PTL2 (Portable Traffic Lights)
Operating and Programming for NC

The Programmer Front Panel

N21990

Manufactured by Global Traffic Equipment Pty. Ltd.
a Quality Management System Approved to
AS/NZS ISO 9001:2008 – Reg. C31071

Contents

Please Note: Specifications subject to change without notice

Document Revision History:

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20/01/2014	V1.8	Document Revision History Added for version control.	B.B.
02/04/14	V1.9	4 Way Indepentant operation added	D.E.
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7/7/14	V2.1	Minor changes and correction of Error (MANUAL) on page 20	D.E.
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27/1/17	V2.6	Included to Manual, PTL LHC, Quick reference guide; Reprogramming PTL2 Lamp Controller Changed wording Giga Signs to Global Traffic Equipment	R.P.

Pre-Delivery Checks

The following checks should be performed:

a) Tyre condition & pressure (200 kPa).

b) All wheel nuts tight.

c) Spare wheel (if fitted) secure & locked.

d) Tail light wiring & plugs are in good order and all lights working correctly.

e) Drawbar, joiner bar, towing gear and safety chains are in good order.

f) Hand brake adjusted & functioning properly (if fitted).

g) Jockey wheel and stabilizer legs are in good operating condition.

h) Winches operational and winch cables are in good order.

i) **Solar panels are clean.**

j) SMS phone number set to contact appropriate person (982 SETUP).

k) SMS system tested for correct operation (997 SETUP).

l) Locks present for battery box (if required).

m) Locks present for controller box (if required).

n) Locks present for wheel locking chains and mast (if required).

o) Light head fully lowered, and mast pin locked into position before relocating the units.

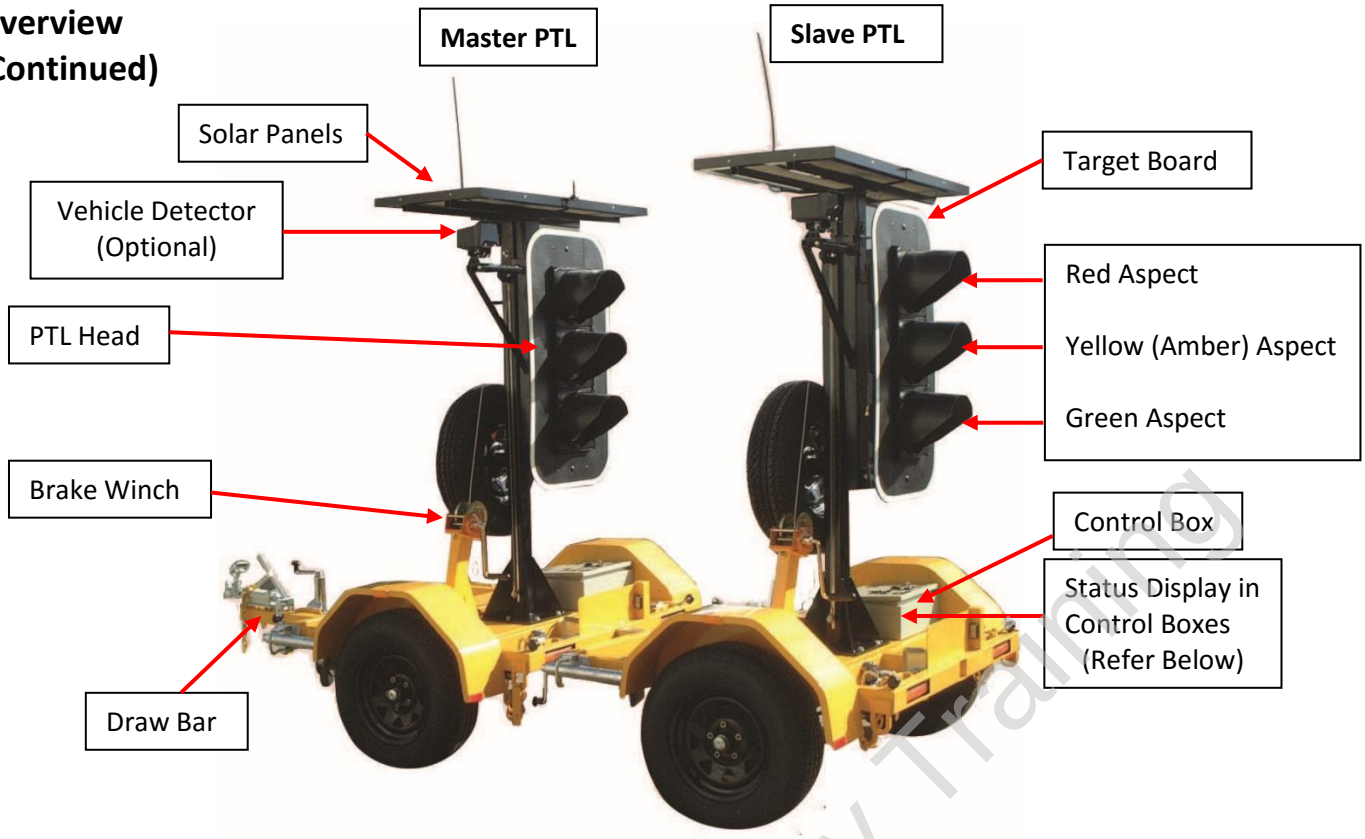
p) Switch on Slave unit, then Master unit. Switch lights into Timer mode, and check the operation of all lights, including rear “red condition” amber lights. This is a lamp check only.

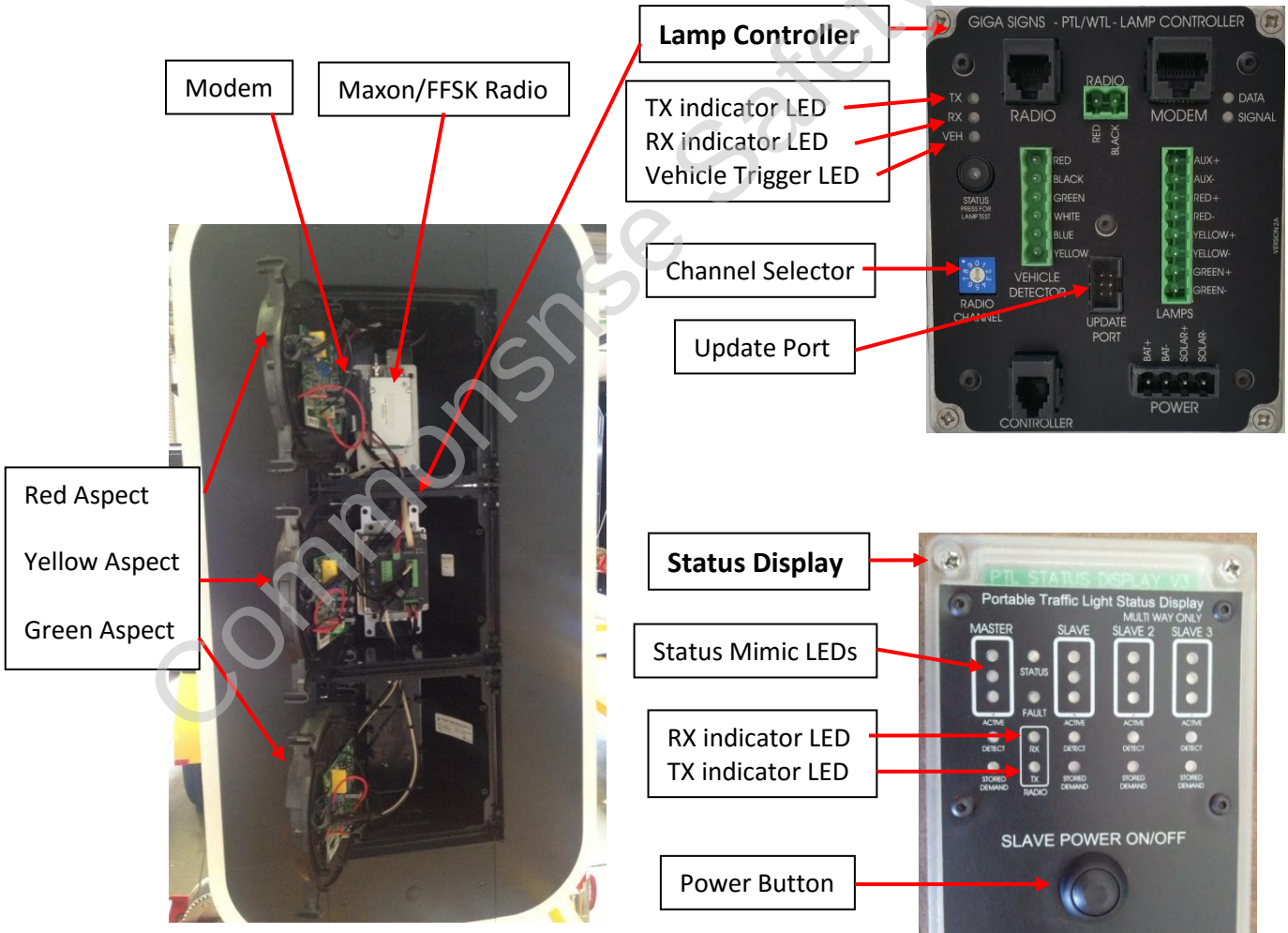
When testing equipment to ensure correct operation it is recommended the units are a minimum of 10m apart.

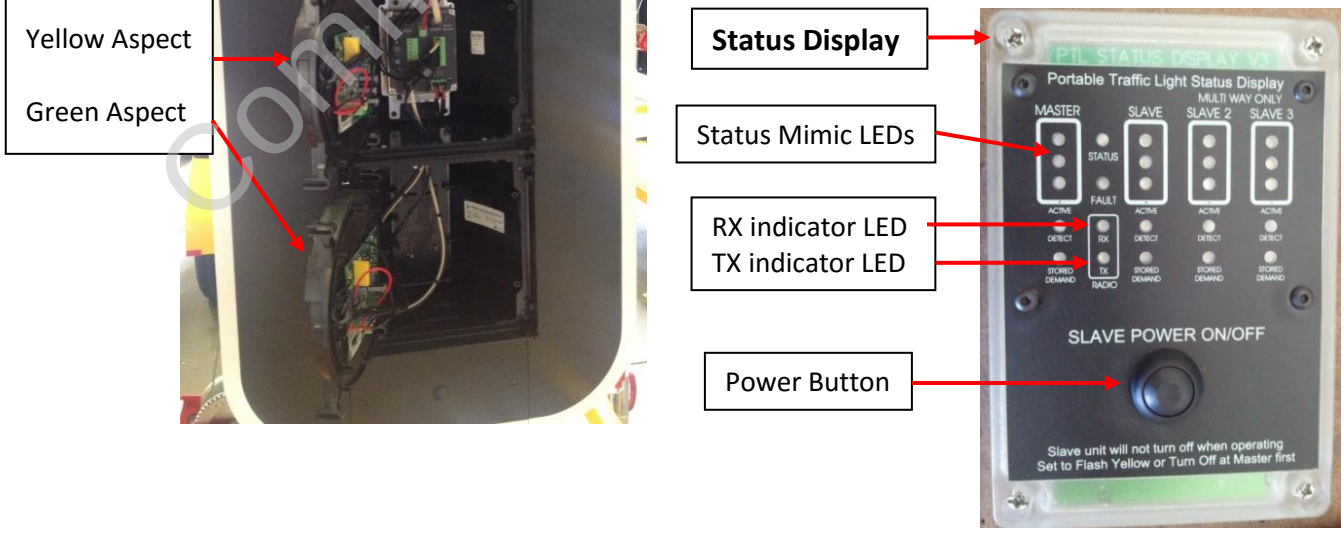
Overview and Definitions

Aspect	The lamp or colour of the lamp on the Traffic Light head.
Flash Yellow	When the Yellow (amber) lamps flash intermittently. Occurs when in programming mode or when an error has occurred.
Master Unit	The set of Traffic Lights that has the SIM card fitted to it, and the unit you plug the Master Hand Controller into.
Slave Unit	The secondary set of Traffic Lights. (Towed behind the Master)
Lamp Controller	The main controller unit located behind the Yellow lamp in both the Master and Slave units.
Maxon Radio	The radio used to communicate between the 2 Traffic Lights.
Modem	The device used to communicate with a mobile phone that advises of errors during operation.
Interference	Other communication system that is operating on the channel you are using and therefore interrupting communication between the units. (May be many different things from irrigation pumps to sewerage treatment plant equipment)
TX Light **TX = Transmit**	Red LED light located on the Lamp Controller and the Status Display box. It will pulse intermittently once per second (once on one unit, then on the other unit).
RX Light **RX = Receive**	Green LED light located on the Lamp Controller and the Status Display box. It will pulse intermittently once per second (once on one unit, then on the other unit).
Status Display	Mimics the Master and slave/s lamp heads and controls the Traffic Light operation.
Brake Winch	Hand winch with self-actuating brake mechanism. Handle must be turned in reverse direction to lower the mast.

