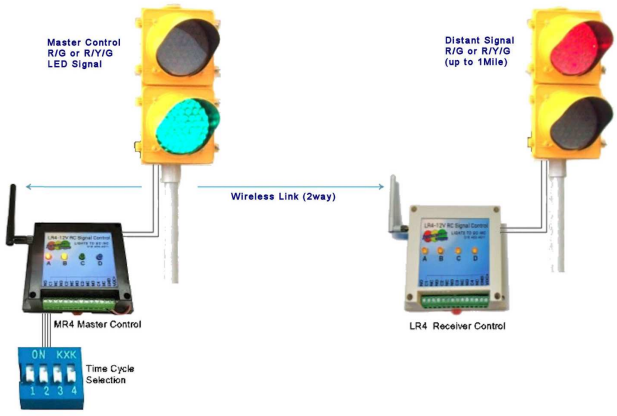
MR4 - Wireless Single Lane Signal Control

MR4 Wireless Control System Introduction:

This simplified time control is made to synchronize control of 2 directions of traffic over a single traffic lane. The unit is simple to use and extremely versatile while not requiring any specialized programming, equipment or training to configure and operate. The MR4 system works with temporary or permanent installed Red/ Green or Red/ Yellow/ Green Signal Systems with a range of over 1 mile.

This type control is widely used during construction operations to allow bidirectional traffic in a defined single lane zone. This system can replace flagman for work zones, temporary bridge lane closures. It has been applied to blind driveways and limited visibility, narrow roadways as well as tight access parking garages.

MR4 Wireless Control System Operation:



The MR4 control system consists of 2 parts: The MR4 master control (+signal) and the LR4 receiver control cabinet (+signal). Each signal/ control cabinet requires its own power source and can be located up to 1 mile apart. The MR4 master has an embedded microcontroller which runs a proprietary timing logic cycle. On-board there are 4 output relays that drive the local traffic signal. There are also 4 monitor LEDs that correspond to the output status of these relays. The crucial component of both these cabinets is the Lora Communication module that allows the micro-controller to communicate commands with the distant LR4 receiver and its attached traffic signal. The following section specifically covers the Lora Module and is extracted from the manufacturers' data sheet.

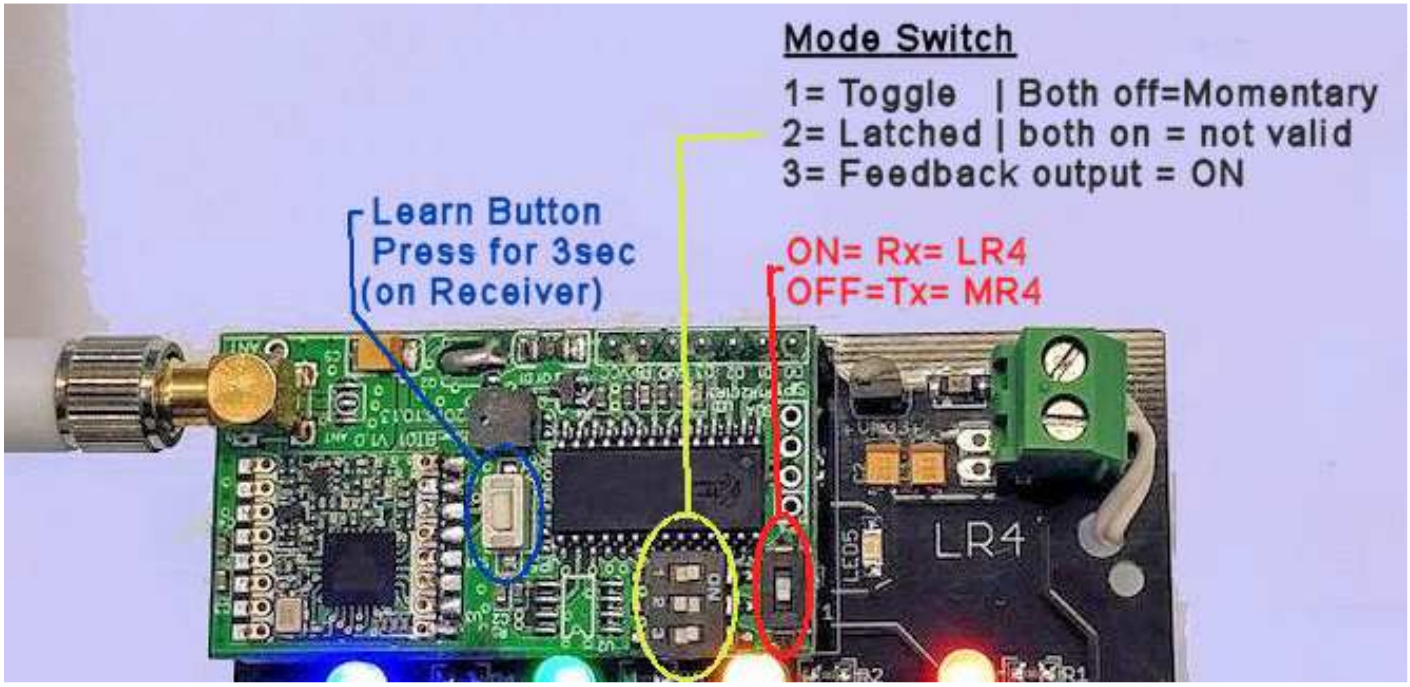
1. Overview

Lora-01 is a bidirectional transceiver module. It uses state-of-the-art spread spectrum communication techniques, which greatly enhances its effective sensitivity and anti-interference performance. Features of Lora-1.0 are ultra-high sensitivity and high transmit power with strong anti-interference performance.

