

## BHARAT ELECTRONICS LIMITED

Nodal Officer		List of Items for Indigenization					
Name & Address of Unit	Contact Details	Sl.#	Nomenclature of Item	Part No	Brief Specification/Description	Photo/ Drawing	Approx. Annual Requirement (Qty)
BEL Bangalore Unit, Bharat Electronics Limited, Jalahalli Post, Bangalore 560013  Mr.Narasimha Naika, Sr.DGM-Production Control, Phone:080-22195248 Fax: 080-28382067 e-mail:kasmohankumar@bel.co.in		1	Relay	468011760276	Non-polarized, non-latching Hermetically sealed 2PDT, 1A, 28V RA-PIN 28VDC	Refer Annexure-1	As per customer requirements
		2	Relay	468011770170	Non-Latch 3 PST NO, 25 AMP + 1 PDT, 2 AMP		
		3	Relay	468213260122	Non-Latch 3 PDT, 10 AMP		
		4	Relay	468213270113	Non-Latch 3 PST, 25 AMP + 1 PDT, 2 AMP		
		5	Relay	468011820319	Non-Latch, 6 PDT/10 AMP RELAIS MONOSTABLE, 6 RT/10 A		
		6	Relay	468011760179	Non-Latch 2 HER DPDT, 1 AMP 28V		
		7	EMI Filter	453013530163	EMI/EMC FILTER -40 TO +40VDC 15A 9W		
		8	DC-DC Converter	457919200112	DC-DC CONVERTER 16-40V I/P, 5V O/P,10A, 50W		
		9	DC-DC Converter	457919200209	DC-DC CONVERTER 16-40V I/P,28VO/P,2.32A, 65W		
		10	Integrated Light Plate Assy.	110002096601 (360019180180)	Internal lighting will be provided by an integrated light plate for illuminating the legends. Power for the lamps will be the supplied by aircraft DC internal lighting supply through cockpit light control arrangement (28V DC Typ.).		
		11	Multi-Directional Control Switch	471311620154	Hand operating toggle switch with snap action contact mechanism. (A)Normal Selection (B) Roll right & Left Trim (C) Pitch up & Down Trim		
		12	Aluminium Silicon Carbide (AlSiC) Heatsink	383012040101	AlSiC metal matrix composite materials have a unique set of material properties that are ideally suited for flight critical electronic packaging applications. AlSiC co-efficient of thermal expansion value is compatible for Ceramic & Plastic BGA packages. Used as sandwiched core between polyimide laminate PCBs.		
		13	Display Unit 4 ATI AMLCD Rugged	446810880101	A high-end, versatile display for use in aircraft cockpit. Incorporates high performance, low power components with technologies like LED backlight, RS422 & Fan less operation and superior graphics capabilities. Unit receives the processed symbol display data on RS422 channel from the I/O Controller & transmits back the pushbutton selection commands to I/O Controller. It displays symbols on 480x480 pixels AMLCD. It performs its built-in self test during POWER-ON and when requested by the I/O Controller and sends the status report to I/O Controller.		

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BEL Bangalore Unit, Bharat Electronics Limited, Jalahalli Post, Bangalore 560013	Mr.Narasimha Naika, Sr.DGM - Production Control, Phone:080-22195248 Fax: 080-28382067 e-mail:narasimhanaika@bel.co.in	14	Attitude Reference Unit (ARU)	474310900215	ARU is a six-axis dynamic measurement Unit for linear acceleration & rotation rates along/around 3 orthogonal axes (X, Y & Z). It uses accelerometers and angular rate sensors for the purpose. ARU measures rates of pitch, roll & yaw; calculates roll, pitch, yaw & relative heading angle.	Refer Annexure-1	As per customer requirements
		15	AC-DC CONVERTER	457915850120	AC-DC converter is a regulated power supply. Input to this module is 115V 400Hz 3 Phase AC. It provides DC outputs as mentioned above.		
		16	Digital Instantaneous Frequency Measurement Unit (DIFM)	455611130120	DIFM unit is a MW sub-module used for measuring frequency of input RF signals in the range of 2GHz to 18GHz. Measures pulsed & CW RF signals and outputs frequency data with 12-bit resolution. The RF input connection is made via a SMA connector and the frequency data is output through a miniature D type connector. I/p & O/p signals are LVDS compatible. Conducts self-test & provides health status.		
		17	RADOME for Transmitting Antenna FWD	476810460138	To protect the transmitting antenna from external aerodynamic & environmental loads without degrading the electrical performance of the antenna. It will be installed on a fighter aircraft enclosing high power transmitting antenna. It is required to be operated continuously at a temperature of +120°C & at +150°C for 3 minutes.		
		18	RADOME for Transmitting Antenna	476810400192	To protect the Transmitting Antenna from external aerodynamic loads and environmental loads without degrading the electrical performance of the antenna. It will be installed on a fighter aircraft enclosing high power transmitting antenna. It is required to be operated continuously at a temperature of +120°C and at +150°C for 3 minutes.		

