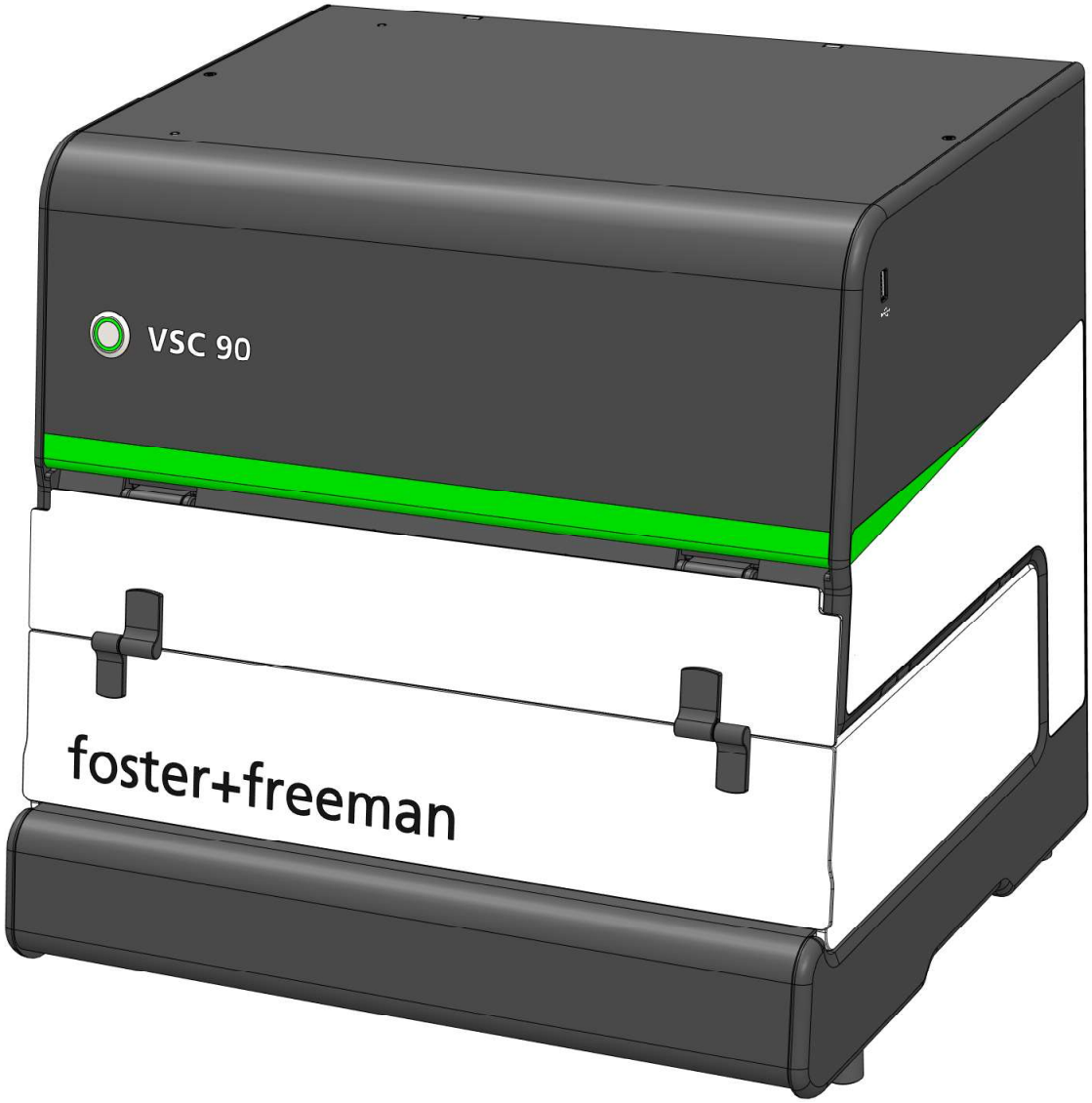
Video Spectral Comparator VSC90 – Service Manual



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1. WARNINGS

WARNING: While working on this equipment, wear adequate protective clothing, eye and hand protection. Use safe lifting procedures.

Failure to comply with the service and user manuals will void the warranty.

Hazardous high voltages - Unplug the mains power lead prior to servicing or removing any covers.

Hot surfaces - Allow the unit to cool before carrying out any service operations.

Use appropriate ESD protection to prevent damage to electronic assemblies.

Contact Foster & Freeman Ltd Technical Support Team if further details, instructions or parts are required for servicing of this product. E-mail: customersupportteam@fosterfreeman.com

CAUTION: Possible optical radiation hazard. Do not stare at LEDs

NOTICE: UV emitted from this product. **Minimise exposure to eyes or skin.**

Sharp Surfaces – Carefully remove parts which have sharp edges.

2. Tool List

Here follows a list, not exhaustive, of the tools required to carry out the following inspection and servicing tasks.

- T6 Torx Screwdriver
- T8 Torx Screwdriver
- T10 Torx Screwdriver
- 5.5mm Hex Nut Driver

3. System Access And Component Identification

3.1. Removal of Top Electronics Cover

Remove 6 off screws shown below to access Camera, Filter Wheel, Main Control PCB, Anti-stokes Driver & internal PC (if fitted).

Fig. 1 – 2x (T10 Torx) screws from the centre of the top cover

Fig. 2 – 2x (T10 Torx) screws from rear of top cover

Fig. 3 – 2x (T10 Torx) screws from inside front flap

3.2. Removal of Rear Cover

Remove screws shown below to access OVD PCB, UV Driver PCB and cables.
NB. If unit is fitted with internal PC, remove screws that are highlighted in orange as well.

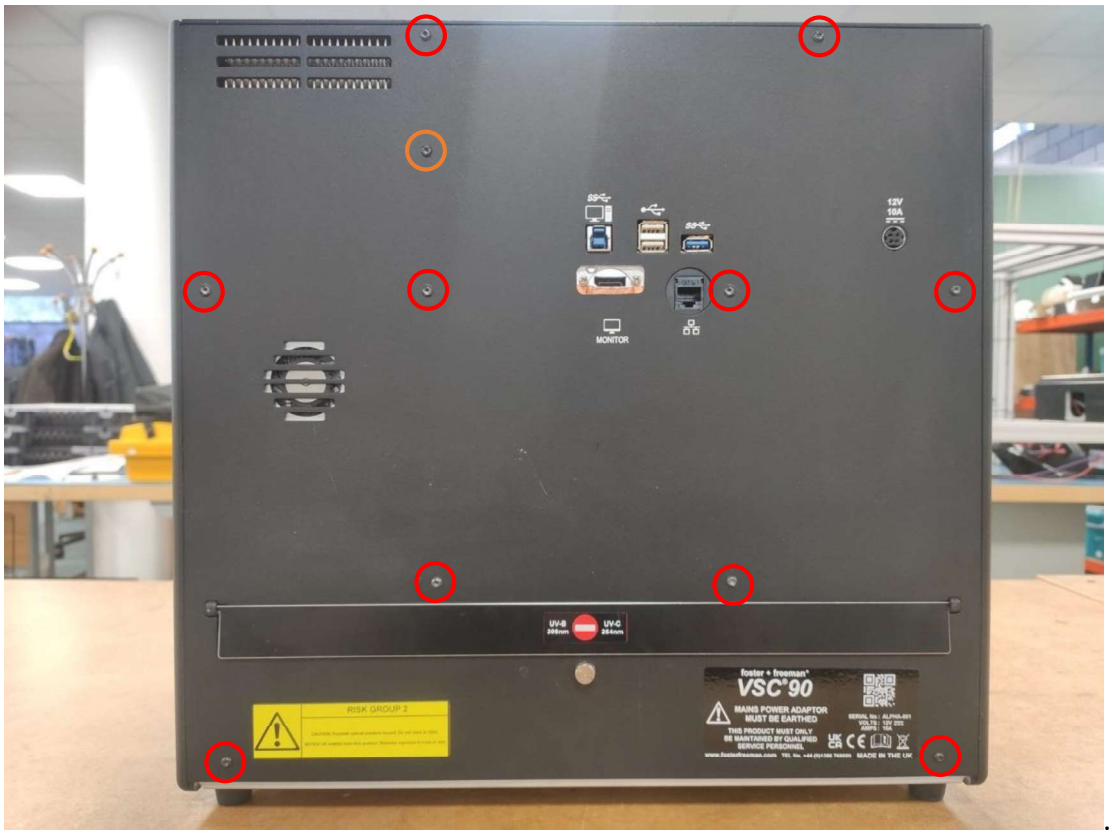

Fig. 4 – 10x (T10 Torx) screws from back panel.
If PC is fitted – 1x (T10 Torx).

Note: Before refitting back panel, ensure the ESD gasket on the power connector & between the Control PCB USB ports & metal work is secure and in the correct position.

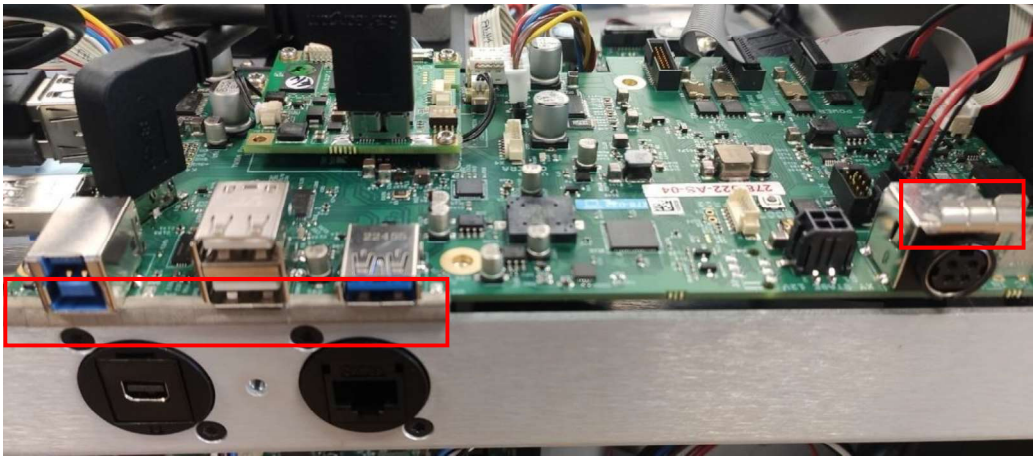

Fig. 5 – Back Panel Gasket positions

3.3. Removal of Document Tray Assembly

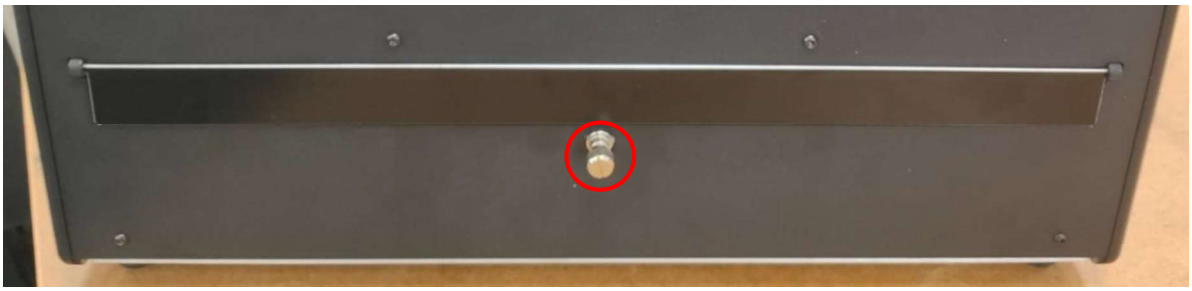

Fig. 6 – Ensure Transit Screw has been loosened at the rear of the unit. This is captive.

