DOC REF NO.: **AX-MLS-231022**
Alonex - Data Monitors Replacement List for Industrial & Special Purpose Controls

Created: February 3, 2022
Last updated: October 22, 2023

Manufacturer	Machine/CNC/CPU/Video-Graphic Card	Original Monitor	Interface/Remarks
ABB	BBC PROCONTROL	P1948623A9	20" CRT VGA
	TESSELATOR Series 6000, 7000, 8000, MasterView 810/830, ABB DMS, ABB SuperView, ABB ALSY 225, ABB AccuRay 1190, ABB Transmission HVDC CAS, LinkLaser Process Supervisor, MOD300		14-21" CRT VGA
Accupress	7606, AP2, ETS2000, ETS3000		CRT
Agathon	250 PL CNC-Ultra, 250 CL CNC, 250 PA CNC-Ultra		9" CRT Monochrome
	Combi 350 CNC		12" LCD Color
AGIE	Agietron Console, Agiecut AC 100/200/250/300, AGIECUT 100D/200D, Agiematic C/CU, Agiematic C, Agiematic CF, Agiematic CD, Agietron 100C, Ageitron 200, Agietron AT 200 C	CM 4114-344 D018	14" Color DB-25M/10EDGE, 24/85VDC
	AGIECUT Classic V3, Evolution 3		15"/10.4" LCD Display
Allen Bradley	8520-MOP7, 9 Series CNC, Series 8200 HMI Operator Control		9" CRT
	7100/7300/7320/7340/7360 CNC System		9" CRT
	8200/8400/8600 CNC System		9" CRT
AMADA	OCTO 334, AMADA-FANUC-O, PEGA 344, VELA 355, DA58/59, DA69, DA65, OPC8XA, AMADAN-O4PL-A, BPROMECAM, HFBO 220-4	KME 26512M004	12" CRT Color
	AMADA HFE CNC		10.4" LCD
	AMADA HFP CNC		15" LCD
Arburg	Arburg Multronica 220M, 221M, 270C, 270M, 305, 320D, 370, 370C, 420C, 420M, 520C, 520M	Arburg 586A, 598A	9" CRT Monochrome, 2x5 Header
	Arburg Dialogica	Mitsubishi EUM-1282M	12" CRT Color, DB-15
		EIZO/EG-Electronic FDC1080/S/011000 KME 26S12MA003B	12" CRT 15kHz RGBHV/VGA
B&R	Provit 500D3, Provit 1000		12"/14" CRT Monochrome
	Provit IPC5200		LQ10D367
BATTENFELD Netstal Synergy	UNILOG 8000		14" CRT
BIESSE	Rover 16/S, Rover 322/ 325/335/346, Rover RT 480, Rover CNi NC 481,..	SELTI SL/CD09602 SL/CD12602, SL8000	9/12" CRT B&W CGA 14" CRT EGA
Boehringer	Philips VDF B1T, B2T, B3T, 3000/3460/3580		12"/14" CRT Mono TTL, VGA
BOSCH	CC200, CC220M, CC300, CC320		12"/14" CRT Monochrome
	CC100T, CC100M, CC120M		9" CRT Monochrome, 10EDGE
