 = Light(s) will fade (ramp) on over a 2 second time period.  
 Fade Rate 2 = Light(s) will fade (ramp) on over a 4 second time period.  
 Fade Rate 3 = Light(s) will fade (ramp) on over a 8 second time period.

Fade Rate 4 = Light(s) will fade (ramp) on over a 16 second time period.  
 Fade Rate 5 = Light(s) will fade (ramp) on over a 32 second time period.  
 Fade Rate 6 = Light(s) will fade (ramp) on over a 46 second time period.  
 Fade Rate 7 = Light(s) will fade (ramp) on over a 60 second time period.

## Controlling RadioRA2 Lights using Rules

**3.13** Select **EikRP > Automation > Rules**.

**3.14** Click **New** to start a new Rule. E.G. Turn ON a Flood Light when the System is Armed Away.

**3.15** Click **WHENEVER > Security/Alarms > Is Armed > Armed Away**. A pop-up box appears to pick the Area (partition). Use the drop down to pick the area or Click OK to accept "Area 1".

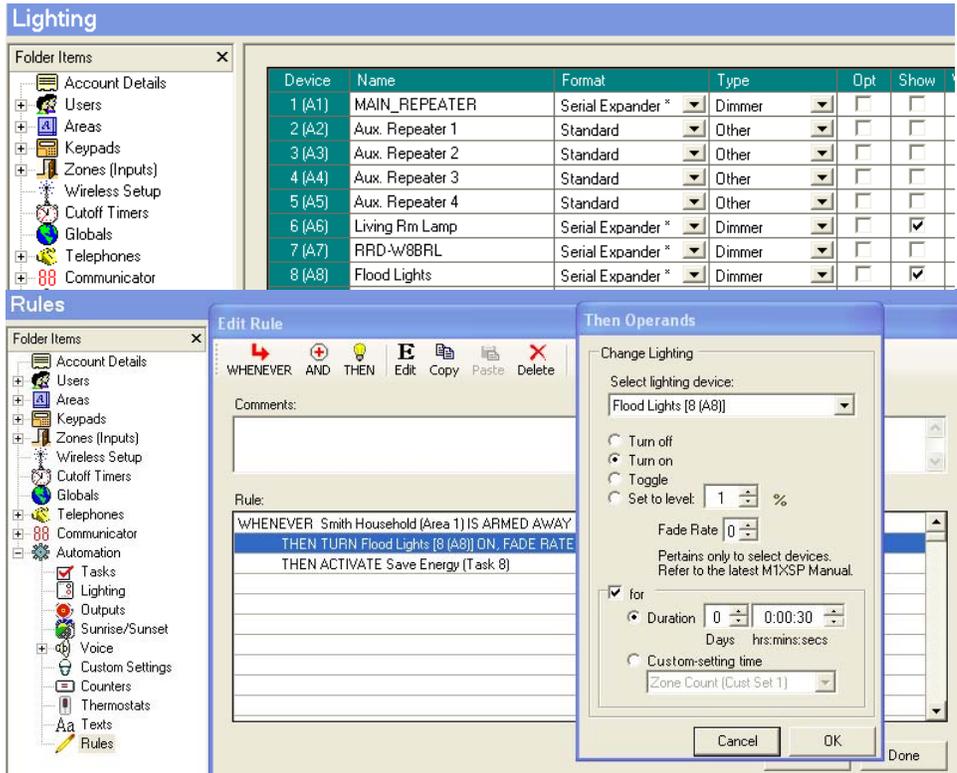
**3.16** Click **THEN > Control Lighting > Individual**. A new box will appear.

**3.17** In the Select lighting device box scroll and select one of the Lights. E.G. Flood Lights [8 (A8)].

**3.18** Click **Turn On** followed by **OK**. The screen should resemble the first two lines in the illustration below.

**3.19** Repeat for additional lights and then click **DONE** to complete the Rule.

**3.20** Make sure that EikRP is connected and on-line with the M1 Control, then click **Send to Control**.



This Rule directly controls 1 light and activates Task=Save Energy when the System is Armed Away.

**Then Operands** are Turn Off, Turn On, Toggle (flip/flop), and Set to Level (Dim). Note: Dim levels are also used for virtual button presses on Keypads. See Table 3b.

**Fade Rate (Ramp)** - A dimmer device can be set to fade On/Off over a time period. Settings are: 0=none, 1=2 Secs, 2=4 Secs, 3=8 Secs, 4=16 Secs, 5=32 Secs, 6=46 Secs, 7\*=60 Secs

**For (Duration)** - Allows a duration to be set for the light, after which it will revert back to its previous state. Duration can be Days, Hrs, Min, Sec, or a Custom Setting selection.

This rule turns the Flood Lights ON for 30 seconds. They should turn OFF automatically 30 secs. after arming and leaving the building.