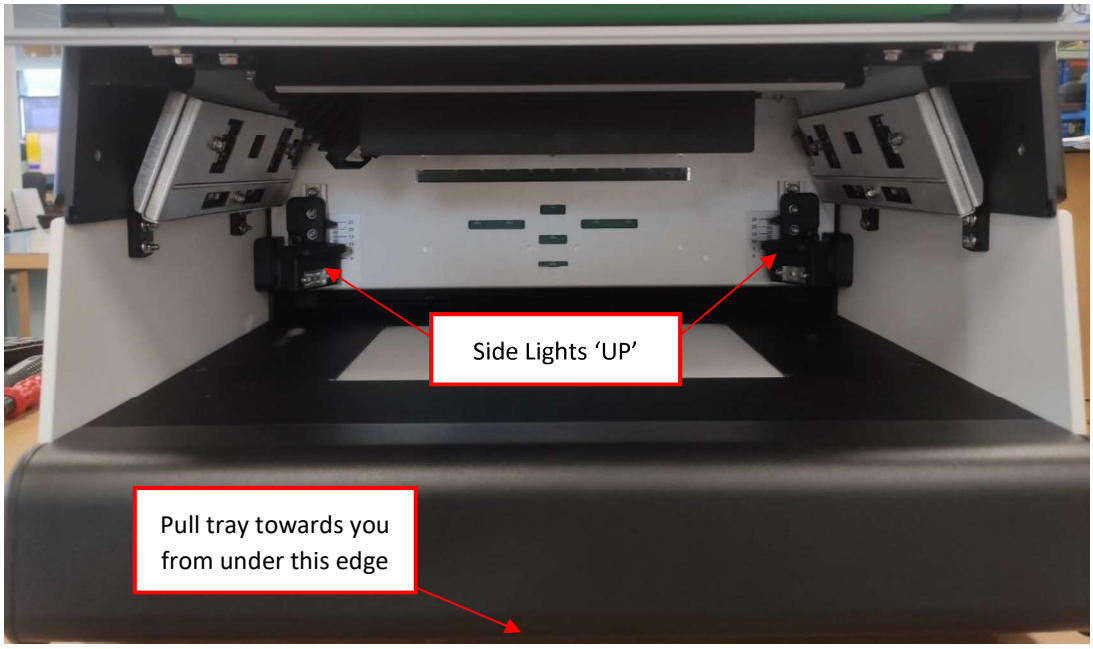

Fig. 7 – Ensure side lights are in their highest position and pull Document Tray towards you from under the lowest front bend.

When re-fitting the Document Tray, ensure that the transit screw at rear is secured if the unit is to be moved or dispatched.

3.4. Separation of Translight Tray from Document Plate

Remove the Document Tray from the unit (See previous section). Remove the screws & nuts that secure the Document Plate to the Translight Tray.

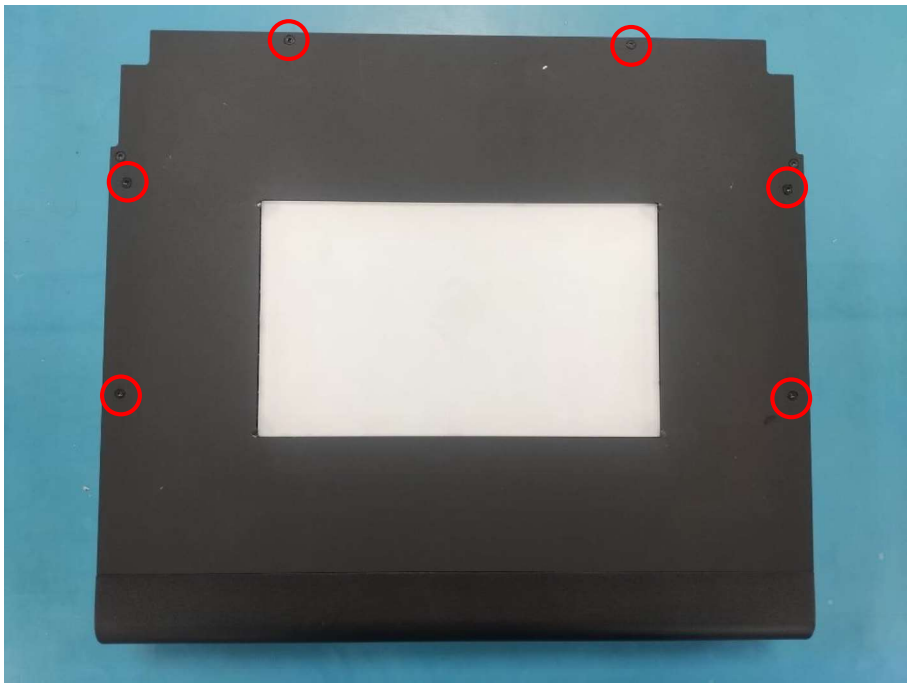

Fig. 8 – 6x (T10 Torx) screws with nyloc nuts on opposite side

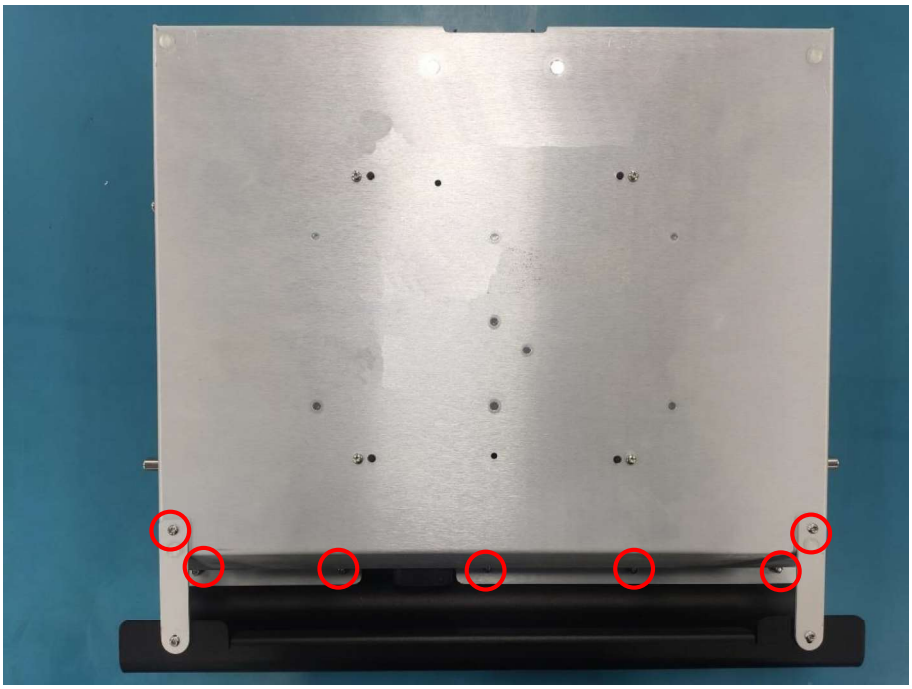

Fig. 9 – 5x Flange Nuts (5.5mm Driver) from front section &
2x (T10 Torx) screws on side braces

With all relevant screws removed, the front sections & the document plate can be separated from the Translight which allows access to the Translight PCB, RFID PCB & Controller & Trans Backplane PCB

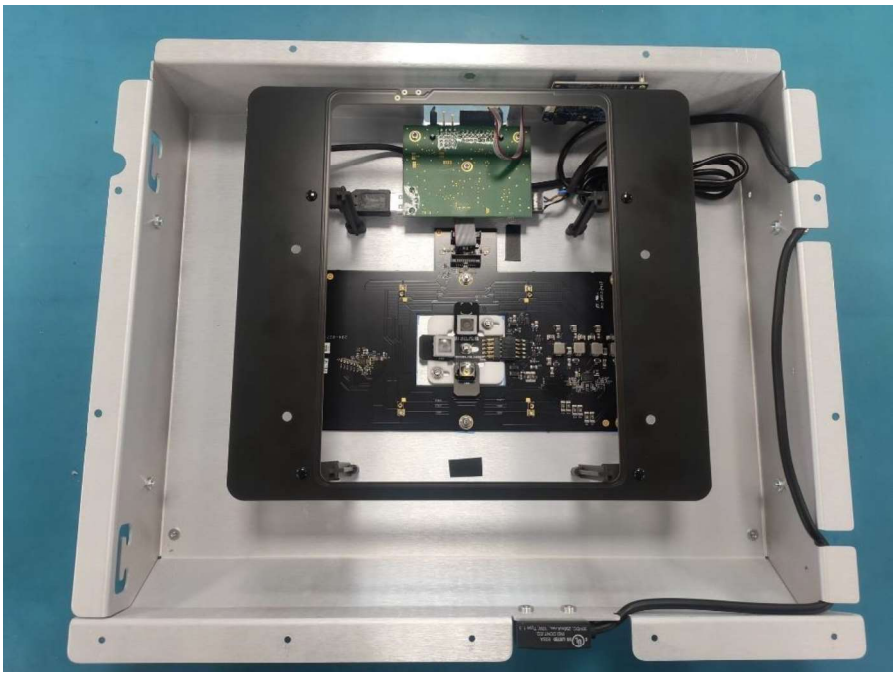

Fig. 10 - Translight Tray

3.5. Component Identification

This section details the unit's main components and sub-assemblies.

