



NextWindow 2500 Series Optical Touch Screen Integration Guide

Confidential

Doc Ref #	DOC000294
Date	03/06/10
Revision	1.1
Author	S.Whitaker

Specifications subject to change without notice
Copyright NextWindow Ltd. 2010. All rights reserved.

Table of Contents

1. Introduction	4
1.1. Related Documents	4
1.2. Getting Started	4
2. System Overview	5
2.1. Components	5
2.2. Cameras	6
2.3. Controller Board	6
2.4. Retroreflective Bars	6
3. Mechanical Considerations	6
3.1. Top of Screen Buffer	6
3.2. Active Area to Retro Border	7
3.3. General Clearances	7
3.4. Glass Substrate	9
3.5. Mounting Touch Screen	9
3.6. Stylus Design	24
4. Controller Board Considerations	24
4.1. Location	24
4.2. Mounting	24
4.3. Flexible Flat Cables	25
5. Electrostatic Discharge Considerations	26
5.1. Path Determination	26
5.2. Controller Board Protection	26
5.3. Camera Protection	26
5.4. Retroreflective bars	27
6. USB Connection	27
7. Software	28
7.1. Device Driver	28
7.2. Touch Screen Calibration Utility	29

Revision History

Name	Date	Reason for change	Version
S.Whitaker	04/06/10	First formal release	1.0
J.Shaw	02/08/10	<ul style="list-style-type: none">• Added note about active area of retro border when using stylus verses using finger (section 3.2)• Added example drawings for integration methods (section 3.5)• Controller Board Mounting max screw head size changed from 5.3 to 5.5mm (section 4.2)• Countersink screw changed to Cap head screw in figure 15, (section 3.5.3).• Added note about DSP mounting with nylon washers (section 4.2).• Added note about glass flatness (section 3.4)• Added further details about bezel type mounting (section 3.5.2)	1.1

1. Introduction

This document provides technical design guidelines for integration of NextWindow's 2500 series optical touch screen. The intended audience for this document is engineers experienced in monitor design and integration.

Designed for large-format display applications, the NextWindow 2500 touch screen has thin borders and a low profile for easy integration into a wide range of monitor sizes.

The 2500 optical touch screen supports Windows 7 multi-touch functions, such as zoom, rotate, tap, and press-and-tap. It can be supplied as a kit of components (optical sensors, passive border and controller board) ready to be assembled on glass or a fully-assembled touch screen (including glass).

Please contact your local NextWindow sales representative for further information and support.



Figure 1: 2500 Optical Touch Screen

1.1. Related Documents

Ref.	Title	Description
1	2500 Series Approval Specification	Specification of the 2500 Optical Touch Screen
2	Touch Screen Calibration Utility Specification	Specification for NextWindow Touch Screen Calibration Utility
3	2500 Kit Assembly Guide	Defines operating procedures for integrator assembly and configuration of 2500 kit product option
4	2500 On-Glass Assembly Guide	Defines operating procedures for integrator assembly and configuration of 2500 on-glass product option

1.2. Getting Started

It is recommended that the following be considered when integrating the 2500 optical touch screen:

1. Requirements for mounting the touch screen inside the monitor chassis as detailed in section 3.
2. Requirements for mounting the controller board and routing the Flexible Flat Cables (FFC) as detailed in section 4.
3. Recommendations for Electrostatic Discharge (ESD) mitigation as detailed in section 5.
4. Universal Serial Bus (USB) connection as detailed in section 6.
5. Software for user operation and configuration as detailed in section 7.
6. Assembly. For assembly procedures please refer to documents [3] and [4].

NextWindow would like to work with integrators during the design phase of the system. We also request the opportunity to review the system design prior to design freeze to ensure optimum performance of the touch screen.

2. System Overview

The 2500 optical touch screen consists of a controller board, passive retroreflective border, glass substrate and two cameras modules.

The cameras are located in the upper corners of the display. Each camera consists of an infrared (IR) light source and a sensor that measures the reflected light in a 90-degree sweep. When no touch is present the two cameras see a relatively uniform level of reflected IR light across the substrate. If a finger or other object touches the substrate it blocks the light from the reflectors, causing the cameras to see a silhouette (shadow) of the object.

A controller board collates the camera output signals, supplying touch data to the host computer over the Universal Serial Bus (USB). A device driver installed on the host system analyzes this data, supplying the operating system with touch coordinates.

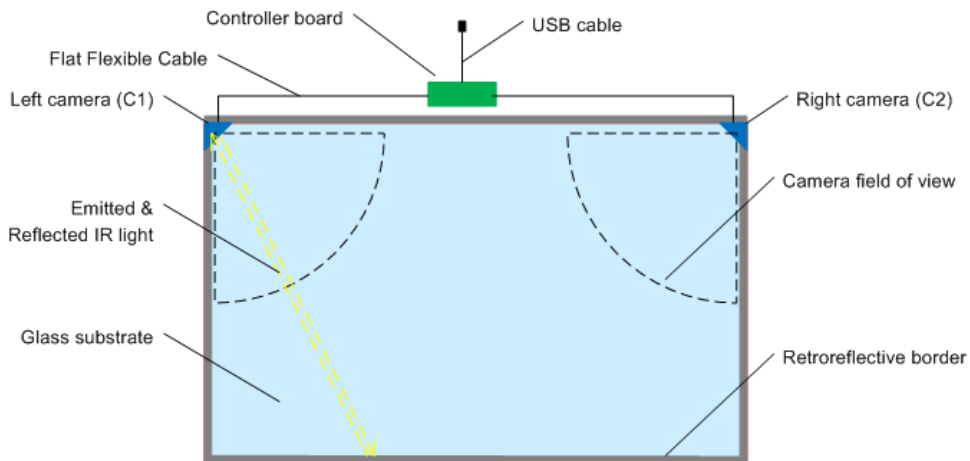


Figure 2: 2500 Optical Touch Screen System

2.1. Components

The NextWindow 2500 series touch screen is comprised of seven components:

1. Touch screen controller board
2. Left camera clip assembly
3. Right camera clip assembly
4. Left side passive retroreflective bar
5. Right side passive retroreflective bar
6. Glass substrate (Supplied by integrator for the kit option)
7. Base passive retroreflective bar

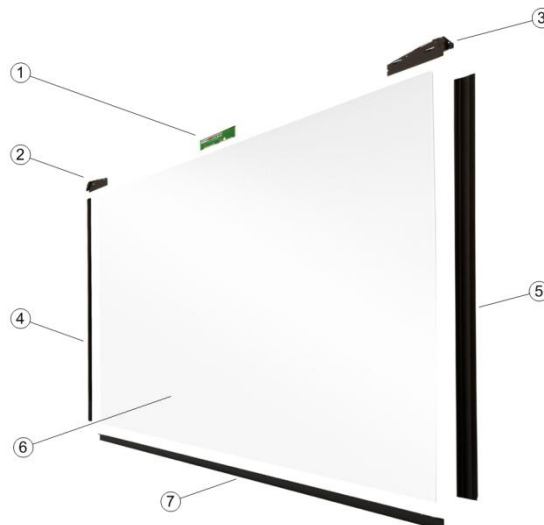


Figure 3: NextWindow 2500 Components

2.2. Cameras

The 2500 touch screen has two camera modules located at the top corners of the display. The camera module is supplied as a clip for ease of assembly onto the glass substrate. The clip is bonded to the glass substrate in a two stage process using DOUBLE SIDED tape and UV cure adhesive. Each camera is connected to the controller board through a Flexible Flat Cable (FFC).



Figure 4: Left Camera Assembly

2.3. Controller Board

The controller board includes the signal processor and the USB interface. When integrated, the controller board needs to be mounted within the monitor bezel or at the rear of the monitor inside the chassis cover. The integration guidelines must be followed for robust operation to meet EMI/EMC and ESD requirements. An appropriate USB cable needs to be supplied (See section 6).

2.4. Retroreflective Bars

The three retroreflective bars provide a passive border to reflect IR light back to the camera modules. These need to be assembled onto the left, right and bottom edges of the glass substrate.

3. Mechanical Considerations

Optical touch technology requires a line of sight to the retroreflective border, any bow or twist in the touch screen can reduce the signal strength, potentially impacting performance. Both the glass substrate and chassis mounting significantly impact the rigidity of the solution and hence require consideration during the design phase.

3.1. Top of Screen Buffer

A touch location is calculated by triangulating the shadows seen by both cameras. The top of the screen accuracy can be optimized by increasing the triangulation angle. This is achieved by mounting the cameras higher than the active area of the monitor, creating a buffer zone. In practice the limitation tends to be the allowable thickness of the “forehead” of the monitor bezel. Figure 5 details the minimum recommended buffer. For larger monitor sizes the thicker bezel typically allows for a larger buffer and it is recommended that the buffer is maximized where possible.



Figure 5: Top of Screen Buffer

3.2. Active Area to Retro Border

On 2500 standard sizes, the retro reflective bars are designed to be 2 to 3mm larger than the active area of the display panel so that when a 7mm stylus is positioned against the inside edge of the retroreflective bar, the centroid of the stylus will align with the edge of the outside edge of the active area. Note that 2-3mm is for most standard display panels on the market at the time of writing. This figure may not be accurate for all panels. (Refer to Section 5 of the 2500 Optical Touch Screen Approval Specification [DOC000293-REV1.0] for details of the active area of standard models).