**Button Presses:** Buttons on RadioRA2 Wall or Tabletop Keypads and Visor Ctrl Receivers may be programmed to activate Groups of lights (Scenes) with a single press. To permit M1 to activate these buttons, Elk reserved "Set to Level" (Dim) 2 thru 20 @ "Fade Rate" 0 as special commands to the M1XSLU. See Table 3b and the example below. As a result, the M1 cannot set a RadioRA2 Dimmer to Dim Levels 2 thru 20 UNLESS the Fade Rate is set as 1,2,3,4,5,6, or 7.  
NOTE: Fade Rate 7 has some additional unique functionality. Refer to the top of page 12.

**6** Task "Watch TV" presses a Scene Button #3 on Device #7 which is a RadioRA2 RRD Keypad  
WHENEVER Watch TV (Task 4) IS ACTIVATED  
THEN SET RRD-W8BRL [7 (A7)] TO 3% BRIGHT, FADE RATE = 0

**TABLE 3b: Set to Level (Dim) Options usable in ElkRP Lighting Rules for RadioRA2**

Dim Level	Fade Rate	Applicable Command (Action) and Device	Dim Level	Fade Rate	Applicable Command (Action) and Device
1	0	* none * See Dim Level 20	1	1,2,3,4,5,6,7*	Sets the level to 1% – Lighting Device Type=Dimmer
2	0	Used to press Button (Scene) #2 – Wall/Tabletop Controller	2	1,2,3,4,5,6,7*	Sets the level to 2% – Lighting Device Type=Dimmer
3	0	Used to press Button (Scene) #3 – Wall/Tabletop Controller	3	1,2,3,4,5,6,7*	Sets the level to 3% – Lighting Device Type=Dimmer
4	0	Used to press Button (Scene) #4 – Wall/Tabletop Controller	4	1,2,3,4,5,6,7*	Sets the level to 4% – Lighting Device Type=Dimmer
5	0	Used to press Button (Scene) #5 – Wall/Tabletop Controller	5	1,2,3,4,5,6,7*	Sets the level to 5% – Lighting Device Type=Dimmer
6	0	Used to press Button (Scene) #6 – Wall/Tabletop Controller	6	1,2,3,4,5,6,7*	Sets the level to 6% – Lighting Device Type=Dimmer
7	0	Used to press Button (Scene) #7 – Wall/Tabletop Controller	7	1,2,3,4,5,6,7*	Sets the level to 7% – Lighting Device Type=Dimmer
8	0	Used to press Button (Scene) #8 – Wall/Tabletop Controller	8	1,2,3,4,5,6,7*	Sets the level to 8% – Lighting Device Type=Dimmer
9	0	Used to press Button (Scene) #9 – Wall/Tabletop Controller	9	1,2,3,4,5,6,7*	Sets the level to 9% – Lighting Device Type=Dimmer
10	0	Used to press Button (Scene) #10 – Wall/Tabletop Controller	10	1,2,3,4,5,6,7*	Sets the level to 10% – Lighting Device Type=Dimmer
11	0	Used to press Button (Scene) #11 – Wall/Tabletop Controller	11	1,2,3,4,5,6,7*	Sets the level to 11% – Lighting Device Type=Dimmer
12	0	Used to press Button (Scene) #12 – Wall/Tabletop Controller	12	1,2,3,4,5,6,7*	Sets the level to 12% – Lighting Device Type=Dimmer
13	0	Used to press Button (Scene) #13 – Wall/Tabletop Controller	13	1,2,3,4,5,6,7*	Sets the level to 13% – Lighting Device Type=Dimmer
14	0	Used to press Button (Scene) #14 – Wall/Tabletop Controller	14	1,2,3,4,5,6,7*	Sets the level to 14% – Lighting Device Type=Dimmer
15	0	Used to press Button (Scene) #15 – Wall/Tabletop Controller	15	1,2,3,4,5,6,7*	Sets the level to 15% – Lighting Device Type=Dimmer
16	0	Used to press Button (Scene) #16 – Wall/Tabletop Controller	16	1,2,3,4,5,6,7*	Sets the level to 16% – Lighting Device Type=Dimmer
17	0	Used to press Button (Scene) #17 – Wall/Tabletop Controller	17	1,2,3,4,5,6,7*	Sets the level to 17% – Lighting Device Type=Dimmer
18	0	Turns ON Security Solid Mode – Visor Control Receiver	18	1,2,3,4,5,6	Sets the level to 18% – Lighting Device Type=Dimmer
18	7	Turns OFF Security Solid Mode – Visor Control Receiver	18	7	Turns OFF Security Solid Mode – Visor Control Receiver
19	0	Turns ON Security Flash Mode – Visor Control Receiver	19	1,2,3,4,5,6	Sets the level to 19% – Lighting Device Type=Dimmer
19	7	Turns OFF Security Flash Mode – Visor Control Receiver	19	7	Turns OFF Security Flash Mode – Visor Control Receiver
20	0	Used to press Button (Scene) #1 – Wall/Tabletop Controller	20	1,2,3,4,5,6,7*	Sets the level to 20% – Lighting Device Type=Dimmer
21 to 99	0	Sets the level from 21% to 99% – Dimmer Device	21-99	1,2,3,4,5,6,7*	Sets the level to 21 to 99% – Lighting Device Type=Dimmer

# STEP 4 - Adding Lutron RadioRA2 Thermostats to M1

Skip to Step 5 if not adding Thermostats.

