

## Interface Control Document

# AVDU-1620-xx-yy-ICD

## 6.4" Multi-function LCD Display



### General Description

This specification applies to the 161mm (6.4") Colour TFT-LCD Display AVDU-1620-xx and its variants. The display supports the multiple screen formats including Video and graphics in up to 16.7M colours (RGB 8/6-bits data) at high response speeds optimised for high-speed motion video typical in airborne surveillance applications. The unit has a number of screen configuration options including Polarised, contrast enhancing and NVG compatibility filters. A touch screen may be optionally fitted into the front of the display, this features RS-232 interfaces allowing a screen touch system level man machine interface to be realised.

This Display contains:

- Power input filter and Power supply module
- Video display driver Panel Electronic Circuit (PEC )
- Inverter PEC for the backlight
- Backlight light box assembly
- Touch screen and driver



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### Applicable Changes

Issue No. Change	Replaced		Added	Removed	Reason for Change	Completed: Date, Name
	Old	New				
A					First Issue	-
B					Drawing updated	19 May 05
C					Connector P/N correction P/N variants added Key options added	15 Jul 05

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### Electrical

#### Pin assignment

<b>Power and Remote connector</b>		
 <p>Size 22D Contacts Wire size 28,26,24,22 Gauge 1.5, 2, 3, 5A max</p>	<b>Unit connector</b>	
	D38999/20WB 35PN	FLANGE MT RECEP 13 WAY PIN
	<b>Mating Half (cable connector)</b>	
	D38999/26WB 35SN	PLUG 13 WAY SKT
	G8801-11M	SIZE 11 Backshell
<b>Video connector</b>		
 <p>Size 22D Contacts Wire size 28,26,24,22 Gauge 1.5, 2, 3, 5A max</p>	<b>Unit Connector</b>	
	D38999/20WC 35PN	FLANGE MT RECEP 22 WAY PIN
	<b>Mating Half (cable connector)</b>	
	D38999/26WC 35SN	PLUG 22 WAY SKT
	G8801-13M	SIZE 13 Backshell
<b>Video IN/OUT connectors</b>		
	<b>Unit connector</b>	
		Isolated BNC

For pin outs see table on next page



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Power and Remote Connector	
1	+28V DC Input (Isolated from Chassis)
2	28V Return (Isolated from Chassis)
3	Chassis
4	Data (+)
5	Data (-)
6	(RS422 + In)
7	+12V DC Output
8	12V DC return (Data reference/chassis)
9	(RS422 + Out )
10	Touch RS232 Out /( RS422 – Out)
11	Touch RS232 IN /( RS422 – In)
12	Illumination bus (0 to 28V)
13	Enable/Inhibit (Connect to pin 2 for inhibit) do not connect to any other pin – permanent damage may occur)

Signal -Video Connector		
1	Video 2	S-Video : Chroma in
2		Ground
3		S-Video : Luma in
4		Ground
5	Video 1	Composite video in (Looped to Video In BNC)
6		Ground
7	Video 3	Luma in / Green in
8		Ground
9		Cb in / Blue in
10		Ground
11		Cr in / Red in
12		Ground
13	PCR	Red, analogue
14	AGND	Analogue ground red
15	PCG	Green, analogue
16	AGND	Analogue ground green
17	PCB	Blue analogue
18	AGND	Analogue ground blue
19	HS_IN	Horizontal sync or composite sync, input
20	DGND	Digital ground
21	VS_IN	Vertical sync, input
22	DGND	Digital ground



“VIDEO IN”/VIDEO OUT BNCs routed to Video 1 or Video 4 dependant on the configuration (see options later in the document)

**Note:** The grounds of all video signals are connected to chassis and not isolated.



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### Touch controller interface

A touch screen may be fitted to some variants of the display.