Alternatively, if the application requires touch using a finger or larger stylus up to the edge of the active area, a custom kit will be required that allows for approximately 6.5mm distance between the inside edge of the retroreflective bar and the edge of the active area. This option will also require ceramic masking of the glass to hide the exposed frame of the underlying panel. The dimension of the viewable area of the front bezel or enclosure will also need to be designed to fit accordingly.

3.3. General Clearances

The monitor chassis and bezel should be designed to provide clearance to the touch screen components. This ensures that excessive force is not applied to the touch screen and that there are no obstructions in the camera line of sight. The clearance requirements around the cameras, centre top and sides are detailed in Figure 6. Further recommendations are listed below:

- Internal surfaces of the bezel should be matte finish (fine spark, not high gloss) to minimize internal reflections of light into cameras.
- No ribs or features should be placed in the clearance zone.
- The current camera height is 3mm above the surface of the glass, but to allow for future camera design enhancements a minimum of 4.5mm should be allowed.
- Refer to section 4 for controller board clearance requirements.

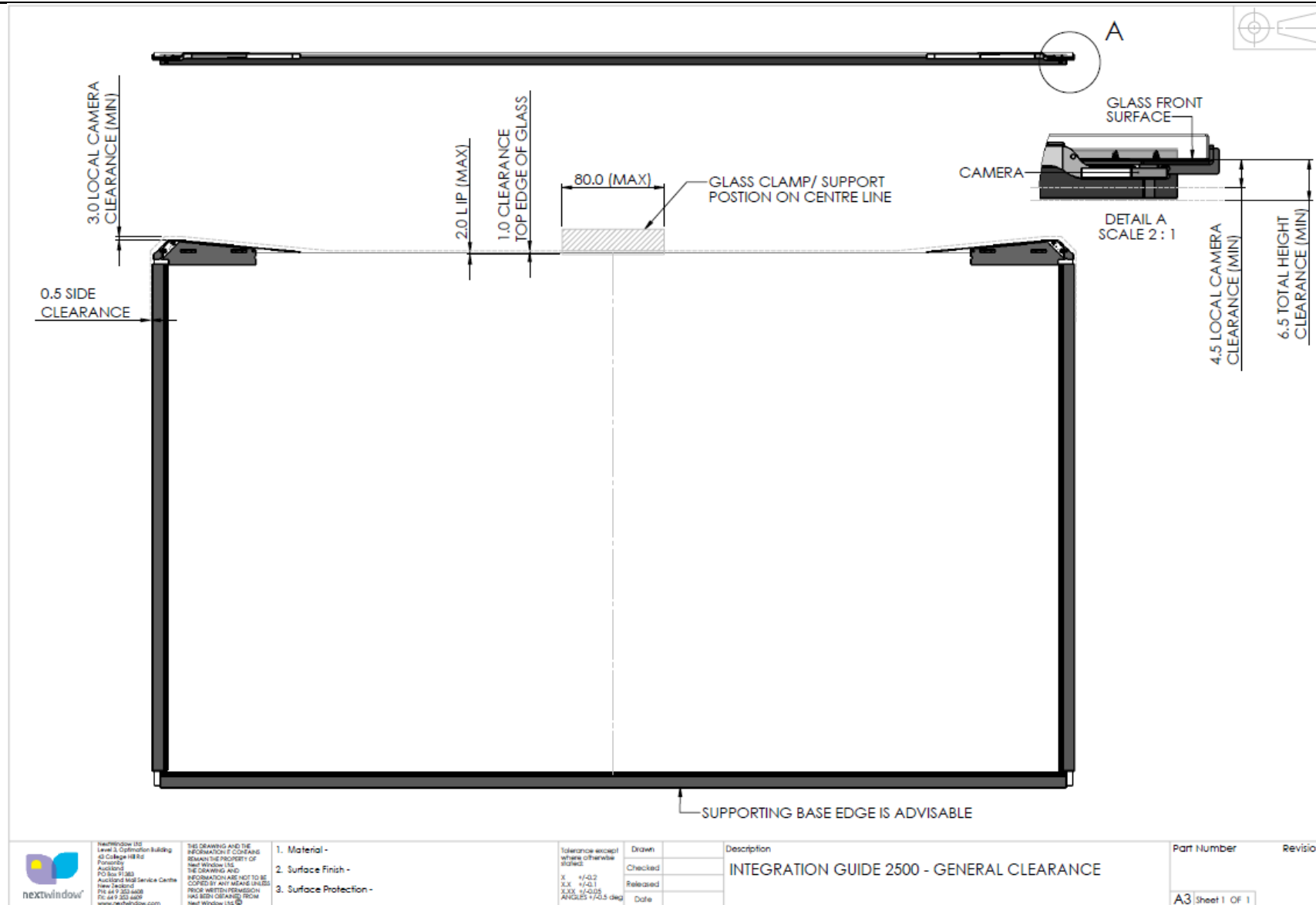


Figure 6: Screen Clearance Requirements

3.4. Glass Substrate

The thickness of the glass substrate has a significant impact on its rigidity. NextWindow recommends utilizing 4mm thick glass with appropriate clamping to the display chassis. The minimum thickness of glass supported by the camera clip is 3mm.

For the kit option the integrator supplies the glass substrate. At a minimum the supplied glass shall meet the specifications defined in Table 1.

1.

Ref.	Item	Min.	Typ.	Max.	Unit
3.4.1.	Glass thickness	3.0	4.0	None	mm
3.4.2.	Edge 45° chamfer	0.3	0.5	0.7	mm
3.4.3.	Edge finish	Smooth Arris			
3.4.4.	Tempered glass.	Recommended to meet specifications for glass breakage defined in EN/UL 60950			
3.4.5.	Recommended glass hardness	Mohs 6 or higher			

Glass Substrate Requirements

As defined in the 2500 Series Optical Touch Screen Approval Specification (DOC000293) the flatness of the touch screen needs to be considered when defining the monitor chassis design and assembly procedures. For some glass manufacture processes the glass may have an inherent bow. In this event, robust inspection and handling procedures need to be implemented to ensure the touch screen is mounted on the concave surface as detailed in Figure 7. One such method is to pre-screen glass using a granite table and feeler gauges, marking the concave side for production.

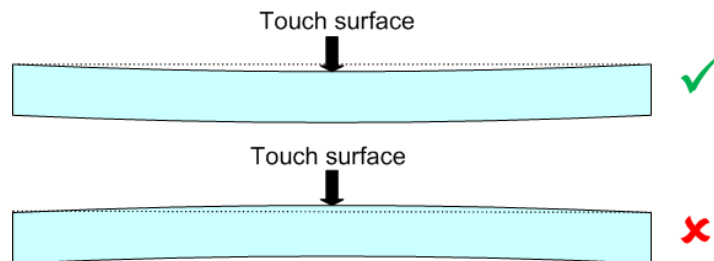


Figure 7: Touch Screen Mounting for Glass Bow

3.5. Mounting Touch Screen

Consideration should be given to the mounting design to ensure that a rigid structure is provided to support the 2500 optical touch screen in the monitor chassis, preventing excessive bow and twist.

Examples of four mounting types below are shown in detail below:

- [Sheet metal welded bezel](#)
- [Extrusion type bezel](#)
- [Mounting with brackets to display panel](#)
- [Mounting with double sided foam tape to display panel](#)

NOTE: The following examples are offered as guide lines for assisting design and integration of the 2500 touch screen into a display panel. Integrators are responsible for finished design and must test thoroughly.

¹ It is assumed the integrator will add further glass quality requirements as required.

3.5.1. Type 1: Mounting with sheet metal welded bezel to monitor

This method of integration will yield the narrowest monitor bezel width, as the bezel can be screwed directly to the LCD panel.

Considerations for integrating the 2500 touch screen onto the display panel.

Display Panel: The display panel must have drilled and tapped holes around the outside edges of the panel to receive the bezel mounting screws.

Gasket: A dust gasket should be provided to seal the gap between the touch screen glass and the display panel.

Welded Bezel:

- The welded bezel is fastened directly to the display panel through the tapped mounting holes on the panel.
- The bezel should comprise integrated support blocks or bars along the length of the base and sides of the bezel (See Figure 9 for detail) as a means of aligning the touch screen to the centre of the bezel and active area of the display panel.
- Countersunk machine screws should be used to provide accurate location and additional rigidity.
- The touch screen should be mounted directly into the welded monitor bezel, which will serve to make the bezel more rigid.

Assembly of the touch screen and bezel:

- To install the touch screen into the bezel, double sided Tape should be applied along the mating surfaces of the support blocks. The double sided tape will bond the touch screen to the bezel between the support blocks and the aluminium extrusion of the touch screen.
- Remove the protective film from the double sided tape and assemble the touch screen into the bezel.

There are two methods of assembling the touch screen and bezel.