Overview (Continued)







Joining & Separating PTL2 Trailers

For connecting trailers with the joiner bar, the following procedure should be adopted:

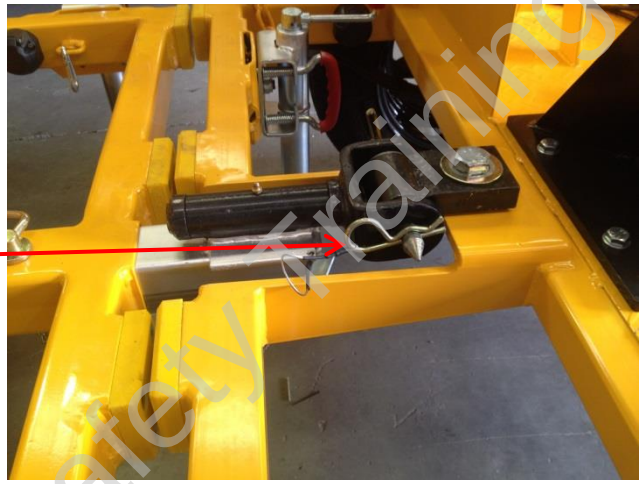
NOTE: IT IS REQUIRED THAT ALL OF THE STABILISER LEGS BE LOWERED BEFORE SEPARATING TRAILERS

FOR SAFETY REASONS JOINING AND SEPARATING TRAILERS IS BEST DONE ON LEVEL GROUND

a) Install the short joiner bar into the Slave trailer.

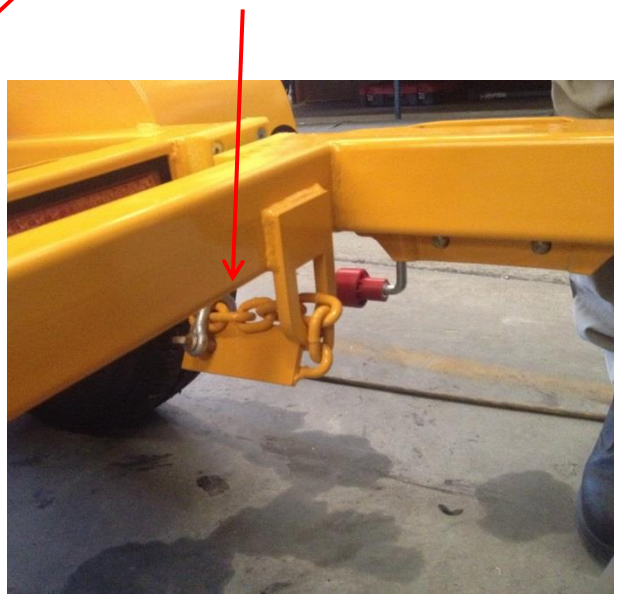
b) Ensure the drawbar pins are fitted into the joiner bar before connecting the two trailers.

c) Line-up both trailers, end on end. Ensure both trailers are close to level and connect the trailers to each other via the Off Road Coupling. Insert the pin through the coupling and secure by the retaining R clip.



The wheel locking chains are also used as safety chains when the two trailers are joined.

d) 1. Pass the wheel locking chain that is welded to the master trailer through the lifting eye on the slave trailer
2. Double the wheel locking chain back underneath the eye.
3. Shackle the wheel locking chain plate it back onto the chain with a rated shackle (1 Ton minimum) as shown below.



e) Connect the tail light leads and test tail light operation.

f) Repeat the above in reverse to separate the units.

On Site Setup and Pack Up

Setting up

a) Before removing the PTL2 Slave (THE REAR TRAILER IS REFERED TO AS THE SLAVE UNIT) trailer from the vehicle, establish the final position for the Traffic Lights with a clear view to desired traffic. Ensure that the unit is not in a position where the PTL2 is too close to traffic for adequate safety clearance or where as it may be hit by a vehicle. Further ensure that the unit is not in a position to hinder or endanger pedestrian traffic. If the unit has to be positioned close to the flow of traffic or pedestrians, it is recommended that appropriate safety barriers be utilised.

b) A suitable location also requires the units to be positioned where the solar panels receive direct sun light.

NB. If there are successive overcast days, trees, buildings or other obstacles blocking the sunlight from the solar panels, the battery units will need periodic external charging.

c) Clean the solar panels regularly to ensure no dirt/dust stops the recharge process.

d) If fitted, engage the hand brake before releasing the Slave trailer from the towing vehicle.

e) Remove the tail light cable and safety chains.

f) Move the units to their final position and lower the stabiliser legs.

g) Level the units with the stabiliser legs.

h) If required remove the wheels or use the wheel locking chains to secure them.

i) Disengage mast pin and raise light head up.

j) Lock the safety pin on the mast into position, the mast must be fully raised.

k) Carry out a final check of the unit to ensure it is in a safe position and correctly aligned with the light head facing oncoming traffic.

l) On the **Slave unit**, open the control box and press the “POWER” button, the Yellow lamps on the Status Display will flash, as will the Yellow Aspect lamp.

m) Now at the **Master unit** at the other end of the work site, open the control box and plug in the Handheld Controller securely.

n) Using the Handheld Controller press the “POWER” button to turn the unit on.

o) Set the sequence times and operational mode, as described in this manual.

Packing up

PICK UP THE MASTER UNIT FIRST

a) Turn off the **Master** PTL2 unit first, by pressing the "POWER" button on the PTL Controller, located in the control box.

   To turn off the Slave unit, the system must be in Flash Yellow mode, and then press the "POWER" button on the STATUS DISPLAY unit on the Slave control box.

b) Ensure that the wheels are properly fitted and wheel nuts correctly tightened.

c) Check that the hand brake is engaged (if fitted) and any wheel locks are removed and stowed.

d) Release the mast locking pin and lower the lamp heads.

e) Raise stabiliser legs and swivel into the transport position.

f) Lower the trailer to the towing vehicle (using jockey wheel).

g) Ensure the tow hitch is properly fitted to the tow ball of the towing vehicle and the latch is in the locked position.

h) Connect safety chains – Master unit to the tow vehicle.

i) Connect the 7 pin tail light connecter.

j) Raise and swivel jockey wheel to transport position.

k) It is recommended that the handles for the jockey wheel and stabiliser legs be rotated to "sit" on the trailer frame and not left hanging down.

l) Release hand brake (if fitted).

m) Check tail lights are operating correctly.

n) Check all stabiliser legs and jockey wheel swivels have locked into position correctly.

o) PICK UP THE SLAVE UNIT NEXT.

p) Follow the procedure listed above.

q) Refer to the section "Joining & Separating PTL2 Trailers".

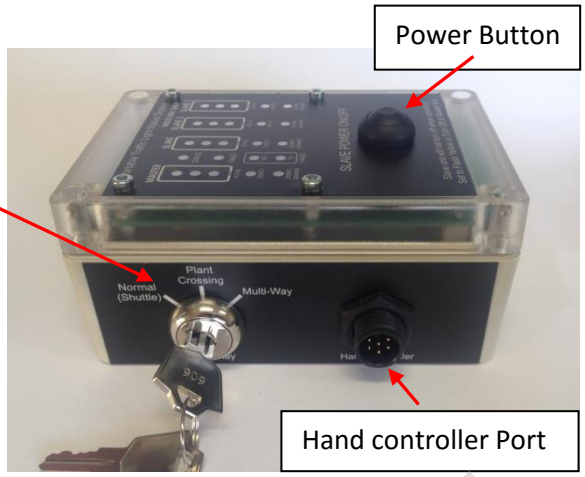
Status Display Mode Key Selector

(Key Switch)

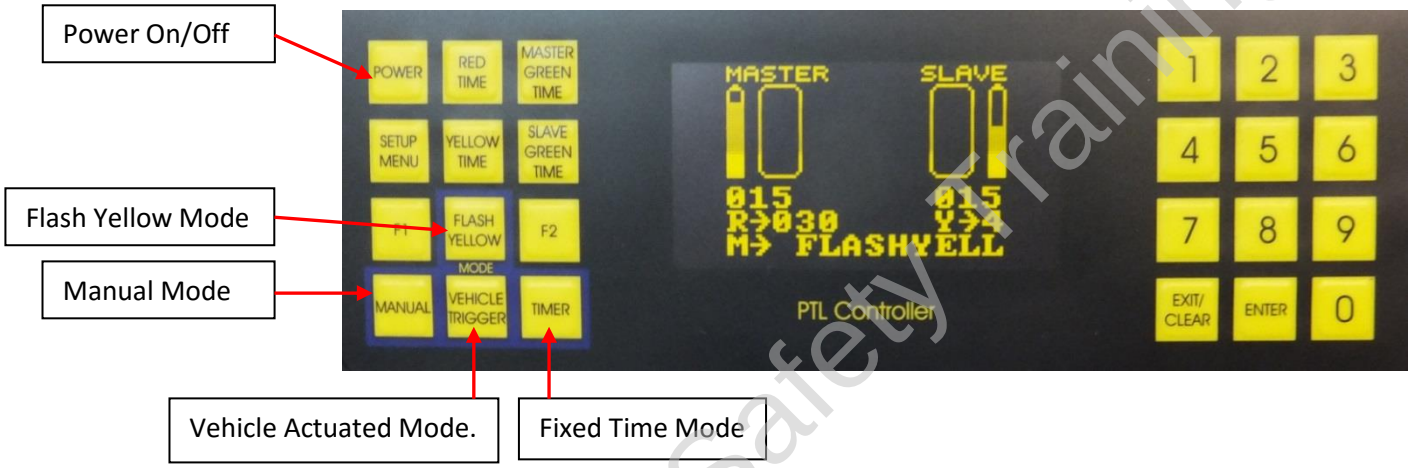
The PTL2 can operate in one of 3 operator selected modes with the Key Switch in the Normal (Shuttle) Position.

1. Manual Mode
2. Vehicle Triggered Mode
3. Fixed Time (Timer Mode)

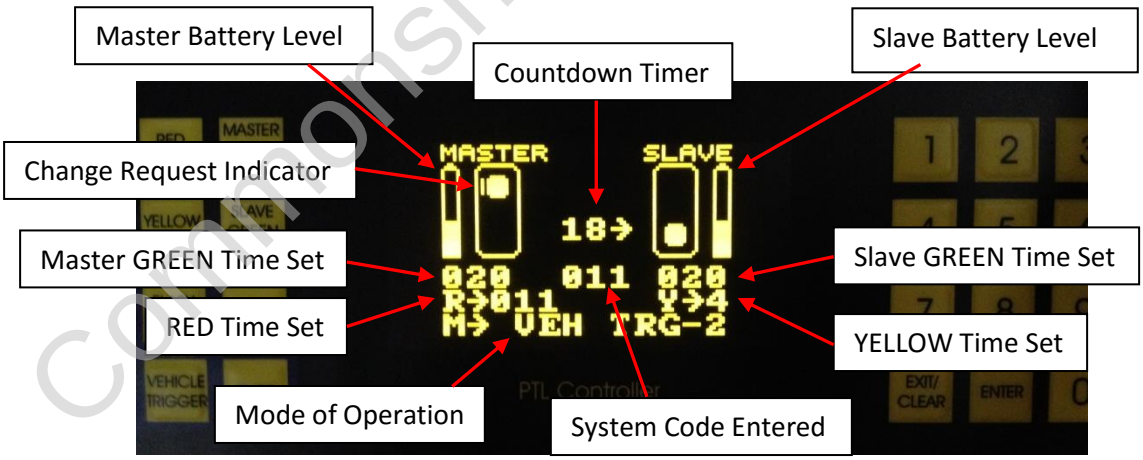
A description of each follows:



Hand Controller Keys



Hand Controller Screen



Check Firmware Version

To check the firmware version set in the Master and/or Slave Lamp Controller units following the below procedure:

1. Connect the handheld PTL controller to the port on the side of the Status Display.
2. Press the Power button on the PTL controller. On the first power up screen it will indicate the firmware which is programmed into the Lamp Controller. It will display its current software version eg. V2.40 NC.

Set Unit Number

To check and reset the unit number;

3. While controller is set on 'Flash yellow' type 8 8 7 into the hand controller and confirm the digits are displayed on the screen of the controller.

4. Press the Setup Menu button and confirm that the bottom of the screen shows "ENTER UNIT NUMBER".
5. Enter the unit number of the PTL into the controller and ensure that the numbers are displayed on the bottom line of the screen, when correct press the Enter key.

6. Turn the SLAVE unit off by pressing the Power button on the hand controller. Repeat steps 3 to 5 with the MASTER unit.

Note: The unit number must be set the same on both Master and Slave units. Suggest to enter the unit number on outside of control box or create a unit number but it must be between 000 and 255 only.