HVAC Thermostats are available with a Lutron RadioRA2 system. The M1XSLU can interface with up to sixteen (16) of these thermostats, but special steps are needed due to the architecture of the equipment. 1. Only Device IDs below 100 (2 digits) may be used for HVAC Thermostats. 2. The M1 has to initialize the M1XSLU with the Device ID (2 digit) of each HVAC Thermostat. This is done by having the M1 send a special text string command <TS to the M1XSLU followed by a two (2) digit Device ID for each Thermostat. The M1XSLU takes this and maps each to an M1 Thermostat location (1-16).

The Lutron Essentials PC software is required to setup the Lutron HVAC Thermostats and to assign each one a unique Device ID. This software also provides a means to view ALL of the installed Device IDs. The ElkRP PC software and Automation Rules programming is required to setup the M1XSLU and to create the text strings and rules for sending the Device IDs of the HVAC Thermostats. Please follow each of the steps below.

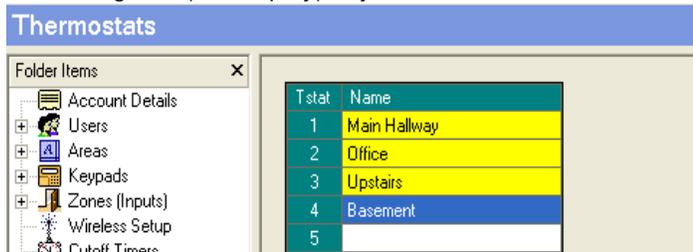
**NOTE: On power-up the M1XSLU performs a Discovery Mode (~ 2 1/4 minutes) to obtain the status for all lighting devices. When complete the M1XSLU will send text string <DE^M (Discovery End). In order to set up Thermostats two (2) ElkRP rules must be written. The first is used to detect the <DE^M string and start a delay timer. The next will execute when the delay timer expires and send text string <TS along with the Device IDs of each Thermostat. See Steps 4.4 & 4.5**

4.1 Use the Lutron Essentials PC software to setup the RadioRA2 System. **THIS IS A REQUIREMENT!** During setup each device (Main Repeater, Dimmer, Keypad, HVAC Thermostat) will be assigned a unique Device ID. Refer to the Reports > Integration menu to view a listing of these device ids, including the HVAC Thermostats and use this information to fill-in the ID of each Lutron HVAC Thermostat in the spaces below. **\*\* HVAC Thermostats may only reside at IDs below 100 \*\***

1st Thermostat ID = \_\_\_ 2nd= \_\_\_ 3rd= \_\_\_ 4th= \_\_\_ 5th= \_\_\_ 6th= \_\_\_ 7th= \_\_\_ 8th= \_\_\_  
9th Thermostat ID = \_\_\_ 10th= \_\_\_ 11th= \_\_\_ 12th= \_\_\_ 13th= \_\_\_ 14th= \_\_\_ 15th= \_\_\_ 16th= \_\_\_

4.2 Launch ElkRP Software and open or create an account for this job. If using a previously programmed account, make sure the ElkRP file and M1 Panel are synchronized with the same data. If in doubt, connect to M1 and select Receive All to bring all the info from M1 into your ElkRP account file.

4.3 Click > **Automation > Thermostats** and program a descriptive name for each Thermostat that is being interfaced. A NAME IS MANDATORY. M1 will ignore (not display) any Thermostat location that does not have a name.

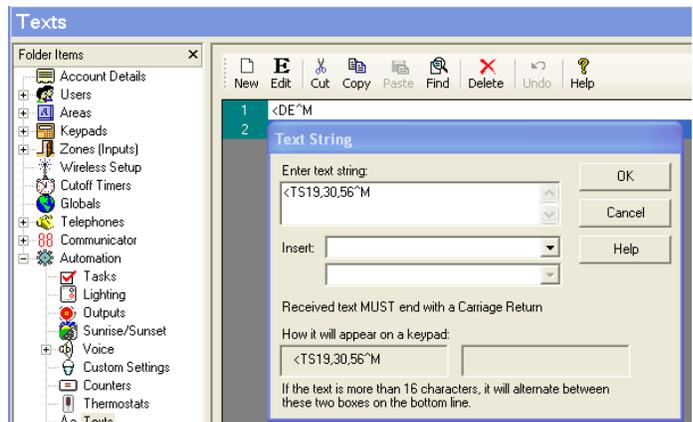
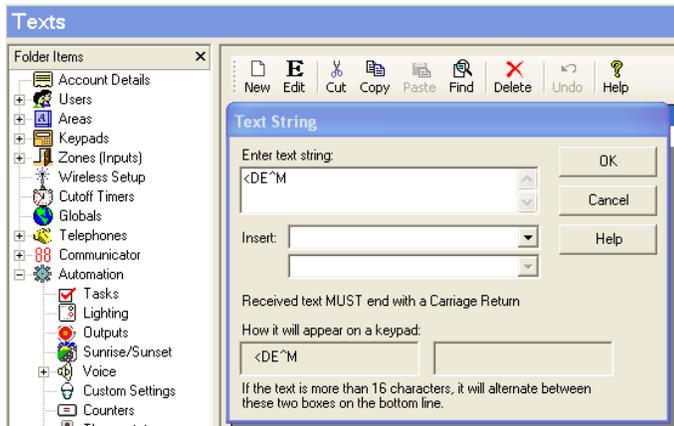


