TFT-LCD Subsystem Engineering

Two Decades of Experience in Controller and Monitor Development

DATA DISPLAY GROUP

Digital Solutions for Business

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Data Display Group – Global Activities

USA - New York

UK - Chatham

Turkey - Istanbul

Germany - Germering
Headquarters

Germany - Eisenach

Italy - Padua

Two Decades of TFT-LCD Controller and Monitor Engineering – Is there anybody with more experience?

Data Display was one of the first companies in the world offering TFT-LCD controllers for the industrial market starting in 1993.

Today, we are the major manufacturer of high quality TFT-LCD controllers in Europe, USA/Canada and supply these boards to industrial, medical, marine and military customers. As an engineering partner of many leading companies all over the world, we develop and manufacture industrial grade TFT-LCD subsystems including custom hardware, custom firmware/software and additionally offer CAD services to design custom display solutions.

Core Competence

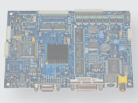|	
Hardware Development	**TFT-LCD controller hardware**. Graphics converters for digital and analog signals, ARM- and FPGA-based solutions, interfaces, customization and custom projects.
Driver, Firmware and Application Software Development	**Firmware** for graphics converter boards, **LINUX and application software** for ARM-based solutions, FPGA programming, **Windows/ LINUX drivers**, customization and custom projects.
Mechanical Engineering	**CAD design** of finished monitors, open frame solutions, prototyping, European and international certifications, customization and custom designs.
Integration and Manufacturing	**Monitor** assembly, **Touch Competence Center**, integration of touch and protective glass, software integration, **TFT modification** (high brightness, anti reflective, transflective).
TFT Distribution and Accessories	**TFT panel distribution** (all manufacturers), supply of all TFT-related accessories like power supplies, touches, protection glass, inverter, cables, **industrial PC kits.**

Hardware Development

In the past years since 1993, we have continuously been developing and supplying TFT-LCD controllers for standard digital and analog signals as well as controllers with ARM/FPGA technology. These developments include our own range of industrial products as well as many full or semi-customized solutions. Just to mention a few requirements of our customers we have implemented:
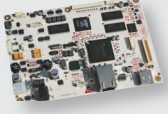
- individual dimensions of the controller,
- special panel adjustments,
- special types of connectors,
- variation of input signal types,
- optical encoders for OSD navigation,
- additional DC output,
- wide range input voltage
- and many more

1993		**Vampower 1** TFT Controller for PC with ISA bus
1998		**Vampower 9** TFT Controller for PC with PCI bus
2000		**Prisma 1** DVI/VGA/Analog video. First converter with scaler
2004		**Prisma 2** DVI/VGA/Analog video converter
2010		**Prisma Media II** DVI/HDMI/Display-Port/SDI converter
2012/Q2		**Prisma Eco Media** Small VGA/DVI/HDMI converter for Full-HD

Milestones: Standard TFT-LCD controller engineering

Hardware is designed and manufactured in Germering (Munich) / Germany, Istanbul / Turkey and Ronkonkoma (New York) / USA as industrial grade standard with long-term availability. Direct contact to our engineering team is guaranteed.

In addition to the standard TFT-LCD controller for digital and analog signals, DD-Group started developing FPGA- and ARM-based controllers for various applications in 2004. These controllers comprise solutions for USB- or LAN-attached monitors and media players.

2004		**Artista USB 1** FPGA-based TFT controller with USB	2005		**ArtistaNET 2** ARM/FPGA-based TFT controller with LAN (Ethernet)
2006		**Artista USB 2** FPGA-based TFT controller with USB for Full-HD	2009		**Artista USB Eco** FPGA-based TFT controller with USB for low resolutions
2011		**ArtistaNET 4.3** ARM-based TFT controller with LAN for 4.3" panel	2011		**Artista Media 2** ARM-based TFT media player with LAN for FULL-HD

Milestones: FPGA- and ARM-based TFT-LCD controller engineering

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Driver, Firmware, Application Software

Our own controller - our own software. When it comes to OSD menu, remote control protocols, right-sized LINUX operating systems, LINUX drivers, Windows desktop drivers or application software for ARM platforms or Windows - our software engineering team is ready to create tailored software solutions for our customers. This full control of firmware and software enables us to offer customization which is not only limited to hardware but also includes all parts of the software.