Set Radio Channels

7. Ensure both PTL units are set to the same radio channel, the blue/white dial is located on the front of the Lamp Controller. Only channels 0-5 are valid at this time.

CHECK OPERATION OF PTLS

8. Turn the Slave unit on with the Slave Power button on the Status Display and the Master unit Power on with the handheld PTL controller.
9. Ensure that the TX and RX lights are flashing on both Master and Slave units and that the lights function correctly in the Timer mode.

PTL2 Modes of Operation

The PTL2 can operate in 3 operator selected modes:

1. Manual Mode
Manual Mode allows the operator to manually change the Traffic Lights from RED to GREEN or GREEN to RED.

2. Vehicle Triggered Mode
This mode is used to control two directions of traffic at a single lane site. This mode utilises the Vehicle Sensors (optional) to detect the presence of vehicles.

3. Fixed Time (Timer) Mode
This mode is used to control two directions of traffic at a single lane site. This mode operates on times programmed into the handheld controller.

Flash Yellow Condition:
'Flash Yellow' is the default mode or condition used to program the units OR to indicate a fault.

Flash Yellow means when the amber lamps on the units are intermittently flashing on & off.

In this manual, the Flash Yellow condition is represented by this symbol:

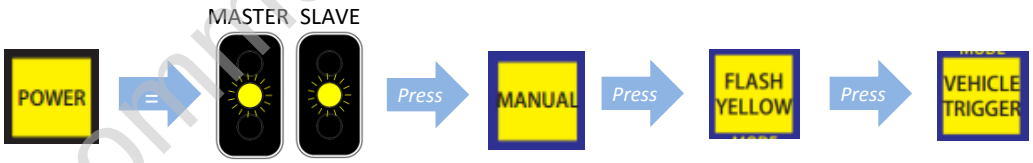
There are 3 ways the PTL2 can enter Flash Yellow mode:

When the system is first turned on.
When the Flash Yellow key is pressed on the Hand Controller.
When the system goes into fault mode.

The Flash Yellow condition is the status the units MUST be in to change between different modes of operation.

Example:
To change from Manual Mode to Vehicle Triggered Mode:

Turn the units on (Slave 1st then the Master with the Hand Controller). The units will be in Flash Yellow condition
Press the "MANUAL" key. The units go into Manual Mode.
Press the "FLASH YELLOW" key. The units go into Flash Yellow condition.
Press the "VEHICLE TRIGGER" key. The units go into Vehicle Triggered Mode.



Manual Mode

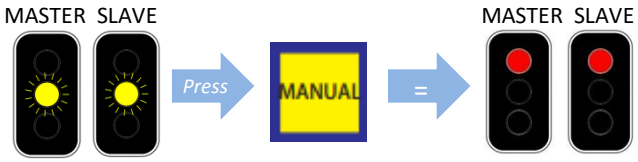
*The Key Selection Switch on the side of the Status Display should be on the **Normal (Shuttle)** selection and any time you change between key selections, the PTL units must be turned off and on to recognize the change.*

Manual Mode allows the operator to manually change the Traffic Lights from RED to GREEN or GREEN to RED and also to program the timing between lamp aspect changes with the Handheld Controller attached to the Master unit.
Or by using the PTL2 radio REMOTE controller (Optional).

Radio Remote Controller (Optional) See Appendix E

With the lamps in Flash Yellow condition, press "MANUAL" on the Hand Controller to enter Manual Mode.
Initially both ends of the system will now display a red aspect.

EXAMPLE:



When either the "MASTER GREEN TIME" or "SLAVE GREEN TIME" keys are pressed, the corresponding unit will cycle through Yellow to display the Green aspect on the selected unit. The Hand Controller will also display a countdown timer for the change.

EXAMPLE:

NB! - In Manual mode, the selection will not change again UNTIL the user makes the change. i.e. in the above example, the Master will stay green indefinitely.

To reverse the direction of traffic flow from one end of the work site to the other, press the "RED TIME" key, and both aspects will change to RED.
Then press either "MASTER GREEN TIME" or "SLAVE GREEN TIME" to display the Green aspect on the selected unit.

Note: You will always need to turn both units red, before allowing the other unit to turn green.

EXAMPLE:

How to Set the Aspect Timing

Length of time between aspect changes can be customised to suit different applications.

Times should be set up whilst unit is in the Flash Yellow condition. The timings can only be changed via the hand controller plugged into the master unit.
Units will be in Flash Yellow condition upon turning on or by pressing the "FLASH YELLOW" key.

1. Once in Flash Yellow condition, press the "EXIT/CLEAR" key to clear previously stored times.
2. Key in the required **Red time** followed by the "RED TIME" key to set the time.
3. Enter the required **Green time** for the **Master** unit, followed by the "MASTER GREEN TIME" key to set.
4. Enter the required **Green time** for the **Slave** unit, followed by the "SLAVE GREEN TIME" key to set.
5. Set **Amber time** to **4 seconds** for speed zones **<80km per hour** - OR - **5 seconds for >80km per hour**.
   Set the **Amber time** required by entering the seconds and pressing the "YELLOW TIME" key to set.

Note: Minimum RED time that can be set is 6 seconds up to a Maximum of 150 seconds.
Minimum GREEN time that can be set is 10 seconds up to a Maximum of 150 seconds.
Minimum AMBER time that can be set is restricted to either 4 or 5 seconds.

Once times have all been entered, press the "MANUAL" key. The lights will now run in the manual mode. To exit this mode, press the "Flash Yellow" button.

Note: Times can also be changed whilst lights are running (not in Flash Yellow condition) by pressing the "ENTER" key then the required time and destination key within five seconds.

Press the below sequence of keys within 5 seconds while the lights are running:

1. Press "ENTER" Key
2. Enter the desired time (in seconds) using the number keys.
3. Press the key for the time you wish to set (e.g. Red, Yellow, Master Green or Slave Green).

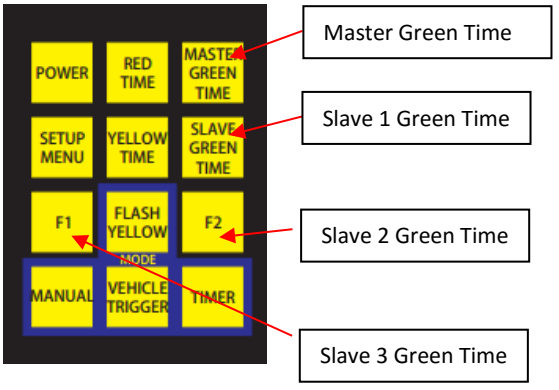
For more information on setting RED TIME, refer to 'Normal Values for 'All Red' Time' in this manual.

Aspect Timing in 3 way and 4 Way Operation:

After entering 3 way or 4 way modes by using the **3 3 1 , 4 4 1 or 4 8 1 SETUP codes:**
The following keys are used to change the aspect timing for additional slave units depending on configuration.

The **F2 key** is now the **Slave 2 Green Time key**. (3 way & 4 way)
The **F1 key** is now the **Slave 3 Green Time key**. (4 way)

While in 'timer' press 'enter' (enter mode will display),
Enter the required **Green time** for the **Slave** unit,
followed by the desired "SLAVE GREEN TIME" key to set.



Vehicle Trigger Mode – *(Optional Vehicle Detectors Must Be Fitted)*

Use this mode to control two directions of traffic at a single lane site. This mode utilises the Vehicle Sensors (optional) to detect the presence of a vehicle. The mode operates on times programmed into the PTL2 Handheld Controller.

After an initial cycle of each signal based on the programmed times, both lights will remain on Red UNTIL the sensor detects the presence of a vehicle.
The unit that detected the vehicle will turn to Green (provided the other unit is in the Red status).
The times are displayed on the Handheld Controller LED display. The presence of a vehicle is indicated by an up arrow the top of the Handheld Controller screen next to the relevant unit status display.

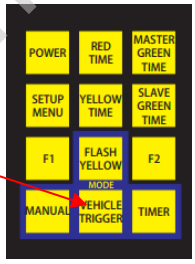
When vehicles are detected at one end of the system only, the system will automatically extend the Green time until a vehicle is detected at the other end, or no further vehicles are detected.

Times between aspect changes can be custom programmed in the Flash Yellow mode or by pressing the ENTER key then the required time and destination key (within five seconds) during operation of the lights. Refer to "How to Set the Aspect Timing" in this Manual.

Note: Amber time should be set to 4 seconds for speed zones <80km per hour - OR - 5 seconds for >80km per hour.

Once required times have been entered, press the "VEHICLE TRIGGER" key to activate.
The lights will now run in the Vehicle Trigger mode.

To EXIT this mode, press the "Flash Yellow" button.



Vehicle Trigger Mode - Manual Override (Vehicle Trigger-2)

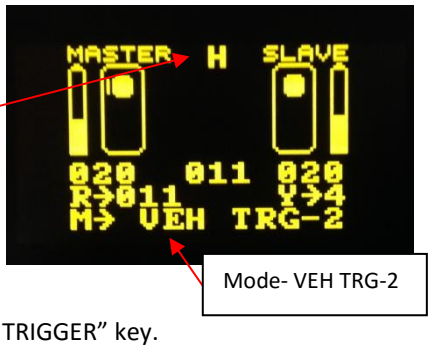
This mode is the same as the Vehicle Trigger mode, except that the PTL2 Remote (optional) or the Handheld Controller can be used to hold both directions of traffic in stop condition to allow for vehicles or animals to cross the single lane.

To activate the Manual Override Mode (Vehicle Trigger-2 mode): From Flash Yellow, press the following keys in sequence on the Hand Controller - (0 1 1 "VEHICLE TRIGGER"). Example:

The controller will display "VEH TRG-2" to show that the unit is now in this mode.

To hold the traffic at both ends of the system, press the "RED TIME" key on the Hand Controller (or "ALL RED" key on the Remote). An "H" will be shown on the controller screen to acknowledge the request.

To release traffic, press either "MASTER GREEN" or "SLAVE GREEN" keys to return to normal traffic flow.



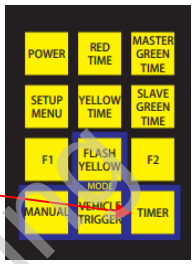
To EXIT the Manual Override (Vehicle Trigger-2 mode):
Enter the Flash Yellow condition; press the "EXIT/CLEAR" key followed by the "VEHICLE TRIGGER" key.

Fixed Time (Timer) Mode

Use this mode to control two directions of traffic at a single lane site. This mode operates on times programmed into the Handheld Controller. The display also shows a count-down timer for each phase of the PTL2 operation between aspect changes.

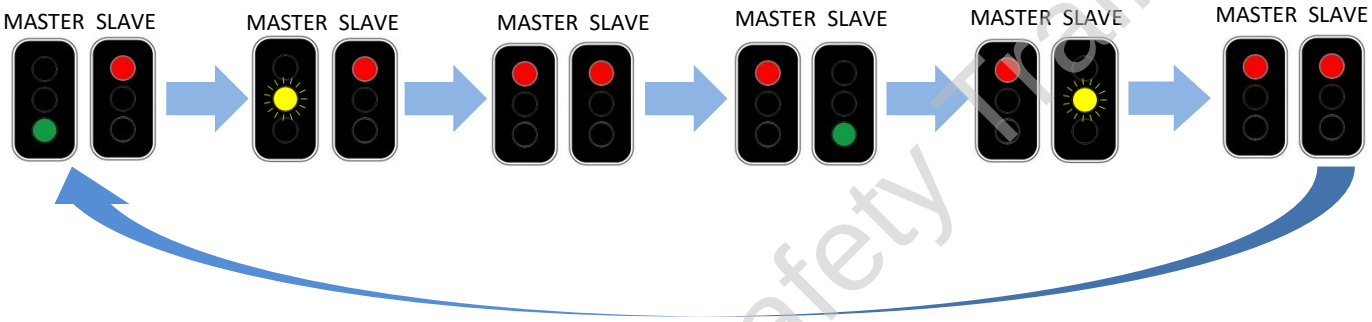
Times between aspect changes can be custom programmed in the Flash Yellow mode or by pressing the ENTER key then the required time and destination key (within five seconds) during operation of the lights. Refer to "How to Set the Aspect Timing" in this Manual.

Note: Amber time should be set to 4 seconds for speed zones <80km per hour - OR - 5 seconds for >80km per hour.



Once required times have been entered, press the "TIMER" key to activate.

The lights will now cycle in the timed mode.
Example:



To exit this mode, press the "Flash Yellow" button.