- a) The Touch screen may be raised up off a flat work surface with foam blocks and the bezel is then lowered down onto touch screen. This method provides the integrator with a visual indication of the alignment of the touch screen retro reflective bars to the edges of the bezel.
- b) An alternative method is to lower the touch screen down into the bezel, visually aligning the welded guide blocks to edge of the touch screen.

The integrator should decide the best method for assembly so that that the touch screen is accurately installed central to the bezel.

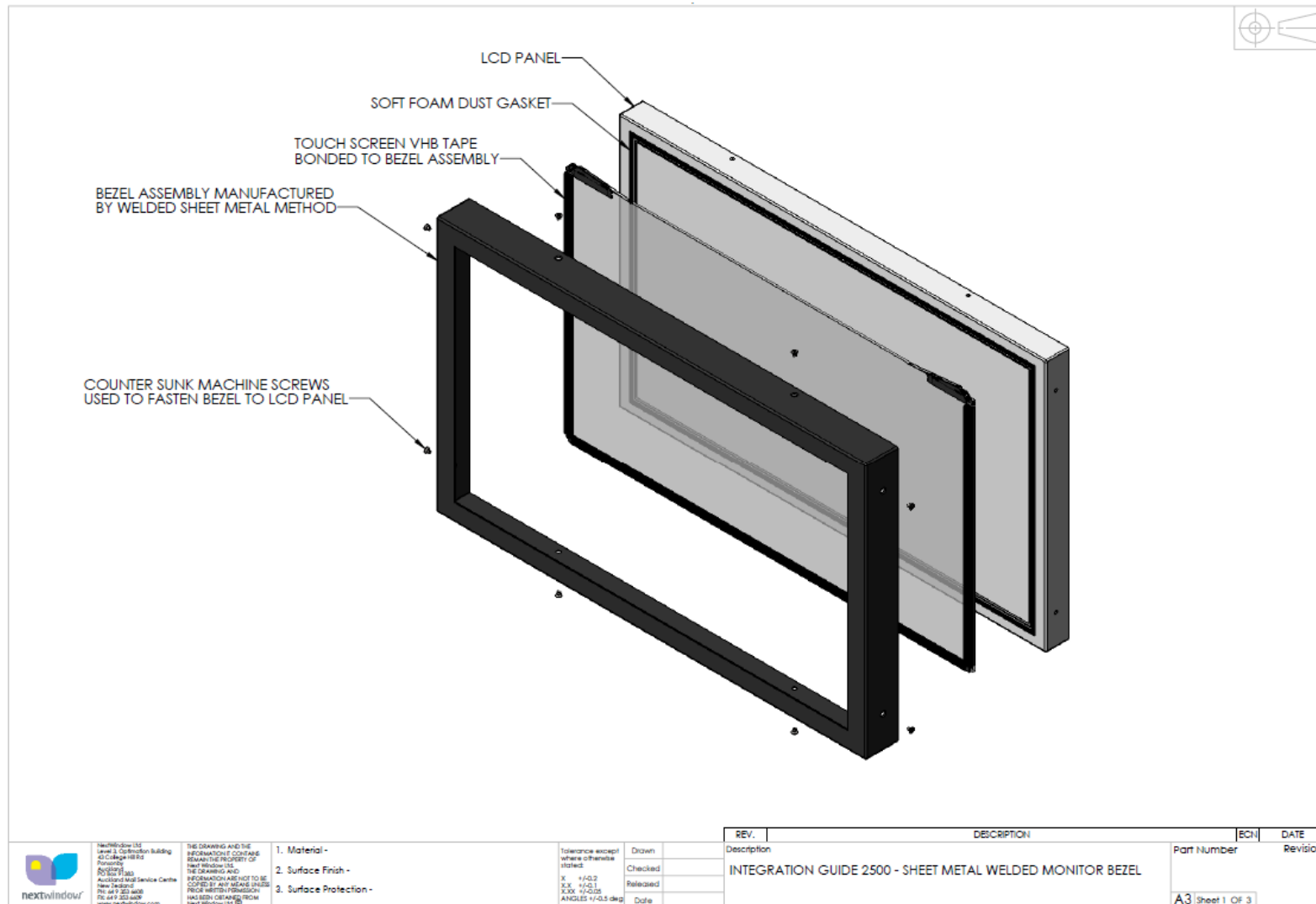


Figure 8: Exploded view of sheet metal welded monitor bezel

IF IN DOUBT, ASK!

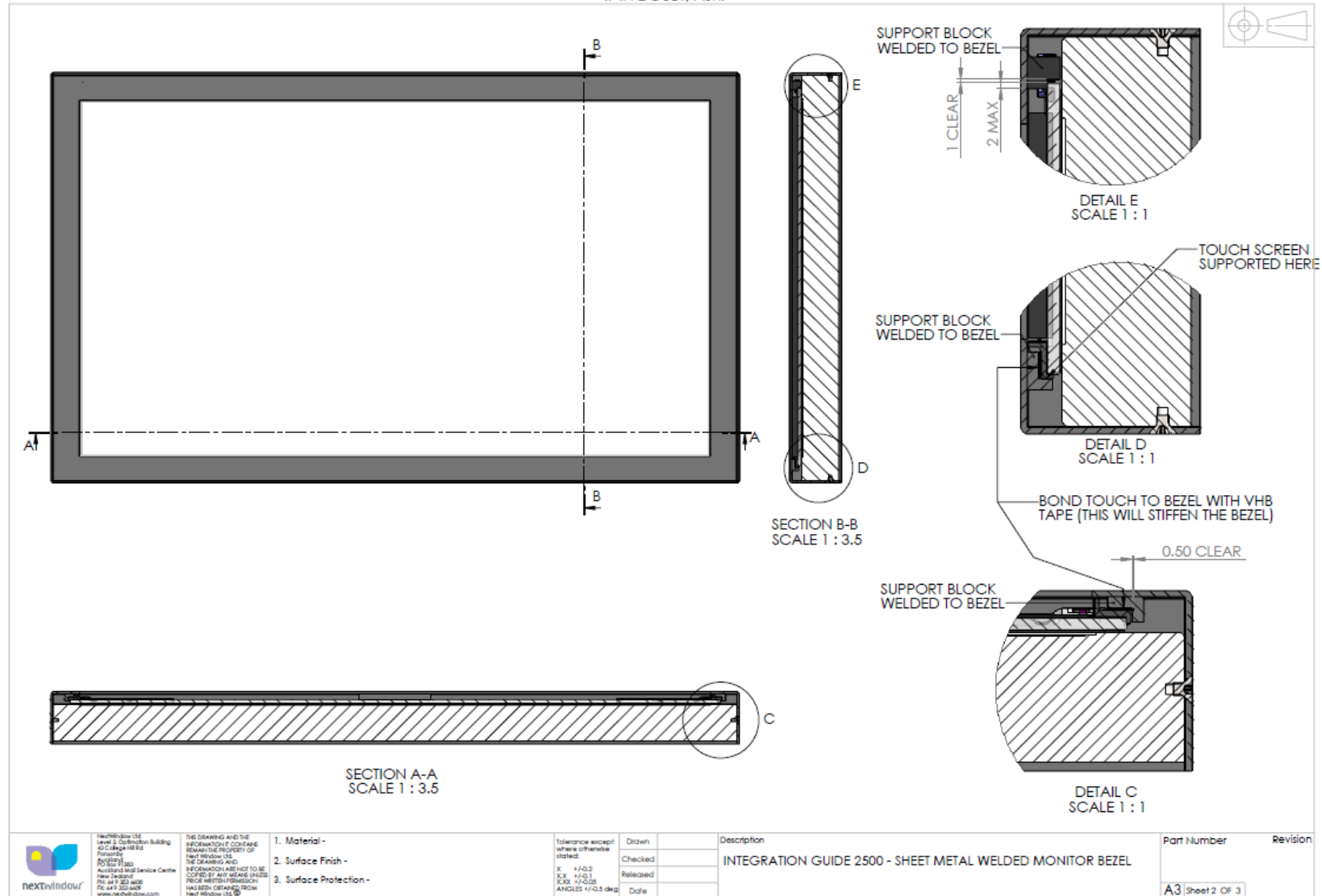


Figure 9: Detail of sheet metal welded monitor bezel showing integrated cross-sections.