Bridgeport	Boss 2/3/4/5/6/8/9, C6, CNC2500, DX, E-CNC, EZ-Trak, EZ-P, EZ-T, EZ-Path, EZ-Link, 1020-X, EZ-Vision, GX480dt, HMC700e, Interact 412, Japax 3F LU3B		12" Monochrome Green
BTG	BTG Pulptec DRT-5200 Refining Analyzer	DRT-5000, SII L2034	20x4 LCD
CHARMILLES	Robofil 200/230/290F/300/310F/330F/390/4020/440/440CC/440SL/510P		14" CRT VGA
	Roboform 30/31/35/84, ROBOFIL/ROBOFORM 100/200/400/600		9" CRT
CYBELEC	CNC 3200, CNC 3300, CNC 7000, CNC 7300, CNC 7400, CNC 7500		9" CRT Monochrome
	DNC 30, DNC 70, DNC 72 DNC 74, DNC 740		9" CRT Monochrome
	DNC 80, DNC 800, DNC 900		9.4" LCD Monochrome VGA
	V-DNC-84, DNC 806, DNC 880LS		10.4" TFT VGA
	DNC 90, DNC 94, DNC 900	KME 26S14MA001	14" CRT VGA
	V-DNC-1200/A-CNC		
	DNC 7000, DNC 7200, DNC 7300, DNC 7400		12" Monochrome, 14" CRT
	DNC 9000		14" CRT
	EURO II, EURO III, EURO 4, EURO 30		9" CRT Monochrome
DECKEL	Dialog 1/2/3/4, Contour 1/ 2/ 3, FP4A, FP5		9" CRT Monochrome
	Dialog 11, Dialog 12, FP3 NC		14" CRT ColorFP3
	FP 1 Aktiv Heidenhain TNC 123		
	Heidenhain TNC 332, FP3AT TNC 355 Heidenhain	BE511	12" Monochrome
	Heidenhain TNC 406/407/415/425/426	BC110(B(F))	14" CRT
DELEM	DA23, DA42		9" CRT Monochrome
	DA23e, DA-24e, DA-64, DM54 12" Mono.		12" CRT Monochrome
	DA58, DA59, DA69, DA65		12" CRT
DEMAG	D100-275, D150-452, NC ll, NC lll, NC 4		12"
ENGEL KEBA	Engel CC80, EC88, CC90, BUHL, 600		12" & 14" CRT
		Philips BM7502	12" CRT
	Engel EC88 AC01		9" CRT
		BU-1201ME-1	12"/B 1145/06 Display 2000
EAE	KBA Colora Control Console	Mitsubishi HL7955 SONY	20" CRT RGBHV BNC Monitor CRT RGBHV BNC Monitor
	REIKOTECH	A5018TFT014	TFT VGA + Touch
		A5020TFT021T	TFT VGA + Touch
Fadal	VMC 15/15XT, VMC 2016, VMC 2016L, VMC 3016, VMC 20, VMC 40, VMC 4020, VMC 4020A, VMC 4020C, VMC 4020HT, CNC 88, CNC 88HS, CNC 32MP	Original Model 914 OmniVision LP1215HVN, LP1215H1N-xx, LP1215H1N-P31, LP1215H1N-P4	12" CRT 15.75kHz, BNC 14" CRT VGA Monochrome 12" CRT TTL 10-pin
	VMC 5020A, VMC 6030A, VMC 8030		CRT
		ELE0189, ELE-0962, ELE-1072, ELE-1073	CRT Monitors
		E144C-CB	14" CRT Monitor
FAGOR	800T/820T		9" CRT Color
	8010/8020, 8025/M		7" CRT Color VGA
	8030, 8050/55-M		10/14" CRT
	8050M		9" CRT Color