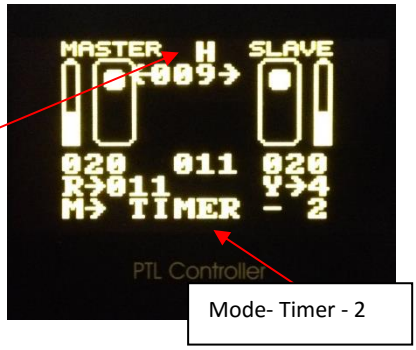
Fixed Time (Timer) Mode - Manual Override

This mode is the same as the Vehicle Trigger mode, except that the PTL2 Remote (optional) or the Handheld Controller can be used to hold both directions of traffic in stop condition to allow for vehicles or animals to cross the single lane.

To activate the Timer Mode Manual Override: From Flash Yellow, press the following keys in sequence on the Hand Controller - (0 1 1 "TIMER"). Example:

The controller will display "TIMER-2" to show that the unit is now in this mode.

To hold the traffic at both ends of the system, press the "RED TIME" key on the Hand Controller (or "ALL RED" key on the Remote). An "H" will be shown on the controller screen to acknowledge the request.



To release traffic, press either "MASTER GREEN" or "SLAVE GREEN" keys to return to normal traffic flow.

To EXIT the Manual Override (Timer-2 mode):
Enter the Flash Yellow condition; press the "EXIT/CLEAR" key followed by the "TIMER" key.

Two Lane Traffic Control

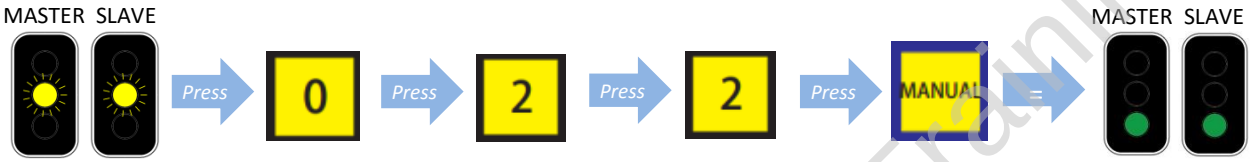
*The Key Selection Switch on the side of the Status Display should be on the **Plant Crossing** selection and any time you change between key selections, the PTL units must be turned off and on to recognize the change.*

Shuttle Mode - Manual Override

This mode is used where the traffic is safely able to travel in both directions through the work site and traffic needs to be interrupted to allow for plant to cross or to enter the roadway.

In this mode the unit is operated manually by a traffic controller using either the PTL2 Handheld Controller attached to the Master unit or the PTL2 Radio Remote controller.

Activate the Shuttle Mode (Manual Override) from the Flash Yellow condition.
Press the following keys in sequence on the Hand Controller - (0 2 2 Manual)
Example:



The controller will display “2-WAY MAN” to show that the unit is now in this mode.

Initially both ends of the system will display a Green aspect.
When it’s required for the traffic to be interrupted, press the “RED TIME” button on the Handheld Controller (or “ALL STOP” key on the Remote). The system will display the Yellow aspect to both ends of the system, followed by the Red aspect to both ends.

The Red aspect continues to both ends UNTIL either the “MASTER GREEN” or “SLAVE GREEEN” keys are pressed.
If either the “MASTER GREEN” or “SLAVE GREEEN” buttons is pressed during the minimum red period, then the display will show both Master Green and Slave Green demand indicators.

Times between aspect changes can be custom programmed in the Flash Yellow mode or by pressing the ENTER key then the required time and destination key (within five seconds) during operation of the lights. Refer to “How to Set the Aspect Timing” in this Manual.

Note: Amber time should be set to 4 seconds for speed zones <80km per hour - OR - 5 seconds for >80km per hour.

To EXIT the Shuttle Mode - (Manual Override):
Enter the Flash Yellow condition; press the “EXIT/CLEAR” key followed by the “MANUAL” key.

PTL2 - 3 Way Operation Set Up

This mode is used to independently control three individual flows of traffic using 3 individual units: Master, Slave 1 & Slave 2. - Any unit (Master or Slave) can be programmed to be a Slave 2.

1. Set the Radio Channels:
Set the radio channels for each of the 3 traffic light units to the same channel for communication via the blue rotary switch on box behind Yellow lamp.

2. Set the Unit Number
Set the unit number of the 3 traffic light units to the same (matching) number:
i.e. Set the Slave 2 unit to the same unit number as the Master.

1. With the unit in **"Flash Yellow" Type code 887,** then press the **"SETUP MENU"** Button.

2. Type the number of the unit to match the other units

3. Press **"Enter"**

3. Program the Units:
Start the following procedure with ALL units turned OFF.

- **Slave 2 Unit:**

1. Turn the Slave 2 unit on with the **Hand Controller.**

2. Type code 3 3 1, then press the **"SETUP MENU"** Button.

3. Turn the unit **OFF with the Hand Controller** (do not unplug the Hand Controller yet).

4. Turn the unit **ON again,** this time **using the push button on the Status Display** (makes it a slave).

The unit will now be set as Slave 2. Confirm this by viewing the Hand Controller, which will indicate the unit is now "Slave 2".

5. The Hand Controller can now be removed for programming the Master unit.

- **Slave 1 Unit:**

6. Turn Slave 1 **ON** as usual using the button on the **Status Display**. (No programming required).

- **Master Unit:**

7. Turn the Master unit on with the **Hand Controller**. **Type code 3 3 1** and press the **"SETUP MENU"** button.

8. The Hand Controller will now display the 3 lights on the screen.

4. Run the Lights:
9. Select the mode you wish to run the 3 Way operations in:

Timer, Vehicle Trigger (optional) or Manual modes

Lights should now be running.

To exit 3 Way Mode (on the Master & Slave 2 units) **type 330, then press the "SETUP MENU"** button.

Return the Slave 2 unit to its previous settings (to match its pair) – Both Unit number and Channel.

Vehicle Trigger 3-Way – *(Optional Vehicle Detectors Must Be Fitted)*

This mode is used to independently control three individual flows of traffic.

This mode is set-up using 3 units: Master, Slave 1 & Slave 2.
Any unit (either Master or Slave) can be programmed to be a Slave 2.

To program a unit to become a Slave 2, plug the Hand Controller into the Status Display of this trailer and:

1. Turn the unit on with the **Hand Controller.**
2. **Type code 3 3 1, then press the "SETUP MENU"** Button.
3. Turn the unit **OFF with the Hand Controller** (do not unplug the Hand Controller at this stage).
4. Turn the unit **ON again, this time using the push button on the Status Display**.

The unit will now be set as Slave 2.
This can be confirmed by viewing the Hand Controller, which will indicate the unit is now Slave 2. The Hand Controller can now be removed for programming the Master unit.

Turn Slave 1 on as usual (no programming required) using the button on the Status Display.

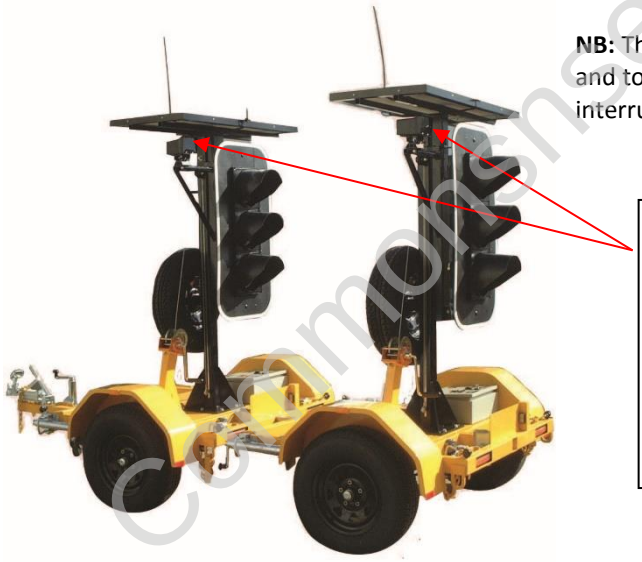
Turn the Master unit on with the Hand Controller. **Type code 3 3 1 and press the "SETUP MENU"** button.
The Hand Controller will now display the 3 lights on the screen.

NB. All units need to be set to the same radio channel.

To exit 3 Way Mode (on the Master & Slave 2 units) **type 330, then press the "SETUP MENU"** button.

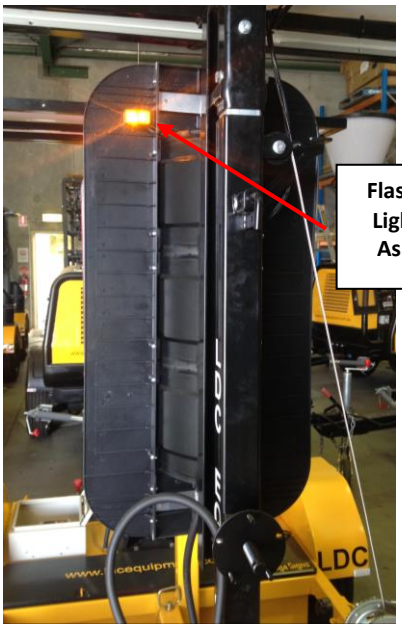
Times between aspect changes can be custom programmed in the Flash Yellow mode or by pressing the ENTER key then the required time and destination key (within five seconds) during operation of the lights. Refer to "How to Set the Aspect Timing" in this Manual.

Note: Amber time should be set to 4 seconds for speed zones <80km per hour - OR - 5 seconds for >80km per hour.



NB: The Vehicle Detectors MUST be faced away from the roadway and toward the direction of approaching plant that will trigger the interruption of traffic flow.

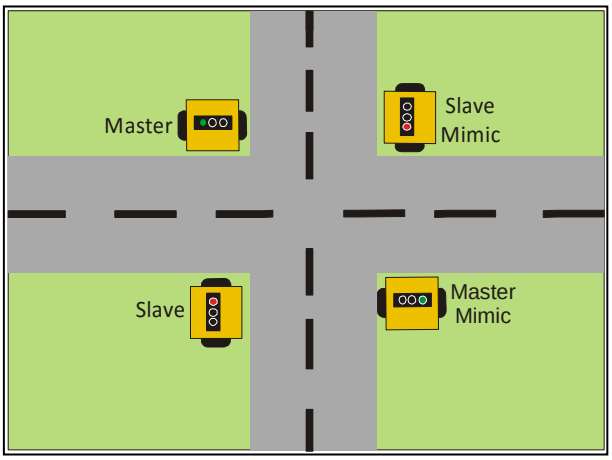
Vehicle Detectors MUST be positioned to face Crossing Plant



Flashing Amber Light indicates Aspect is RED

NB: It is very important that the plant operators are aware that the system is displaying red to the oncoming traffic only when the rear amber lamps are flashing.

4 Way Mimic Operation



The four way intersection requires four Portable Traffic Lights (2 pairs).
The radio channel for each of the four Traffic lights MUST be set to the same channel to communicate.

The portable Traffic Lights are to be configured as:

1. A Master Unit (4UM)
2. A Master Mimic (MM3)
3. A Slave Unit – Slave
4. A Slave Mimic (SM2)

Setting up 4 way mimic mode:

1. Set all units radio channels to the same channel (blue rotary switch on box behind Yellow lamp).
2. Select a Master Unit, a Slave Unit, a Master Mimic and a Slave Mimic.
3. Position lights if not already in place.

Programming the Units:

Slave Unit -

1. Turn ON the Slave Unit by pressing the ON/OFF button on Status Display (in control box).

Slave Mimic -

1. Plug the Hand Controller into the Slave Mimic status display.
2. Press **"POWER" on the Hand Controller**.
3. **Type code 4 4 2 then press "SETUP MENU" key.** (Display on Controller will show 'SM2' after pressing set up).
4. Turn SM2 OFF by pressing **"Power" on the Hand Controller.**
5. Unplug Hand Controller and turn on again by pressing the **power ON/OFF button on the Status Display.**

Master Mimic -

1. Plug the Hand Controller into Master Mimic Status Display.
2. Press **"POWER" on the Hand Controller**.
3. **Type code 4 4 5 then press "SETUP MENU" key.** (Display will show MM3 after set up).
4. Turn MM3 OFF by pressing **"Power" on the Hand Controller.**
5. Unplug Hand Controller and turn on again by pressing the **power ON/OFF button on the Status Display.**

Master Unit -

1. Plug Hand Controller into Master Unit Status Display.
2. Press **"POWER" on the Hand Controller**.
3. **Type code 4 4 1 then press "SETUP MENU" key.** (Display on Hand Controller will show 4UM after set up.)
4. Set lamp times. (Refer to "How to Set the Aspect Timing")
5. Select timer mode by pressing the **"TIMER" key** to activate.