4.4 Click > **Automation > Texts** and program 2 new text strings. As mentioned, the texts strings will be used in Automation Rules to: 1)Detect the end of Discovery Mode and 2)Send the Thermostat Device IDs to the M1XSLU.

Click **New** to create the 1st text string. Enter the first text string as: <DE^M then click OK.

Click **New** to create the 2nd text string. Start this string with <TS and follow with the Device ID of the first thermostat (refer to step 4.1). In the case of multiple thermostats separate each Device ID with a comma ",". End the string with a ^M. An example of a text string for 3 thermostats numbered 19,30, & 56 would be <TS19,30,56^M Click OK when done.

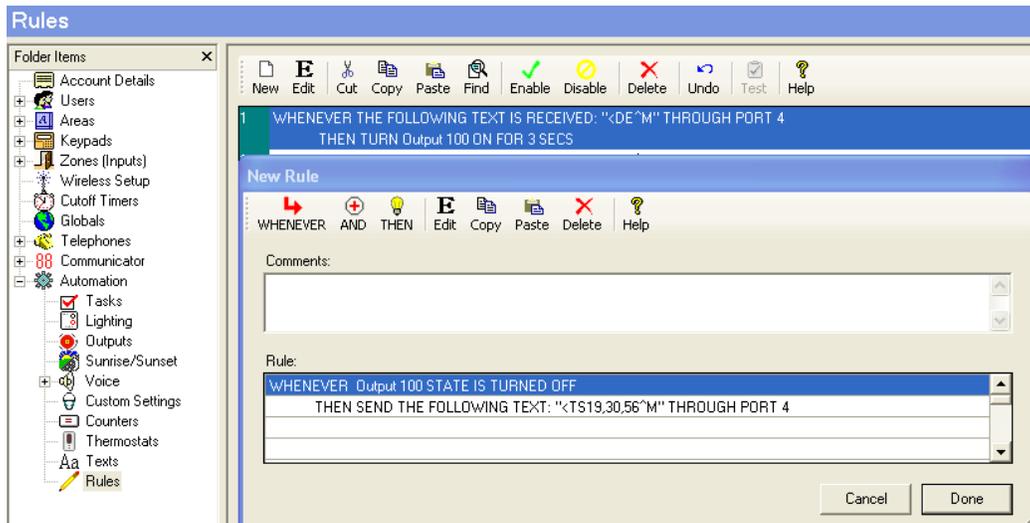
**NOTE: Each ID entry after <TS MUST BE TWO (2) DIGITS. e.g 01 to 09, 10, etc. 1 thru 9 will not work.**



**4.5** Select **EiKRP > Automation > Rules** and program 2 rules using the following examples. These rules incorporate a virtual Output as a timer or "Flag" to delay the sending of the TS command by 3 seconds. Any unused output may be substituted for the flag. It DOES NOT have to be a real output or one attached to an output expander. Three (3) seconds after the virtual output turns off the second rule will send the TS command and contents to the M1XSLU. Substitute your Thermostat Device (2 digit) IDs. Use the enrolled data bus address of the M1XSLU for the Port "X".

WHENEVER THE FOLLOWING TEXT IS RECEIVED: "<DE^M" THROUGH PORT X (address of M1XSLU)  
THEN TURN [ANY AVAILABLE OUTPUT] ON FOR 3 SECS

WHENEVER [OUTPUT USED IN ABOVE RULE] IS TURNED OFF  
THEN SEND THE FOLLOWING TEXT: "<TS19,30,56^M" THROUGH PORT X (address of M1XSLU)



Click **OK** and then **Send** the new rule and all the other programming from EiKRP to the M1 Control.

**4.6** Verify that the M1XSLU is connected to M1 Data Bus and also the RadioRA2 Main Repeater.

**4.7** Power cycle or power-up the M1XSLU to start the Discovery Mode. Discovery takes ~2 1/4 minutes to complete, during which the status LED will flash rapidly, momentarily stop, and then rapid flash again for about ~16 seconds. This second flashing indicates the M1XSLU has received the <TS command from M1. Please wait until the M1XSLU Discovery Mode is complete. I.E. DO NOT DISTURB until the rapid flashing changes to a slow 1 sec. flash.