Interface	Serial <b>RS-232</b> (option for RS422 factory fitted upgrade)
BAUD RATE	19200, <b>9600</b> (shipped setting) , 2400, 1200, 300 The defaults for the other communication parameters are 8 data bits, 1 stop bit, and no parity. A software command may also be used to select a wider range of data transmission rates and other communication parameters. All communication parameters can be saved in NVRAM as a power-on default.
Format	<b>SmartSet Binary</b> (shipped setting) or ASCII (see next page) ASCII format is useful in troubleshooting installations with a dumb terminal or modem software in local mode. Binary mode is more efficient for communication with driver programs. A software command may also be used to select a wider range of data formats. The data format can be saved in NVRAM as a power-on default.
Single-Point or Stream Modes	<b>Stream</b> (shipped setting) ,Single-Point If Single-Point Mode is selected, a single coordinate pair is communicated for each touch. No further coordinates are communicated until the finger is lifted (untouch), and the touch screen is retouched. If Stream Mode is selected, the controller sends coordinate pairs continuously until untouch. If you are using driver programs, Stream Mode is required. A software command may also be used to select a wider range of modes. Modes can be saved in NVRAM as a power-on default. See the Mode command for details
Emulation Mode	If you are using driver software that does not directly support the SmartSet protocol, the controller can be set up through jumpers for hardware compatibility with obsolete controllers including the AccuTouch controller, IntelliTouch controller (2.0 or later firmware), or the DuraTouch controller. When the controller is in an emulation mode, it will not respond to the SmartSet protocol. For descriptions of the protocols in the various emulation modes, see the Manual As an alternative to full emulation modes, a software command may be used to select a wide range of output data formats. The output data format can be saved in NVRAM as a power-on default. See the Emulate command, for details. <ul style="list-style-type: none"> <li>• <b>SmartSet Mode</b> (default)</li> <li>• AccuTouch</li> <li>• IntelliTouch (2.0 or later firmware)</li> <li>• DuraTouch</li> </ul>



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### Smartset Touch mode (Binary) (Default setting)

**Function:** The touch coordinate reporting packet.

**Query:**

0	1	2	3	4	5	6	7
't'							

**Set:** This command cannot be set.

**Response:**

0	1	2 & 3	4 & 5	6 & 7
'T'	Status	X	Y	Z

On serial controllers, the response may be altered if Partial Emulation is selected with the EmulateT command. Touch packets are generated automatically if Touch Reporting is enabled with the Quiet command. This is the default with serial controllers.

The coordinates of the touch are signed numbers reported in the X, Y, and Z integers. The Z coordinate is always set to the maximum Calibration or Scaling value (default is 255).

The Status byte has the following bit positions. Touch packets will only be transmitted with the various bits set if the corresponding mode is enabled with the Mode command.

Bit	Status	Description
0	Initial Touch	If 1, the Touch packet is for an Initial touch. Initial Touch Mode is enabled by bit 0 in the Mode1 byte of the Mode command.
1	Stream Touch	If 1, the Touch packet is for a Stream touch, a coordinate transmitted continuously while the touch screen is being touched. Stream Mode is enabled by bit 1 in the Mode1 byte of the Mode command.
2	Untouch	If 1, the Touch packet is for the point of untouch (when the finger is lifted). Untouch Mode is enabled by bit 2 in the Mode1 byte of the Mode command.
3	Reserved	
4	Warning(s) Pending	If 1, an Acknowledge query should be issued to receive non-command-related warning(s).
5	Reserved	
6	Out of Range	If 1, the Touch packet is outside the Calibration Points. Range Checking Mode is enabled by bit 6 in the Mode1 byte of the Mode command. (Range Checking is not supported on the 2500S controller.)
7	Z-axis Supported	If 1, the Z coordinate is measured, not simulated at the maximum value.

### SmartSet ASCII Mode

In this mode, coordinate data is formatted as three ASCII decimal numbers for X, Y, and Z. The range of the coordinates is determined by the calibration and scaling options of the controller. Coordinate values of less than 1000 are padded with leading zeroes so each number will have at least four digits. Scaling may require the addition of an additional digit for values greater than 9999. Scaling may also add a leading minus sign ("-"). Plus signs are suppressed.

The Z coordinate is followed by an optional status indicator. A "T" indicates initial or stream touch, a "U" indicates untouch. In the example below, optional characters are underlined>.