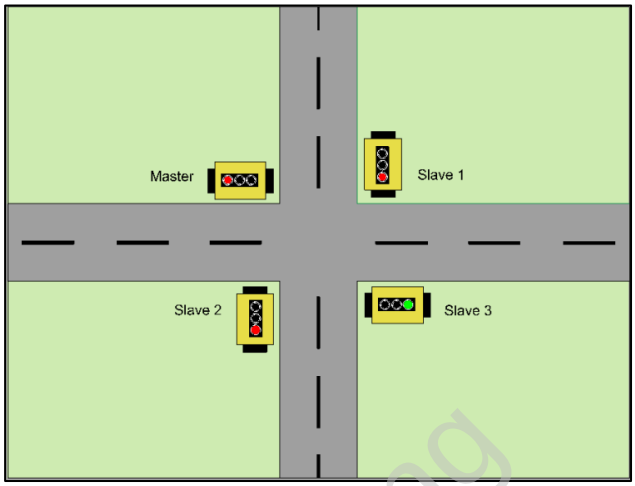
Lights should now be running.

Note: Before entering codes ensure the units are in Flash Yellow condition.

Code	Function
440 Setup	Disable 4 unit mode (return lights to normal 2 unit mode, must be done on all units)
441 Setup	Set 4 unit mode master (4UM)
442 Setup	Set 4 unit mode slave 2 (SM2)
443 Setup	Set 4 unit mode slave 3 (SM3)
444 Setup	Set 4 unit mode master 2 (MM2)
445 Setup	Set 4 unit more master 3 (MM3)

4 Way Independent Intersection Mode (software version: 2.39+)

The four way Independent intersection requires four Portable Traffic Lights (2 pairs).
The radio channel for each of the four Traffic Lights MUST be set to the same channel to communicate.



This procedure sets **2 pairs** of PTL2 trailers from:
Two Master and two Slave units, into 1 x Master and 3 x Slave units.

The portable Traffic Lights are to be configured as

1. Master Unit (4WM)
2. Slave 1 (4W Slave1)
3. Slave 2 (4W Slave2)
4. Slave 3 (4W Slave3)

Setting up 4 way independent operation:

1. Set all units radio channels to the same channel (blue rotary switch on box behind yellow lamp).
2. Select a Master Unit, a Slave 1, a Slave 2 and a Slave 3.
3. Position lights if not already in place.

Programming the Units:

Master Unit:

1. Plug the Hand Controller into the Master Status Display.
2. Press **"POWER" on the Hand Controller** to turn the Master ON.
3. **Type code 8 8 7 then press "SETUP MENU" key.** (Display on Hand Controller will show 'ENTER UNIT NUMBER" on the bottom 2 lines).
4. **Enter the Unit Number for the set** *(This number must be the same for all 4 units in the set. The number can be between 000 and 255).
5. **Press ENTER.**
6. **Type code 4 8 1** on the keyboard **then press the "SETUP MENU" key.** (Sets the unit as Master in 4 Way IND. mode)

Leave the master turned on, and now program the 3 Slave units, the TX light should be blinking once per second.

Slave 1:

1. Plug the Hand Controller into the Slave 1 Status Display.
2. Press **"POWER" on the Hand Controller** to turn Slave 1 ON.
3. **Type code 8 8 7 then press "SETUP MENU" key.** (Display on Hand Controller will show 'ENTER UNIT NUMBER" on the bottom 2 lines).
4. **Enter the Unit Number for the set** (Must be the same as set for the Master Unit).
5. **Press ENTER.**
6. **Type code 4 8 2** on the keyboard **then press the "SETUP MENU" key.** (Sets the unit as Slave1 in 4 Way IND. mode).
   The display on the Hand Controller MUST read "4W SLAVE 1" on the middle left of the screen.
7. Turn Slave 1 OFF by pressing **"Power" on the Hand Controller.**
8. Unplug the Hand Controller and turn ON again by pressing the **power ON/OFF button on the Status Display.**
   (Do not turn the Slave on with the power button on the Hand Controller).

The RX and TX lights should be blinking once per second on the Status Display, and the white ACTIVE light will be illuminated under the SLAVE Traffic Light mimic display.

Slaves 2 and 3:

The process is exactly the same for programming Slave 2 and Slave 3 as Slave 1, EXCEPT that for Slave 2, the code to be entered is **483** and the code for Slave 3 is **484**.

Slave 2 MUST show "4W SLAVE 2" on the screen when connected and Slave 3 MUST show "4W SLAVE 3" on the screen when connected.

Press "TIMER" key to begin operation.

RX (Receive) indicator LED
TX (Send) indicator LED

Important Notes:

The RX/TX sequence of LED flashes on the four units should be as follows.

Master	TX, RX, RX, RX.
Slave 1	RX, TX, RX, RX.
Slave 2	RX, RX, TX, RX.
Slave 3	RX, RX, RX, TX.

If this is not the result, re-check that the units are set to the correct operation mode.

The position of the key switch is not important and should be left in the Normal position.

Note: Before entering codes ensure the units are in Flash Yellow condition.

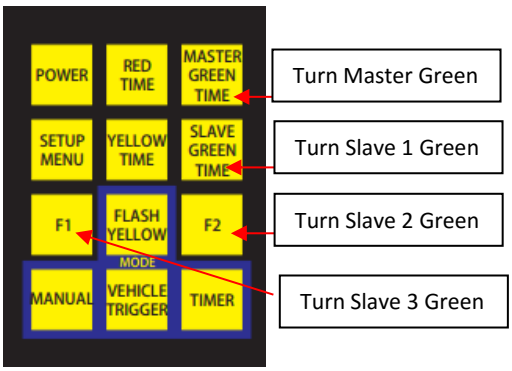
Code	Function
480 Setup	Disable 4 way Indep. Inter. Mode (return lights to normal 2 unit mode; must be done on all units)
481 Setup	Set Master Unit (4WM)
482 Setup	Set Slave 1 (4W Slave1)
483 Setup	Set Slave 2 (4W Slave2)
484 Setup	Set Slave 3 (4W Slave3)

4 Way Independent Operation:

Setting the times:

The Red, Yellow, Master Green and Slave Green times are set as normal. (Refer to "How to Set the Aspect Timing").

The **F2 key** is now the **Slave 2 Green Time key**.
The **F1 key** is now the **Slave 3 Green Time key**.



With the Status Display in Manual Mode, cycle between "MASTER GREEN" "SLAVE 1 GREEN", SLAVE 2 GREEN (F1) and SLAVE 3 GREEN (F2) via the use "RED TIME" key.

NB! You will always need to turn both units red, before allowing the other units to turn green.

4 Way Independent Operation Modes:

There are different 3 operation modes for the 4 Way Independent mode to be activated,

1. Manual mode
2. Vehicle Triggered mode (with optional vehicle sensors)
3. Timer mode

To switch between modes, press the corresponding mode key on the Hand Controller plugged in to the **Master unit**. (The units must be in Flash Yellow condition to change modes).

Manual Mode:

The units are manually controlled from the Hand Controller.
The "MASTER GREEN TIME" key is used to activate the **Master** to green.
The "SLAVE GREEN TIME" key is used to activate the **Slave 1** to green.
The "**F1**" key is used to activate **Slave 3** to green.
The "**F2**" key is used to activate the **Slave 2** unit to green.

Vehicle Trigger Mode: (only if optional Vehicle Sensors are fitted).

The units will operate by sensing approaching vehicles using the optional Vehicle Sensors, all four units must have Vehicle Sensors fitted and checked for correct operation before using this mode.
Priority will be given to the first and subsequent vehicles to arrive at the intersection.

Timer Mode:

The units will cycle to Green, one at a time based on the time settings for the Red, Yellow and Green times for each unit.

Reset the lights to normal operation.

To reset lights to normal operation power each light off, Plug in the Hand Controller, Press "POWER", Type 480, 'SETUP MENU". The lamp will now be in normal operating mode.

To set a time: (all times are set from the Master Unit)

Times can be set up whilst unit is in the Flash Yellow condition.

1. Once in Flash Yellow condition, press the "EXIT/CLEAR" key to clear previously stored times.

2. Key in the required **Red time** followed by the "RED TIME" key to set the time.

3. Enter the required **Green time** for the **Master** unit, followed by the "MASTER GREEN TIME" key to set.

4. Enter the required **Green time** for the **Slave** unit, followed by the "SLAVE GREEN TIME" key to set.

5. Set **Amber time** to **4 seconds** for speed zones **<80km per hour** - OR - **5 seconds for >80km per hour**.
Set the **Amber time** required by entering the seconds and pressing the "YELLOW TIME" key to set.

Once times have all been entered, press the "MANUAL" key. The lights will now run in the manual mode. To exit this mode, press the "Flash Yellow" button.

Note: Minimum RED time that can be set is 6 seconds up to a Maximum of 150 seconds.
Minimum GREEN time that can be set is 10 seconds up to a Maximum of 150 seconds.
Minimum AMBER time that can be set is restricted to either 4 or 5 seconds.

Note: The times for the green light in each of the main and the cross road can be configured to allow a minimum green time.

Note: Times can also be changed whilst lights are running (not in Flash Yellow condition) by pressing the "ENTER" key then the required time and destination key within five seconds.

Press the below sequence of keys within 5 seconds while the lights are running:

1. Press "ENTER" Key
2. Enter the desired time (in seconds) using the number keys.
3. Press the key for the time you wish to set (e.g. Red, Yellow, Master Green or Slave Green).

Note: The red time key will set the red time for **both** lights.
The master green time key will set the minimum green time for the **Master lights**.
The slave green time will set the minimum green time for the **Slave lights**.

Changing Default Settings

Radio Channel Selection

There are 6 different radio channels (frequencies) that the units can operate on.
If there is local interference on the radio channel already in use, or if there are 2 systems in close proximity, then **the system MUST be set to a different channel.**

To select a radio channel there is a small rotary switch on the LAMP CONTROLLER module which is located behind the Yellow Aspects in both Light Heads.

To change the switch you will need a small flat blade screwdriver.
Gently turn the switch to the desired channel on all units to be mated.

Channel	Frequency	Radio Channel (Lamp Controller)
1)	151.4 MHz	0
2)	151.625 MHz	1
3)	151.7 MHz	2
4)	151.795 MHz	3
5)	151.975 MHz	4
6)	152.295 MHz	5
	Not in Use	6
	Not in Use	7
	Not in Use	8
	Not in Use	9

Switch position # 6; 7; 8; 9 is not available for use.

NB. Both the Master and Slave units must be on the same channel for the system to communicate.

SMS Reporting (optional)

The system can send an SMS message when any failure event occurs; the message contains the **Unit Number**, **Software Version** and **Plant Number** (if they have been entered) of the unit and a description of the fault.

Setting the Phone Number

To set the phone number for the system to send the error messages to:

Enter into the Flash Yellow condition.

1. **Type code 9 8 2 then press "SETUP MENU" key.** (Display on Hand Controller will show 'Enter Phone Number Mode' is active).
2. Enter the **phone number** that SMS messages are to be sent to**.**
   Press ENTER.

Note: If you make an error or wish to clear the old number press the "EXIT/CLEAR" key and start again.

Testing the SMS System

To send a test SMS message:

1. Enter into the Flash Yellow condition.
2. **Type code 9 9 7 then press "SETUP MENU" key.**
3. **Press ENTER.**

Setting the Plant Number

To set the Plant Number that the PTL2 sends in the SMS messages:

Enter into the Flash Yellow condition.

1. **Type code 9 8 1 then press "SETUP MENU" key.** (Display on the Hand Controller will show '**Enter Plant Number mode'** is active).
2. Enter the **Plant Number** of the unit.
3. **Press ENTER.**

Note: If you make an error or wish to clear the old number press the "EXIT/CLEAR" and start again.

Setting the Date & Time (Optional)

The clock and calendar should be set whenever the batteries are disconnected or the fuse is removed and replaced for any reason.