**LIMITATIONS: RadioRA2 HVAC Thermostats CANNOT BE MIXED (combined) with other HVAC Thermostat technologies or brands on the same job. I.E. Do not mix hardwired units such as RCS RS485, HAI RS232, or Aprilaire RS485 on the same M1 panel with Lutron RadioRA2 HVAC Thermostats. If RadioRA2 HVAC Thermostats are mixed with hardwired thermostat units on the same installation then NO DATA will be displayed for the RadioRA2 units.**

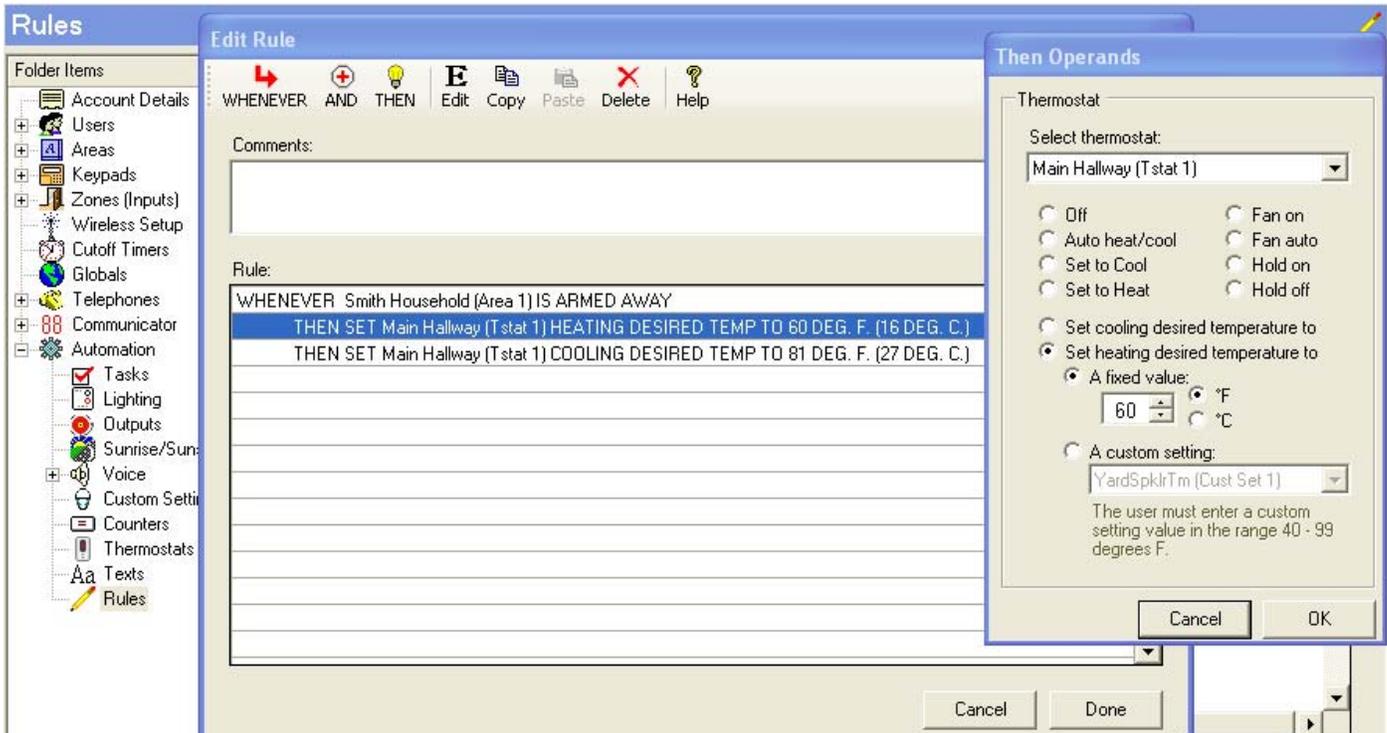
**Q - Will the order or appearance of M1 Thermostats be affected if RadioRA2 Thermostats are removed or replaced?**

A- The sort order is directly related to the Lutron RadioRA2 device ID assignments and the order these are sent to the M1XSLU using the <TS text string. Therefore, should a thermostat be removed or replaced by a new ID then the M1 and RadioRA2 will be OUT OF SYNC. There are two ways to repair this situation: 1) If a thermostat is permanently removed then edit the <TS text string and remove the Device ID of the removed unit. 2) If a thermostat is replaced because of a defect, etc. then use the Essentials PC software to make sure the replacement thermostat is assigned the Device ID that belonged to the old thermostat (the one it replaced).