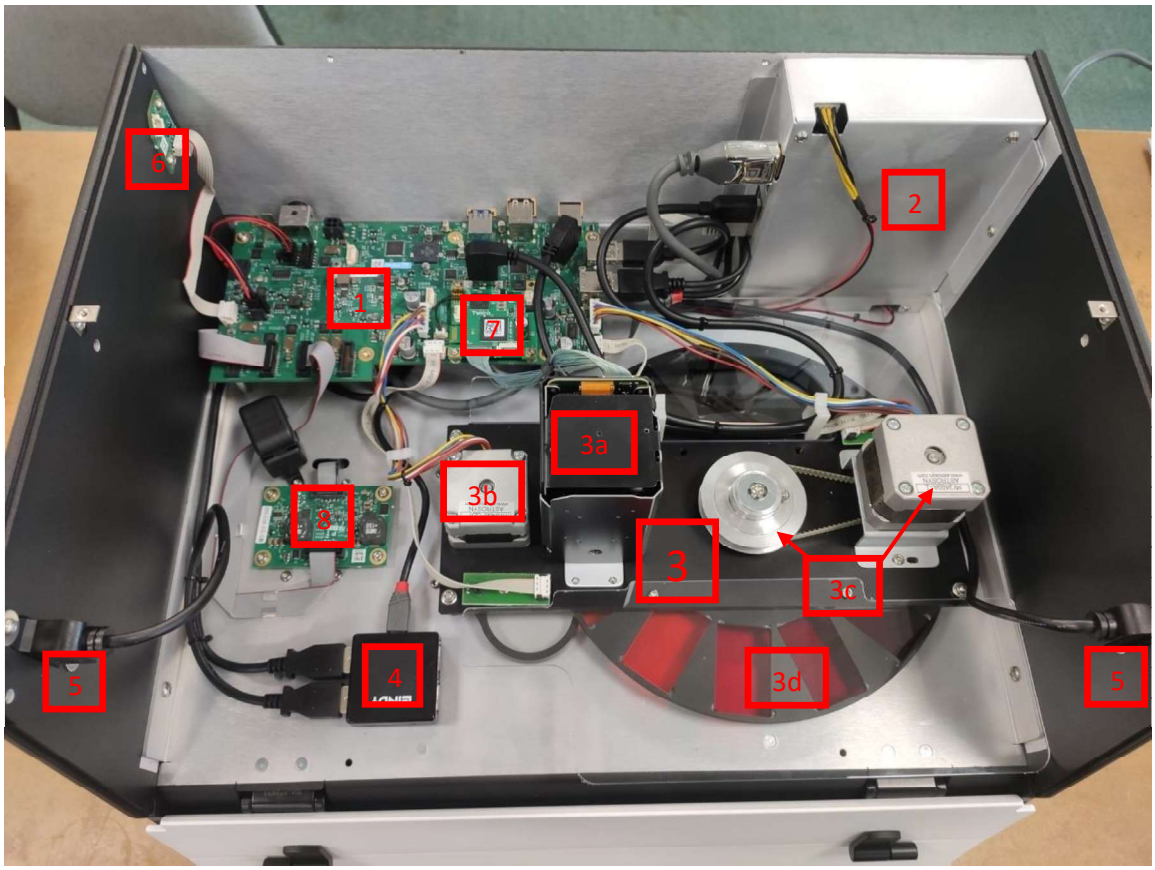

Fig. 11 – View shows inside of unit with Top Cover removed

1. Main Control PCB
2. Internal PC (if fitted)
3. Camera-Filter Assembly
   3a. Camera
   3b. Close up Lens Motor
   3c. Filter Wheel Motor & Pulley
   3d. Filter Wheel
4. USB Hub
5. External USB Connectors (x2)
6. Power Switch Interface PCB
7. Camera Interface PCB
8. Anti-Stokes Driver PCB

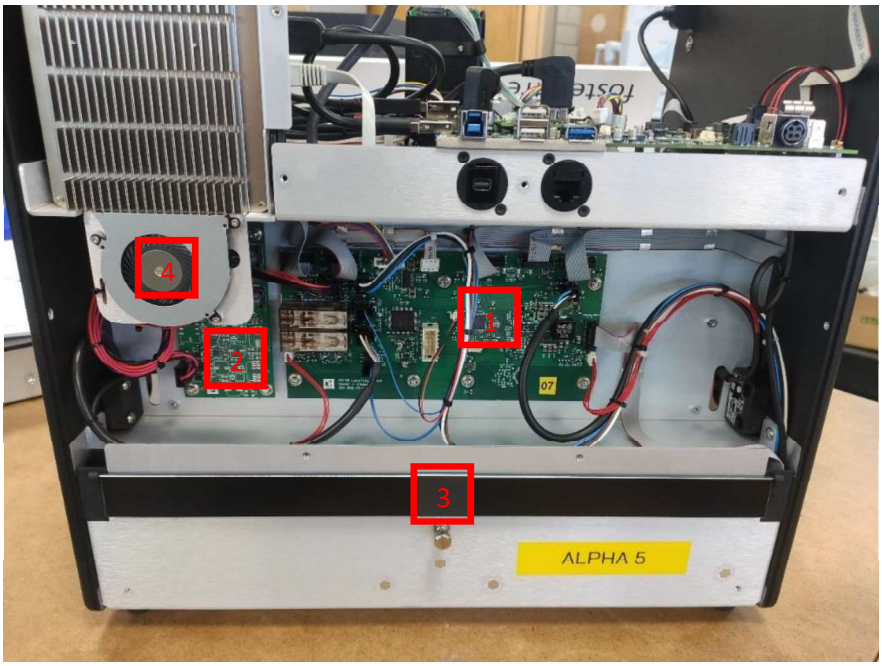

Fig. 12 – View with back panel removed

1. OVD Main PCB
2. UV Driver PCB
3. Rear Flap
4. PC Fan (if fitted)

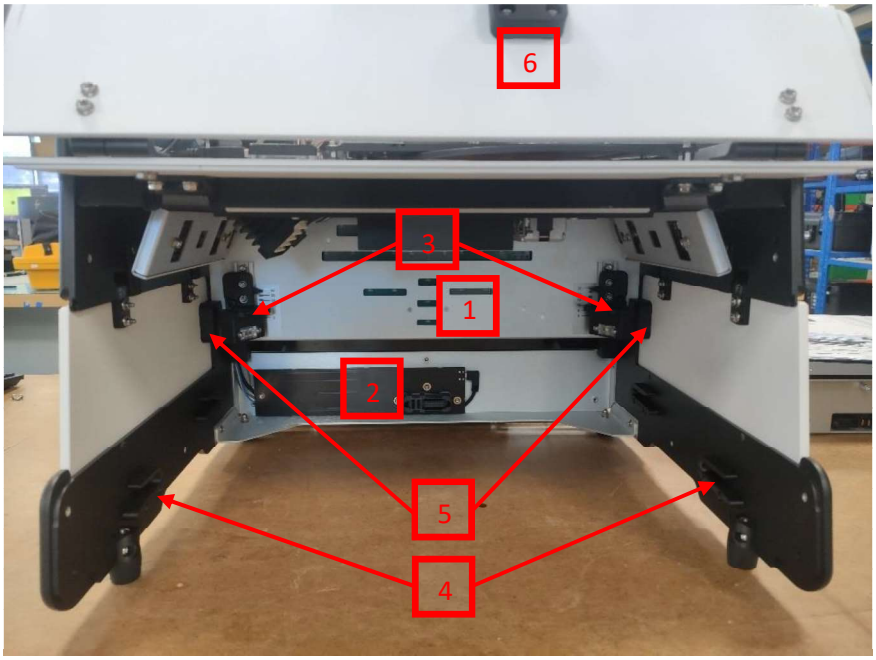

Fig. 13 – Internal View with Document Tray Removed

1. Rear OVD Aperture Face
2. Frame Backplane PCB
3. Side Lights (x2)
4. Document Tray retaining clips (x4)
5. Side flap Safety Magnet (x2)
6. Front flap safety magnet

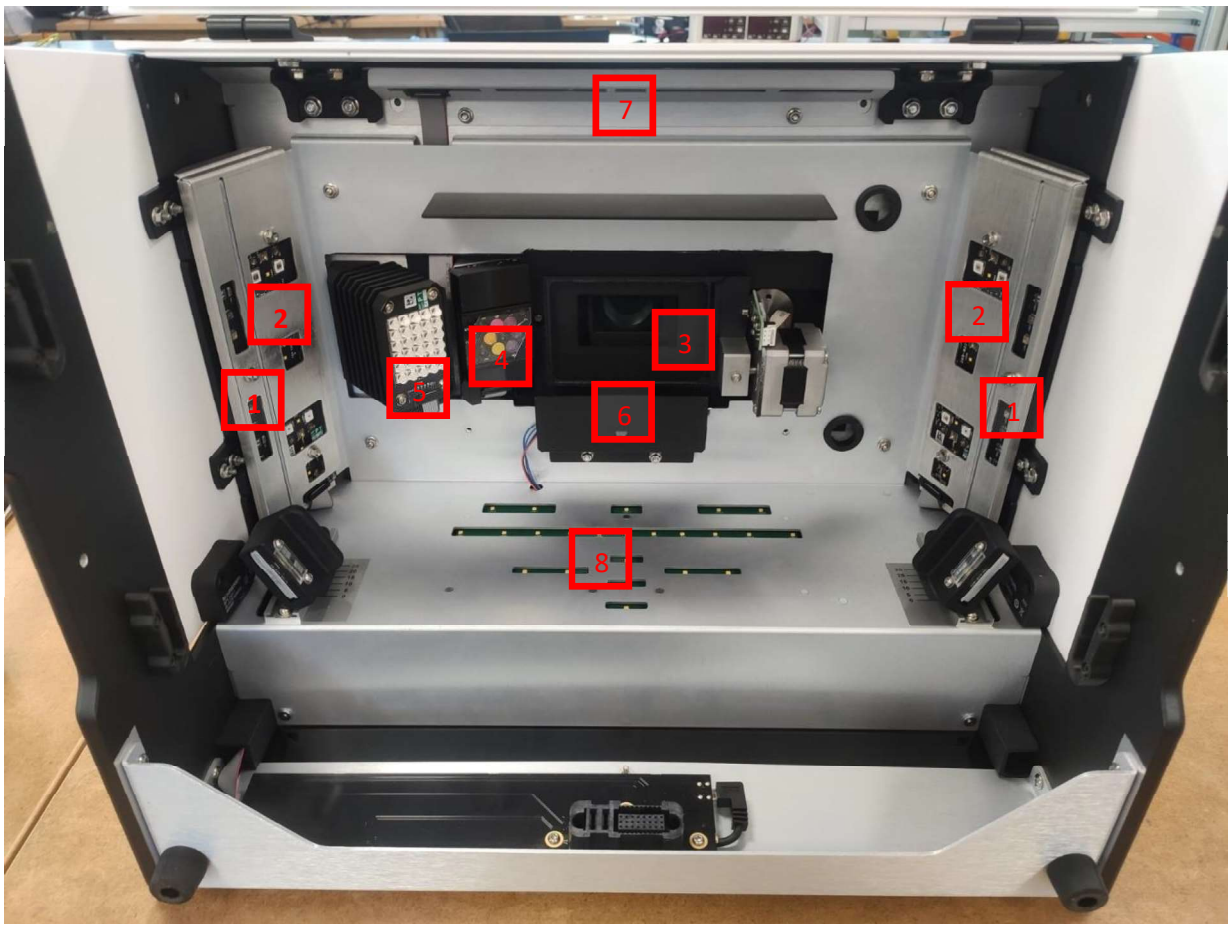

Fig. 14 – View of Lamp Tray from inside the unit

1. UV PCBs (x2) (PCBs accessible by removing sheet metal cover)
2. Flood PCBs (x2) (PCBs accessible by removing sheet metal cover)
3. Coaxial Mirror & Motor
4. LED Spotlight Assembly
5. Anti-Stokes Assembly
6. Coaxial LED
7. Front OVD PCB (Accessible by removing sheet metal cover)
8. Rear OVD PCB (Accessible by removing the back panel)