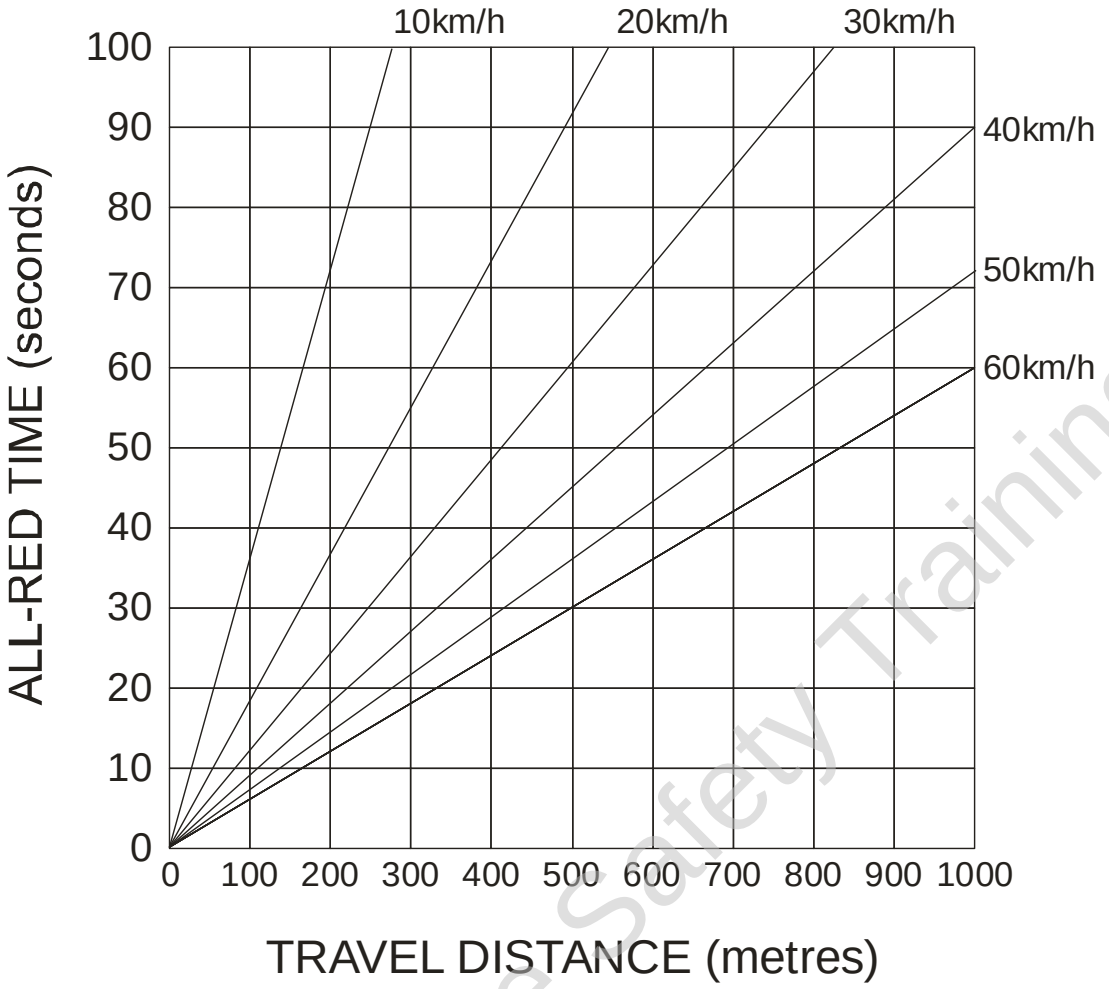
The unit must be turned on and be in the Flash Yellow mode to allow setting of the time and date.

To set the time, press 111 and then press "SETUP MENU" and then press "ENTER".
To set the date, press 112 and then press "SETUP MENU" and then press "ENTER".

The bottom line of the screen will show the current time or date, press the numbered keys to change the digit under the cursor block.

The time is in 24 Hour format and the date in DD/MM/YYYY format. The calendar is programmed to be correct beyond the year 3000.

Typical Values for 'All Red' Time



RELATIONSHIP BETWEEN ALL-RED CLEARANCE TIME AND TRAVEL DISTANCE FOR A RANGE OF VEHICLE SPEEDS

Troubleshooting

The fault condition will be shown on the bottom line of the Hand Controller display.

Fault Modes

If any condition exists that would cause confusion to the approaching traffic or a failure condition exists, the unit will automatically revert to Flash Yellow mode.

An SMS message will be sent to the pre-programmed phone number (if the optional SMS system is configured).

The bottom line of the Handheld Controller screen will show the failure detected. Rectify the failure and then press the "EXIT /CLEAR" button to clear the fault display.

Diagnostic Check Digits (Use this to confirm communication errors)

These are the 2 digits centered between the R and Y on the Master unit Hand Controller when you display them as follows:

Press 999 and then press "SETUP" to show
Press 998 and then press "SETUP" to hide

The left hand number is the number of parts of a second where there is a failure to communicate, after 5 seconds the system drops back to Flash Yellow and sends an SMS to the programmed number.

In normal operation the Left Digit shows as a 1 and the right digit is not changing.

The Right Digit is the number of checksum errors that have occurred since reset, this number is not important by itself, it's only an issue if the digit is changing, which would indicate interference on the radio frequency in use.

If there is interference between the radios, the digits will be rapidly changing over. In this case, try selecting a different channel on the Lamp Controller that does not have interference, all units must have the same radio channel. Channels available on the

Ensure the unit numbers have been set up correctly within each PTL2 unit.

Ensure all Slave units have been turned off with the hand controller and activated as a slave by pressing the Status Display 'Slave Power ON/OFF button'.

Refer Appendix D – PTL2 Fault Finding.

Battery Errors

If there have been a few overcast days in succession or the lights have been parked in a shaded area continuously, you can expect a low battery warning, this is normal.
At the first low battery warning, it is recommended to recharge or swap the batteries over. However, if you receive a battery critical warning, it is imperative that the batteries are recharged immediately, or else you risk damaging the battery life permanently.

ERR→SBATLOW	=	Slave Battery Low
ERR→MBATLOW	=	Master Battery Low
ERR→SBATCRIT	=	Slave Battery Critical
ERR→MBATCRIT	=	Master Battery Critical
ERR→SBATFLAT	=	Slave Battery Flat
ERR→MBATFLAT	=	Master Battery Flat

NB: When batteries are flat, the units will enter into Flash Yellow mode automatically.

Lamp Errors

When there is a lamp error, the units will enter into Flash Yellow mode.

LAMPERR→SGRN = Slave Green Lamp Error
LAMPERR→SYEL = Slave Yellow Lamp Error
LAMPERR→SRED = Slave Red Lamp Error
LAMPERR→SAUX = Slave Auxiliary Lamp Error (at the rear of the Traffic Light head)

LAMPERR→MGRN = Master Green Lamp Error
LAMPERR→MYEL = Master Yellow Lamp Error
LAMPERR→MRED = Master Red Lamp Error
LAMPERR→MAUX = Master Auxiliary Lamp Error (at the rear of the Traffic Light head)

When a lamp error occurs, open the Yellow lamp cover on the appropriate unit (Slave or Master) and press and hold the **lamp test** button to confirm the lamp fault. If the lamp does not illuminate, then there is a fault.

In the case of a confirmed fault:

a) Open the faulty lamp cover and locate the reset push button on the driver board (on the inside of the lamp module) and press briefly whilst holding the lamp test button.
b) If the lamp does not illuminate, check the wiring from the processor unit to the lamp.
c) If the fault continues, the lamp needs replacement, contact Global Traffic Equipment service stating the fault.

Communication Errors

ERR→COMSLAVE = Communication between the Master and Slave units has been broken for more than 5 seconds continuously and they are now in Flash Yellow mode.

The lights will try to re-establish communication for 5 minutes once a COMSLAVE error has occurred. If successful, the lights will resume normal operation. The error code will remain on the screen until the clear button is pressed, even when back to normal operation.

If the lights remain in Flash Yellow mode, this means the communication between the Master and Slave units has malfunctioned. In this situation:

a) Check the Slave is turned ON
b) Check the Antenna/s are intact
c) Ensure the Master and Slave units are on the same frequency channel
d) If a radio scanner is available, you can listen for other signals using the same radio frequency to confirm interference. (You may not always be able to ascertain the actual interference, if in the case that it is an intermittent signal).

Diagnosing the Communication Errors

1. Look for the TX RX lights on the Master
2. Look for the RX TX lights on the Slave

If the TX is blinking on the Master, yet the RX is NOT blinking on the Slave, it indicates a likely radio transmitter fault. In this situation:

a) Open the Red Lamp on the Master to check for the light on the Maxon radio. If it is blinking red in synchronization of the TX lamp, this indicates that it is attempting to transmit.

i) If it's not blinking red, but on steady amber, then the data cable between the Lamp Controller and the Maxon Radio is either not correctly connected or the cable or Lamp Controller are faulty. Contact Global Traffic Equipment Service stating the fault.

ii) If there is no light on the Maxon Radio, then ensure the red and black power cable between the bottom of the Maxon Radio and the front of the Lamp Controller is connected.
If the fault continues, contact Global Traffic Equipment Service stating the fault.

Appendix A.

Spare Parts Listing

Spare Parts Listing

Part #	Description
BS1001	FORD STUD PATTERN WHEEL & TYRE 14 INCH
GM5064	SLAVE TOW HITCH PTL – 50MM COUPLING P/C
BW3066	JACK LEG WITH SWIVEL BRACKET – RED HANDLE
BS3005	JOCKEY WHEEL WITH SWIVEL BRACKET – RED HANDLE
BS1059	6 VOLT DC250-6 BATTERY
GT7017	PTL HAND CONTROLLER
BS1086	3 LED LIGHT HEAD TARGET BOARD
BW3040	RED LED LANTERN
BW3041	AMBER LED LANTERN
BW3042	GREEN LED LANTERN
BS1089	RED LENS DOOR UNIT
BS1090	AMBER LENS DOOR UNIT
BS1091	GREEN LENS DOOR UNIT
BS1093	LANTERN SUN VISOR
GT7045	PTL REMOTE CONTROLLER WITH IMAX B6 CHARGER
GT7032	MAXON RADIO WITH FFSK MODEM
GM5084	NCV2 MAXON DATA & POWER CABLE
GT7024	PTL2 STATUS DISPLAY V3
GT7025	PTL2 LAMP CONTROLLER

Appendix B.

PTL2 Control Codes

PTL2 Control Codes

999 Setup	Turn On Diagnostic Check Digits	
998 Setup	Turn Off Diagnostic Check Digits	
440 Setup	Cancel 4 Unit Mode	
441 Setup	Set 4 Unit Mode (4 Units in 2 Way Operation with Mimics, monitors 2 extra slaves)	
442 Setup	Set unit as Slave mimic	Unit 2
443 Setup	Set unit as Slave mimic	Unit 3
444 Setup	Set unit as Master mimic	Unit 2
445 Setup	Set unit as Master mimic	Unit 3
997 Setup	Send test SMS (Set Phone Number First, only units with Modem and SIM card Installed)	
981 Setup	Set Plant Number	
982 Setup	Set Phone Number	
887 Setup	Set Unit Number **(MUST BE SET SAME FOR UNITS TO COMMUNICATE,** MAX VALUE 255)	
111 Setup	Set Clock	
112 Setup	Set Date	
331 Setup	Set 3 Way Mode (3 Unit independent operation. 1 Green / 2 Reds)	
330 Setup	Cancel 3 Way Mode	
885 Setup	Main Lamps Off (This will display MLO on the screen)	
886 Setup	Main Lamps On	
995 Setup	Set Radio Channel (When Rotary Switch is on 9)	
480 Setup	Cancel 4 Way Operation	
481 Setup	Set the Master Unit to 4 Way Operation (4 Way Independent mode, 1 Green/ 3 Reds)	
482 Setup	Set the Unit to 4 Way Operation as Slave 1	
483 Setup	Set the Unit to 4 Way Operation as Slave 2	
484 Setup	Set the Unit to 4 Way Operation as Slave 3	

N.B. For 4 Way operations, all units must be set to 4 way mode, to return to 2-3 way operation all units must be cleared from 4 way operation. (In firmware version 2.39 this is not interlocked)

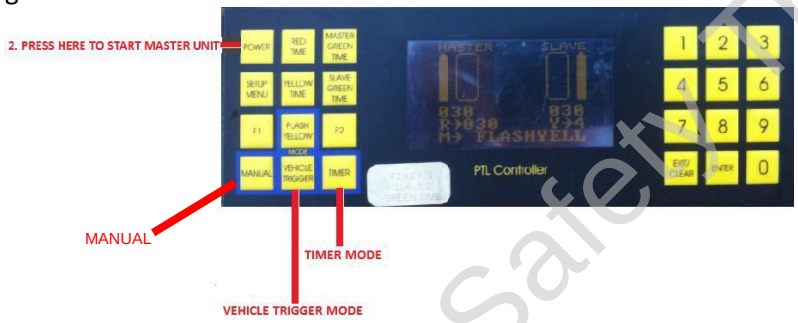
Appendix C.

Quick Reference Guide

QUICK REFERENCE GUIDE

SET UP

1. Drop Slave unit at location and wind down the stabiliser legs and secure, ensure the unit is level, then uncouple from Master unit. Wind up the mast and turn the unit on by pressing the on/off button inside the box marked 'S'.
2. Drop Master unit at location and wind down the stabiliser legs, secure and ensure the unit is level. Set the key switch to the appropriate mode, plug in hand-controller and turn on using the POWER button on hand-controller.
3. Determine the mode required. Manual, Vehicle Trigger or Timer, then set the red, amber and green times.



OPERATIONAL MODES

MAN Manual. Traffic is controlled by pressing red and green buttons on the hand-controller or radio remote controller as desired.

VT Vehicle Trigger. Traffic is controlled by the radar sensors on the lights. Minimum times are displayed on the hand-controller.

TIMER Timed Control. Traffic is controlled automatically by a programmed length of time for red, amber and green lights.