**IMPORTANT! We strongly recommend that each HVAC Thermostat be tested after any changes are made to EiK-M1 or the Lutron RadioRA2 network. Verify that each is communicating and responding properly. Test all EiKRP Rules that involve a Thermostat. Verify that all keypads, touchscreens, or software interfaces are properly displaying the: 1)Mode i.e. Auto, Heat, Cool, or Aux., 2) Current Temperature, 3) Heat Setpoint, 4) Cool Setpoint, 5)Fan Mode**

## Controlling RadioRA2 HVAC Thermostats using Rules

- 4.8 Select **EIKRP > Automation > Rules**.
- 4.9 Click **New** to start a new Rule. Example: Lower the Heat and Raise the Cool Setpoints when Armed.
- 4.10 Click **WHENEVER > Security/Alarms > Is Armed > Armed Away**. A pop-up box appears to pick the Area (partition). Use the drop down to pick the area or Click OK to accept "Area 1".
- 4.11 Click **THEN > Thermostat**. A new box will appear.
- 4.12 In the Select Thermostat box scroll and select one of the Thermostats. E.G. Main Hallway [Tstat 1].
- 4.13 Click **Set heating desired temperature to**.
- 4.14 In the value box scroll to set the temperature value. Set the F or C box to your preference. Then click **OK**. The screen should resemble the first two lines in the illustration below.
- 4.15 To set the Cooling setpoint click **THEN > Thermostat**.
- 4.16 Select the same Thermostats. E.G. Main Hallway [Tstat 1] as before.
- 4.17 Click **Set cooling desired temperature to**.
- 4.18 In the value box scroll to set the temperature value. Set the F or C box to your preference. Then click **OK**. The screen should resemble the first three lines in the illustration below.
- 4.19 Click **DONE** to complete this Rule.
- 4.20 Make sure that EIKRP is connected and on-line with the M1 Control, then click **Send to Control**.



## STEP 5 - Rule Examples and Advanced M1XSLU Options

Below are examples of Elk-RP Rules being used to control Lights and Thermostats.

Rule 1 - Turns Flood Lights on for 30 secs. and activates Save Energy Task\* when Armed Away.

Rule 2 - Task\* "Save Energy" activates a RadioRA2 Phantom #3 and sets back HVAC Thermostat to save \$\$.

**NOTE: RadioRA2 Phantoms are**  
 - Groups or Scenes stored in the Main Repeater [Device ID1] which may be activated by a Set to Level command. In this rule the 3% Bright activates Phantom #3. See "**Phantoms**" for more info.

Rule 3 - Upon Disarm the Task "Welcome Home" is activated.

Rule 4 - Task\* "Welcome Home" turns on some lights and sets HVAC to 69 & 72 deg.

Rule 5 - Task\* "At Home" activates RadioRA2 Phantom #6 in the Main Repeater.

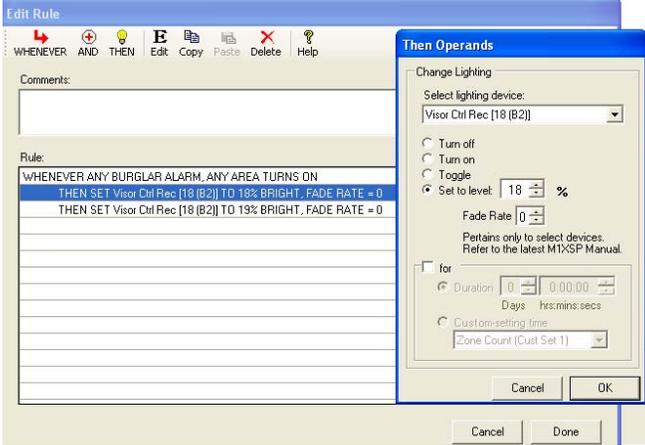
Rule 6 - Task "Watch TV" sends Dim Level 5% Bright @ Fade Rate 0 to Device ID7 which in this case is a RadioRA2 RRD8BRL Keypad. This unique option is used to virtually press Button 5 on the Keypad. See "**Button Presses**" for more info.

\*NOTE: Tasks are like macros and can be handy for optimizing or saving rule space. The same task can be activated by any of several rules and conditions.

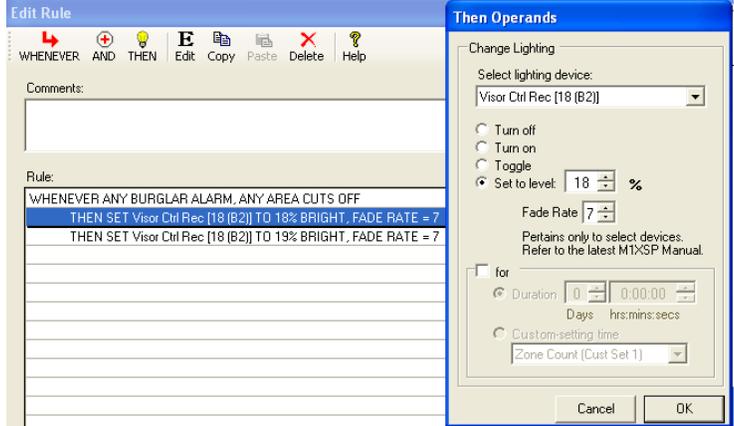
**Button Presses:** Buttons on RadioRA2 Wall or Tabletop Keypads and Visor Ctrl Receivers may be programmed to activate Groups of lights (Scenes) with a single press. To permit M1 to activate these buttons, Elk reserved "Set to Level" (Dim) 2 thru 20 @ "Fade Rate" 0 as special commands to the M1XSLU. See Table 3b and the example below. As a result, the M1 cannot set a RadioRA2 Dimmer to Dim Levels 2 thru 20 UNLESS the Fade Rate is set as 1,2,3,4,5,6, or 7. NOTE: Fade Rate 7 has some additional unique functionality.