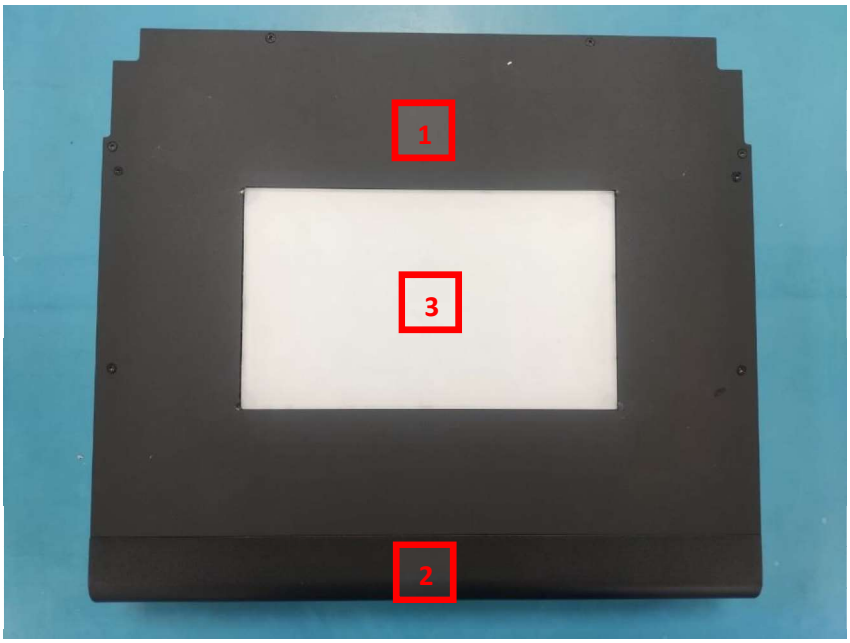

Fig. 15 – Top of Document Tray

1. Document Plate
2. Document Front Plate
3. Translight Glass (Fixed into Document Plate)

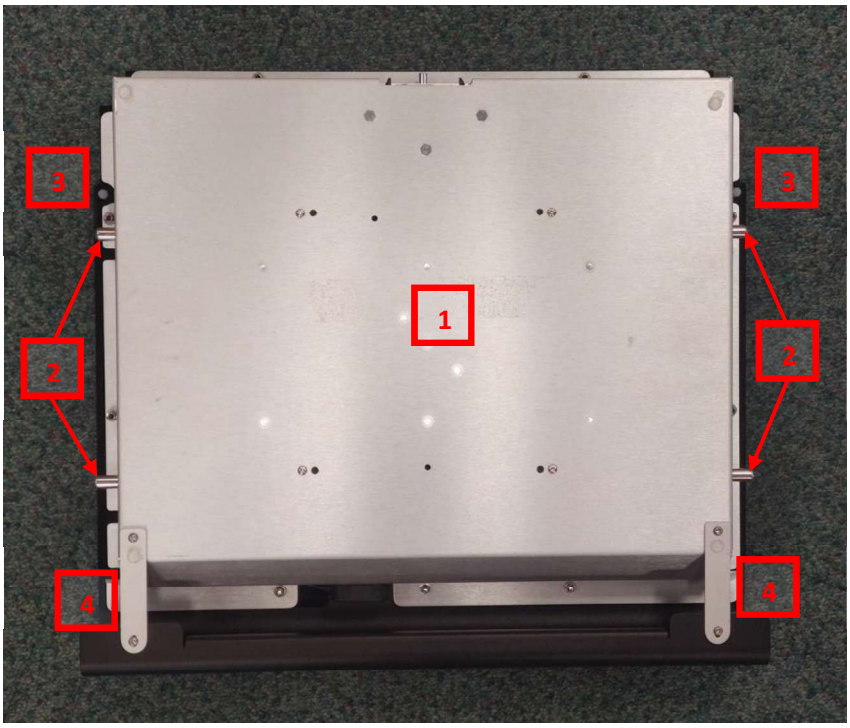

Fig. 15 – Bottom of Document Tray

1. Translight Tray
2. Document Tray Retaining Pins (x4)
3. Document Tray Guide Pins (x2)
4. Front Plate Side Braces

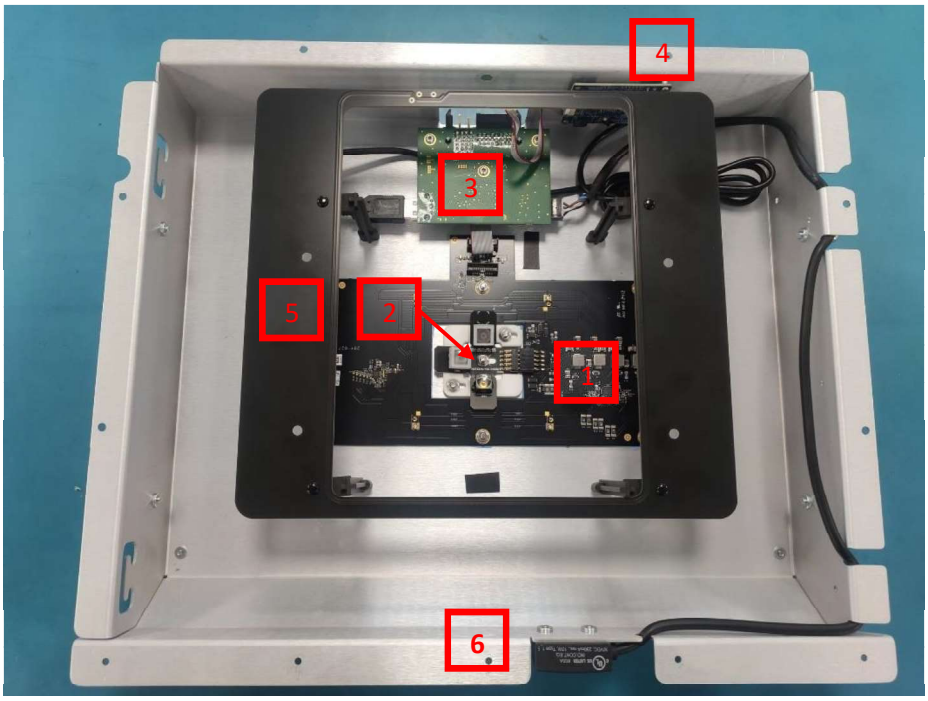

Fig. 16 – Inside view of Translight Tray.

1. Main Trans-Light PCB
2. Trans-Light Centre Spot PCB
3. Backplane Trans-Light PCB
4. RFID Control Board
5. RFID PCB
6. Front Flap Safety Switch

4. PCB Part Numbers And Descriptions

PCB Description	PCB Part Number
MAIN OVD ARRAY	284-021-AS
FRONT OVD ARRAY	284-028-AS
MAIN CONTROL	278-022-AS
FLOOD ARRAY	260-022-AS
POWER BUTTON ADAPTOR	278-024-AS
UV LED ARRAY	284-025-AS
UV LED DRIVER	284-030-AS
MAIN TRANS-LIGHT ARRAY	284-027-AS
TRANSLIGHT SPOT ARRAY	284-029-AS
BACKPLANE (FRAME)	278-032-AS
BACKPLANE (TRANS)	278-033-AS
LED SPOT-LIGHT ARRAY	260-023-AS
LED SIDE-LIGHT ARRAY	260-024-AS
LED ANTI-STOKES ARRAY	260-037-AS
LED ANTI-STOKES DRIVER	260-038-AS
COAX LED ARRAY	284-026-AS
RFID ANTENNA	284-024-AS
RFID READER MODULE	ACM1552U-Y3
TWIGA INTERFACE	TV10-0083
HALL SENSOR	180-436-AS

5. Fuses

5.1. Replacing External Fuses

The only external fuse present will be in the power supply lead, supplied with the unit (depending on lead type).

5.2. Replacing Internal Fuses

This system contains no replaceable internal fuses

6. Serviceable Components

Before removing any panels or covers, ensure power to the VSC90 unit has been disconnected.

6.1. Replacing Camera

Remove the Top Cover. Disconnect the interface cable located at the top of the camera. NB. Care must be taken – cable is fragile. Also remove the cable clamp at the rear of the camera.

Locate & remove the 4 screws which secure the camera to the main mounting plate on the Camera-Filter assembly. Lift away the camera & remove the two brackets that are each fixed to the base by 2 screws. Camera can now be replaced.

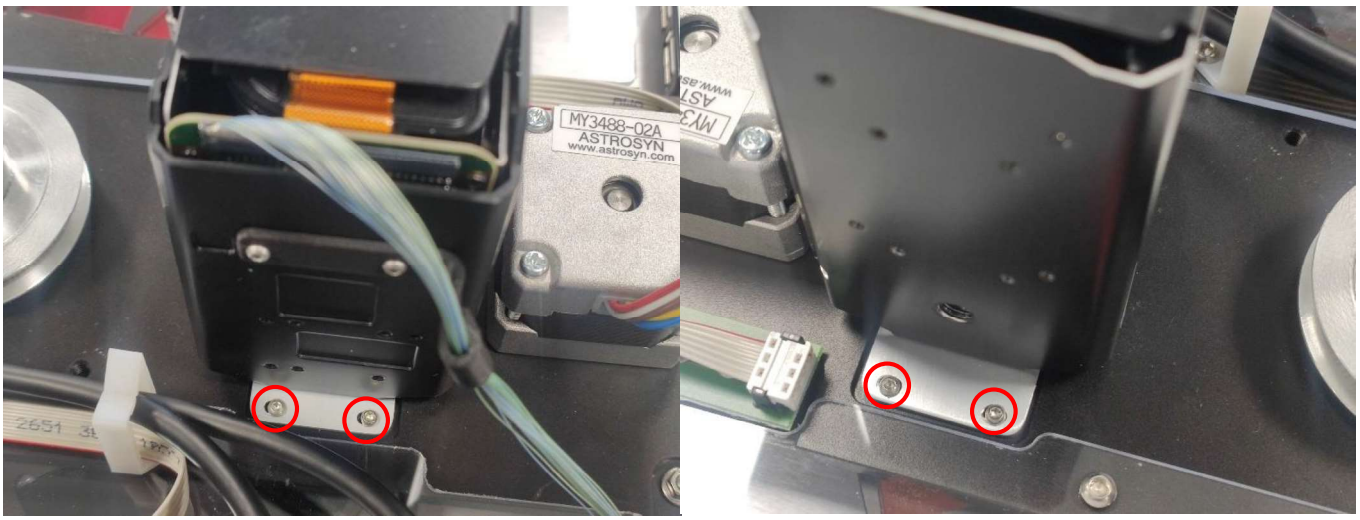

Fig. 17 – 4x (T6 Torx) screws fixing camera to main mounting plate.