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FAGOR	8050T		9" CRT Amber
	8055i		9" CRT
FANUC	6, 6M, 6T, 10, 10M, 10T, 11M, 11T, 15A, 15B, 15M, 15T, 0-MC, 0-TC, 0-MD Series	A61L-0001-0074 A61L-0001-0094 A61L-0001-0096 A61L-0001-0097 A02B-0163-C322 A02B-0200-C071	14" CRT Color
FANUC	3 Series	A61L-0001-0073	12" CRT Monochrome
FANUC	3M, 3T, 10, 11 Series	A61L-0001-0077 A61L-0001-0087	12" CRT Color MDT1283B-1A
FANUC	6T, 6B, 6M, 0, 0M, 0T, 6, 6MB, 6BT, 11, 11M, 11T Series	A61L-0001-0071 A61L-0001-0072 A61L-0001-0076 A61L-0001-0079 A61L-0001-0086 A61L-0001-0092	9" CRT Monochrome MDT925PS, MDT941D, MDT947B-1A, MDT947B-1B, MDT948B-3A, MDT962B-2B, MDT962B-1A
	15, 16, 18, 20, 0B Series	A61L-0001-0095 A61L-0001-0090	9" CRT Color
	16-L Series	A02B-0200-C061	9" CRT Operator Panel
FERROMATIK	FM, FX, IQT6		14" CRT
	IQT33, IQT44		10,4" LCD VGA
FICEP	CEPTROL CNC		12" CRT Monochrome
Foxboro	8000-SB15-G 90F08741-1-1 8000 Series, IMT20-SB10FGZ I/A Series		Repair
GE	GENERAL ELECTRIC Mark Century 2000 CNC		12" CRT
Grafikontrol		VD.001102.A CC.006102	LCD
		GA 9986/2	LCD
GILDEMEISTER	CTX400, CTX500, CTX600/CT20, ELP1, ELP2, EPL90, NEF 400, ELTROPILOT 1190, NEF CT20, NEF CT40, NEF CT60	9*, 12* 2MF1141CTN08	9", 12", 14" CRT BNC Mono 14" CRT Color
HAAS	VF0, VF1, VF2, VF3, TM1, SL-20, SL-30	Kristel 28HM-NM4 OmniVision LP1218FK7	12" CRT Monochrome, TTL-9/10, 18.18kHz
HEIDENHAIN	TNC 406/407/415/425/426	BC110/BC110B	14" CRT Color VGA
	TNC 407/410/416/426/426PB/430 Mill Plus	BC120/BC125	15" CRT/LCD
	TNC 135/145/150 /151	BE110/BE111	9" CRT Monochrome
	MAHO CNC132, CNC232, CNC322, CNC223, CNC 234	BE132, Matsushita M-1203DNB	12" CRT Monochrome
	TNC 150B,TNC 151	BE211	12" CRT Monochrome
	TNC 246/2500B/306/335/351/360, CNC 223/322	BE212/BE311/BE412	12" CRT Monochrome
	TNC 155	BE411	12" CRT Monochrome
	TNC 355, TNC 332	BE511	12" CRT Monochrome
	MAHO CNC 234, MH600C/E/T	BE512	12" CRT Monochrome
	CNC Pilot Mill Plus		14" CRT
	Philips CNC 3000 Video & Teletext Module		14" CRT
	Philips CNC 5000 Series with GCB		14" CRT
Heidelberg	Harris/Goss M300, M600-A24, M1000, M850A, M850C, M850L, M1000A		9" CRT Monochrome
	CPC 2-01		CRT
	CPC 1-04, CD102, SM52, SM74, SM102, CP Tronic	CP2000	9.4 LCD
HELLER	Uni-Pro NC80		12" CRT Monochrome
	Uni Pro NC90		14" CRT
Hermle	UWF700, UWF720, C800U, UWF801, UWF851H, UWF900E/W, UWF902H, UWF1000, UWF1001		CRT
Hewlett-Packard	HP16500A Logic Analyzer	SONY	9" CRT
Hitachi	S-2500, S-4500, S-8620 Scanning Electron Microscope		CRT
HONEYWELL	IWS-1103-HW Operator Interface Panel		14" CRT Monochrome
	559T12-0021, UMC551, UMC800, HC900 10420F-0021 Operator Panels		
Hurco		425-0001-011F	VGA
	Ultimax 3, Ultimax 4, Ultimax SSM		9" CRT
INDEX	C200		12" CRT
	GS30		9" CRT Monochrome
JEOL	JSM-840, JSM-840F, JSM-5300LV, JSM-5800LV Scanning Electron Microscope		CRT
	JSM-6100, JSM-6400, JSM-6600 Scanning Electron Microscope		CRT
Krauss Maffei	microcontrol MC2, MC3		12"/14" CRT Monochrome
KBA	Planeta VL 67-22 Varicontrol, Planeta P 74 Super Variant, Planeta 104	Sharp CZ-603D 15/31kH	14" CRT Color DB-15(2 rows)
Koenig & Bauer	Planeta Variant P44-7, Planeta 142-7+L UV Varicontrol, Planeta 162 Varicontrol	Mitsubishi,..	14" CRT Color
	Rapida 104 ColorTronic		CRT MDA
Lam Research	AutoEtch 490/590/690/790, Versys 2300 V2 Kiyo 45	Motorola	12" Monochrome, 10EDGE
LVD	Barco MNC 85, MNC 90, MNC 95C/M, MNC 32000		14" CRT Color
Makino	MGC3, MGE20, MGW-E, EDNC 64		14" CRT Color
MARPOSS	E50, E9034, E9066 Industrial PC		10"/12"/14" CRT VGA
MAZAK	Mazatrol M-2, Mazatrol T32-2, T1, T2, M Plus, T Plus M32B, M32T CNC TX 8F, Citizen M20 with Mitsubishi Meldas	Mitsubishi Totoku MDT962B-1A	12"/14" CRT Monochrome
MRC	Eclipse Operator Interface Monitor 38-C05IMA-OP	Electrohome 14H948GE2	14" CRT
MIKRON	Heidenhain TNC 426 PB, TNC410		14" CRT
Mir	CNC RMP 380/1680		12'/14" CRT
Mitsubishi	CNC 320M	BKO-NC6212 MDT 962B-1A	CRT/MDI Display Unit
	M64 E60 CNC	MDT962B-1A, BM09DF, MDT962B-4A, MDT947	9" CRT Amber
		Mitsubishi EUM-1282M	12" CRT Color