Hundreds of our customers are using their own customized software versions on our various controllers:

- Custom boot screens and logos
- Custom functions in OSD menu
- Fully customized OEM firmware
- Additional drivers
- Fully customized application software
- Software and firmware projects

From a custom boot screen to custom OSD menues and fully customized programming software for media players - there are almost unlimited possibilities since we can offer full control over hardware **and** software.

Firmware: WEB front end for ARM controllers

Application Software for Windows: Playlist creation

OSD Menu: Prisma controller

Custom Prisma OSD: NightVision application (iPhone®-look)

Custom Prisma OSD: Crosshair setting and positioning

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Mechanical Engineering

Our CAD design team has created numerous monitor solutions from 4.3" to 70". This is not limited to our own standard monitor products. Many custom and OEM designs, finished monitors as well as open frame chassis or simple mounting plates, were made to exactly meet our customers' requirements.

Custom USB service monitor with 7" panel and touch

40" OEM monitor with glass front and backlit logo
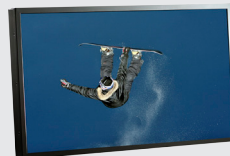

19" open frame monitor

Our service includes:

- Mechanical design
- Prototyping
- EMC-measurements and documentation (with certified lab)
- Product safety (with certified lab)
- Country specific certifications (with certified lab)
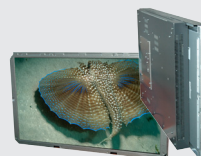
Some of our standard monitors:

Monitor Albra
Series of monitors with aluminium bezel and various options, 32" - 55"

Monitor Brilan
Series of slim bezel monitors with various options, 32" - 82"

Monitor Smart
Industrial monitors, 10.4"-23"

Monitor Inline
Series of industrial open frame monitors with various options, 10.4" - 70"

Integration and Manufacturing

To provide the best quality possible, we control the whole process – from product development to integration and manufacturing. Our integration and manufacturing departments are equipped with state-of-the-art technology like clean room and air-flow systems allowing us to realize panel modifications (i.e. to increase sunlight readability) or to integrate TFT-LCD panels with touchscreens or safety glasses.

Our service includes:

- Manufacturing of standard and custom TFT-LCD controller hardware
- Manufacturing of standard or custom monitor chassis (finished, open frame, mounting plates)
- TFT-LCD panel modifications (anti reflective, transflective, CCFL-LED conversion, brightness)
- Integration of touchscreens and safety glasses
- Integration of standard products into custom monitors (i.e. GSM modules, WLAN modules)
- Assembly of finished monitors and open frame products
- Installation of standard and custom software images on disks and flash memories
- Burn-in tests