6.2. Replacing Control PCB

Remove top cover. Disconnect all cables to PCB and remove 6x screws as shown below. Disconnect the interface cable located at the top of the camera. NB. Care must be taken – cable is fragile. Remove the cable clamp at the rear of the camera (T6 Torx) to free the cable. The Control PCB now be removed. The Camera Interface PCB will still be attached to the Control Board. Instrutions on how to remove this are shown below.

NB. When re-connecting Stepper motor connectors, ensure correct orientation, via screen printing on PCB indicating wire colour and DO NOT push connector fully down. Ensure power terminals are reconnect in their correct position.

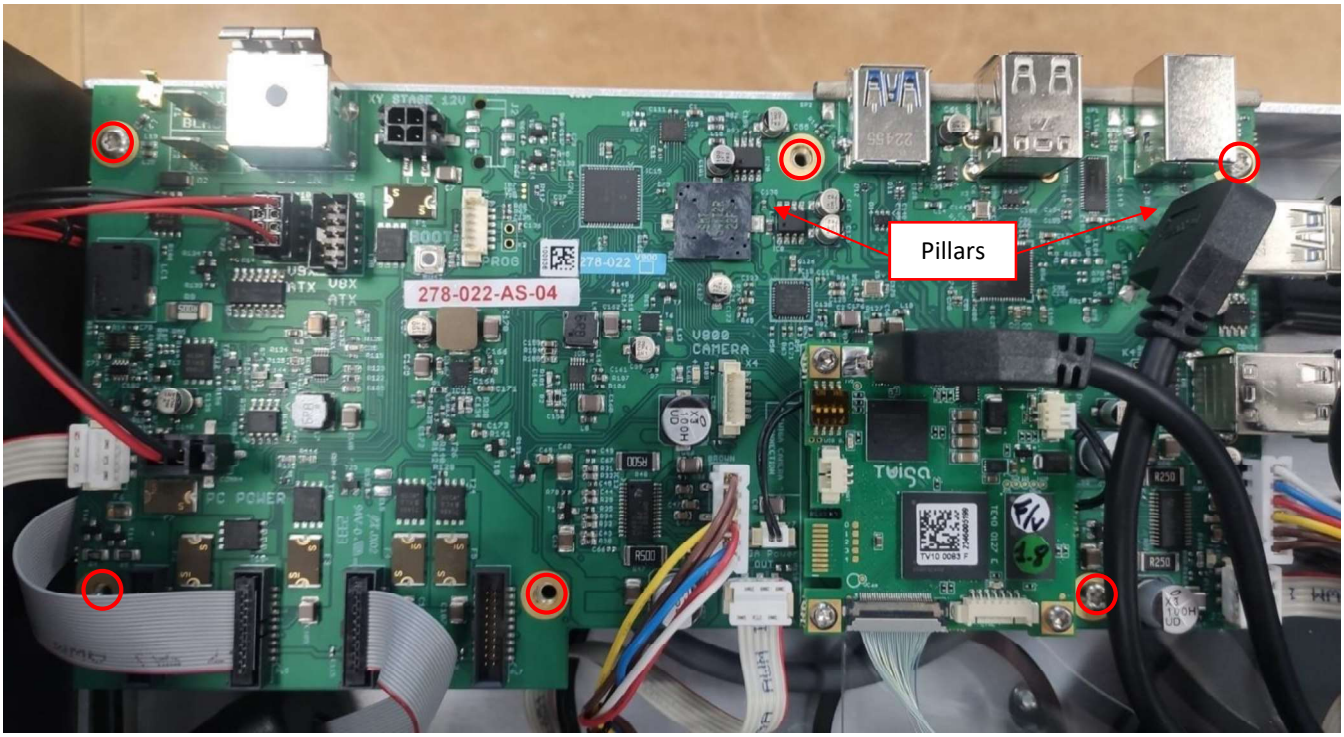

Fig. 18 – 6x (T10 Torx) Control PCB retaining screws.

6.3. Replacing Camera Interface PCB

Remove top cover. Interface PCB can be removed with the Control PCB in place or removed from the unit. Remove the 3x screws. IMPORTANT – Do not remove the screw highlighed with 'X' – See Fig.19. Carefully lift the Interface PCB off the Control PCB. Disconnect the interface cable and the power cable.

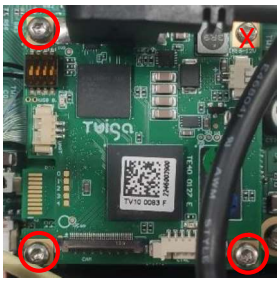

Fig. 19 – 3x (T8 Torx) Interface PCB retaining screws.

6.4. Replacing Camera-Filter Wheel Assembly

This sub-assembly will require removal if the close-up lens, filter wheel or motors individually need replacing.

Remove the Top Cover. Disconnect all relevant cables. Remove the four flange nuts that secure the Camera-Filter assembly as shown. When removing this assembly, the camera, close-up lens, filter wheel and respective driving motors will be removed as one piece. When re-connecting Stepper motor connectors, ensure correct orientation, via screen printing on PCB indicating wire colour and DO NOT push connector fully down.

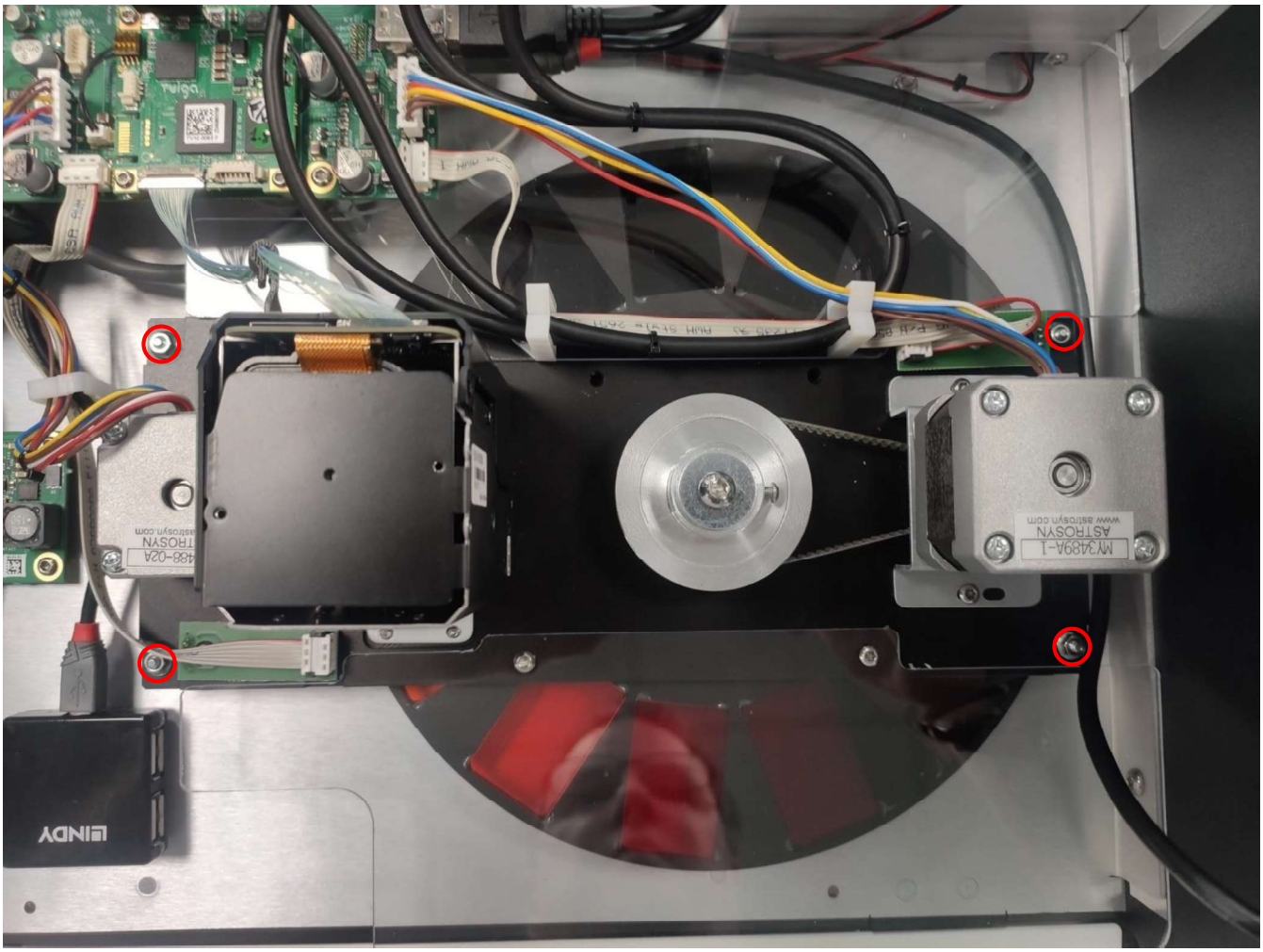

Fig. 20 – 4x (5.5mm Driver) fixings that secure Camera/Filter to unit.

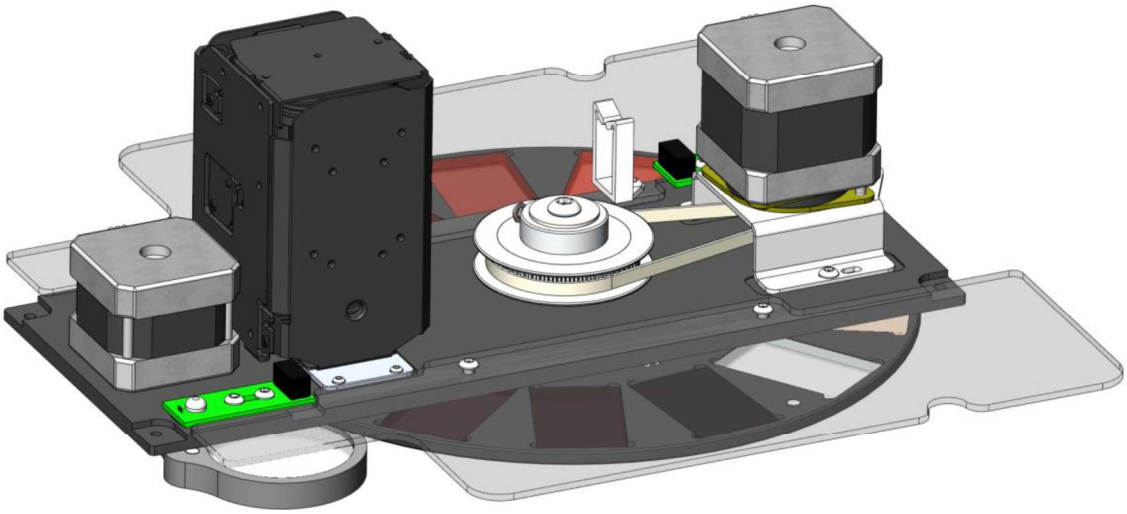

Fig. 21 – Camera-Filter Assembly removed.