At left is an example of a THEN Operand programmed to press a Keypad Button on Lighting Device 7 (A7) which in this case is a RadioRA2 Keypad [RRD8BRL]. With a Set to Level of "3" and "Fade Rate" of "0" the M1XSLU sends a virtual keypad press command to Button 3 on the selected Keypad device. Other buttons may be pressed (numbers 2 to 20) by changing the Set to Level value. See Table 3b for more info.

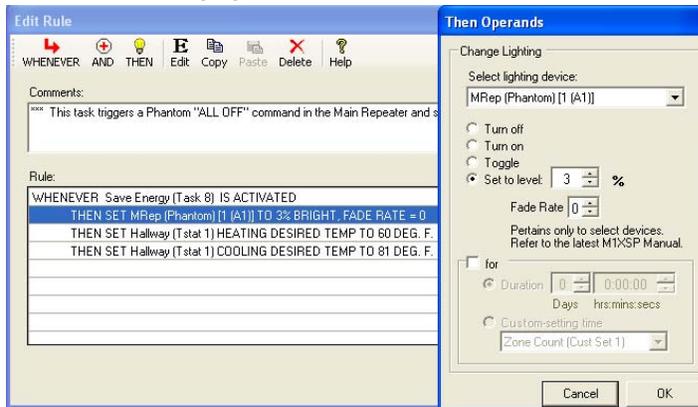
**Security Flash & Security Solid** - A RadioRA2 Visor Ctrl Receiver provides an ability to program groups of lights to flash or go solid on demand. After programming these with the Visor Ctrl Receiver, M1 can activate them by sending a Dim Level 18% (Solid) or 19% (Flash) @ Fade Rate 0 to the ID belonging to the Visor Ctrl Receiver. See Table 3b and example below:



**Fade Rate 7** - To turn Off Security Flash or Security Solid the M1 must send Dim Level 18% (Solid) or 19% (Flash) with the fade rate set to "7" to the ID belonging to the Visor Ctrl Receiver. See Table 3b and example below:



**Phantoms:** The RadioRA2 Main Repeater ID1 can store 100 groups of lights (Scenes) called **Phantoms**. In order for M1 to activate these Phantoms ELK specially reserved Set to Levels 1 to 100 when used in rule commands that are addressed to Lighting Device #1. The RadioRA2 Main Repeater **MUST** be setup as Device ID 1. Below is a Then Operand: **THEN SET MRep [Phantom] 1 (A1) to 3% Bright, FADE RATE=0** which will activate Phantom #3 in the Main Repeater. The Fade Rate has no purpose as is left at its default of "0". Changing the Set to Level value will allow other Phantoms (1 to 100) to be activated.



**TABLE 5: M1 and M1XSLU TEXT Strings** (Refer to section 4.5 for an example of creating and sending Text Strings)

TEXT String	Transmitted Strings (M1 to M1XSLU) and their application
<POLL^M	Can be sent to the M1XSLU to manually activate the Discovery Mode which gathers all the latest lighting status from the Main Repeater. This ordinarily activates only upon power application. While it is unlikely that this command will ever be needed, it does allow Discovery Mode to be activated without the need of powering down the M1XSLU.
<TSxx^M	This string is VERY IMPORTANT if RadioRA2 HVAC Thermostats are to be integrated with M1. It is used to send the Device IDs of each thermostat to the M1XSLU. This allows the M1XSLU: 1) To know the ID of each existing RadioRA2 thermostat. 2) To query the status of each and to map the data response to the appropriate M1 Thermostat locations (1-16). The mapped order is dependent on the order of the IDs sent by <TS^M string sent to the M1XSLU. E.G. Say there were 3 RadioRA2 thermostats and their Device IDs are 19, 30, & 56. The string to be sent would be: <TS19,30,56^M Device ID19 will be M1 Thermostat 1, ID30 will be M1 Thermostat 2, and ID56 will be M1 Thermostat 3.
<b>Received ONLY Strings (M1XSLU to the M1) and their application</b>	
<DE^M	The M1XSLU will transmit <DE^M to the M1 whenever the power-up Discovery Mode ends. The current application for this is to determine when it is appropriate for the M1 to send the thermostat status command <TS^M. Two Automation Rules should be written, one to receive the <DE^M and turn on a delay flag (E.G. Output x On for 3 sec.), and a second one to send the <TS^M string. E.G. WHENEVER <DE^M Received on Port x THEN SEND <TS^M on Port x.
<LOSS^M	The M1XSLU supervises its connection to the Main Repeater by querying every 30 seconds. If the Main Repeater fails to respond 3 consecutive times the M1XSLU will transmit <LOSS^M to the M1. This can be used to create a trouble alert or relay activation by writing an Automation Rule that looks for this received string. E.G. WHENEVER [Text String] <LOSS^M Received on Port x THEN [do something] Turn on an Output, etc.
<REST^M	This is for use to clear any trouble set by the <LOSS^M string above. Once the M1XSLU receives a valid response from the Main Repeater it will transmit <REST^M to the M1. An Automation Rule that looks for this received string will be required. E.G. WHENEVER [Text String] <REST^M is Received on Port x THEN [do something] Turn Off an Output, etc.