<->XXXXX<space><->YYYYY<space><->ZZZZZ<space><T|U><CR><LF>



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### Functions

<b>Display panel</b>	
Vertical refresh rate	60Hz at VGA (640x480)
Dot clock (pixel clock)	maximum 280MHz
<b>Graphics Input (x1)</b>	
Graphics formats	Standard VESA VGA, SVGA, XGA, SXGA & UXGA (auto scaled to fit screen);
Graphics Connectivity	VGA / SVGA / XGA / SXGA / UXGA analogue
Graphics input (auto mode detect )	VGA, SVGA, XGA, SXGA & UXGA interlaced and non-interlaced standard with automatic detection of: Digital Separate Sync; Composite Sync, Sync On Green.
<b>Video Inputs (x3)</b>	
Video formats	PAL, NTSC & SECAM,
Video inputs	1 Composite video - With Loop through output to rear BNC 1 S-Video 1 Component video YCbCr or RGB Video, STANAG 3350/B/C (Default)
<b>Control Functions</b>	
OSD menu functions	On screen display (OSD) of functions Image controls: Panel brightness/contrast, Colour Temperature, Video Adjustment, Video System, Position, PIP, Rotation, Gamma, Video Scaling, Language, Video source, Utilities,
Display controls	Power On/Off Backlight brightness Video Source select OSD Menu OSD Select up OSD Select down Setting + Setting -
Settings memory	Settings are stored in non volatile memory

### Screen Filter options

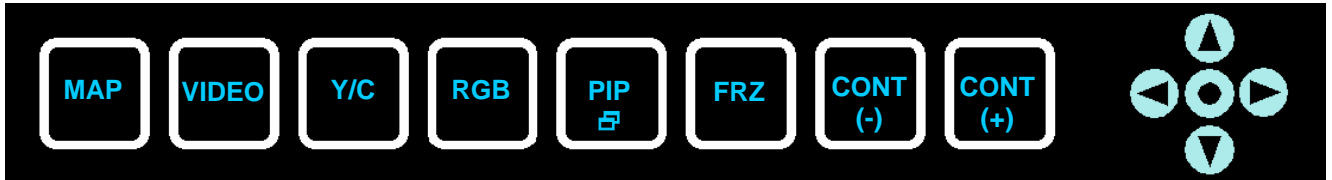
All displays have part numbers that use the following principals:  
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AVDU	indicates that the product is a display (Advanced Visual Display Unit)
16	Screen diagonal in cm (approximate)
20	This denotes the variant of the display in this series
xx	This denotes the type of front screen fitted: (See section below ) 01: Polarised contrast enhancing filter 02: NVG Filter with etched front surface 03: Clear glass with etched front surface 51: Touch screen with Polarised contrast enhancing filter 52: Touch screen with NVG Filter 53: Touch screen with Clear glass
yy	This denotes the configuration of key and controls (See below)

## Interface Control Document


### AVDU 1620-xx-01 functionality

Arrangement for the Button Legends



#### Button Functionality

The functionality for the buttons on the Display's front panel. The ON/OFF switch is implemented by the rotary brightness control when turned fully anti clockwise and isolates the power to the unit.

Button No.	Legend		Function
1	MAP	Graphic	Selects the Graphic input from a PC on the Signal Connector at the rear of the Display. Pressing the button while in PIP mode will remove the PIP
2	VIDEO	Video Composite	Selects the 'Video 1' video input from the signal Connector or BNC at the rear of the Display (Composite). Pressing the button while in PIP mode will remove the PIP
3	Y/C	Y/C Video	Selects the 'Video 2' video input from the signal Connector at the rear of the Display (Y/C). Pressing the button while in PIP mode will remove the PIP
4	RGB	Video RGB	Selects the 'Video 3' video input from the Video Connector at the rear of the Display (RGB/STANAG 3350 Class B). Pressing the button while in PIP mode will remove the PIP
5	PIP 	Graphic/ Video PIP	Selects the last elected 'Video 1' or the 'Video 3' inputs superimposed as a picture over the Graphics video input from the Mission Computer (Picture In Picture). Pressing the button again removes the PIP
6	Freeze		Freezes and unfreezes the video image
7	'CONT (-)'		Adjusts the display contrast down. (Graphic or Video Depending o the mode)
8	'CONT (+)'		Adjusts the display contrast up.

The Menu select key invokes the On Screen Menu Display (OSD) and selects the menu when held down for more than 5 seconds. To exit the menu press and hold the key for >5 seconds

Video1 (composite) is routed to the "VIDEO IN" BNC and the signal connector  
The four direction keys have four modes depending on the current display mode.