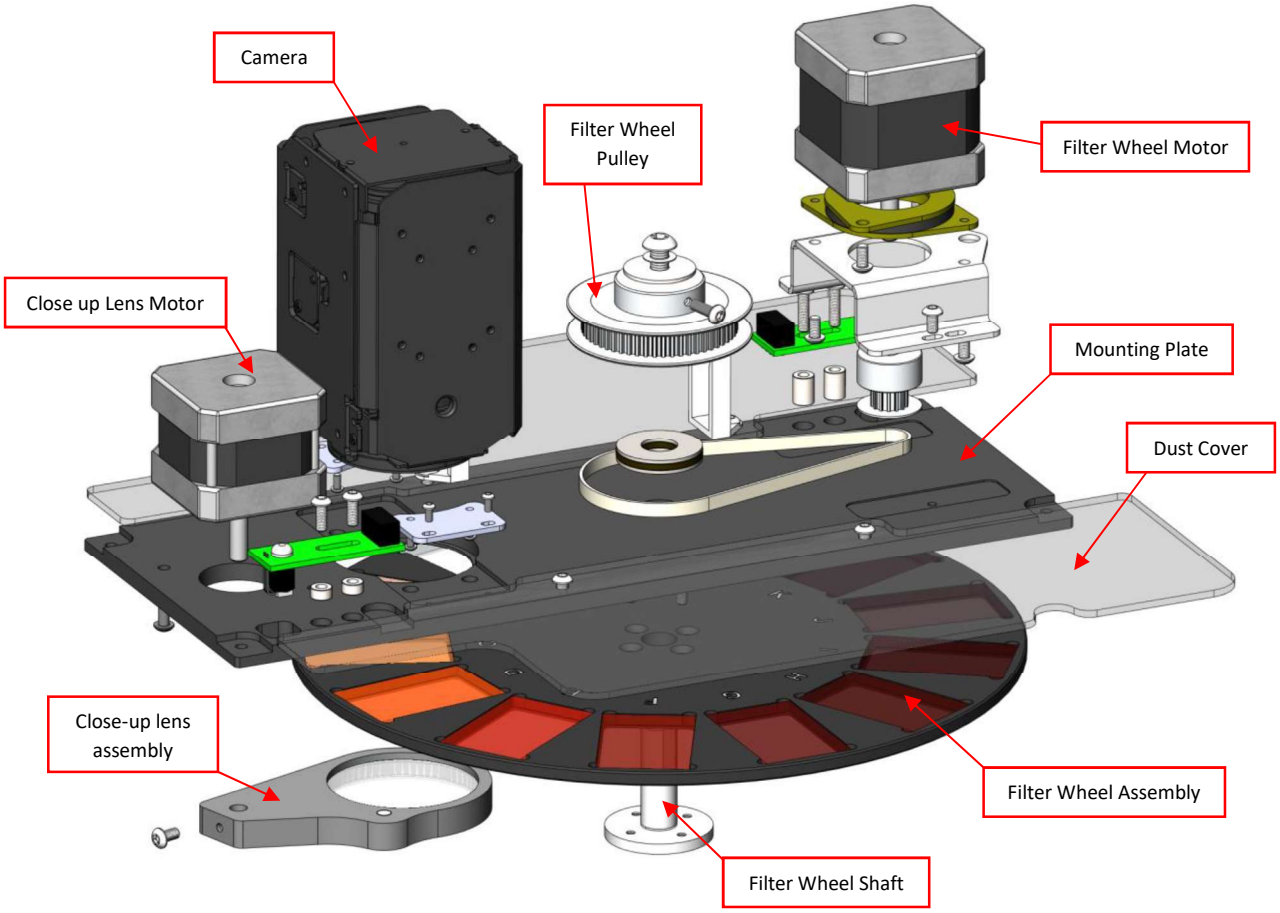

Fig. 22 – Camera-Filter Assembly parts exploded.

6.5. Replacing the Internal PC Assembly (If fitted)

Remove the Top Cover and Rear Panel. Identify the PC unit assembly from the system components section and disconnect all cables. Ensure that the fan power connector is disconnected (see Fig.24). Remove the lower flange nut & side screw shown below, and PC assembly will then be free to replace.

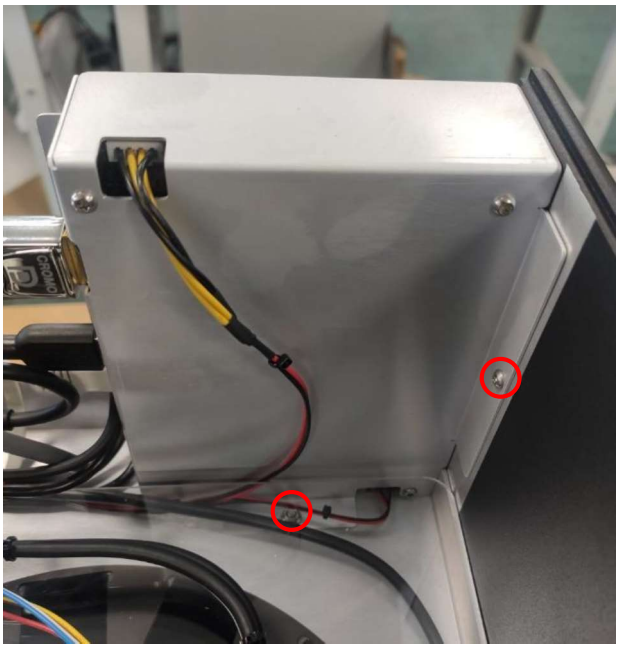

Fig. 23 – Internal PC Fixings: 1x Flange Nut (5.5mm Driver) & 1x (T10 Torx) Screw.

6.6. Replacing Internal PC Fan (If fitted)

Remove the rear panel. Disconnect the fan power connector. Remove the 3 screws that secure the fan to the unit.
NB. There are 3 spacers placed between the fan & the unit. Ensure these are re-fitted when reattaching the fan.

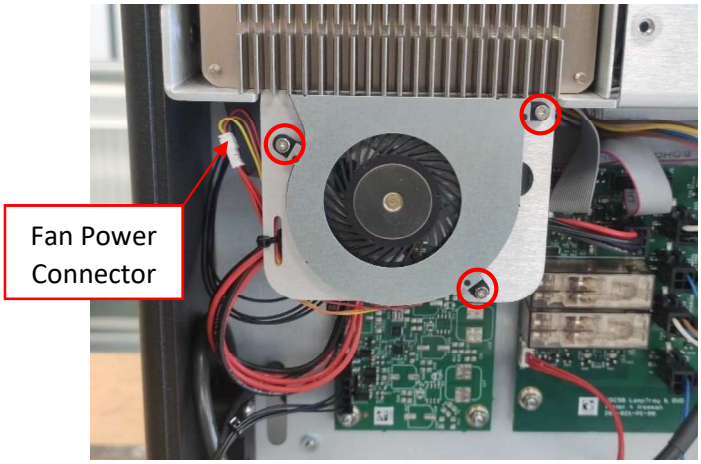

Fig. 23 - 3x (T8 Torx) Fixings that secure PC Fan to Unit.

6.7. Replacing Anti-Stokes Assembly

Method 1 – Remove the Anti-Stokes PCB only.

Gain easy access to the under-side of the Lamp-Tray by removing the Translight Tray.

Disconnect the power cable from the Anti-Stokes PCB. Remove the four screws that secure the PCB to the Anti-Stokes Heat Sink block. Remove the PCB.

NB. The PCB may need some coaxing to come away from the Heat Sink, this is because the PCB has thermal paste applied to it. Thermal paste must be reapplied if a new PCB is fitted.

Fig. 24 – 4x (T10 Torx) Anti-stokes PCB retaining screws.

Method 2 – Remove the complete Anti-Stokes Assembly.

Remove the Top Cover. Disconnect the power cable from the Anti-Stokes PCB (See Fig.24 above). Remove the four screws that secure the Anti-Stokes assembly to the Lamp-Tray. NB. Support the Anti-Stokes assembly when removing the screws as it will suddenly drop & potentially damage the unit/LEDs.

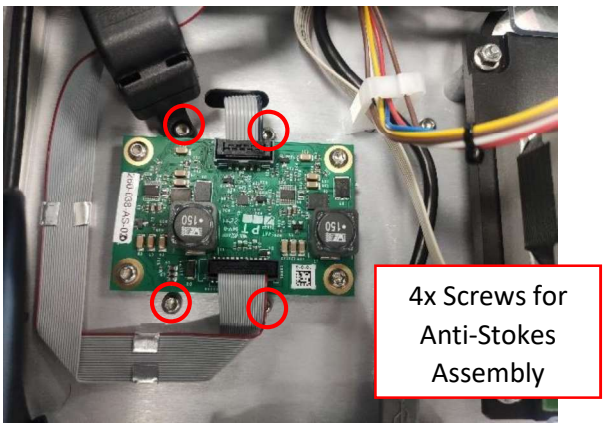

Fig. 25 – 4x (T10 Torx) Anti-stokes Assembly retaining screws.

(Found by removing top cover).

6.8. Replacing Anti-Stokes Driver PCB

Remove top cover. Disconnect both cables to PCB and remove four screws as shown below.

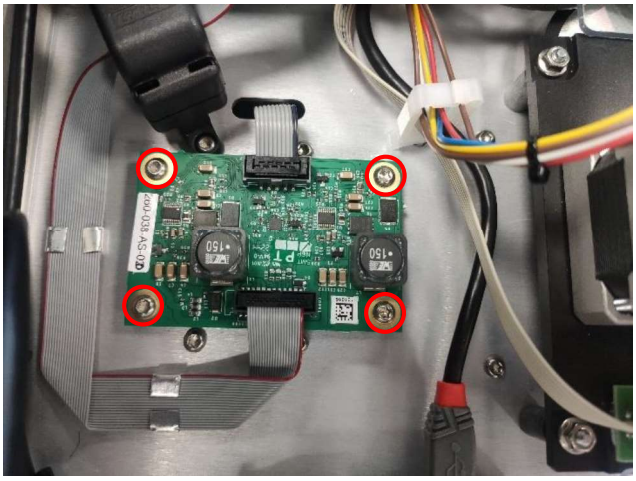

Fig. 26 – 4x (T10 Torx) Anti-Stokes Driver PCB retaining screws.

6.7. Replacing OVD PCB

Remove rear cover. Disconnect all cables to PCB and remove nuts as shown below. NB. Both Main & Lower PCBs have spacers behind them. If they are removed, ensure they refitted prior to PCB re-assembly. Locate and secure new board, reconnect cables. When re-connecting Stepper motor connectors, ensure correct orientation, via screen printing on PCB indicating wire colour and DO NOT push connector fully down.