## **STEP 6 - Importing RadioRA2 XML file into ElkRP Lighting**

### **What is the RadioRA2 XML project file and what information does it contain?**

A RadioRA2 XML project file contains detailed information about the installed and programmed lighting system, such as the Device IDs, Names, Lighting/Scene assignments, etc. ElkRP can use this data to eliminate the time consuming task of manually typing all of this information into the Lighting Device locations.

### **Where is the XML project file located and how can it be obtained?**

The Main Repeater generates and stores the XML project file upon request, using the project database that was transferred by the RadioRA2 Essentials software.

### **Steps to extract XML**

- 1) The Main Repeater must be connected to the LAN.
- 2) Using the PC Essentials Software, design, program, activate, and transfer the project to the system.
- 3) On a PC connected to the LAN, open a Web Browser and enter the IP Address assigned to the Main Repeater.  
Example: <http://<IPAddress>/DbXmlInfo.xml> \*\* For the <IPAddress> enter actual IP address of the Main Repeater.
  - When using a static IP address, the IP Address of the Main Repeater can be found in the RadioRA2 software.
  - When using a dynamically assigned IP address (DHCP), the IP address can be obtained from your router's DHCP table. Refer to your router's documentation for details.
  - Example: <http://192.168.2.105/DbXmlInfo.xml>
- 4) If a Login and Password box pops up, enter **lutron** for the Login and **lutron** for the Password. The screen should display the contents of the XML file.
- 5) Save this file to your desktop selecting **File > Save As** , then type a file name and hit OK.

### **Can an XML project file be extracted from a walk-around programmed RadioRA2 system?**

NO. The XML project file is generated by the Main Repeater based on the database transferred to it by the RadioRA2 PC Essentials Software. Therefore, it can only be extracted from a system that has been software programmed. A walk-around programmed RadioRA2 system does not generate an XML file. The RadioRA2 software is available to factory-trained installers only. For questions on how to become a qualified dealer/installer, please contact your local Lutron representative.

### **Steps to import the XML project file into ElkRP.**

- 1) From **ElkRP > Automation > Lighting** use the mouse and right click on **Lighting**.
- 2) Select **Import Lighting Data**.
- 3) For the Export File Format click on the button next to: Lutron RadioRA2 XML database
- 4) On the right side click Browse and locate Export/Project File that was previously saved in step 5 above.
- 5) In the next four (lower) boxes select how this new imported data should be handled. We generally recommend:  
 Clear existing device...  Set (enable) the "Show" flag...  Leave the "Opt" flag...  Clear "Voice Description...  
CAUTION: If other lighting products (brands) are installed on this Control, it is possible that one or more Lighting Device locations may be overwritten by this import. We DO NOT recommend mixing lighting technologies on any control for this reason. Be sure to save a backup of this ElkRP Account in case it becomes necessary to restore the previous selections. Mixing of lighting brands requires extreme care to make certain that no two brands are attempting to utilize the same Lighting Device number locations.
- 6) Click Import to import the XML file and all of its contents into ElkRP.
- 7) Review each ElkRP Automation > Lighting Device location to determine if the XML file data imported correctly.

### **Why are more M1 Lighting Device locations consumed than the number of RadioRA2 devices?**

This is because Device IDs are assigned to every item in the RadioRA2 network, not just the Dimmers, Switches, Repeaters, and Thermostats. For example; rooms are assigned Device IDs even though they are not directly controllable. So when the XML project file is imported by ElkRP, each Device ID must be assigned to an individual M1 Lighting Device location. ElkRP does help identify the controllable devices by automatically placing a checkmark ✓ in their "Show" box. Note! The "Show" box of the Main Repeater (Lighting Device ID1) will not be checked, although it is possible for ElkRP rules to control Phantom (Scenes) are stored in the Main Repeater.

**Importing of a RadioRA2 XML file into ElkRP Lighting REQUIRES a new version of ElkRP; V2.0.12 or later.**

**ELK**

**PRODUCTS, INC.**

PO Box 100

3266 US Hwy 70 West

Hildebran, NC 28637

828-397-4200 828-397-4415 Fax

<http://www.elkproducts.com>