

	TECHNICAL SPECIFICATION		DOC CODE TS	PART NUMBER 4461 415 601 19		
15.6" MTID- RUGGED			VER P1	SH No. 1	PREPARED BY SHIVA	DATE 16.11.22
			HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22
<div>TECHNICAL SPECIFICATION FOR 15.6" MTID- RUGGED</div>						


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 भारत इलेक्ट्रॉनिक्स BHARAT ELECTRONICS	TECHNICAL SPECIFICATION		DOC CODE TS	PART NUMBER 4461 415 601 19	
15.6" MTID- RUGGED		VER P1	SH No. 3	PREPARED BY SHIVA	DATE 16.11.22
		HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22


List of Abbreviations

EMC	Electro Magnetic Compatibility
EMI	Electro Magnetic Interference
ESS	Environmental Stress Screening
ET	Environmental Testing
LAN	Local Area Network
PC	Personal Computer
PP	Purchase Part
I/O	Input Output
JSS	Joint Services Specification
RH	Relative Humidity
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
CoC	Certificate of Conformance
NABL	National Accreditation Board for testing and calibration Laboratories
MTID	Multi-Touch Touch Input Device

	TECHNICAL SPECIFICATION		DOC CODE TS	PART NUMBER 4461 415 601 19		
15.6” MTID- RUGGED			VER P1	SH No. 4	PREPARED BY SHIVA	DATE 16.11.22
			HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22
<div>CONTENT</div> <div><div><div>1. INTRODUCTION</div><div>2. RELEVANT DOCUMENT</div><div>2.1. BEL PP Drawing P/N</div><div>3. TECHNICAL SPECIFICATION</div><div>3.1. FEATURES</div><div>3.2. I/O INTERFACE</div><div>3.3. POWER SUPPLY</div><div>3.4. MECHANICAL SPECIFICATIONS</div><div>4. ENVIRONMENTAL SPECIFICATIONS (IN ACCORDANCE WITH JSS 55555:2012).....</div><div>5. ESS (ENVIRONMENTAL STRESS SCREENING)</div><div>6. EMI/EMC SPECIFICATIONS</div><div>7. RELIABILITY</div><div>8. STORAGE CONDITION</div><div>9. NOTES.....</div></div><div><div>5</div><div>5</div><div>5</div><div>5</div><div>5</div><div>5</div><div>6</div><div>6</div><div>7</div><div>8</div><div>9</div><div>9</div><div>9</div><div>10</div></div></div>						


	TECHNICAL SPECIFICATION	DOC CODE TS	PART NUMBER 4461 415 601 19	
15.6" MTID- RUGGED	VER P1	SH No. 5	PREPARED BY SHIVA	DATE 16.11.22
	HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22
<div> <div>1. <u>INTRODUCTION</u></div> <p>This document specifies the functions, construction and performance of the “15.6” MTID- RUGGED”. It lays down the outline specifications on the functional, electrical, mechanical and environmental characteristics of the equipment.</p> <div>2. <u>RELEVANT DOCUMENT</u></div> <div>2.1. BEL PP Drawing P/N</div> <div>3. <u>TECHNICAL SPECIFICATION</u></div> <div>3.1. <u>FEATURES</u></div> <ul style="list-style-type: none"> • Display Size : 15.6" • Resolution : 1920 x 1080 @ 60Hz • Aspect Ratio : 16:9 • Brightness : 400 cd/m2 (or more) • Contrast Ratio : 800:1 (min) • Wide Viewing Angle : 160° H / 160° V (min) • Display Colour : 16.2M (min) • Anti-Reflective, Toughened EMI protective glass with 90% visibility • LED Backlighting and brightness control to be provided. • TOUCH SCREEN: PCAP-MULTI-TOUCH WITH GLASS PROTECTION • On Screen Display(OSD) : Water Sealed Membrane OSD Keypad • Display with Optical bonding • Operating System Support : Support and touch driver for RHEL 8.1 and higher Edition <div>3.2. <u>I/O INTERFACE</u></div> <ul style="list-style-type: none"> • POWER INPUT : D38999/20WB5PN -01 No • HDMI INPUT : HDMI TV 7X Connector – 01 No • DVI-D INPUT: Standard Connector- 01 No </div>				