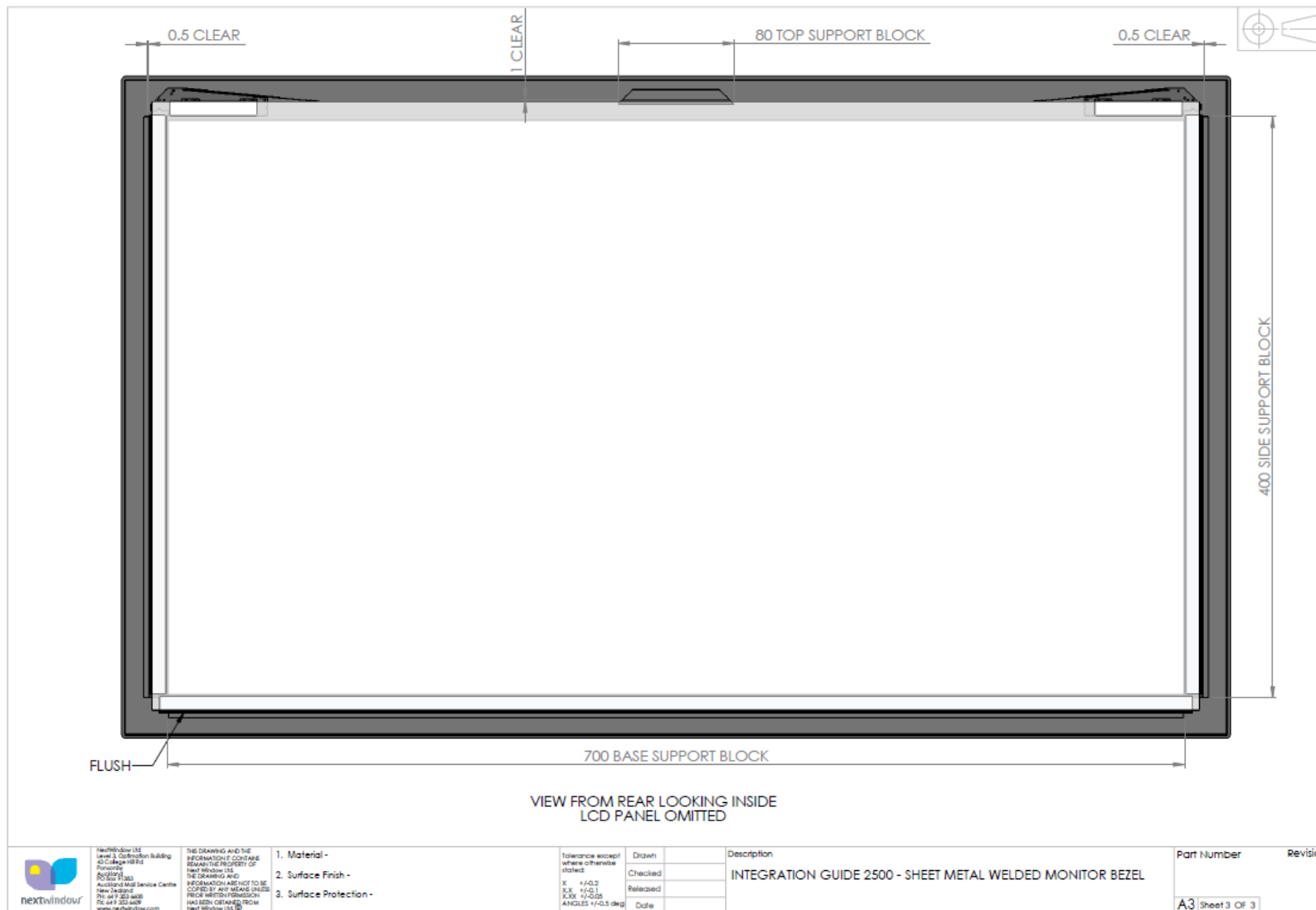


Figure 10: Rear view of welded monitor bezel showing integrated 2500 touch screen

3.5.2. Type 2: Mounting with extrusion type bezel

Display Panel: The display panel must have drilled and tapped holes around the outside edges of the panel to receive the mounting screws for the display panel brackets.

Display panel brackets Rigid brackets should be screwed to the display panel around all four edges. The touch screen/bezel assembly should be attached to the panel brackets. Countersunk machine screws should be used to provide accurate location and additional rigidity.

Gasket: A dust gasket should be provided to seal the gap between the touch screen glass and the display panel.

Extrusion:

This design uses a common extrusion to manufacture the bezel. The extrusion has been machined for integration of the 2500 touch screen. A brief description of the extrusion profile and machining requirements illustrated in figure 12 are described below: Corresponding CAD files for the extrusion type bezel are available from Next Window on request.

- **Detail C:** Illustrates the bezel extrusion profile for top-of-glass touch screen support. In this design, the length of the extrusion is machined to remove profiles F, G and H (see extrusion detail on Figure 12) except for the region shown at position J in Figure 13, where 80mm of the extrusion profile is retained to prevent outwards bow at the top centre region of the glass.
- **Detail D:** When assembled, the lower retro support of the touch screen is supported by the bezel extrusion at point G (shown in Figure 12). In this design, profile G of the bezel extrusion is machined, removing 1.5mm along its full length to enable a 1.0mm clearance gap between the top of the glass and the bezel extrusion (illustrated in Detail C) when the touch screen is assembled into the bezel.
- **Detail E:** In this design, the side members of the extrusion bezel shown in detail E are machined at point G, removing 2mm along their length to allow for lateral clearance and positioning of the touch screen into the bezel.

Assembly of the touch screen into the extrusion type bezel:

- Lay the assembled extrusion type bezel face down onto a flat work surface.
- Pick up the touch screen assembly from the rear of the panel using suction cups and lower it into the extrusion pocket. Make sure the DSP and FFC cables are secured out of the way to avoid damage during assembly.
- Clean the touch screen glass and display panel thoroughly with a lint free cloth, ensuring that there is no dust, smears or finger prints present.
- Lift the display panel and lower it over the touch screen into the bezel assembly, again making sure that the DSP board and FFC cables do not get damaged.
- Fasten the display panel onto the bezel using M4 counter sink machine screws
- Route the camera FFC cables into the rear of the display panel and fasten the DSP board to the display (see section 4 for further details).
- Plug the USB cable into the DSP board and place the monitor rear cover onto the back of the display panel. Fasten using self tapping screws.