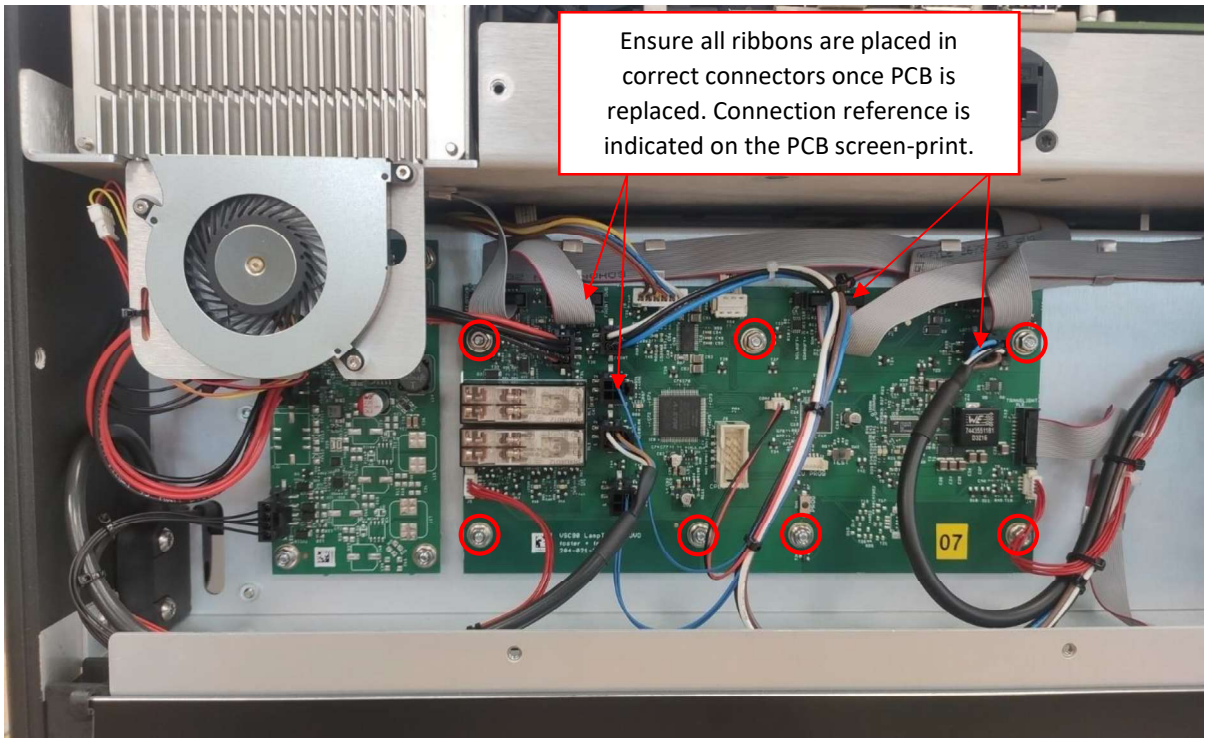

Fig. 27 – 7x (5.5mm Driver) OVD PCB retaining nuts.

6.8. Replacing UV Driver PCB

Remove rear cover. Remove PC fan (if fitted) to gain easy access to upper fixings. Disconnect all cables to PCB and remove nuts as shown below. NB. PCB has spacers behind it. If they are removed, ensure they refitted prior to PCB re-assembly. Locate and secure new board, reconnect cables.

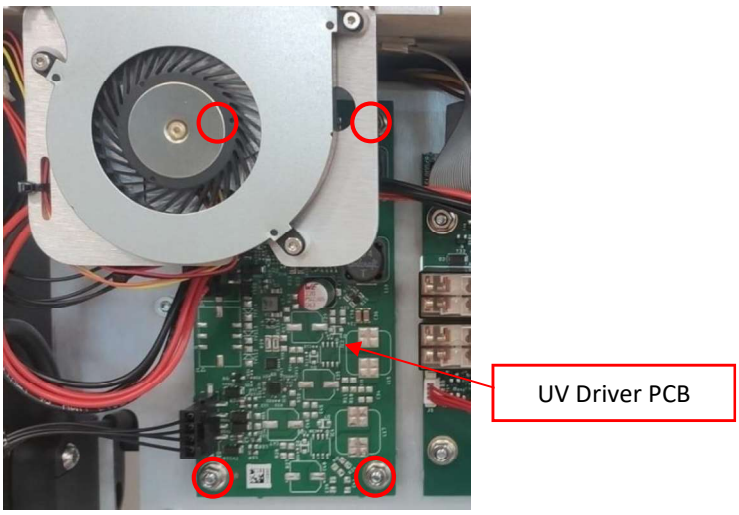

Fig. 28 – 4x (5.5mm Driver) UV Driver PCB retaining nuts.

6.9. Replacing UV PCBs & Flood PCBs

WARNING: Ensure power has been disconnect, UV radiation!

Gain easy access to the under-side of the Lamp-Tray by removing the Translight Tray. Locate the three nuts that secure each PCB Cover to each of the UV PCB & Flood PCB array.

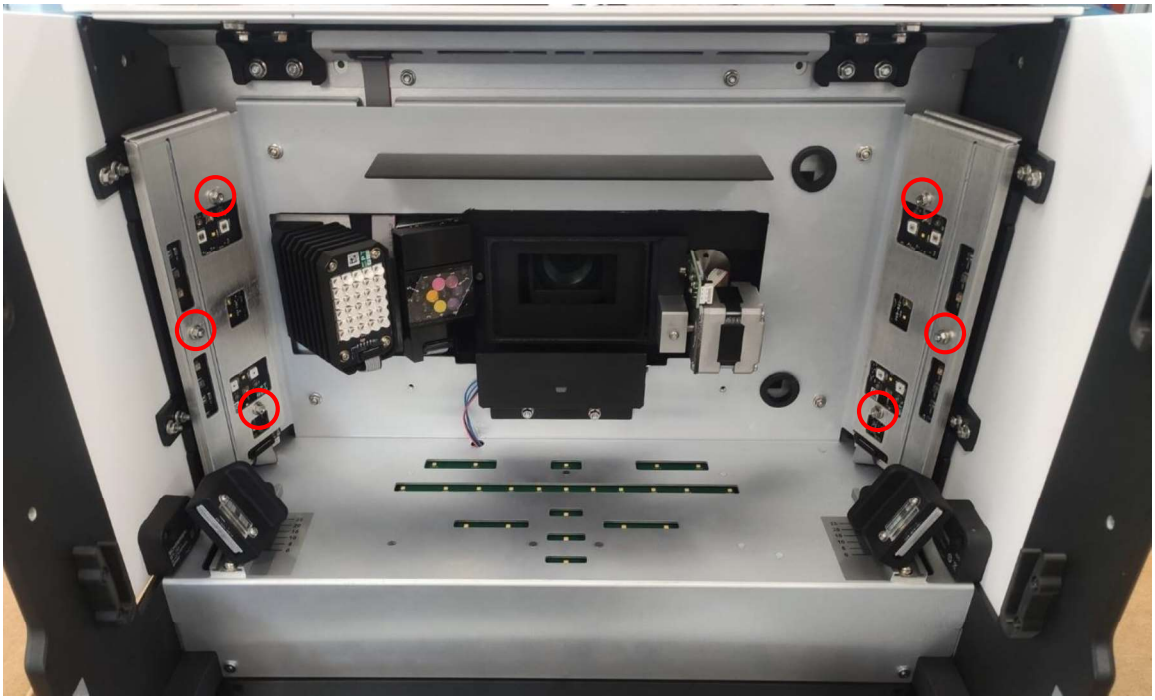

Fig. 28 – 6x (5.5mm Driver) UV Cover retaining nuts – 3x Per Cover.

Once the covers are removed, disconnect the cables to the PCBs. To remove the Flood PCB, remove the single flange nut located in the centre of the board. To remove the UV PCB, remove the two screws from either end of the board.

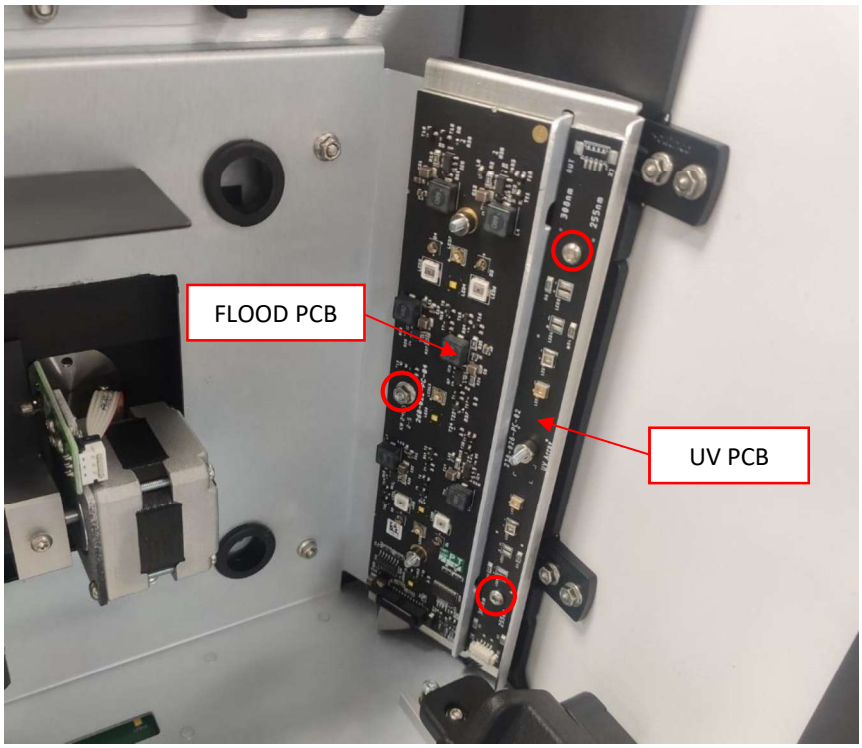

Fig. 29 – 1x (5.5mm Driver) retaining nut on Flood PCB & - 2x (T10 Torx) screw on UV PCB.

6.10. REPLACING SPOT LIGHT ARRAY

Raise the front flap and locate the Spotlight sub-assembly. Remove the screws shown below to remove spotlight sub-assembly. Once loose, disconnect the ribbon cable and replace.

Fig. 30 – 2x (T6 Torx) spotlight array retaining screws.

6.11. REPLACING TRANSLIGHT PCBS

RFID PCB:

Raise the front flap and remove Document Tray. Remove the Translight Tray as shown in Section 3.4. You can now gain access to the PCBs contained within.

The RFID is secured to the Translight Tray on 4 stands via push-in plastic rivets. These rivots can be removed by pressing them up from underneath & pulling them out. Once the rivets are removed, lift the RFID PCB up & disconnect the cable at the rear of the PCB. The PCB can now be replaced.