	TECHNICAL SPECIFICATION		DOC CODE	PART NUMBER	
			TS	4461 415 601 19	
15.6" MTID- RUGGED	VER P1	SH No. 6	PREPARED BY SHIVA	DATE 16.11.22	
	HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22	
<ul style="list-style-type: none">TOUCH SCREEN PORT: (USB-FTV) USB 2.0 CONNECTOR.- 01 No.Earthing: Earthing Stud with nut and washer for safety					
3.3. <u>POWER SUPPLY</u>					
<ul style="list-style-type: none">Power Input : AC 230V±10% , 50-60Hz ± 3HzPower Consumption : 50W (max)					
3.4. <u>MECHANICAL SPECIFICATIONS</u>					
<ul style="list-style-type: none">All structural material to be Al Alloy (64430/53000 NS5) or Stainless Steel AISI 316L GradeAll fasteners to be SSI grade AISI 316LAll Structural Parts Shall be Coated With Protective Coatings Against Corrosion in marine EnvironmentEnclosure: Rugged Corrosion Resistant enclosure.All corners shall be rounded and there shall be no sharp edges.Weight: 7 Kg (max.)Dimension: WXHxD (max)- 436mm x 281mm x 75mmPaint & Finish: Paint RFU Fire Retardant, color Black (PS 613-BK-SGL), finish semi-gloss.Mounting: Panel mountSealing: IP 65 from all sidesNoise should be <51 dBA at 1 meter of the unit measured in an ambient temperature of 35°C					

		TECHNICAL SPECIFICATION		DOC CODE TS	PART NUMBER 4461 415 601 19		
15.6" MTID- RUGGED				VER P1	SH No. 7	PREPARED BY SHIVA	DATE 16.11.22
				HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22

4. ENVIRONMENTAL SPECIFICATIONS (IN ACCORDANCE WITH JSS 55555:2012)

SL NO	TEST	TEST NO	SPECIFICATIONS	REMARK
1.	Vibration	28	5 to 33 Hz, ± 0.125 mm constant displacement	The Equipment should be in switched 'ON' condition during the test. The equipment would be mounted on the vibration table by its normal means of attachment on ship
2.	High Temp	17	Procedure 6.test Condition K (for protected & submersible) (a) Operation : + 55 °C (b) Storage : + 70 °C Duration:16 hrs	Performance Check during last hour
3.	Damp Heat	10	Operating Temp : 40 °C RH : 95% Duration Unpacked and switched OFF : 15 h 30 Mins Unpacked and switched ON : 30Mins Total : 16 Hrs duration	
4.	Low Temp	20	Procedure 4,Test Condition 'H' Temperature : - 10 °C Duration : 16 hrs	Power will be available in last ½ hour of the test. Unit should switch ON immediately after powering ON. Performance Check during last 30 mins.
5.	Drip Proof	11	Duration : 15 min	Equipment should be operated during the test.
6.	Tropical Exposure	27	Test Condition A:7 cycles Temp : 20 °C to 35 °C RH : 95% Duration : 24 hrs (one cycle)	
7.	Mould Growth	21	Temp : 30 °C RH :> 90% Duration : 28 days	To be conducted on representative samples
8.	Corrosion Salt	9	Procedure 2 Temp : 35 °C RH : 90 to 95%	To be conducted on representative samples
9.	Shock Test	-	The equipment should be able to withstand following shock severities:- Pulse shape: Half sine wave Peak acceleration:	Equipment should be in switched 'OFF' condition. Visual and functional checks after the test.

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15.6" MTID- RUGGED	VER P1	SH No. 8	PREPARED BY SHIVA	DATE 16.11.22	
	HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22	

SL NO	TEST	TEST NO	SPECIFICATIONS	REMARK
			20 g, 11 msec, all 3 axis.	