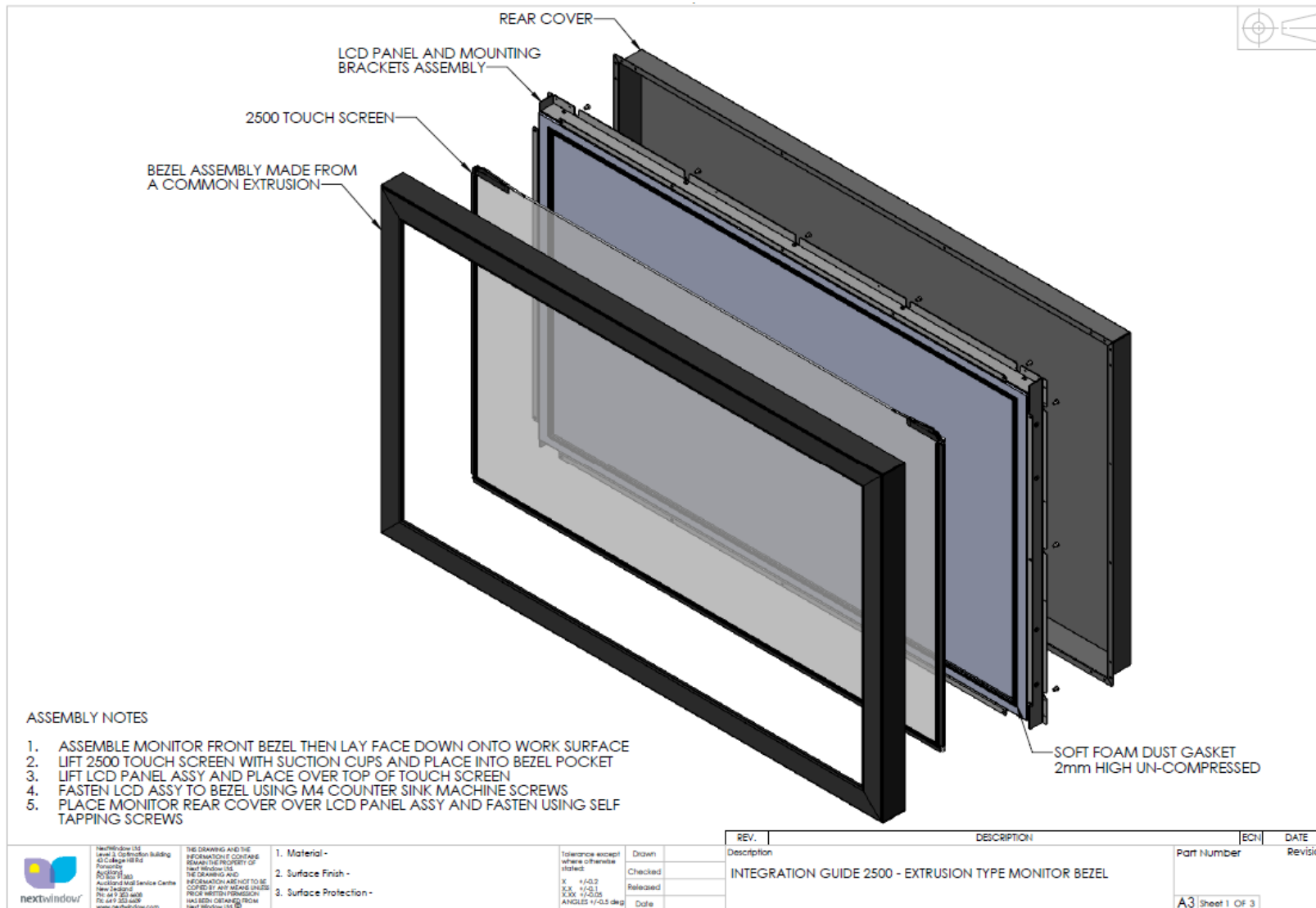


Figure 11: Exploded view of extrusion type front bezel

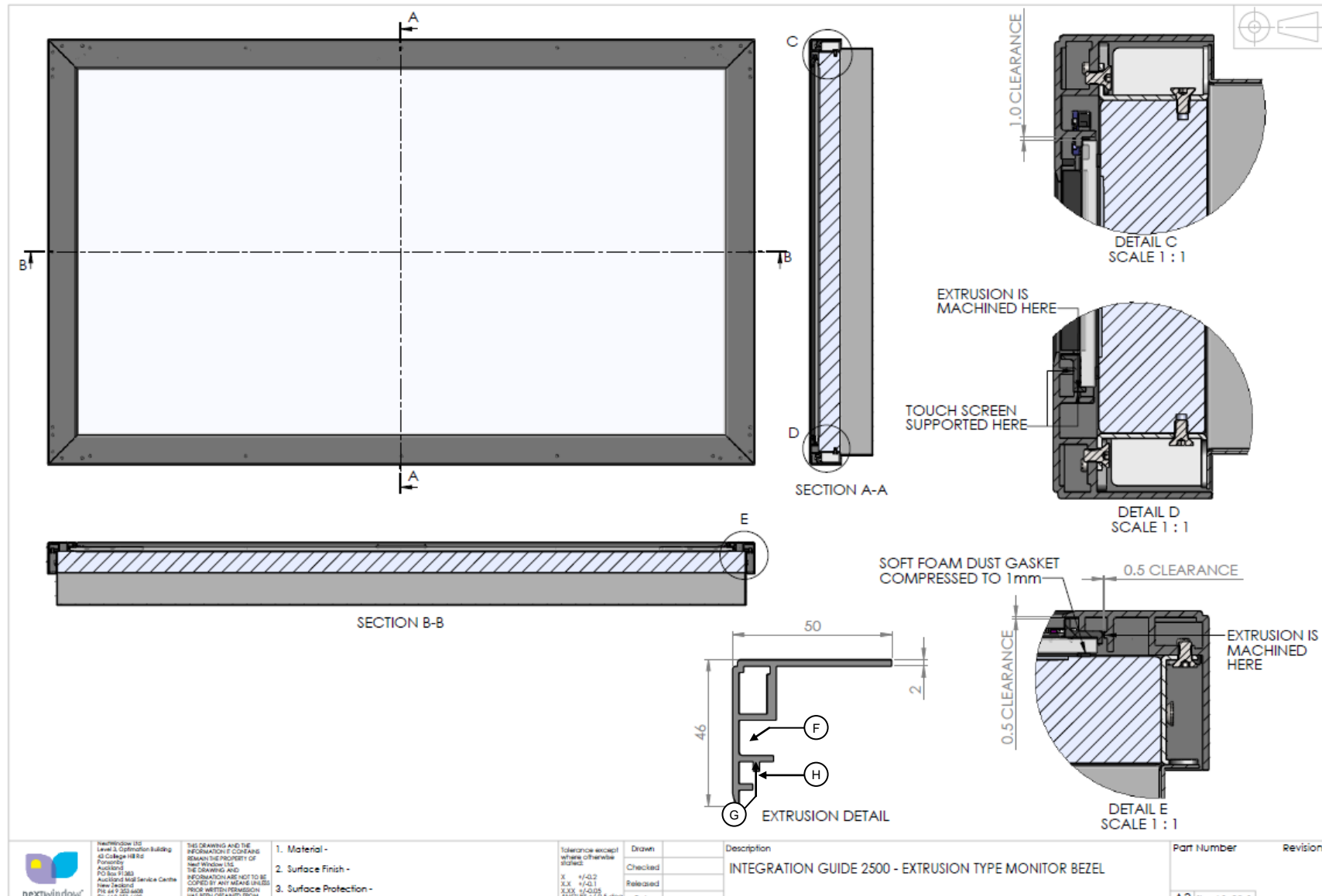


Figure 12: Detail of extrusion type front bezel

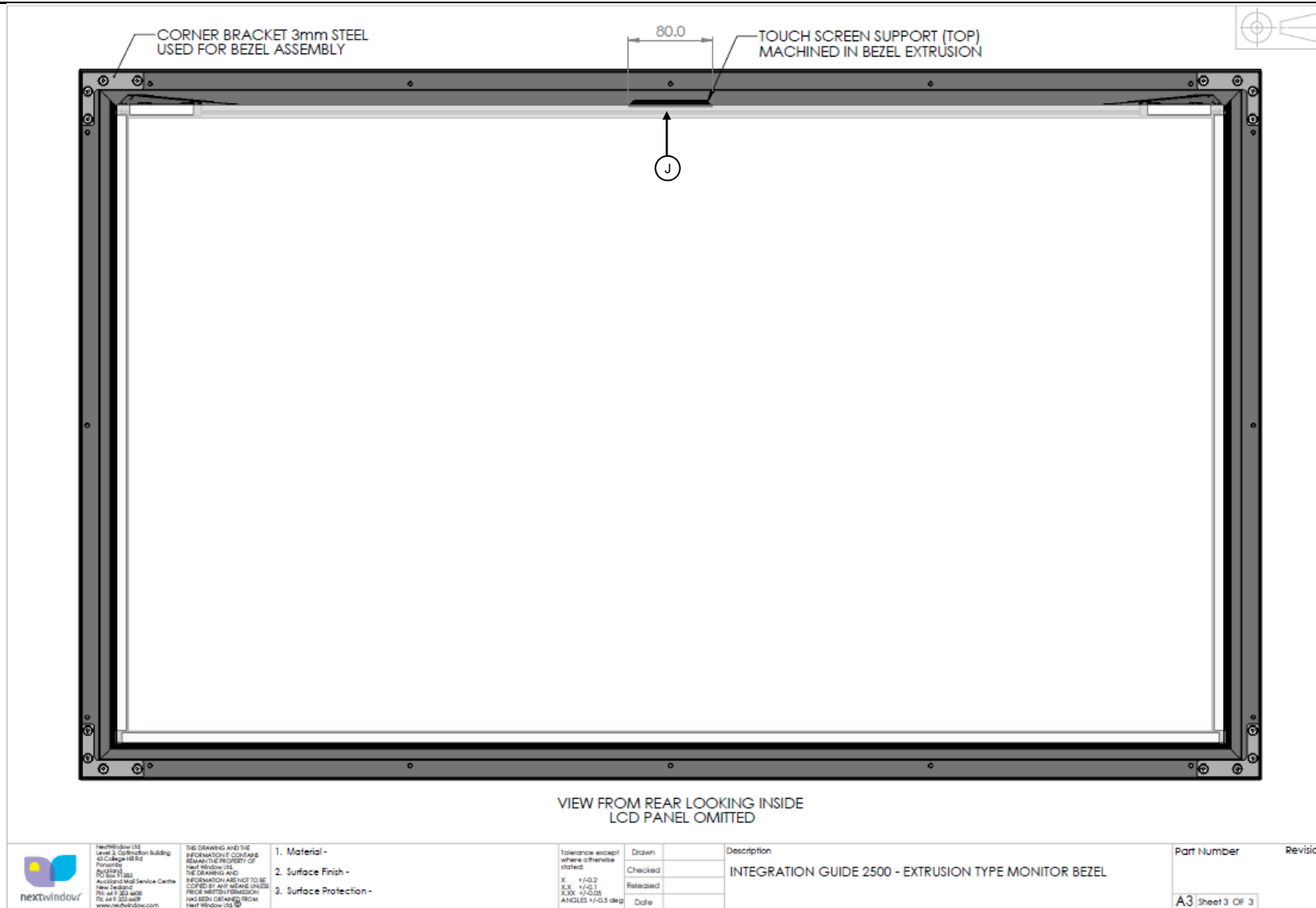


Figure 13: Rear view of extrusion type front bezel showing integrated 2500 touch screen

3.5.3. Type 3: Mounting with sheet metal brackets to Display Panel

This is the preferred method for ease of service and maintaining. If the glass or display panel requires cleaning, or the display panel requires servicing, the touch screen can be easily removed and reinstalled.

Display panel brackets (A). Rigid brackets screwed to the display panel around all four edges. The touch screen mounting brackets and bezel should be attached to the panel brackets. Additional strengthening brackets can be added to each corner, in so doing forming a single rigid structure around the edge of the panel. Countersunk machine screws should be used to provide accurate location and additional rigidity.

- **Touch screen mounting brackets (B).** These brackets clamp the touch screen to the display panel brackets at the corners and in the centre of the long sides. The example below illustrates a smaller display, for larger sizes it is recommended that either an increased number or longer brackets be used. Note that the top centre bracket needs to meet the clearance requirements and clamp directly onto the glass substrate. It is critical this top centre bracket be a matt finish so not to reflect light back to the camera.
- **Gasket.** A dust gasket should be provided to seal the gap between the touch screen glass and the display panel.
- **Bezel.** The bezel is fastened to the display panel brackets. Compared to other schemes this reduces the requirement for bezel rigidity, allowing more flexibility for industrial design.