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BEL Bangalore Unit, Bharat Electronics Limited, Jalahalli Post, Bangalore 560013	Mr.Narasimha Naika, Sr.DGM - Production Control, Phone:080-22195248 Fax: 080-28382067 e-mail:narasimhanaika@bel.co.in	19	Dual Antenna with Radome	110002144810	Passive Antenna operating in 1-18 Freq. range as FER to RWR System	Refer Annexure-1	As per customer requirements
		20	Single Antenna with Radome	110002144907	Passive Antenna operating in 1-18 Freq range as FER to RWR System.		
		21	Equalizer	455611120129	Equalizer is a MW component having 4 I/p ports and 4 o/p ports. Its operating frequency range is 1 GHz to 18 GHz. It is used between RFU and MASS unit of SPU to achieve constant RF power at the i/p of MASS over frequency range.		
		22	Dual Front End Amplifier (FEA)	110002144616	FEA module is an essential requirement for the EW receiver systems for high dynamic range and better sensitivity. FEAs are placed in the near vicinity of antennae receiving the electromagnetic signals from the radars for amplifying the weak signals received by the antennae before sending these signals to the processor bay by using long coaxial RF cables, which have very high losses especially at higher radio frequencies.		
		23	Power Divider-4 Way	454510570157	An RF component which distributes incoming RF signals in N-way outputs.		
		24	Power Divider-2 Way	454510880169	A passive RF component which distributes incoming RF signals into N-way outputs.		
		25	Front End Receiver (FER)	995798463965	An RF sub module which channelizes the signals received in 1GHz to 18GHz range into six bands. It performs amplification, signal detection in each band, Down Conversion of RF input in the range of 4 to 18GHz to 0.3 to 4.3 GHz , logic for switch control and LO frequency generation. Based on the band control lines set by the Processing Unit to FER, RF signals received are amplified & converted to video signals, which are then sent to the Processing Unit for further processing.		

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Radar SBU, BEL Ghaziabad Unit, Bharat Electronics Limited, Stage IV, Sahibabad Industrial Area, Bharat Nagar Post, Ghaziabad 201010	MrP.K.Gupta, AGM - D&E Phone: 0120-2775189, E-Mail: guptapk@bel.co.in	26	Air Traffic Control Display	143032571133	Part of Surveillance Radar Element (SRE) Project.	Contact Nodal Officer for details.	As per customer requirements	
		27	BADC Display	143032376260				
		28	Controller Working Position Display	143032474424				
		29	MAP Generation	143032935950				
		30	Safety Net	143032571521				
		31	Record and Replay Facility	143032571327				
		32	CWP/RMM ASSY	143032474036				
		33	CPPI for REPORTER Radar	446141050190	Part of Reporter project			
		34	Active Gette & vapotron (AGV) Safety Drawer for IRMA	51000302200	Part of IRMA project			
		35	CPEX Card for BHARANI-II	143033815546	Part of Bharani- II project			
		36	G4 DSP for IFF (MRSAM)	143032635444	Part of MRSAM project			
DCCS SBU, BEL Ghaziabad Unit, Bharat Electronics Limited, Stage IV, Sahibabad Industrial Area, Bharat Nagar Post, Ghaziabad 201010	Mrs.Prabha Gooyal, Sr. Deputy General Manager, Phone: 0120-2774950, E-Mail: prabhagoyal@bel.co.in	37	CPCI based Single Board Computer	143032571133	Refer Annexure-2	Refer Annexure-2	As per customer requirements	
		38	Router + Exchange	143032376260				
		39	RAID	143032474424				
		40	22 inch Display	143032935950	Part of ADC&RS Project.			
		41	15 inch rack mount monitor	143032571521	Part of ADC&RS Project.			
		42	19 inch rack mount monitor	143032571327	Part of ADC&RS Project.			
		43	GPS	143032474036	Part of ADC&RS Project.			
		44	UPS	446141050190	Part of ADC&RS Project.			
		45	Generator (40/30 KVA)	51000302200	Part of ADC&RS Project.			
		46	Rugged Computer	143033815546	Part of ADC&RS Project.			
		47	Rugged Handheld Device	143032635444	Part of ADC&RS Project.			
		48	Battlefield Surveillance System		Refer Annexure-3			