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Mitsubishi		Mitsubishi EUM-1491A	14" CRT Industrial Monitor
		Mitsubishi C-5470NS	Color Monitor
	M70		8.4"/10.4" LCD(640x480)
Montalvo	System 3000 X-3100Pce-UW, X-3400ce-UW, X3400		Repair
Moog	CNC Hydra-Path 3000		
	Bosch CC200, CC220M, CC300, CC320		12" CRT
MORI SEIKI	CL-25A, CL-35B, SL-00, SL-35M, SL-65B, SL-70, SL-75, SL-204MC, SL-250B, MH-63; Fanuc Moric T5F, MF-T6, System 2T, 3T, 6T; Fanuc 16M, MSC-516,	Victor Data Systems ME-N9812, ME-9603-BR2	8"/9"/12"/14" CRT
Muller Martini	Inventa II, Inventa Plus, 3210, 3212, 3214, 3215, Corona C15 /S35, Pantera Perfect, 1577 PUR, Sigma, Primera	Muller 0056.4686 B&R 5PP320.1043-39	10.4" LCD VGA Control Panel
NETSTAL	S 3000-1700, Euromap 3000-1700, Discjet 600/110 Injection Molder DK239A-65, SYCAP Temp Controller	PRIMELCO PRI-1566/01	15" CRT VGA
NUM	NUM 720B, NUM 750/760, NUM 1020/1040/1050/1060 CNC		9"/10"/14" CRT Mono/VGA
	CABEL Electronic P/N: NUM P/N:	M23B23X31WW5A 0216 010 935	9"/10" Mono/VGA
OKUMA	OSP 3000		9" CRT Monochrome
	OSP 5000/5000M/5000L/5020/5020L		12" CRT Monochrome
	OSP 7000/7000L, OSP-U10/U100, OSP-U100L		12"/14" CRT
Olympus	BH, BHA, BHB, BHC Inspection Microscope	JVC	CRT Color Monitor
OptiSpec	DE3200-S2, ME3200 Fiber Optic Video Microscope	SONY	CRT
OSAI	Allen Bradley, AB 8600 CNC System	Olivetti	9" CRT
Oskar Frech	DC1.0/DC2.0		14" CRT
Philips	Philips 432/9, CNC 3360		12" CRT Monochrome
	Philips 432/10, CNC 3460		14" CRT
	Philips 532, CNC 5000		14" CRT
	Philips VDF B1T/B2T/B3T		12"/14" CRT Mono TTL, VGA
	Philips Topaz X, Topaz Xi, Emerald X, Emerald Xi, Emerald PA		9" CRT Monochrome
Polar Mohr	Polar 92/115/137/155/176 EM/EMC-Monitor	Puratech/Polatech POLAR/EB 022331	12" CRT Monochrome
	Polar 92/115/137/155/176 EM/EMC-Monitor	ADT Electronic DCC-121555-03	12" CRT Color
	Polar 56/66/78/80/92/115/137/155 D/E/ED/ED-AT/ECO/ES/NET/N/Plus/X/XS/XT	AutoCut, AutoTrim	5.4", 15",18.5" LCD, Repair
	Polar 55/58/66/76/92/115/137/155 EM/EMC/EMC-II/S/S-DP	Polar 7-Segment LED	Repair only