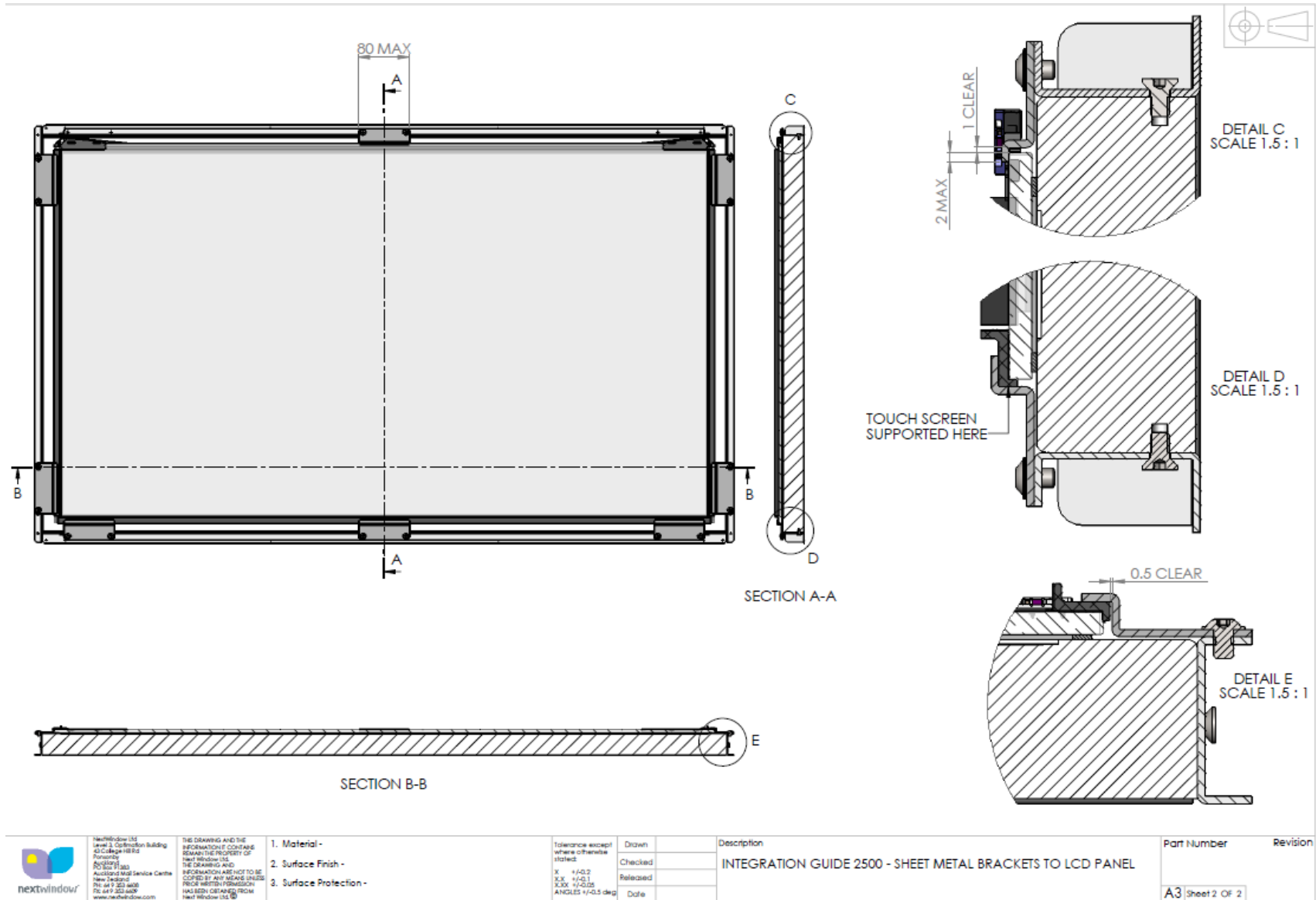


Figure 15: Detailed cross section view showing mounting with brackets to Display Panel

3.5.4. Type 4: Mounting with double sided tape to display panel

The 2500 can be mounted to the display panel using double sided foam tape. The display panel and touch screen assembly can then be placed into an appropriate display enclosure.

NOTE: This is not the preferred method of integration due to service difficulties. If touch or display panels need to be removed for servicing after integration, there is a high risk of damaging touch screen and panel components due to the difficulty in breaking the double sided tape bond.

There are some instances where high volume production is required, in which case this may be the preferred method of integration. However, it is the integrators responsibility to ensure the correct double sided tape is selected. As some double sided tapes will have potential to creep over time, it is important that factors such as weight of the touch screen, surface area, cleanliness of bonding surfaces and user environment are considered when selecting double sided tape.

Assembly Considerations:

- Make sure glass and display panel mounting surfaces are thoroughly cleaned with an appropriate cleaning solution.
- Apply the double sided tape to the front face of the display panel first, making sure that full lengths of tape are applied along the sides, base and top perimeters of the display panel.
- Thoroughly clean both the active area of the display panel and the inside face of the touch screen glass to remove any finger marks, smears or dust. It is very important that both surfaces are cleaned thoroughly BEFORE the touch screen is mounted to the display panel as it will be very difficult to remove the touch screen after it is bonded onto the display panel.
- Remove the protective film from the double sided tape and position the touch screen glass onto the display panel, aligning the side and base retro reflective bars with the inside perimeter or viewable area of the display panel. (Positioning of the touch screen should be performed by two people. Alternatively, temporary alignment blocks could be fabricated to assist this process). On standard 2500 touch screens, the retro reflective bars are designed to be positioned approximately 3mm from the edge of the active area of the display panel. (see section 3.2 Active Area to Retro Border above for further details)
- Pushing on the top of the extrusions towards the display panel, apply even pressure around the perimeter of the touch screen to ensure proper bonding of both sides of the double sided tape to the touch and display panels. Proper bonding is essential to ensure the touch screen does not fall off as a result of shock or vibration during handling or transportation. Other environmental conditions may also affect bond strength.
- Route the FFC cables over the back of the display panel and fix the DSP to the display panel. (See section 4.0 Controller Board Considerations for further details).

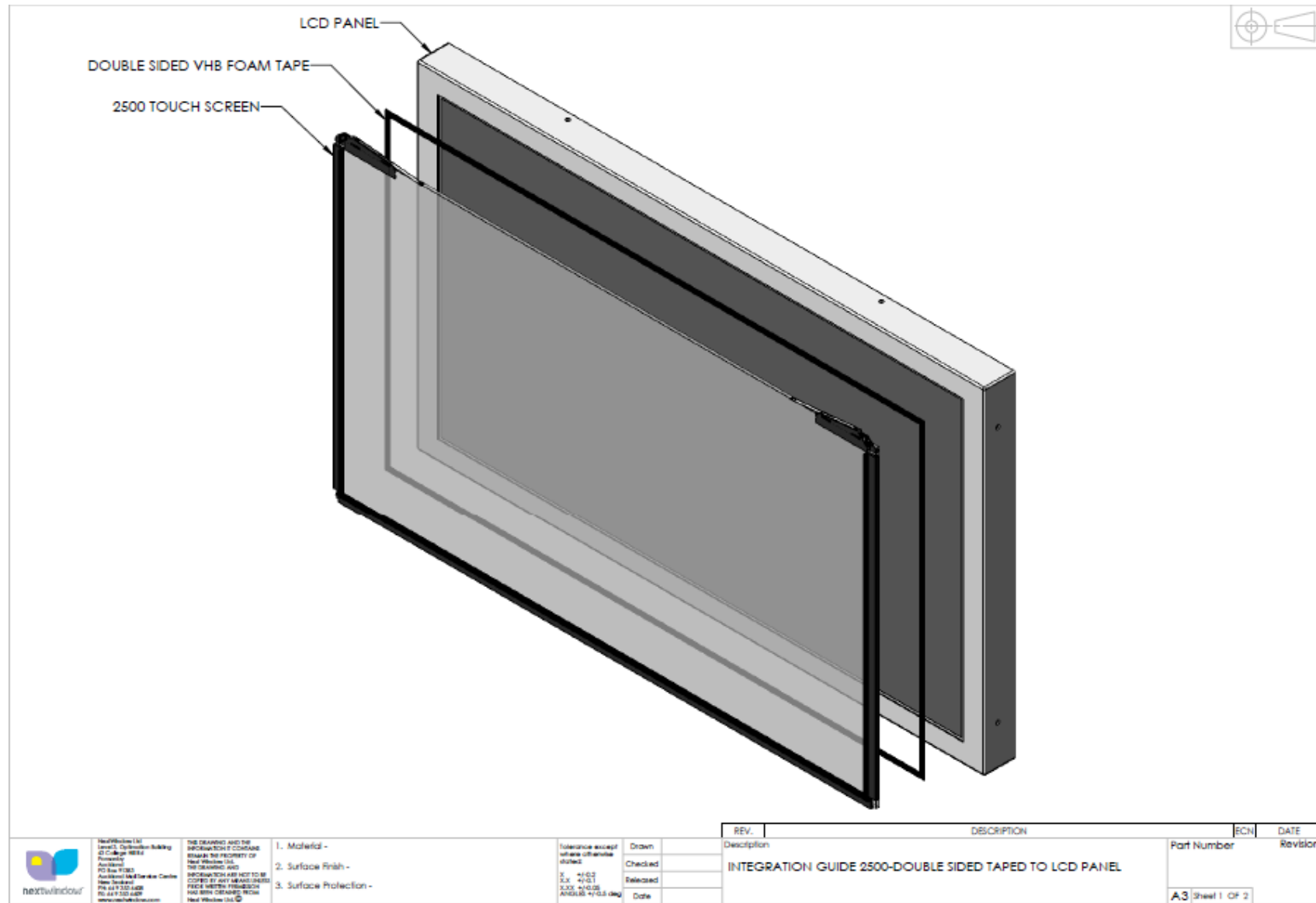


Figure 16: Exploded view - 2500 touch screen, double sided tape and display panel.

