



Fireray 5000
Technical notes

1. Versions of System Controller

There are 3 versions of the System Controller:

Mark 1, this has 5 LEDs above the LCD window. It can only support 1 Detector. This can be identified by the fact there are 3 empty ports on the top of the First Fix PCB. These were only made for about a year and if you come across any, it is a good idea to replace them, whether they are faulty or not. They have a 'flexi cable' which connects the Controller to the First Fix PCB which is very flimsy and easily damaged. Needs to be set to 'Hi A' to do an alignment (it can take over 20 minutes in Lo A), does not have the 'Find' function, used to pick up the number of Detectors fitted and has a temperature function (which is in the Detector). There isn't an Event Log on this Controller. Do not press the 'Spanner' function when in the Engineering menus as this will un-align the Detector.

Mark 2, this has 5 LEDs above the LCD window. It can support 4 Detectors, but there are only one set of relay outputs, Fire and Fault, for all the Detectors, so the engineer will not know which Detector gave an activation unless that Detector is still in Fire or Fault. There isn't an Event Log on this Controller and you need to use 'Hi A' to do a commissioning. If you get random faults on this Controller, the comms between the Controller and Detector can get out of Sync and fail for a few seconds, before starting again. Fitting the Mark 3 Controller will fix this issue. As with the Mark 1 Controller, there is a Temperature function (which is in the Detector). Do not press the 'Spanner' function when in the Engineering menus as this will un-align all the Detectors connected to the Controller.

Mark 3, this has 3 LEDs above the LCD window. It can support 2 Detectors and has a Fire and a Fault relay for each of the 2 Detectors. The Controller selects 'Hi A' when in a commissioning mode and has an Event Log. It does not support the Temperature Function which is on the older Detectors. There are also Simplex and Apollo Analogue Addressable Mark 3 System Controllers. These can be connected straight to a Simplex or Apollo Loop Bus (which comes from the Fire Panel) without an interface. The customer selects the Address of the Controller (between 1 and 127), but the rest of the commissioning is the same as with the Standard F5000s.

There are 2 versions of the Detector:

Mark 1, this Detector can be identified by two 'prongs' which protrude from the bottom of the Detector and connect to the First Fix PCB. This Detector has a Software Version which is lower than 3. It is compatible with the Mark 3 version of the Controller.

Mark 2, this Detector can be identified by the 'flying lead' which connects to the First Fix PCB. This Detector has a Software Version of above 3. It is compatible with the older Controllers, but if used with the Mark 1 or 2 Controller, the Temperature function will read -40 (this will not affect the operation of the Detector). There have been two Software Versions, 3.5 and 3.6 (the current version). 3.5 does not work with the older Controllers, it will give a comms (E-01) after a short period of time. 3.5 was only made for about 6 months, so there shouldn't be any of these Detectors left that have not been installed. The Controller will indicate (assuming it will power up) which Detector is not working correctly.

2. Fault Codes explained:

1. E-00: (Code Green)

The System Controller is faulty. There is a comms fault between the Mother and Daughter boards inside the Controller and it will need to be replaced.

2. E-01: (Code Amber)

There is a comms failure between the Detector and the Controller. If possible, it is a good idea to work out if the Detector or the Controller is faulty, purely so the engineer does not have to replace the Detector if it is not necessary.

Tests:

1. Can you see an LED flashing (Red or Amber) on the 'faulty' Detector? If Yes, then the cable to the Detector is OK. If No, either the Detector (or the channel to it) has totally failed or the cable to it could be broken/damaged. In my experience, I've only had cable issues during commissioning.
2. Check the voltage at the appropriate channel on the First Fix PCB. It should be between 11V and 13.5V. If the voltage is less than 11V, then disconnect the cable to the Detector and see if the voltage goes up (to between 11V and 13.5V). If it goes up, then the fault could be on either the Detector or Controller (you can work out whether it's the Detector or Controller which is faulty, but I don't think it's worth going that deep), so both should be replaced.
3. If the voltage stays low after removing the Detector, then the Controller is faulty and only that needs to be replaced. The alignment data is stored in the Detector, so all the engineer must do is run the 'find' function and the Controller will pick up the Detector

Note: If the Controller needs to be replaced and it has 3 or 4 Detectors connected to it, then, unfortunately, you will need to fit 2 Controllers.

3. E-02: (Code Green)

The 'find' function has not been run. You will see this at the commissioning stage and it will follow on from E-01 (and you may also see E-05).

4. E-03: (Code Amber)

The AGC (Automatic Gain Compensation) has been reached. All Beams have AGC, on the F5000 it ranges between -50 and +205 (the Detector will automatically re-align itself at +75). A re-alignment will re-set the AGC to 0 (clearing the fault), but what you need to find out is the reason the AGC limit was reached.