Reishauer	RZ150, RZ301, RZ301S, RZ362, RZ701, RG500, RG1000, RGB25		10" CRT
Renz	ABL Inline 500, 700		LCD Touch Screen
SCHENCK	CAB 690, CAB 750		14" CRT/15" LCD
	CAB 720		14" CRT
Schroeder, CR	Schröder Ducter 1500		9" CRT Monochrome
Schutte	S32PC, WU32, WU63, WU400, WU500 CNC 4, WU750 CNC 6		12" CRT Monochrome
Seibu Walter	EW-400-F3, EW-450J, EW-700 K1, SW-5000B		12" CRT Mono/14" CRT
Selca	S1000V, S1100V		12" CRT
	1200-ELEXA500-520, S1000/S1100V/3040-30457		14" CRT
	3040, S3045 CNC Control panel		LCD
SIEB & MEYER	CNC 35.00, CNC 45.00, CNC 82.00		15" CRT
Siemens	CP526M		9" CRT Monochrome
	CP527	MP12-527	12" CRT Monochrome
	CP560	MP14B-527	14" CRT
	Simatic KTP400 Comfort, KTP700 Basic		Repair
	MONA-S5		19"-24" CRT
	Simatic OP7, OP37		Repair
	PM36/C1C	MultiSync	14" CRT 15 kHz
	PM36/C1D, S5		17" CRT 15 kHz
	PM36/C1R (CP526/527/528,Coros)		14" CRT
	PM36/C1R (WF470 only)		14" CRT
	SCD1215-E		12"CRT
	SCD1515-E		15" LCD
	SCD1815-E		18,1" LCD
	WF470	6FM1496-2DA22	12-24" CRT
	Sinumerik 805/805M		12" CRT Mono/Color
	Sinumerik 810/810M GA1/2/3	Siemens SM-0901	9" Monochrome, 2x8 Header
	Sinumerik 820/850/880/880G/880T		12" CRT
	Sinumerik 840C/840CE/840M		14" CRT, 10.4 LCD Display
	Sinumerik FM-NC/810D/DE/840D/DE OP 032 6FC5203-0AB20-0AA0		10.4/12.1" LCD Display
	Sinumerik 840D MMC100/MMC102 OP31		9,4" Display
	Sinumerik 840D MMC100.2/MMC103 OP31/OP32S		10,4" Display
	Sinumerik S3, System 3		9" CRT Monochrome
	TP177A, TP177B		Repair
	MP20/C25, MP40/C36A, MP40/C36B2, 6AV3530-1RS32 OP30/C		CRT
	MP40 6AV5040-1BF41-0BC0 Operator Panel		CRT
	WS 400-20, WS 400-22, (WF470 6FM1470-4AA25 Graphic Card)		9" CRT Monochrome
	WS 400-50 (WF470 6FM1470-4AA25 Graphic Card)		14" CRT
	WS 510P		9" CRT Monochrome
	SIMATIC S5, WF470, WF470A, WF470B, WF470C	15.625kHz Mono/Color	RGB/BAS SoG, RGBHV/TTL-9
		Weltron WT-110	VFD Text Display
Sodick	FS-A65, BF275, AQ535L, AQ325, A500, CTS-600, LQ-1, EX-21, MARK20/21		14" CRT
Stork	CDS 85		12" CRT Monochrome
	CDS 285/385/485/500		14" CRT
Traub	TNA300, TND400, TX8, TX-8D, TX-8F, TX-8F, TX-8H	Hitachi CD1472D1M	14" CRT Color