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BEL Panchkula Unit, Bharat Electronics Limited, Plot No.405, Industrial Area, Phase III, Panchkula.134119	Mrs. Neerja Taneja, DGM, Phone: 0172-3937208/342 Fax:2594548 E-mail: neerjataneja@bel.co.in	49	IC Controller	438741090134	IC Controller SOMDM3730-30-1780AKIR. Part of G-SAT Project	Contact Nodal Officer for details.	As per customer requirements
		50	Converter AC-DC	457983030671	Converter AC/DC 12 V/5.4A. Part of G-SAT Project		
		51	Duplexer with LNA & PA	454371150117	Duplexer with LNA & PA (S Band). Part of G-SAT Project		
		52	Crystal	451571370150	Crystal 19.6608 MHz 2.5ppm. Part of Advanced VLF Receiver		
		53	Pre Amplifier	443310260196	Pre amplifier pha 4000-1, Macom. Part of LUP		
		54	Power Amplifier	443310260293	Power Amplifier pha 4000-2, Macom. Part of LUP		
BEL Pune Unit, Bharat Electronics Limited, NDA Road, Pashan, Pune 411021	S K Modi, DGM (E&E), Phone: 020-22903831, FAX: 040-229103322 E-Mail: skmodi@bel.co.in	55	Meniscus Lens	282010310145	Used to see the target & aim the reticle pattern on to the target simultaneously. aterial is BK 7 or equivalent. Part of Multi purpose Reflex Weapon Sight (MRWS)	Refer Annexure-4	As per customer requirements
		56	Visible Laser Diode	446080520153	Wavelength:650nm, compact in dimensions, Power <5mw. Part of MRWS.		
		57	IR Laser Diode	446080530144	Wavelength:850 nm, compact in dimensions, Power <5mw. Part of MRWS.		
		58	Magnesium Housing	280088030105	Dimensions (mm) (LxWxH) 120x60x75 (max) Material:Magnesium AZ91D-F. Part of MRWS.		
		59	Cover	280088010123	Dimensions mm (LxWxH) 107X43X30(max) Material:Magnesium AZ91D-F. Part of MRWS.		
		60	Reserve Battery	457581210111	Power source for Electronic fuze. Battery remains inert untill fuze is fired alongwith shell from an artillery gun. Battery consist of a thionyl chloride cathode, lithium metal anode & an organic electrolyte which is kept separately in a glass ampule. Upon gun firing, glass ampule breaks due to acceleration forces and electrolyte comes into contact with anode/cathode to produce electricity. Glass ampule is broken by an activation mechanism built into the battery. Battery activation should happen at 1600g acceleration & 2500 RPM.	2-3 lakhs	

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BEL Hyderabad Unit, Bharat Electronics Limited, Industrial Estate, Nacharam, Hyderabad 500076	Mr.Sreenivas Murthy.K., DGM - OPS-Material Control & Stores, Phone: 040-27194546, Fax: 040-27156007, E-Mail: sreenivasmurthy@bel.co.in	61	Filter BP 8.7 - 8.9 G	455377500188	Refer Annexure- 5.1 & 5.2 Filter Band Pass 45537750-1 & 45537750-2)		10
		62	Filter BP 9.0 - 15.0 G	455377500285		10	
		63	Filter BP 9.2 - 17.2 G	455377500382		10	
		64	Filter BP 9.2 - 17.2 G	455377500479		10	
		65	Filter BP 18.0 - 26.0 G	455377500576		10	
		66	MONITORING RECEIVER (9KHz - 30MHz)	455677120190	Annexure-5.3 Monitoring Receiver	7	
		67	MONITORING RECEIVER (40KHz - 3.15GHz)	455677930140	Annexure-5.4 Monitoring Receiver	40	
		68	ANTENNA HF DIRECTIONAL 1.5 - 30MHz	476777010173	Annexure-5.5 Antenna HF Directional	4	
		69	ANTENNA HF OMNI 1.5 - 30MHz	476777020164	Annexure-5.6 Antenna HF OMNI	4	
		70	ANTENNA HF DF 0.3 - 30MHz	476777030155	Annexure-5.7 Antenna HF DF	10	
		71	ANTENNA HF ACTIVE 9KHz - 30MHz	476777150144	Annexure-5.8 Antenna HF Active	9	