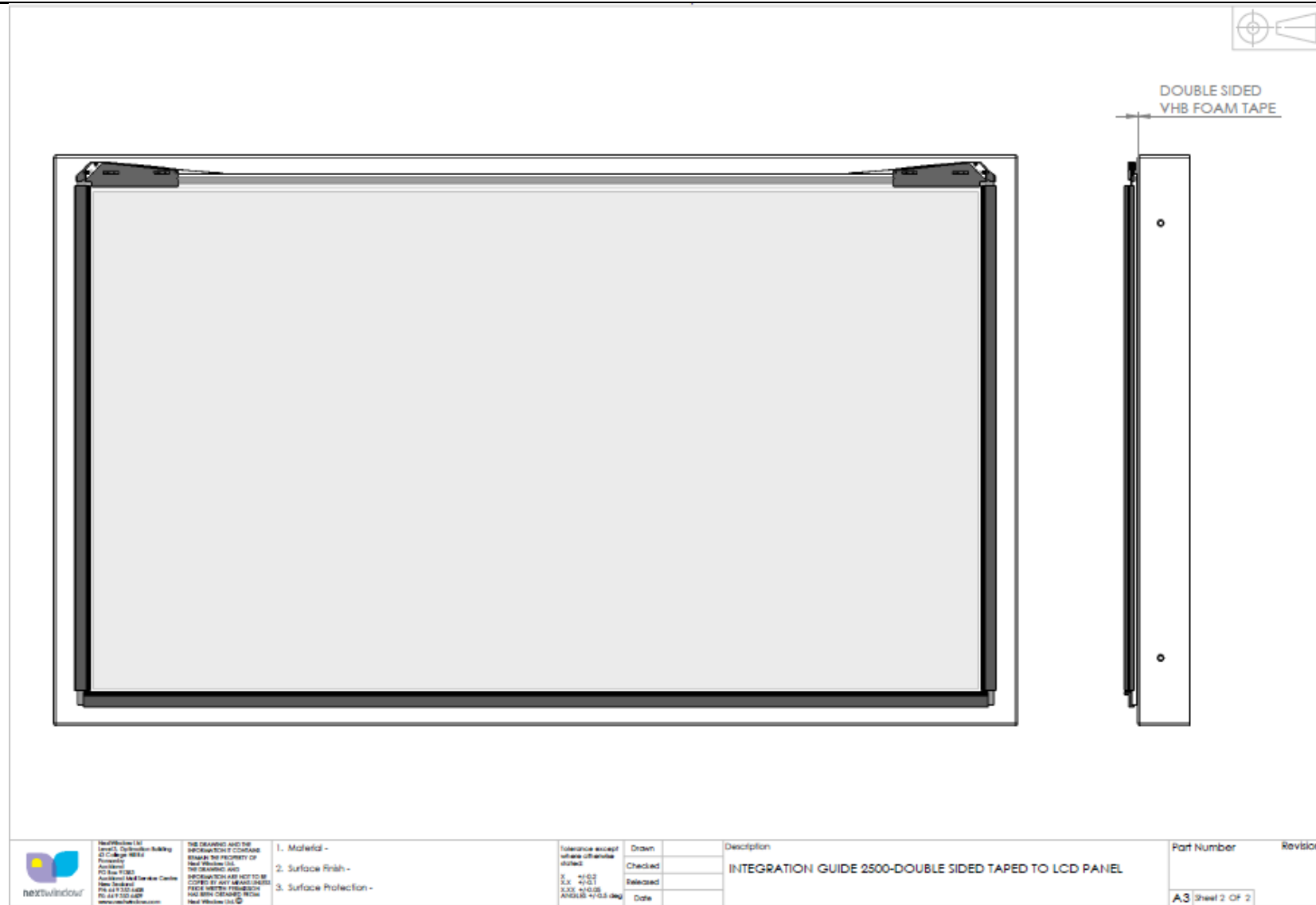


Figure 17: Front view showing integrated 2500 touch screen on the display panel.

3.6. Stylus Design

The 2500 optical touch screen is stylus independent in that any infrared (IR) opaque object can be used to activate a touch. However there are some design guidelines that should be followed if designing a custom stylus. For optical touch technology a touch is detected when the stylus or finger blocks the reflected light back to the camera. The design of the stylus significantly impacts the size of shadow created. If the stylus is too small or has an inadequate tip profile the shadow produced may not be large enough for a touch to be reliably detected across the screen. The specification document [1] defines the minimum stylus size for an example stylus profile. Other profiles can be used, but to ensure reliable operation the area of the IR blocking tip needs to be considered and thoroughly tested. NextWindow would like to assist with reviews of any new stylus design.

4. Controller Board Considerations

4.1. Location

The ideal location for the controller board is at top of screen. The board can be located either at the top of the panel behind the bezel or at the rear of panel inside the chassis. When locating the controller board EMC, EMI, ESD and FFC routing should be considered.

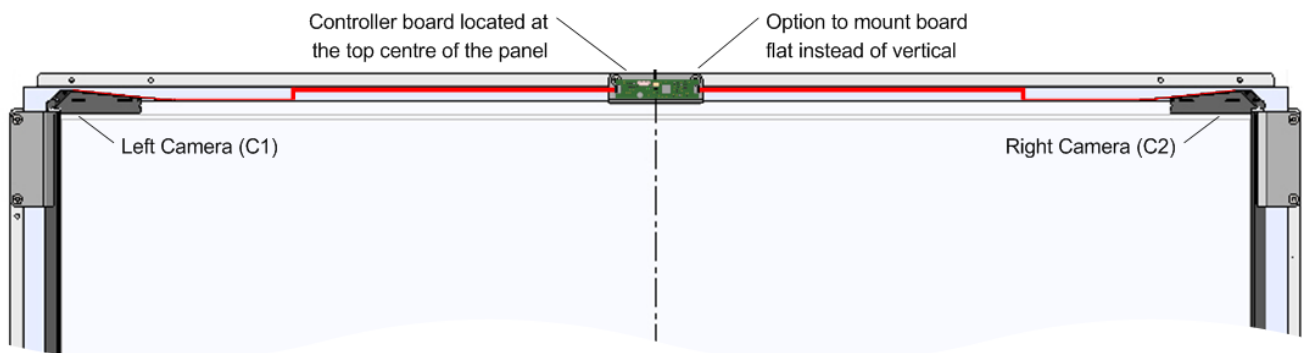


Figure 18: Example Controller Board Location – Top Front

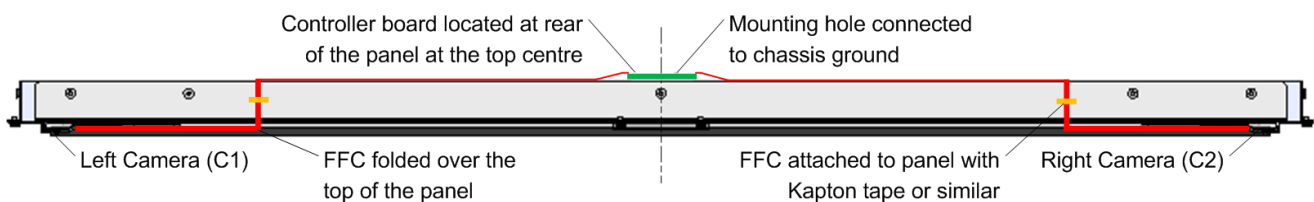


Figure 19: Example Controller Board Location – Rear of Chassis

4.2. Mounting

The controller board needs to be mounted to the monitor chassis through the mounting hole. This should provide both physical support and grounding. The mounting screw should have the following characteristics:

- Maximum screw head size is 5.5mm
- Recommended screw size is M3
- Recommended screw type is cap head screw.

A Nylon washer is supplied to fit beneath the screw head to prevent any occurrence of shorting between the DSP board circuitry and the screw head. A second washer is also supplied and may be required to isolate the DSP board's mounting chassis/ground connection from chassis if any video interference is present on the display monitor.

To test if the second washer is required, connect the rest of the system (USB, video sources etc) and perform a test power up, checking for possible ground-potential loop-paths. If the 2500 system is found to be causing video interference, install the second nylon washer between the DSP and the chassis/ground mounting point.