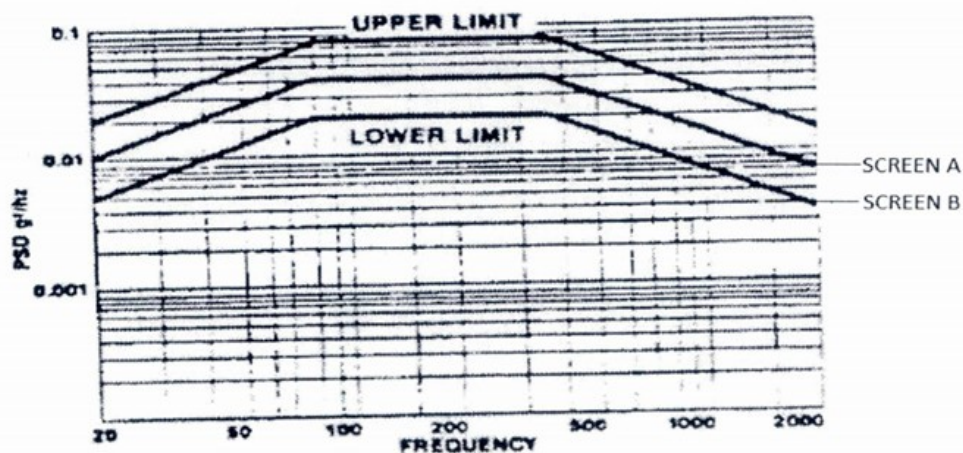
5. ESS (ENVIRONMENTAL STRESS SCREENING)


Thermal Cycling Stress Screening (TCSS)

Sl. No.	Level	Screen	Test Details	Remarks
1.	PCB Level	B	-20°C to +55°C, 10 Cycles (Ramp 10°C/min) or 20 Cycles (Ramp 5°C/min), Dwell: 10 min	Power OFF condition

Random Vibration Stress Screening (RVSS)

Sl. No.	Level	Screen	Test Details	Remarks
1.	PCB Level	B	20-80Hz, +3db Octave 80-350Hz, PSD 0.02g ² /Hz 350-2000Hz, -3db Octave 10min per axis, G rms=4.284	1. On all three axes. 2. Power ON condition



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15.6” MTID- RUGGED	VER	SH No.	PREPARED BY	DATE	
	P1	9	SHIVA	16.11.22	
	HELD IN	No. OF SH	APPROVED BY	DATE	
	GAD	12	RAKESH	16.11.22	

6. EMI/EMC SPECIFICATIONS

The Equipment should meet the MIL STD 461 E & F applicable for Equipment below the Deck in Naval applications. Based on standard for Surface ships the applicable tests are as per below table:


SL.NO.	TEST NAME	TEST DESCRIPTION
1.	CE101	Conducted Emissions, Power Leads, 30 Hz to 10 kHz
2.	CE102	Conducted Emissions, Power Leads, 10 kHz to 10 MHz
3.	CS101	Conducted Susceptibility, Power Leads, 30 Hz to 150 kHz
4.	CS106	Conducted Susceptibility, Power Leads, 200V,0.15μS±20%
5.	CS114	Conducted Susceptibility, Bulk Cable Injection, 10 kHz to 200 MHz
6.	CS115	Conducted Susceptibility, Bulk Cable Injection, Impulse Excitation
7.	CS116	Conducted Susceptibility, Damped Sinusoidal Transients, Cables and Power Leads, 10 kHz to 100 MHz
8.	RE101	Radiated Emissions, Magnetic Field, 30 Hz to 100 kHz
9.	RE102	Radiated Emissions, 10 kHz up to 18 GHz
10.	RS101	Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz
11.	RS103	Radiated Susceptibility, Electric Field, 2 MHz to 40 GHz

7. RELIABILITY

- MTBF(Part stress method MIL-STD HDBK 217F):
50,000 hours or more (Naval sheltered at 25°C) Vendor to specify MTBF of item and spares in absolute value after placement of order.
- MTTR: 30 minutes

8. STORAGE CONDITION

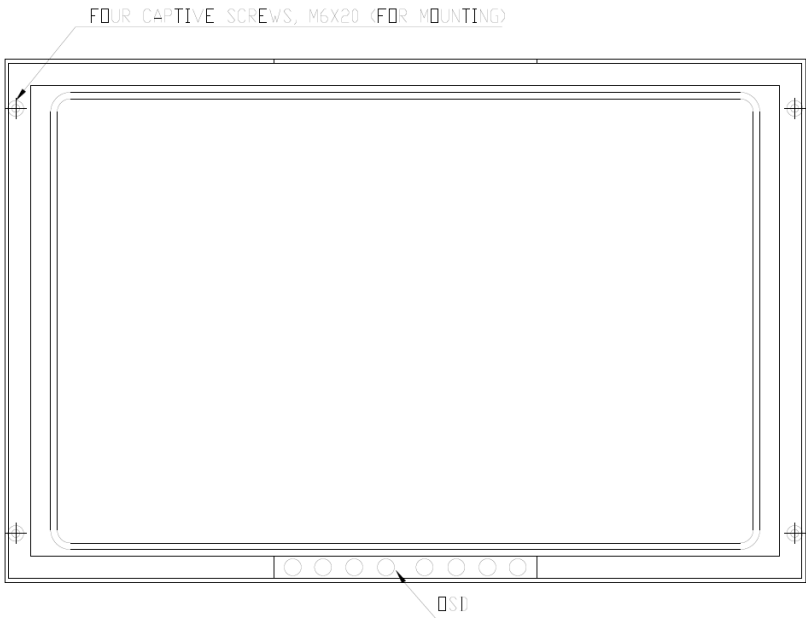
The storage condition e.g. Temperature, Humidity etc along with preservatives if any shall be stated by the vendor. Vendor shall also provide details of preservation and de-preservation process.