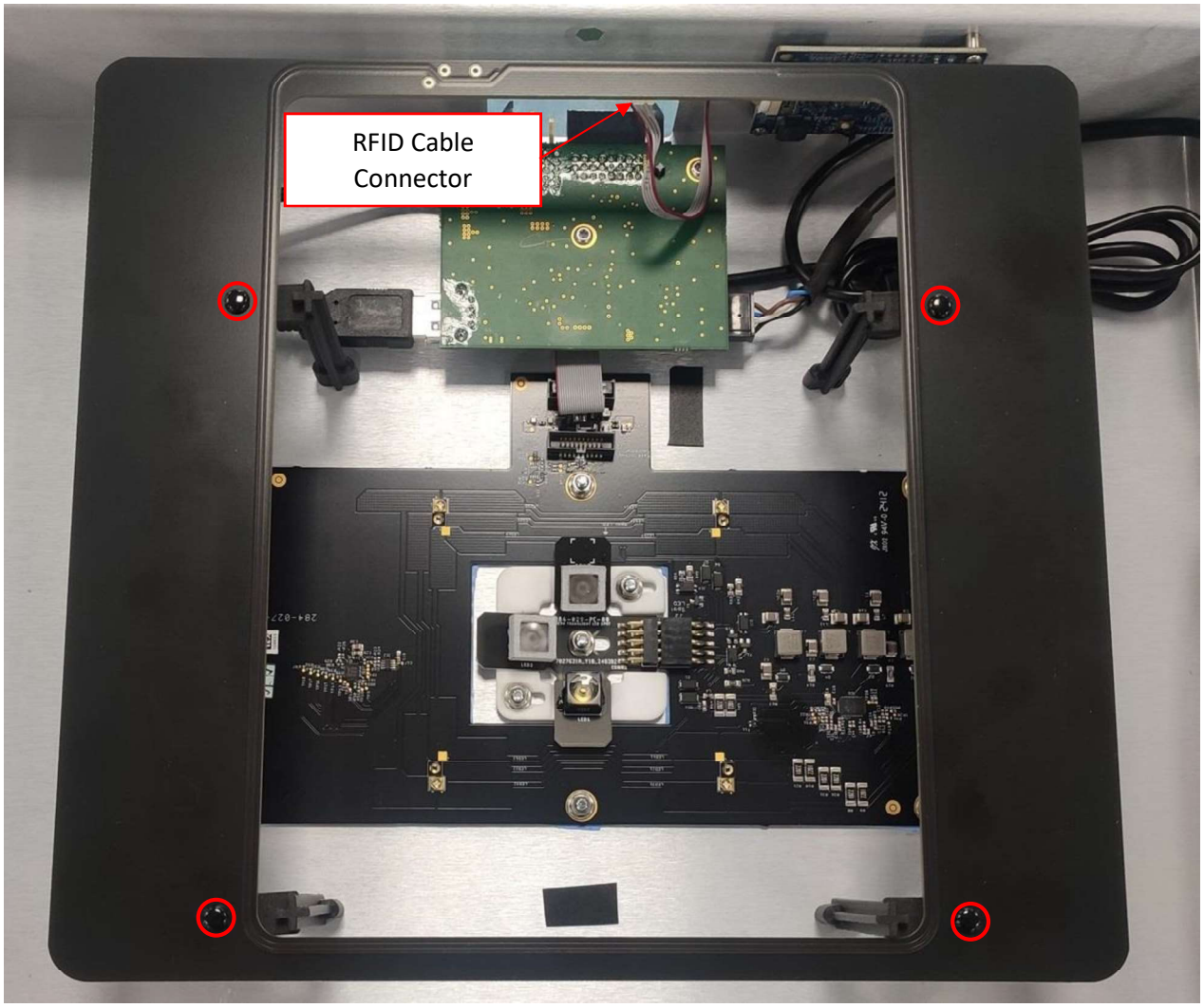

Fig. 31 – View of RFID PCB in Translight Tray secured with 4 Plastic Rivets

Translight PCB & Spot PCB:

Raise the front flap and remove Document Tray. Remove the Translight Tray as shown in Section 3.4. You can now gain access to the Main Translight PCB & the Centre Spot Translight PCB. NB. To gain easier access to the outer fixings on the Translight PCB the RFID Antenna can be removed. Remove the appropriate nuts & cables & replace. When replacing the Centre Spot PCB, only remove the centre nut. Replacement PCB will be flat & will bend into position when centre nut is fully tightened. Ensure replacement Centre PCB have Lens's/Filters attached.

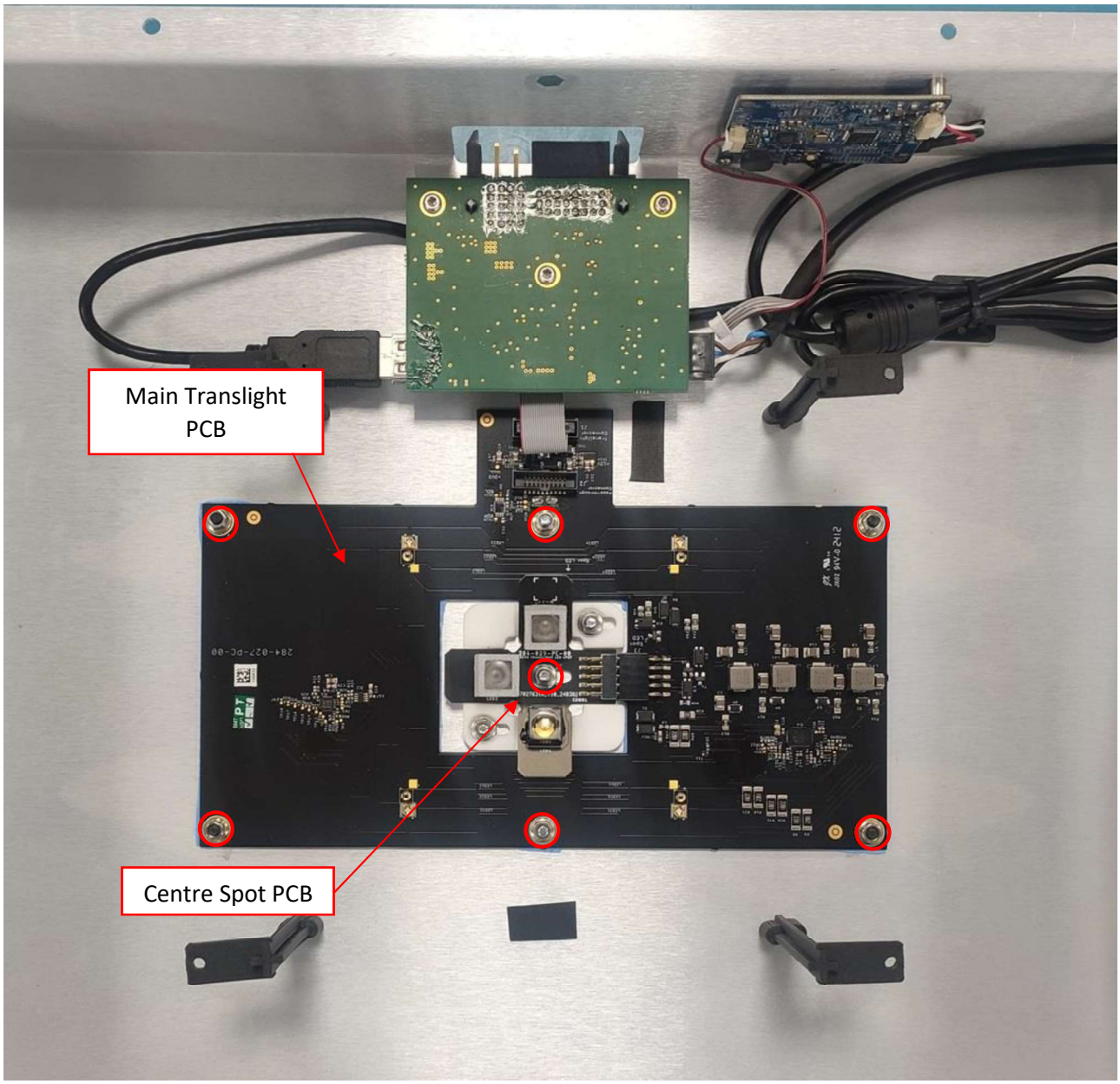

Fig. 32 – View of Trans-Light PCB when removed from document tray (7x retaining Nuts)

6.12. REPLACING BACKPLANE PCB - TRANSLIGHT TRAY

Raise front flap and remove document tray. Remove the Translight Tray as shown in Section 3.4. Disconnect cables & remove the three nuts that secure Document Tray Backplane PCB to Trans-Light Cover Assembly. When securing new PCB ensure it is centrally located.

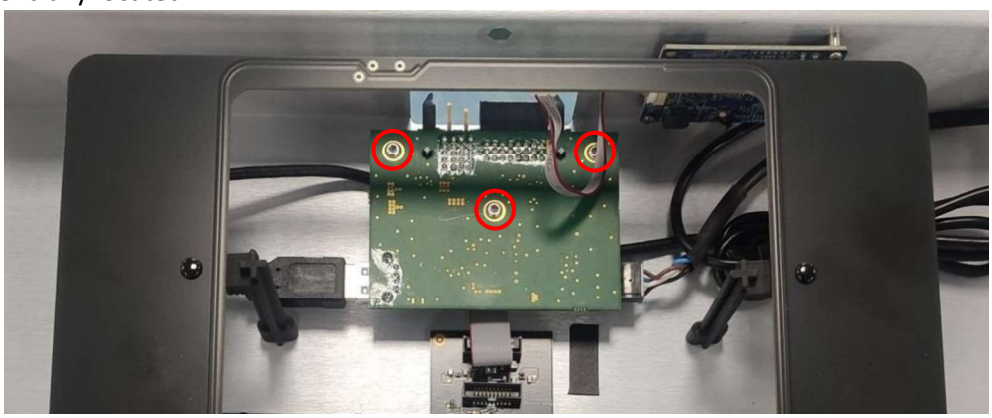

Fig. 33 – 3x (T10 x Torx) retaining screws on Document Tray Backplane PCB

6.13. REPLACING BACKPLANE PCB - FRAME

Raise front flap and remove document tray. Locate Frame Backplane PCB at rear of unit and remove the four fixing screws. Once free, disconnect cable and replace board. When securing new PCB ensure it is centrally located.

Fig. 34 – 4x (T10 Torx) retaining screws on Backplane Frame PCB

7. LABEL INDENTIFCATION

Main Serial Label

The Main Serial Label is located on the rear of the unit, fixed in the lower right corner.

Fig. 35 – Main Serial Label

Risk Group Label

The Risk Group Label is located on the rear of the unit, fixed in the lower left corner.

Fig. 36 – Risk Group Label

UV No Entry Label

The UV No Entry Label is located on the rear of the unit, fixed centrally to the lower rear flap

Fig. 37 – UV No Entry Label

RFID FCC ID Label

The RFID FCC ID Information label is found on the rear of the removable Trans-light tray.

Fig. 38a – Rear of Translight Tray show location of FCC ID Label

Fig. 38b – RFID FCC ID Label

8. Fitting Of Optional Accessories/Modifications

Power leads must only be replaced with approved leads that have equal or better rating.

9. Troubleshooting

8.1. Prerequisites

8.2. Update File Types

8.3. Important Notes

8.4. Checking Current Firmware Version

8.5. How To Update Software/Firmware

8.6. Bootloader

8.7. Fault Codes