Technical Specifications Lora-01 Bidirectional communication module	
(MR4) Transmitter:	
Working Voltage	12.0VDC standard or (120VAC by option)
Transmit Current:	110mA
Working Frequency:	434MHz (base frequency)
Encode Type:	custom match code
Modulation Mode	: FSK (FM) + LORA (SPSP)
Transmitting Power:	20dBm
Control Distance:	>2Km (>1 Miles) [line of sight conditions]

(LR4) Receiver :	
Working Voltage	12.0VDC standard or (120VAC by option)
Standby Current:	16mA (receiver mode)
Modulation Mode:	FSK (FM) + LORA (SPSP)
Receiving Sensitivity: -	-148dBm
Control Distance:	>2Km (>1 Miles) [line of sight conditions]

2. Wiring Instructions -See appendix



3. Lora Module Setup Instructions	
MR4	MR4 is used in Transmit mode, so the corner single switch must be configured to OFF. The Mode switch must be set 1,2= OFF, and 3 = ON
LR4	LR4 is used in Receive mode, so the corner single switch must be set to ON. The Mode should be configured switch 1=OFF , and 2 = 3 = ON (Latched w FB)
Learn New MR4 (Tx)	In order to match a new MR4 to the LR4, we need to power up the MR4 (transmitter). Next the LR4 Learn button should be pressed and held for~ 3 sec. until the small red LED Indicator lights, and after the MR4 attempts the next transmission the same LED should flash 2times, indicating the it has completed matching the TX code.
Delete all Transmitters	To Delete the codes; Press and hold the learn button until the LED flashes 3 times, this indicates the Code delete was successful. This will cause the LR4 to not respond.

Dip Swches							
1	2	3	4	Grn	*Yel	Clr t	Total time
1	1	1	1	10s	4	20	60
0	1	1	1	15	4	30	90
1	0	1	1	20	4	45	130
0	0	1	1	30	4	60	180
1	1	0	1	45	5	90	270
0	1	0	1	60	5	120	360
1	0	0	1	90	5	180	540
0	0	0	1	120	5	240	720
1	1	1	0	10s	4	05	30
0	1	1	0	20	4	10	60
1	0	1	0	30	4	15	90
0	0	1	0	45	4	20	130
1	1	0	0	60	5	30	180
0	1	0	0	90	5	40	260
1	0	0	0	120	5	50	340
0	0	0	0	180	5	60	480

* Yellow time is optional for RYG signal combination

Digital Cycle Time Selection - Table 1

Directional Priority

Most commonly both directions of traffic have equal priority and take turns evenly based on the same Green Light duration. In some instances based on time of day or special events the majority of traffic may be in one direction while minimal in the other. An example would be vehicles entering a parking garage in the morning. In the afternoon the direction priority may be reversed to allow faster egress. This can be selected on the MR4 with an external directional priority switch. The optional 3 position switch allows a selection to be made of Inbound Priority, Outbound Priority or Equal time (default).

Triggered Access Cycle mode (option)

If triggered access mode is required, one direction will remain green until a vehicle presence (waiting) signal is received from the other side. This may be from a loop detector or similar type of sensor switch input. Upon this trigger the red time (clearance time runs until expiration and then a Green light cycle is initiated. This triggered access can also be commanded via remote control from a traffic monitor such as a security officer, attendant or road worker / flagman. The control system is bidirectional so the traffic signals will always stay in synchronization. If triggered operation is required please contact us so we can confirm details of the usage.

Signal Options

The MR4 will operate all standard Traffic Signals. We will work with you to select just what you need in the way of signals to best fit your custom applications. We offer both AC and DC LED Systems with 200 or 300mm LEDs units in either Red / Green and RYG Signal head models. We stock Red / Green full ball signals as well as Red X, Green Arrows. We also have additional customization options including stenciled messages custom colors custom timing and more.

Custom timing sets and cabinet options are also available to meet your exact needs – Please call us for more details and custom configurations.

Technical Specifications

MR4- LR4 Wireless Link Control System	
MR4- Master	Custom Signal Control w/ timing logic
R/G Jumper	Jumper on MR4 selects R/Y/G; if present or R/G Signals; if removed
LR4 - Receiver	Receiver Signal Control w/ relay logic for R/Y/G or R/G Signals
Voltage	120VAC (or 12-24VDC optionally)
Power Max	>300W Max load per output
	10A output relay contacts
Inputs	Priority inputs for detection loops
Timing	16 Selectable Time Sets
Sequences	Limited visibility roadway / blind drives
	Temporary Lane Closures
	Parking Garage / 1 lane bridge signal
Temp Rating	-40F to 150Deg F (-40C to +60C)
Format	Control in fiberglass flasher cabinet, (AC version typically 12x12x6 in)
Timing Accuracy	Internal clock <2%
Wireless Link	Lora spread spectrum tranceiever
Digital interface	Bidirectional link w/ comand responce
High sensitivity	➢ -148dBm
No infrastructure	No GSM / Cell Data service required
Range	Line of sight range >1 mile, (1.5Km)