	TECHNICAL SPECIFICATION	DOC CODE TS	PART NUMBER 4461 415 601 19	
15.6" MTID- RUGGED	VER P1	SH No. 10	PREPARED BY SHIVA	DATE 16.11.22
	HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22
<p>9. <u>NOTES</u></p> <ol style="list-style-type: none"> 1) Mating connectors with back shell & boot for power input connector are part of supply along with display. 2) All PCB used in Rugged DISPLAY shall be conformal coated. 3) All connectors on the display should have metallic dust cap with suitable arrangement for securing. 4) Shielded cable of 2.5m Length with Std HDMI connector for Display connectivity and mini DP (with securing notch) for computer connectivity to be supplied along with display. 5) Shielded cable of 2.5m Length with Std DVI connector for Display connectivity and mini DP (with securing notch) for computer connectivity to be supplied along with display. 6) Supplied cables should have suitable ferrite beads/cores for required performance and to meet EMI/EMC. 7) Shielded USB cable of 2.5m Length with Std. USB connector at both ends for touch interface to be supplied along with display. 8) CoC for all the specifications including ET & EMI/EMC of the unit to be provided in prescribed format of BEL. 9) Item to be supplied with EMI/EMC & IP Sealing Gasket for mounting. 10) ESS of all the PCBs (Indian Make Only) used in the Display (as the BEL Specifications: Thermal Cycling and Random Vibration) shall be carried out by the vendor in a NABL accredited LAB. Moreover test reports of ESS of all the Indian make PCBs are to be provided by the vendor for all the individual units of Display manufactured by the vendor. 11) Vendor has to provide the following Reports: <ol style="list-style-type: none"> a) Structure Material Report from NABL accredited or Equivalent Lab. b) For Paint: Paint test reports (Shelf life, viscosity, adhesion etc.) to be provided by vendor in case paint procured from BEL approved vendor or the same to be provided by vendor from NABL accredited/ equivalent Lab in case of any other source of procurement. c) ESS Test Reports of the PCBs (Indian Make Only) from NABL accredited lab. 				

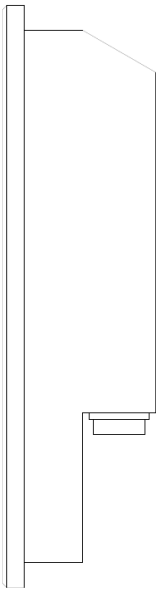
	TECHNICAL SPECIFICATION	DOC CODE TS	PART NUMBER 4461 415 601 19
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15.6" MTID- RUGGED	VER P1	SH No. 11	PREPARED BY SHIVA	DATE 16.11.22
	HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22

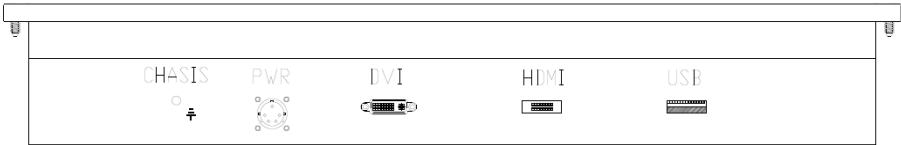
APPENDIX A - REFERENCE FIGURE



FRONT VIEW



SIDE VIEW



BOTTOM VIEW

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15.6" MTID- RUGGED	VER P1	SH No. 12	PREPARED BY SHIVA	DATE 16.11.22
	HELD IN GAD	No. OF SH 12	APPROVED BY RAKESH	DATE 16.11.22

APPENDIX – B

Pin details for PWR connector

Pin No.	Signal
A	PHASE
B	NEUTRAL
C	EARTH