1. +205 AGC means that the Infra-Red Signal has been dropping and the Detector has boosted the IR Signal +205 times to try and keep the Signal at 100%. The reason for the IR Signal going down could be poor installation (at the Detector or Reflector end) or a large amount of air born contamination for example.
2. -50 AGC means the IR Signal has gone up and had to be reduced -50 times. This is a rare event but means that the Detector is picking up extra IR Signal. This can be because a shiny object has been placed very close to or in the Beams 'Line of Sight', and this is reflecting signal back to the Detector.

5. E-04: (Code Amber)

If the voltage (measured at the First Fix PCB) going to the Detector is less than 11V use the E-01 tests to determine with the Detector or Controller is faulty. If you get a voltage between 11V and 13.5V DC, the Detector is faulty.

6. E-05: (Code Green)

The Detector is not aligned.

Note: Aligned Detectors should not become unaligned but seem to do so for no apparent reason. This may be a Software bug.

7. E-06: (Code Amber)

Something has blocked the Beam and caused the IR Signal to drop to 0%.

Note: This is a 'common' fault in warehouses or buildings where the Beams have a process which can break the IR Signal during normal operations. It can also happen during commissioning or servicing when testing the Beams.

8. E-07: (Code Amber)

Something reflective (and this doesn't always have to be shiny) is either in or near the Beams path and this has added a small amount of Infra-Red Signal to be added to the IR Signal coming back from the Reflector.

9. E-08: (Code Amber)

AGC (Automatic Gain Control) was not at '0' after an alignment. This should never happen, but if it does, re-align the Beam or power down for 2 minutes before re-aligning.

10. E-09, E-10 and E-11: (Code Amber)

These failure modes are very rare and are all very similar in cause. Either the Reflector(s) have not been found due to the wrong number of reflectors being fitted, the Detector trying to align onto the wrong surface, the wrong distance has been selected (8-50M being the default distance when the range may need to be set to 100M). If there is no apparent reason for the failure, the Detector may well be faulty.

11.E-12: (Code Red)

The reflector(s) may not have been covered when the 'tick' button on the Controller was pressed or the Infra-Red Signal may not have dropped low enough.

Note: When in 'Hand' mode, the signal must drop below 500 when the reflector(s) are blocked. When the reflector(s) are uncovered you should have a value of over 800 but less than 1200 when in 'Hand' mode.

The 'Hand' values will never be steady.

12.E-13: (Code Amber)

The reflectors may not have been uncovered when the 'tick' button was pressed on the Controller.

Note: When you are at the 'Set' function, it is always good to confirm that the person at the reflector(s) end has covered or uncovered them as required. This is main reason for a failure at this point.

13.E-14: (Code Amber)

This is the most common error when aligning a F5000 and there are several potential reasons which can give an E-14 error. E-14 basically means the Detector has tried to align onto something other than or as well as the Reflector(s).

1. Poor 'line of sight'. Ideally the F5000 needs a 1M diameter clearance down the whole of the Beams path to align through (and without shiny surfaces near the reflector(s) or that the Beam passes through).
2. Windows or surfaces which are reflective near the Reflector(s) can cause alignment failures. Passing close to a shiny surface such as 'Cling Film' can cause E-14.
3. A strong Infra-Red source (which can be a light directly above the Detector, the Sun or another Beam) can cause alignment failure.

A large amount of air born contamination, such as dust, could prevent alignment and result in E-14.

Note: You can overcome an E-14 alignment error by doing a Manual Alignment (which will be explained in training). If you get E-14 errors, switch on the laser and see where it ends up. If you do successive alignments the laser always ends up in the same place, it could be that something is drawing the Beam to that part of the building. Try starting the laser starting the laser offset from the reflector(s). Some lasers are not very accurate and may be pointing the Detector in the wrong direction, so if the laser always ends up in the top right position in relation to the reflector(s), try starting it from the bottom left. In the worst-case scenario, the Detector and or Reflector(s) may need to be moved to a better 'line of sight'.

14. E-21: (Code Amber)

This error indicates that the power supply to the Controller is too low (typically less than 12V). However, this rarely happens other than when powering down the Controller. The typically scenario is that you have E-21 on the screen but with +24V connected. If this occurs, there is an internal power fault on the Controller and there is nothing that can be done other than replace it (this might also cause E-01 errors to occur to).

15. E24 and E26: (Code Green)

I've not come across E-24 which means the Detector and Controller are not compatible. In theory, this could only happen when connecting very old and brand-new Detectors and Controllers together. With E-26, this would be the same as with E-00, there is nothing the customer can do other than replace the Controller.