HOW TO SET TIMES

1. Times should be set up whilst unit is in Flash Yellow mode. Units will be in Flash Yellow mode upon starting or by pressing the "FLASH YELLOW" button. (Times can be changed while running by pressing the enter key then the required time)
2. Once in Flash Yellow, press the "CLEAR" button, followed by the desired red time required (up to 100 seconds) then press the "RED TIME" button.
3. Then enter the required Master green time required, followed by the "MASTER GREEN" button.
4. Then enter the required Slave green time required, followed by the "SLAVE GREEN" button.
5. Amber time is either 4 seconds for <80km per hour or 5 seconds for >80km per hour. Depending on the speed zone, set the amber time required by entering the seconds and pressing the "YELLOW TIME" button.

MANUAL TRAFFIC CONTROL

1. Always preset minimum times before activating this mode using the "How to Set Times" method.
2. After entering the mode, the lights will all go to red (initially). To allow traffic to flow from the Master to the Slave, press the "MASTER GREEN" button. Once the minimum red time has elapsed, the Master unit will turn

green.
3. To stop traffic, press the “RED TIME” button, and the lights will turn red. *You will always need to turn both units red, before allowing the other unit to turn green.*
4. To allow traffic to flow from the Slave unit, press the “SLAVE GREEN” button.

HOW TO USE THE RADIO REMOTE

1. To turn on a radio remote, press any button briefly. The radio remote will automatically turn off after 30 seconds of inactivity.
2. When on, the traffic lights depicted on the radio remote will reflect what is on the actual traffic light units.
3. The numeral shown on the display when any button is pushed, is the battery level of the radio remote. 9=full battery/1=flat battery
4. To ensure the channel frequency is correct, press and hold the Master green and the Slave green buttons simultaneously for 6 seconds. The current channel will be flashing. To change the channel, up is the Slave green button, down is the Master green button. To select a channel, press the “ALL STOP” button.
5. If the radio remote cannot communicate with the PTL units, the 3 request lights (above the buttons) will be all lit. Firstly check the antennas are intact on the radio remote and the PTL units, ensure the batteries are fully charged, the channel and unit number is selected correctly.
6. Ensure the Master unit hand-controller and key-selection are correct for Manual operation, and follow the Manual Traffic Control instructions as above.

Refer to Appendix E PTL-R RADIO REMOTE CONTROLLER with more detailed instructions

QUICK REFERENCE GUIDE

ON-SITE TROUBLESHOOTING

BATTERIES

If there have been a few overcast days in succession or if the PTL units have been parked in a shaded area continuously (under trees or buildings) or if the solar panels are dirty, you can expect a low battery warning**, this is normal**. At the first low battery warning, it is recommended to recharge or swap the batteries over. From the first low battery warning, there is approximately 6 hours (up to 24 hours) before a critical warning will be issued. NB. *It is similar to a mobile phone, if you only recharge the batteries a little, they won’t continue to work for long and eventually the batteries won’t recharge to full capacity. If you suffer continued battery shortage, it is recommended to have a second set of batteries to swap over completely to allow a full recharge. Ensure the solar panels are cleaned often.*
ERR→SBATLOW = Slave Battery Low Lights will continue to work normally
ERR→MBATLOW = Master Battery Low Lights will continue to work normally
ERR→SBATCRIT = Slave Battery Critical Lights will enter Flash Yellow mode
ERR→MBATCRIT = Master Battery Critical Lights will enter Flash Yellow mode
ERR→SBATFLAT = Slave Battery Flat Lights will shut down
ERR→MBATFLAT = Master Battery Flat Lights will shut down

LAMPS

When there is a lamp error, the units will enter into Flash Yellow mode.
LAMPERR→SGRN = Slave Green Lamp Error
LAMPERR→SYEL = Slave Yellow Lamp Error
LAMPERR→SRED = Slave Red Lamp Error
LAMPERR→SAUX = Slave Auxiliary Lamp Error (at the rear of the traffic light head)
LAMPERR→MGRN = Master Green Lamp Error
LAMPERR→MYEL = Master Yellow Lamp Error
LAMPERR→MRED = Master Red Lamp Error
LAMPERR→MAUX = Master Auxiliary Lamp Error (at the rear of the traffic light head)

COMMUNICATION

ERR→COMSLAVE = Communication between the Master and Slave units has been broken for more than 5 seconds continuously and they are now in Flash Yellow.
The lights will try to re-establish communication for 5 minutes once a COMSLAVE error has occurred. If successful, the lights will resume normal operation. The error code will remain on the screen until the clear button is pressed, even when back to normal operation. If the lights remain in Flash Yellow mode, this means the communication between the Master and Slave units has malfunctioned. In this situation:
a) Check the Master and Slave units are turned ON
b) Check the Antennas are intact
c) Ensure the Master and Slave units are on the same frequency channel
d) Ensure that the units are within 1 kilometre of each other and near line-of-sight
e) Are there other PTL units in the vicinity that could be using the same frequency channel?

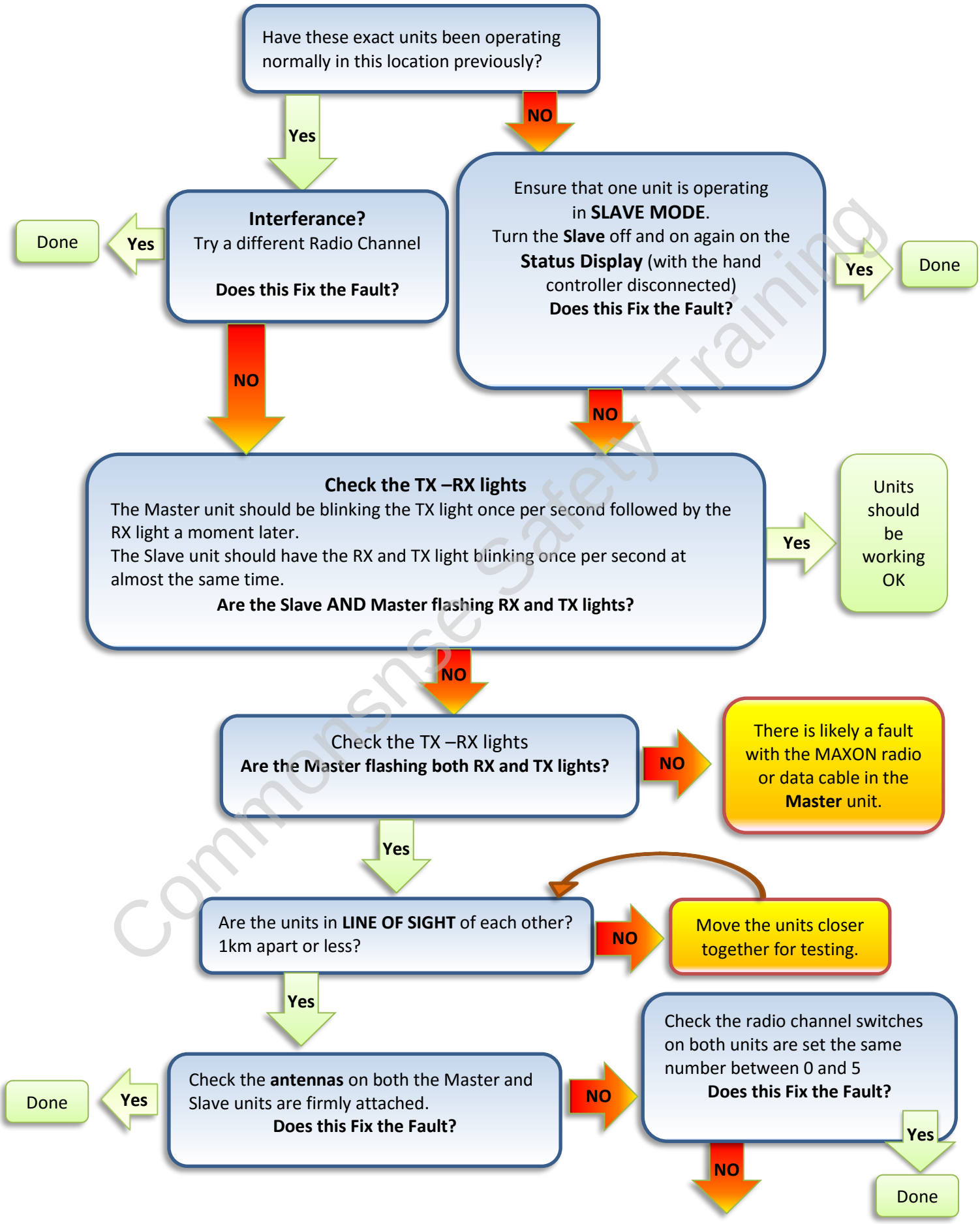
If these components have been checked and you cannot get the units to communicate with each other, please contact your PTL unit provider for assistance.

Appendix D.

PTL2 Fault Finding

PTL2 - Fault Finding

When the units will not Enter Operation Modes or Generates error "ERR->COMSLAVE"



Continued Overleaf

NO

Check that firmware version is the same on both master and slave units
Is it the same?

NO → Upgrade the firmware version to 2.37NC or greater

Yes

Make sure the unit number is set the same on both the master and slave units. Code **887 SETUP** to view or change the unit numbers, this number must be between 0 and 255.
Does this Fix the Fault?

Yes → Done

NO

Make sure the Slave and Master unit are in 2 way operating mode if this is the desired mode. Enter **'330 SETUP'** and **'480 SETUP'** codes into both units if in doubt. The Master and Slave unit should be showing only 2 sets of lights on the status display and there should not be any text at the top of the screen between the 2 light heads.
Does this Fix the Fault?

Yes → Done

NO

There a failure in the unit that needs further diagnostics.

a) The most common failure is the MAXON radio.

b) The second most likely is the data cable connecting the MAXON radio units to the lamp controller.

Ask your supplier for an exchange set of MAXON radios and MAXON radio cables and exchange these units one at a time testing after changing each part.
Does this Fix the Fault?

If **ERR->COMSLAVE** errors continue, bring the 2 units close to each other to see if operation is restored or try changing radio channels again, obtain a radio scanner and listen on the frequencies outlined in the operation manual for the signal on the set frequency with the units turned off. If there are signals on these radio channels then a clear radio channel must be found for operation. Turn on the units and listen for a sound that coincides with the TX light on the master unit and then listen for a sound that coincides with the TX light on the slave.

If there is still no solution then call Global Traffic Equipment Service on 0438 193 294 for further assistance.

Appendix E.

PTL2-R Radio Remote Controller

PTL2-R RADIO REMOTE NC Controller (Optional)

***NB**

The PTL2 Remote Controller is designed to operate 2 way traffic only (Master & Slave).

The unit has three control buttons and a system Status Display on the front panel.

On the side panel, there is a radio antenna and a recharging socket for connecting to an approved recharging unit to replenish the internal Ni-MH batteries.

Before use the PTL2-R should be charged overnight to ensure long operational life.

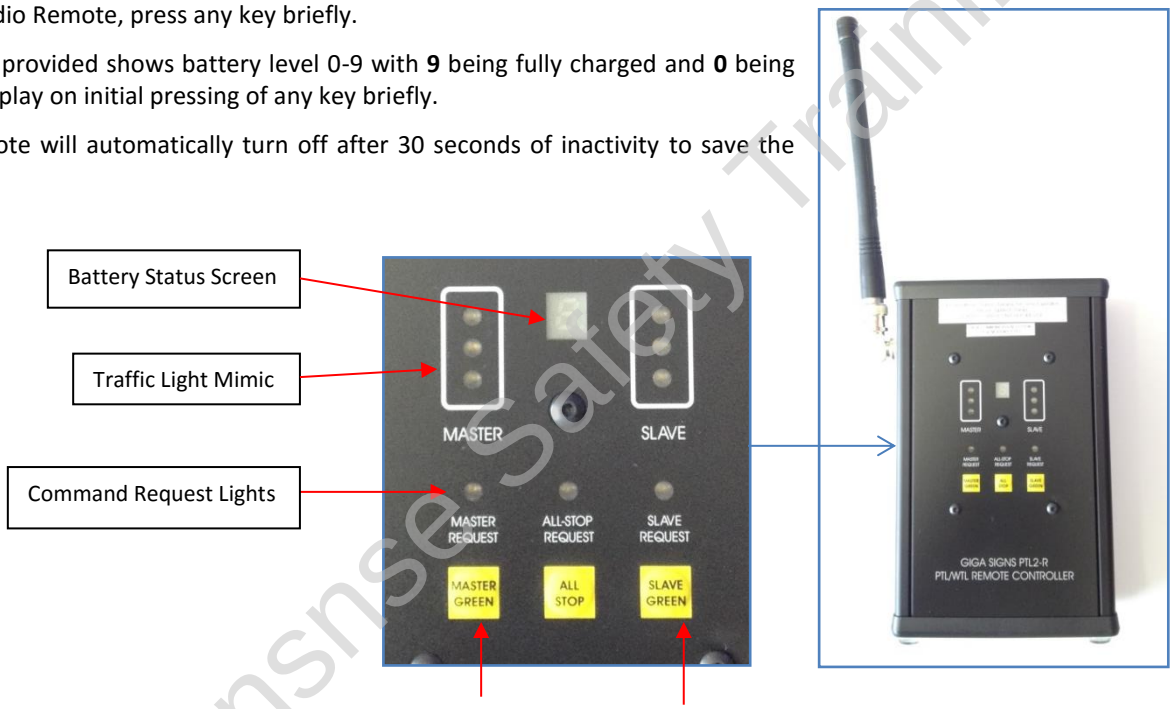
The use of the Radio Remote is identical to the use of the Handheld Controller with the convenience of being able to be used wirelessly. It includes coloured mimic LEDs of the units themselves.