MODE	Graphic	VIDEO	PIP	MENU/OSD
<b>Down</b>	Dim the brightness of the keys	Freeze and zoom out	Move PIP Down	DOWN
<b>UP</b>	Increase the Brightness of the keys	Freeze and zoom in	Move PIP UP	UP
<b>LEFT</b>	MAP Contrast -	Video Contrast -	Move PIP Left	LEFT
<b>RIGHT</b>	MAP Contrast +	Video Contrast +	Move PIP Right	RIGHT

## Interface Control Document

### AVDU 1620-xx-02 functionality (Also valid for AVDU-1620-02-52/ AVDU-1620-52-02)

Arrangement for the Button Legends



#### Button Functionality

The functionality for the buttons on the Display's front panel. The ON/OFF switch is implemented by the rotary brightness control when turned fully anti clockwise and isolates the power to the unit.

Button No.	Legend		Function
1	'MC'	Graphic	Selects the Graphic input from the Mission Computer on the Signal Connector at the rear of the Display. Pressing the button while in PIP mode will remove the PIP
2	Blank	Video Composite	Selects the 'Video 1' video input from the signal Connector or BNC at the rear of the Display (Composite PAL). Pressing the button while in PIP mode will remove the PIP
3	Blank	Video RGB	Selects the 'Video 3' video input from the Video Connector at the rear of the Display (STANAG 3350 Class B). Pressing the button while in PIP mode will remove the PIP
4	Blank	Graphic/ Video PIP	Selects the last elected 'Video 1' or the 'Video 3' inputs superimposed as a picture over the Graphics video input from the Mission Computer (Picture In Picture). Pressing the button again removes the PIP
5	Blank		Not used.
6	Blank		Not used.
7	'CONT (-)'		Adjusts the display contrast down. (Graphic or Video Depending on the mode)
8	'CONT (+)'		Adjusts the display contrast up.

The Menu select key (centre button in the direction cluster) invokes the On Screen Menu Display (OSD) and selects the menu when held down for more than 5 seconds. To exit the menu press and hold the key for >5 seconds

Video1 (composite) is routed to the "VIDEO IN" BNC and the signal connector  
The four direction keys have four modes depending on the current display mode.

MODE	Graphic	VIDEO	PIP	MENU/OSD
<b>Down</b>	Dim the brightness of the keys	Freeze and zoom out	Move PIP Down	DOWN
<b>UP</b>	Increase the Brightness of the keys	Freeze and zoom in	Move PIP UP	UP
<b>LEFT</b>	MAP Contrast -	Video Contrast -	Move PIP Left	LEFT
<b>RIGHT</b>	MAP Contrast +	Video Contrast +	Move PIP Right	RIGHT

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### AVDU 1620-xx-03 functionality



The functionality for the buttons on the Display's front panel. The ON/OFF switch is implemented by the rotary brightness control when turned fully anti clockwise and isolates the power to the unit.

Button No.	Legend		Function
1	PC	Graphic	Selects the Graphic input from a PC on the Signal Connector at the rear of the Display. Pressing the button while in PIP mode will remove the PIP. When pressed in freeze mode will go live.
2	VIDEO A	Video Composite	Selects the 'Video 1' video input from the signal Connector on the rear of the Display (Composite). Pressing the button while in PIP mode will remove the PIP. When pressed in freeze mode will go live.
3	VIDEO B	Video Composite	Selects the 'Video 4' video input from the BNC connector on the rear of the Display (Composite). Pressing the button while in PIP mode will remove the PIP. When pressed in freeze mode will go live.
4	PIP	Graphic/ Video PIP	Selects the last elected 'Video 1' or the 'Video 4' inputs superimposed as a picture over the Graphics video input from the Mission Computer (Picture In Picture). Pressing the button again removes the PIP
5	'ZOOM (-)'		Freezes then Zooms the displayed Video image out
6	'ZOOM (+)'		Freezes then Zooms the displayed Video image in
7	'CONT (-)'		Adjusts the display contrast down. (Graphic or Video Depending o the mode)
8	'CONT (+)'		Adjusts the display contrast up.