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Traub	TNM42	KME 26S14019C	14" CRT Color
Trumpf	Trumatic 120, 200, 235, 240, 250, 500R		12" CRT Monochrome
	TLC 5005		14" CRT
Weiler	160 CNC, UD24, UD42, Primus 2 CNC, Sinumerik 805/805M		12" CRT Monochrome
Westover	FVIW-209, FVIW-409 Video Fiber Microscope		9" CRT NTSC
	FVIW-2409 Dual Video Workstation		9" CRT NTSC
Wohlenberg	92/115/137/155/180 MCS-2 TV, MCS-3 TV		9" CRT Monochrome
	76/92 SPM, 92 MCS-2	7-Segment LED	Repair only
Vollmer	CHD 250, CHD 251, CHD 270, CHF 270		12" CRT
Yaskawa	Yasnac ACGC100, ACGC120, ACGC130, ACGC/Plus		14" CRT
	Yasnac LX1/LX2/LX3, MX1/MX2/MX3, i80/i80m/b, J100M/J300M, JZNC-10P75E	TOTOKU ELECTRIC CDT14111B-8A	14" CRT
	JZNC-JPCOP-02E-00		LCD

Related resources:

https://www.crt-mon.com - Alonex CRT Monitors Portal
https://www.cnc-mon.com - Alonex CNC Monitors Portal
https://www.med-mon.com - Alonex Bio-Med Monitors Portal
https://www.mil-mon.com - Alonex Military Monitors Portal
https://www.alonex.com/pdf/AX-MON.pdf - Alonex Special & Indistrial Monitors Repair & Supply Flyer
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Data Monitors for Industrial, Military and for Special Purpose Applications

A Data Monitor is a display, which is intended to represent a data in an alphanumeric format. Usually, any data is represented by name/description of a variable parameter, by numerical values of the parameter, and by specified units of the corresponding parameter value. A data monitor may be implemented with a digital and/or a visual display of different natures: simple Incandescent Lamps or LED's for binary data values indicating (Yes/No, ON/OFF, Green/Red,..), seven segment (or more segments/dots) numeric or alphanumeric LED/VFD/ELD/LCD displays, monochrome or color visual graphic LED/ELD/PDP/CRT/LCD display for an alphanumeric data representation with pixel based graphic techniques.

Data Visual Monitor is a display, which is capable to represent an alphanumeric data in a more understandable visual form, such as value bars, parametric and function graphs and charts, and even in real static or motion visual pictures captured by video cameras. The monochrome and color LED/ELD/PDP/CRT/LCD displays are used for data graphical visualization.

LED simple display matrixes are very reliable, well visible and cost effective, until we do not speak for complicated graphics of high resolution or for OLED technologies. The green and red Seven-Segment LED matrixes are the excellent solution for numeric data displaying.

The color Electro-Luminescent Displays (ELD) is a good solution for sunlight lit dashboards and data monitors.

The Monochrome Plasma Display (PD) Panels have been attempted for use in industrial controls in the past. However, the Plasma Panels did not have a wide usage and were pushed out of the market by the LCD tsunami.

The LCD is a cost effective but extremely unreliable and of worse image quality technology, especially when used in industrial and in mission critical applications. Taking in account the complicated controlling of any LCD matrix and the requirement to be backlit by a CCFL - Cold Cathode Fluorescent Lamp(s) ignited with a HV AC inverter, or by a LED backlight chain, the cost efficiency of the LCD products looks as formed mostly by their very big production volumes. The mass use of the LCD screens in specific equipment is a tribute to the current fashion, which has been actually formed by the non-alternative market offer with the corresponding aggressive mass marketing. Any specific LCD panel may not be considered as a reliable, repairable and cost effective solution for end users products.