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BEL Machilipatnam Unit, Bharat Electronics Limited, Post Box No.26, Ravindranath Tagore Road, Machilipatnam 521001	Mr.Durgaprasad. Manager, Phone: 08672-220644, Fax:08672-222640 e-mail:durgaprasadp@bel.co.in	72	Objective Assy.	170000337697	Part of Passive Night Vision Device - PNS LMG	Contact Nodal Officer for details.	As per customer requirements
		73	Objective Cell Assy.	170000367088	Part of Passive Night Vision Device - PNV Goggle		
		74	Uncooled IR Engine	446770340115	Part of Uncooled TI Binocular		
		75	SI Window-TI	270103120153	Part of Cdr TI sights for T72/BMP project		
		76	Opical Receiver (Day Sight)	270190340128	Part of Cdr TI sights for T72/BMP project		
		77	Mirror	270190350119	Part of Cdr TI sights for T72/BMP project		
		78	Cupola Window - Day	270103790132	Part of Cdr TI sights for T72 Project		
		79	Cupola Window - TI	270103800123	Part of Cdr TI sights for T72 Project		
		80	Protection Cover Window	270191340101	Part of Cdr TI sights for T72 Project		
		81	ZNS Clear Grade Window-1	270095020168	Part of Cdr TI sights for T90 Project		
		82	ZNS Clear Grade Window-2	270095030159	Part of Cdr TI sights for T90 Project		
		83	Roof Penta Prism with Dichroic Prism	373085390192	Part of Cdr TI sights for T90 Project		
		84	Right Angle Prism	373085380104	Part of Cdr TI sights for T90 Project		

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BEL Chennai Unit, Bharat Electronics Limited Nandambakkam, Chennai-600089	Ms.Sumathi, Manager, Phone:044-22338159 Fax: 044-044-22326905, E-Mail:sumathia@bel.co.in	85	Slip Ring	474575300196	Part of L-70 Project	Contact Nodal Officer for details.	As per customer requirements
		86	Absolute Shaft Encoder	474375570309	Part of L-70 Project		
		87	Inverter	457975580101	Inverter 115V/1A Part of L-70 Project		
		88	Anti-Backlash Synchro Gear	384075260205	Part of L-70 Project		
		89	Potentiometer	402173020170	Resistor Variable Cosine 2.5K+/-3% 1W part of BMPII project		
		90	Torque Motor	474175310414	Part of BMP Upgrade		
		91	Motor	474175530313	Brushless servo motor with brake-travAK630		
		92	Joystick	476675600262	Control handle part of Remote Control Weapon Station (RCWS) project		
		93	Hydraulic Booster	384373210158	Part of T-72 project		
		94	Actuating Cylinder	384373230140	Part of T-72 project		
		95	Replenishing Tank - Elevation	173000000229	Part of T-72 project		
		96	Pump with Drive Motor	384373240131	Part of T-72 project		
		97	Hydraulic Motor	384373220149	Part of T-72 project		
		98	Replenishing Tank - Traverse	173000000132	Part of T-72 project		
		99	Regulator Frequency 1A	173000015167	Part of T-72 project		
		100	Converter	474373020179	Part of T-72 project		
		101	GYRO	474473010107	Part of T-72 project		
102	Relay(P7)	468973010197	Part of T-72 project				
103	Internal Gear	275117200115	Compact Multipurpose Advanced Stabilization System (CoMPASS)				
104	Bearing	377075710135	Compact Multipurpose Advanced Stabilization System (CoMPASS)				
105	Slip Ring	474575380124	Compact Multipurpose Advanced Stabilization System (CoMPASS)				