On the handheld controller press 'Manual' Mode to operate the Remote Controller

To turn on a Radio Remote, press any key briefly.

The LED screen provided shows battery level 0-9 with **9** being fully charged and **0** being flat. This will display on initial pressing of any key briefly.

The Radio Remote will automatically turn off after 30 seconds of inactivity to save the battery.



On the Remote Controller cycle between "MASTER GREEN" and "SLAVE GREEN" via the use of the "ALL STOP" key. (This is the same as the "RED TIME" key on the Hand Controller).

NB! You will always need to turn both PTL2 units red (All Stop), before allowing the other unit to turn green.

Note: The keys **must be held for 3 seconds** for the command request to be registered to prevent accidental triggering of an aspect change.

When a command request has been triggered, an LED will illuminate above the corresponding key to alert the operator of the request.

Setting up the Radio Remote NC

Before 1st use, the Radio Remote must be paired to the unit number and channel of the PTL units being used.

To set the radio channel, press and hold together the "MASTER GREEN" and the "SLAVE GREEN" keys for 3 seconds. The LED display will start to flash between C and the radio channel number, set the same channel as the PTL2 unit it will be operating with.

Press the "SLAVE GREEN" key to increase the value and the "MASTER GREEN" key to decrease the value. Press the "ALL STOP" key to set the channel.

The screen will then change the display to set the unit number. The display now will alternate between H and the HUNDREDS digit of the unit number.
Again press the "SLAVE GREEN" key to increase the value and the "MASTER GREEN" key to decrease the value.

Press the "ALL STOP" key again to set the value and the screen moves to set the TENS digit t of the unit number, and again to change the UNITS u digit.

If the Radio Remote cannot communicate with the PTL units, the 3 request lights (above the buttons) will be all lit. Firstly check the antennas are intact on the radio remote and the PTL units, ensure the batteries are charged and the channel is selected correctly.

PTL2 Remote Operation - Manual Mode

In Manual mode set by the Hand Controller, operation of the system is then controlled from the Remote.
In order to request a Green aspect be shown, the system must be showing **RED aspects at both Master and Slave.**

(Ie. If either end is showing green, then the **"ALL STOP"** must be requested before either green can be requested).

To cause the Master Unit to display a Green aspect, press and hold the "MASTER GREEN" button for 1 second.
(If the remote has powered down, press any button briefly to turn it on, and then hold for 1 second).

To cause the Slave Unit to display a Green aspect, press and hold the "SLAVE GREEN" button for 1 second.
(If the remote has powered down, press any button briefly to turn it on, and then hold for 1 second).

To cause both units to display Red aspects press and hold the "ALL STOP" button for 1 second (while the unit is on).

PTL2 Remote Operation - Vehicle Trigger Mode

In Vehicle Trigger mode, only the "MASTER GREEN" and "SLAVE GREEN" buttons may be used, when activated the function simulates a vehicle approaching the lights from the respective end.

The remote can also be used when testing and setting up the Vehicle Sensors as the request from the Vehicle Sensor will be shown on the front panel indicators.

***NB: NC (New Communication) a label on front of Remote indicates FFSK fitted, also an operating label is on back of Remote Controller; this Remote will only operate with Lamp Controllers with software version 2.37NC or greater, also the Maxon Radios located behind the Red Aspect will be labeled 'Maxon/FFSK fitted'.**

PTL2 Remote - Charging

Be sure to only use the supplied charger unit. It should be set to Ni-MH, 8 CELLS position and 1.5 AMPS position. Charging will take approximately 90 minutes from flat. Using the wrong charger may damage the batteries or unit, and will not be covered under warranty.

The unit can be charged when connected to either the Master or Slave trailer units via the Anderson plug, or by connecting to a vehicle 12v power outlet socket .

The PTL2 Remote Controller and Charger are not waterproof. Exposure will cause damage and will not be covered under warranty.

Appendix F.

RE-PROGRAMMING PTL2 LAMP CONTROLLER

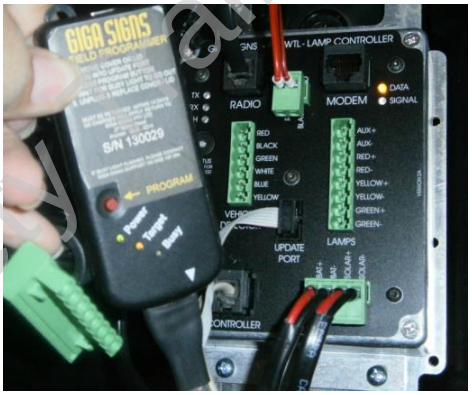
RE-PROGRAMMING PTL2 LAMP CONTROLLER

Ensure you are in a safe place to carry out this work. Turn off lights and wind down mast.

10. Remove top and bottom retaining clips from the Yellow Lamp on the Traffic Light head using pointed pliers.
11. Remove the Lamp Cover and swing out the Yellow LED Lamp assembly by squeezing the right latching tabs.

RE-PROGRAMMING PTL2A LAMP CONTROLLERS - NC FIRMWARE:

12. A label is on the back of the Field Programmer to indicate what the firmware is. It should read PTL2A LAMP CONTROLLER V2.40 NC - (latest software version).
13. Connect the Field Programmer to the Lamp Controller UPDATE PORT and check that the Power LED lights up on the Field Programmer.
14. Press the Program button on the Field Programmer and wait until the Busy LED goes out and the Target LED will flash to indicate the unit has been programmed.
15. Repeat this process on both the Master and Slave units.



CHECK FIRMWARE VERSION

16. Connect the handheld PTL controller to the port on the side of the Status Display of the SLAVE unit.
17. Press the Power button on the PTL controller. On the first power up screen it will indicate the firmware which is programmed into the Lamp Controller. It will display its current software version eg. V2.40 NC.

SET UNIT NUMBER

After the Lamp Controller has been reprogrammed you have to reset the unit number

18. After power up type 8 8 7 into the hand controller and confirm the digits are displayed on the screen of the controller.

19. Press the Setup Menu button and confirm that the bottom of the screen shows “ENTER UNIT NUMBER”, enter 3 digits from 000 up to 255 only.
20. Enter the unit number of the PTL into the controller and ensure that the numbers are displayed on the bottom line of the screen, when correct press the Enter key.

21. Turn the SLAVE unit off by pressing the Power button on the hand controller. Repeat steps 7 to 11 to the MASTER Lamp Controller.

Note: The unit number must be set the same on both Master and Slave units for them to communicate correctly.

Appendix G.

PTL-2-LHC (Local Hand Controller)

PTL-2-LHC USER INSTRUCTIONS

The PTL-2-LHC package is designed to operate directly to PTL units and is not a wireless setup so no maxon radio is required to operate this system. Each PTL unit fitted with the PTL-2-LHC is manually controlled.

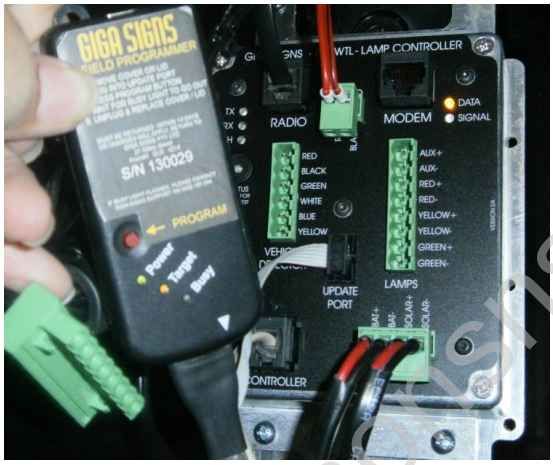
PARTS REQUIRED FOR ONE PTL2 ONLY:
1 x PTL-2-LHC (Local Hand Controller)
1 x PTL-2- LHC INTERFACE MODULE
1 x PTL-2-LHC 10m cable
1 x Field Programmer (V2.35 LHC)

Photo above is to operate with 2x PTL units

To Set Up

Ensure you are in a safe place to carry out this work.
Turn off lights and wind down mast.

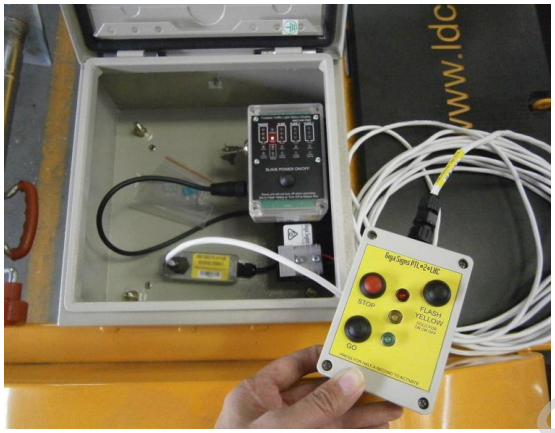
1. Remove top and bottom retaining clips from the Yellow Lamp on the Traffic Light head using pointed pliers.
2. Remove the Lamp Cover and swing out the Yellow LED Lamp assembly by squeezing the right latching tabs.
3. Locate the Lamp Controller and plug the Field Programmer (Software version V2.35 LHC) into the "Update Port" and follow instructions on the front of the Field Programmer.



4. Once updating is complete remove the Field Programmer from the Lamp Controller and re-assemble Yellow Lamp.
5. Connect PTL-2-LHC Interface Module to the Status Display.

6. Connect the PTL-2-LHC Cable to the Interface Module.

7. Plug the opposite end of the PTL-2-LHC Cable into the PTL-2-LHC. The PTL2 unit is now ready to be controlled by the PTL2 LHC.



8. Turn the traffic Lights ON by holding down the “Flash Yellow” button for 4 seconds. The unit will display flash yellow.

9. To operate either STOP or GO, hold down the appropriate button for 1 second.

10. Turn the traffic lights OFF by holding down the “Flash Yellow” button for 4 seconds.

Note:

- **Repeat all the above set up procedures if working with another PTL2 unit. One PTL2-LHC set per traffic light unit.**
- **Traffic Light must be turned ON/OFF by the PTL-2-LHC.**
- **PTL2 units are individually controlled (Local Mode) by the PTL2 LHC so there is no Master or Slave**
- **When converting set up back to normal operation the Lamp Controller software version must be reprogrammed back to its original version, please contact supplier for more information.**

Appendix H.

PEDESTRIAN LIGHTS

PTL Pedestrian

This Pedestrian Setup is for lights being operated directly across from each other.
NB: The current pedestrian firmware is only written for the older style Maxons and not the Maxon/FFSK (new communication).

SETTING UP PEDESTRIAN SET

- Power on Slave with button on status display.
- Power on Master with Hand Controller using the power button
- Units will communicate and enter flash yellow mode, if communication between the sets is ok
- Set the desired Red time by pressing the number and then Red Time. The Red Time sets the length of the Green man time for the pedestrian crossing.
- Press the vehicle trigger button, the hand controller will display M ->Pedestrian. Both units will display the green lights.

TIMER SETTINGS WITH THE HAND CONTROLLER

Green Time changes the amount of time before each button is registered by the traffic lights. For example if the green time is set for 30 seconds, there will be a 30 second delay before the next pedestrian button press is actioned.
Red Time changes the amount of time the Green Man is displayed for crossing. If the Red Time is set too low, the Green Man will not be displayed and only a Red Flashing man will be displayed. The minimum red flashing man is set in firmware for 10 seconds.
THE RED TIME IS CALCULATED BY HOW LONG IT TAKES TO CROSS THE ROAD PLUS 10 SECONDS.

SEQUENCE LIGHTS.

- Pedestrian Button pressed on either set .
- Cycles to Red, 3 seconds after, the Green Man and walk tone will be generated to indicate crossing. Depending on RedTime Setting.
- Both Traffic lights remain red, Green man will turn off and the walk generator stops, the red man will flash for 10 seconds which is the default setting in firmware.
- Both Traffic lights remain red, Red man will go solid 2 seconds and traffic lights will then go green and wait for next pedestrian button press.