Vacuum Fluorescent (VFD) and Cathode Ray Tube (CRT) displays are still very reliable, well visible and cost effective solutions for data monitors especially for the vintage controls, where such technologies initially were used. The CRT data monitors work since 80's till now with a proper maintenance, while the LCD panels have a lifetime about 2-5 years and maintenance or repair are near impossible for them. The disadvantages of the CRT displays are big weight/dimensions and significant power consumption. And the principal disadvantage of the CRT is the impossibility to be implemented in the "smart-phones" for dullards. Regretfully, the CRT monitors are stigmatized as of the old and useless technology, and their manufacturing near has been stopped nowadays.

Data Monitors Replacement

In search for a suitable display replacement for an existing control, a video interface standard compatibility becomes a very important feature of a replacement display.

The simple and very popular alphanumeric text LCD's are de facto standardized, dot-matrix level controlled by the HD44780 device and having near the same control interfaces. A replacement text LCD must be suitable to an original display as to overall and character dimensions, a character set, a number of character lines and number of characters per a line (2x16, 4x20,..). A backlight color is not principal, and power supply bus, contrast, data and control signals can be fed in a less or more simple parallel way via a 1-2 row standard header of about 16-20 pin max. Sometimes, I²C or SPI adapter is used in order to decrease pin count of the LCD interface.

The VFD, LED, ELD, PD and color graphic LCD panels have more complicated interfaces, which have not been standardized while the coming LCD expansion apocalypses. Near all the text/digit and graphic VFD, LED, ELD, PDP and LCD displays require an exclusive hardware interface and an exclusive software driver, if we do not speak about LCD panels already adapted for VGA or for another standard interfaces. Sometimes, special mechanical (proper connectors, cables,..) and logic/level adapters are used, especially when a such display is placed on a significant distance from its text or graphic controller. The VFD, ELD and PD panels require specific voltages to be supplied, and LCD must be backlit usually with a CCFL and a HV AC inverter, or with a LED chain.

The CRT monitors have less of connection options which are standard basically, but also have such features as Horizontal and Vertical deflection frequencies, different deflection modes, analog or TTL, positive or negative, separated or composite video, color and sync signals, and a number different connectors and different pin-out of the connectors.

Adaptation of an incompatible display to a machine control is not a simple task. Thus, the same or near the same display technology and video interface should be used as the first candidate while selecting a suitable display replacement, in order to simplify and to success in such maintenance procedure. The vintage control and display technologies were based on first computers as IBM/XT, Micro-80, Radio-86RK, ZX-Spectrum, Atari, Amiga,.. and on microprocessors as Z80, 8085, 8086, 6800, 6502,.., on video and graphic controllers of those times. This fact should not be forgotten when selecting an alternative display, and the corresponding respect should be sincerely expressed for those technologies and for those great people. Persistent pushing of VGA LCD office color monitors equipped with crooked video adapters into such vintage systems, especially designed for monochrome monitors, is a stupid but very popular idea.

Data Monitors Repairing

Repairing of a data monitor should be performed as usually, meaningfully, in accordance with a display technology and its controlling techniques, and under an experience of a repair technician or engineer. However, it should be noted, that a stupid and blind experience could be near useless and even destructive. Any experience should be supported with a clear logic, a relevant basic knowledge, and with continuous education processes, irrelevantly to any regalia, duty, diploma or any pouting posture. Silent prayers and ritual dances with a tambourine around any damaged equipment do not help us in locating nor in solving problems, usually.

The VFD/LED/ELD/PD/LCD flat panels and the CRT bulbs themselves are irreparable and should be replaced with the same ones commonly. Just backlight lamps and the corresponding HV invertors, special power supplies may be fixed/replaced in the ELD/PD/LCD panels, and just CRT deflection magnets and windings may be adjusted or replaced on a CRT bulb. The CRT monitors, in addition to power supply, have a HV generator and transformer (FBT), deflection and video processing circuits, which may be inspected and repaired. A proper repair with a long time warranty should not be limited with a problematic component(s) location and replacing. All the electrolytic capacitors should be replaced in aged equipment irrelevantly to their actual condition.

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