At power up this module will auto select the video input from the available graphic or video sources (Graphic, Video 1, Video 2 or Video 3) - (Video 4, 5 or 6 will not be auto selected). If the auto selected video is removed the display will auto search again from the four sources until a source is found. (In the event that no source is found a message "No Signal" will appear for a few seconds and the display will go into standby.) The display will "wake up" from stand by only if the previously displayed source reappears. (i.e it only watches the last good input). The Graphic, Video 1 or Video 4 inputs may be selected by pressing the button on the front panel after power on. (It is not possible to select Video 3, 5 or 6).

Video 4 (composite) is routed to the "VIDEO IN" BNC but not the signal connector, Video 1 is only on the Signal connector.

The Menu select key (centre button in the direction cluster) invokes the On Screen Menu Display (OSD) and selects the menu when held down for more than 5 seconds. To exit the menu press and hold the key for >5 seconds.

The four direction keys have four modes depending on the current display mode.

MODE	Graphic	VIDEO	PIP	MENU/OSD
<b>Down</b>	Dim the brightness of the keys	Dim the brightness of the keys	Move PIP Down	DOWN
<b>UP</b>	Increase the key Brightness	Increase the key Brightness	Move PIP UP	UP
<b>LEFT</b>	MAP Contrast -	Video Contrast -	Move PIP Left	LEFT
<b>RIGHT</b>	MAP Contrast +	Video Contrast +	Move PIP Right	RIGHT



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### Handling Precautions

Handling of the Display should be in compliance with Real-Time Vision's handling principles.

- 1) Since front window is an optical assembly and is easily damaged, observe precautions in order not to scratch it.
- 2) Be sure to turn off power supply when inserting or disconnecting the input connectors.
- 3) Wipe off water or fluid droplets immediately. Long contact with water or other fluids may cause discoloration or spots.
- 4) When the front window surface is soiled, wipe it with absorbent cotton or other soft cloth.
- 5) Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
- 6) Since CMOS LSI is used in this module, take adequate static electricity precautions and ensure correct human earth bonding when handling.
- 7) Do not open nor modify the Assembly.
- 8) Do not press the front window sheet a in any direction.
- 9) At the insertion or removal of the Power and Signal Interface Connector, ensure that the sockets are free from debris and be sure not to damage the Interface pins
- 10) After installation of the Display into a mounted position, do not twist nor bend the Display even momentary. When designing a suitable mounting, it should be taken into consideration that no bending/twisting forces are applied to the Display from outside. Otherwise the TFT -LCD module or backlight may be damaged.

#### LIMITATION OF LIABILITY

The manufacturer's liability for damages to customer or others resulting from the use of any product supplied hereunder shall in no event exceed the purchase price of said product.

#### IMPORTANT USAGE NOTE

This equipment is for use by developers and integrators, the manufacturer accepts no liability for damage or injury caused by the use of this product. It is the responsibility of the developer, integrators or other user of this product to:

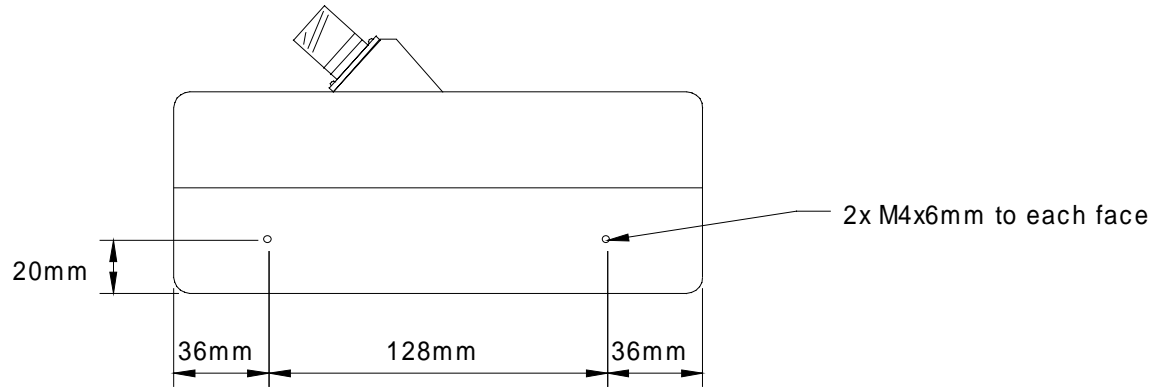
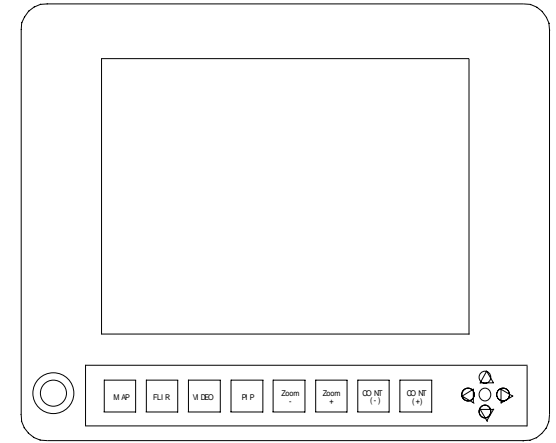
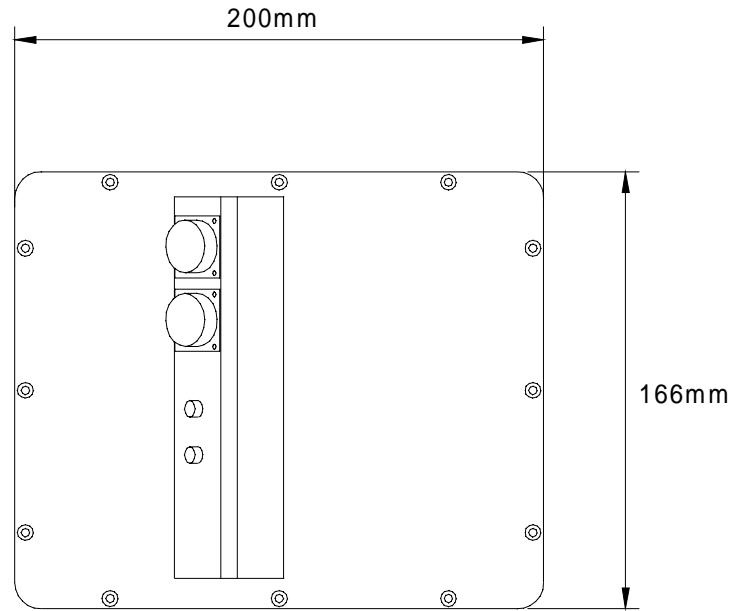
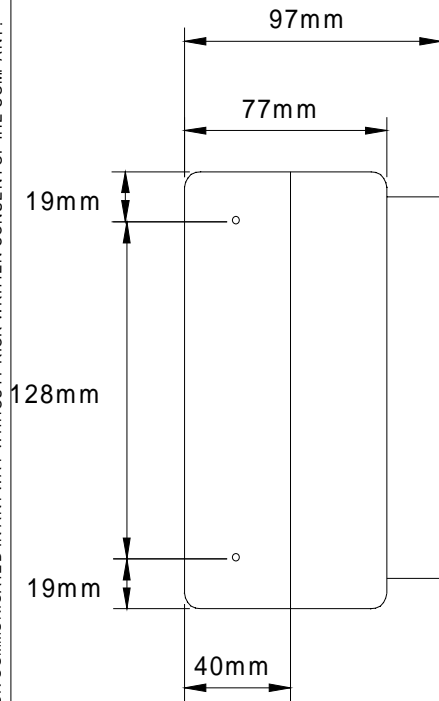
- Ensure that all necessary and appropriate safety measures are taken.
- Obtain suitable regulatory approvals as may be required.
- Check power settings to all component parts before connection.

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THIRD ANGLE PROJECTION  
DO NOT SCALE

MATERIAL:-					
FINISH:-					
CJS		C	18th May 2005	AJM	
AJM		B	15th April 2005	AJM	
CJS		A	10th Oct 2002	AJM	
DRAWN	ECO No.	ISS.	ACTIONED	APPROVED	CHECKED

DIMENSIONS :-		
SCALE :-	NTS	
GENERAL TOLERANCES		
TWO DECIMAL PLACES ± 0.025		
ONE DECIMAL PLACE ± 0.125		ENGLAND UNITED KINGDOM
NO DECIMAL PLACE ± 0.4		
ANGLES ± 1		
PROJECT:-		
TITLE:- Display 160mm (6.4")		
DRG No. AVDU / 1620/ xx		REV C

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