Additional support should be provided for the controller board at both ends. This can be implemented using double sided foam tape or through a suitable housing design. Do not directly mount onto metal chassis or panel; there should be some clearance when mounting controller board to prevent shorting of the circuitry beneath the DSP to the chassis. EMI shielding should be provided to cover the controller board in the system.

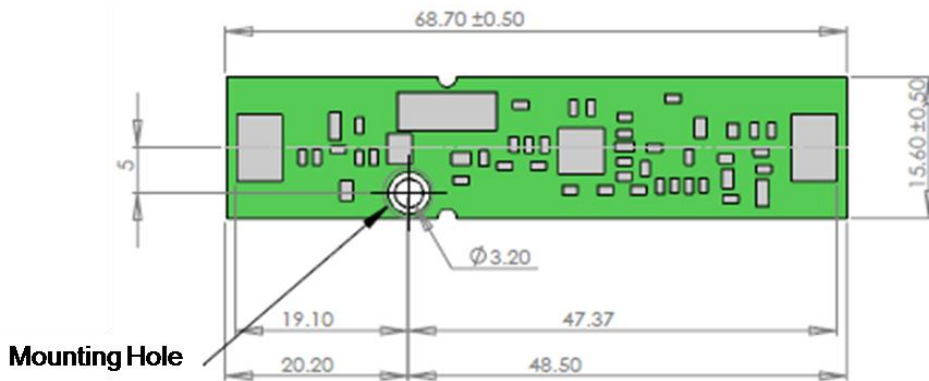


Figure 20: Controller Board Dimensions Top View

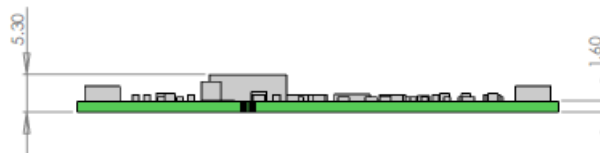


Figure 21: Controller Board Dimensions Side View

4.3. Flexible Flat Cables

Consideration should be given to the routing of the Flexible Flat Cables (FFC):

- Excess FFC length can be folded up and taped down to the chassis.
- FFC's must not pass near LCD high voltage cables.
- FFC's routing should be thoroughly tested once integrated. This should be completed under worst case noise conditions with all devices active (Wireless LAN, LCD, Webcam, Microphone, Speakers, and Printer).
- Ensure burrs or sharp edges on metal chassis cannot damage or cut FFCs. Black cloth tape can be use to protect FFC's from damage.



Figure 22: Example of how not to route FFC

5. Electrostatic Discharge Considerations

The following section defines the integration guidelines for electrostatic discharge mitigation to meet requirements defined in IEC 61000-4-2:2008.

5.1. Path Determination

Electrostatic discharge tests are split into contact and air discharges, with various pulse shapes (human body model) and various voltage limits. In all cases the discharge the path is always that of least inductance to chassis/ground. The discharge will also typically take conducted paths in preference to arc paths. For an integrated 2500 touch screen the available conductive mechanisms are:

1. Retroreflective tape - The retroreflective tape consists of three main layers; Adhesive layer, metallised reflective layer and acrylic IR layer. Although the uppermost and lowermost layers are non-conductive, the reflective layer does conduct. A high voltage discharge will either break through the acrylic layer or arc through air across to the edge of the retroreflective tape where the metallised layer is exposed. The discharge path is then either to the aluminium support extrusions or the camera clips.
2. Retroreflective aluminium support bar – These support bars will typically be left floating (attached to glass, but no electrical connection to chassis/ground) so a high voltage discharge will find the lowest inductance path which may be the camera clip or directly down to the display panel's chassis.
3. Camera clip - Without appropriate ESD countermeasures a discharge path may occur through the camera holder clip and from there terminating at the camera, causing a failure of one of the camera parts. The final termination is likely to be along the ground terminal of the FFC.
4. USB interface connector – For external USB interfaces connectors the USB shell or connector pins are potential discharge paths.

5.2. Controller Board Protection

The controller board provides built in ESD protection on the USB interface, for it to function correctly the controller board should be grounded as detailed in section 4. All signal lines and power lines are protected and will shunt ESD pulses to ground. The controller board should be mounted within the monitor case or bezel to prevent discharge directly onto the board.

5.3. Camera Protection

In order to prevent damage to any camera parts it is recommended that copper tape (e.g. 3M 1181) be applied across the top of the camera body, down and around the clip, and then down to the panel chassis, providing a path to ground. The copper tape must not extend beyond the camera body into the camera's field of view as detailed in the figures below. This should be applied to both cameras.

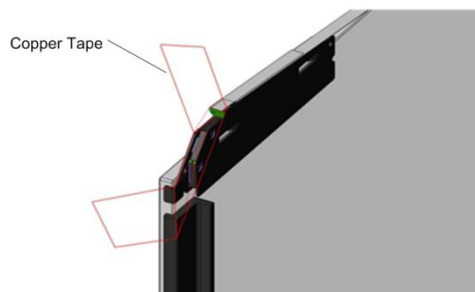


Figure 23: Camera Copper Tape Application



Figure 24: Camera ESD Mitigation Example Picture

5.4. Retroreflective bars

Optional defined paths to ground can be provided from the side and bottom retroreflective bars. The bars are anodised aluminium and this finish is electrically isolating, so copper tape connections will be coupled (capacitive) unless an explicit connection is made. Applying the copper tape across the extrusions' cut ends will be the most effective as these extrusions are cut to length after anodizing as detailed in Figure 25.

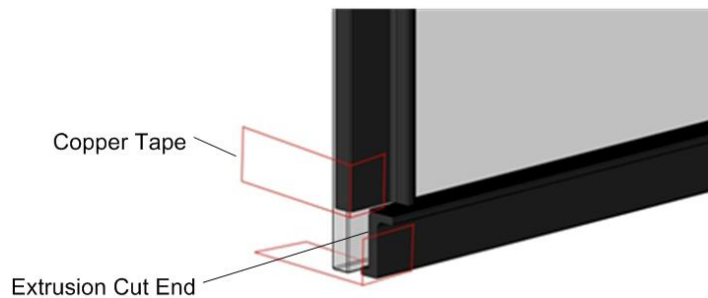


Figure 25: Retroreflective Bar Copper Tape Application

6. USB Connection

The NextWindow 2500 touch screen requires a dedicated USB Port. Data heavy devices such as webcams, printers and microphones should not be connected to the same USB controller as the NextWindow Touch Screen; doing so could slow down data transfer and impact the touch screen performance.

As standard the 2500 touch screen is not supplied with a USB interface cable. The integrator can either supply their own cable to meet the requirements below, or order the optional NextWindow USB 2m Type-A cable (Part Number: P001113).

Ref.	Item	Requirement
6.1.1.	USB male connector - Supplied on NextWindow controller board	Neltron 1251R-05-SM1: right angle connector
6.1.2.	Mating USB female connector- Not supplied by NextWindow	Neltron 1251HM-05: 1.25 mm 5-way wire-to-board housing (Using Neltron 1251TM crimp terminals)
6.1.3.	Maximum cable length	3 metres
6.1.4.	Wire gauge (AWG#)	28

6.1.5.	Other Cable Requirements	Where not listed above requirements shall be as defined for a full speed cable under Universal Serial Bus Specification, Revision 1.1
6.1.6.	USB connector pin out (For custom cable design)	1 – VBUS (+5V) 2 – D- 3 – D+ 4 – GND 5 – Shield

Table 1 Custom USB Cable Requirements

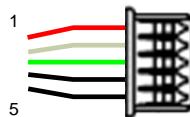


Figure 26: Custom USB Cable Connector Pin Assignments



Figure 27: P001113 - 2500 USB 2m cable - Type-A to 1251HM-05

7. Software

This section summarizes the software requirements for user operation and configuration. Please contact your local NextWindow technical representative for details on the latest software versions. Separate software utilities are supplied for Incoming Quality Control and integrator setup. For more details please refer to documents [3] and [4].

7.1. Device Driver

The 2500 touch screen requires a device driver be installed on the host computer for all modes of operation. The supported operating systems are defined in [1]. If the driver is not installed on the host computer the touch screen will not function.

The driver can be supplied to the integrator in two different formats to provide options in the method of distribution:

- End user installation: Microsoft certified driver in EXE format
- Factory installation: Microsoft certified driver in INF format

7.2. Touch Screen Calibration Utility

The NextWindow Touch Screen Calibration Utility (TSCU) provides support for NextWindow 2500 series touch screens in Windows XP and Vista. For Windows 7 it is recommended that the standard operating system control panel is used.

For full information, refer to NextWindow Touch Screen Calibration Utility Specification [2]. The utility offers the following capabilities:

1. System ID numbers to assist with customer support.
2. Calibration if the monitor aspect ratio is changed or custom calibration is required.
3. Restoring calibration to factory default settings.
4. Drop-down list for selecting touch display.
5. TSCU Help.



New Zealand
PO Box 91383, Victoria Street West
Auckland, 1142, New Zealand
t +64 0 353 6608
f +64 9 353 6609

nextwindow.com