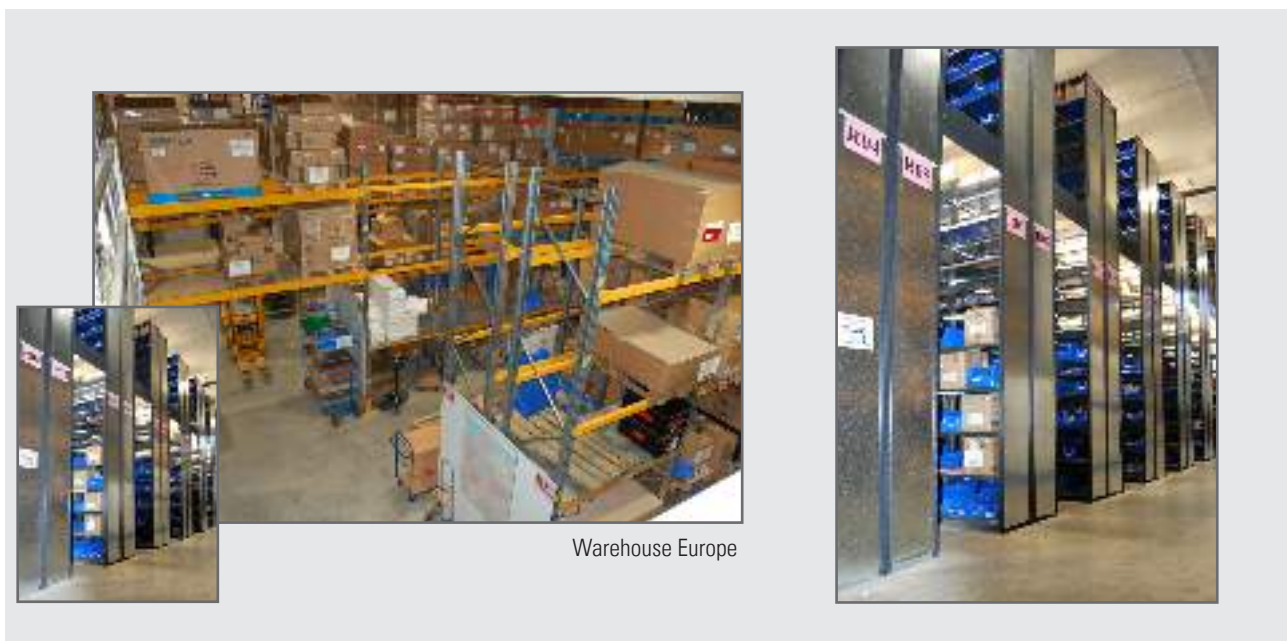Clean Room

Air-flow system for touch integration
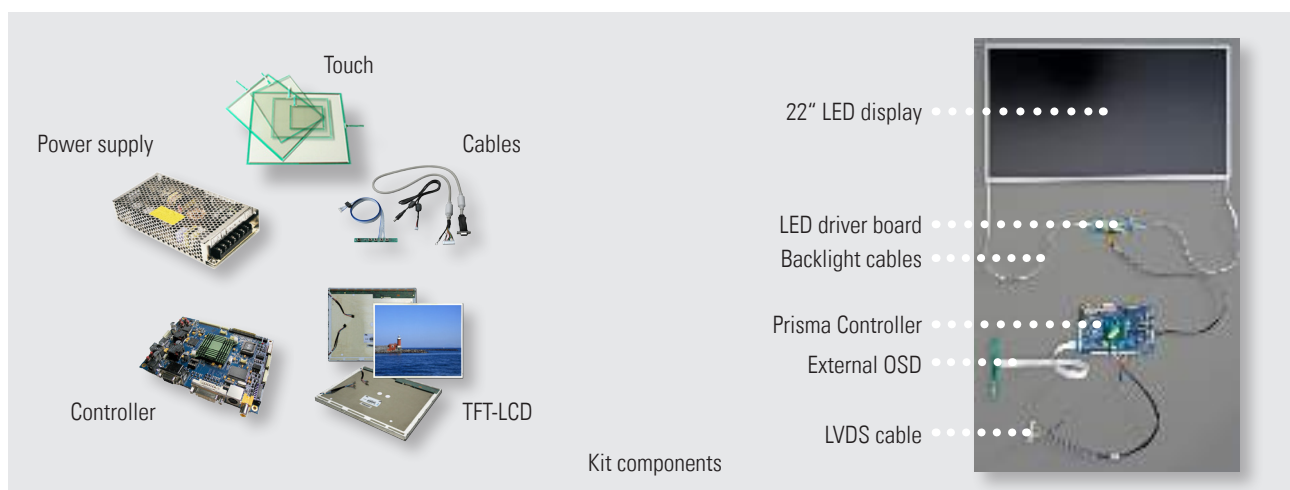

Monitor assembly line

Monitor assembly line

TFT-LCD Distribution and Accessories

Distribution of TFT-LCD panels and related accessories such as touch technologies, cables and power supplies **has been the heart of our business** since the early beginning in 1993. We have close relationships to the major TFT-LCD manufacturers and accessories suppliers. Many TFT-LCD modules which are commonly used in the industrial or digital signage market are stocked in our warehouses in USA and Europe.

Warehouse Europe

Distribution also comprises the combination of TFT-LCD panels, industrial controllers or PC, touch, inverter or LED converter, power supplies and all required cables as **plug and play kit solution**. The kit contains all parts according to the customers specification and forms a complete TFT-LCD subsystem for integration by the customer.

Touch
Power supply
Cables
Controller
TFT-LCD
Kit components

22" LED display
LED driver board
Backlight cables
Prisma Controller
External OSD
LVDS cable

A brief selection of recent projects is described below:

Application	Description
TFT controller for busses and trains	Ruggedized version of Prisma controller featuring wide input voltage with suppression, daisy chaining, additional sensors for hardware protection
TFT controller for TV / entertainment	Custom version of Prisma controller with 2 x 15 Watts amplifier, all versions of standard input signals, full custom OSD
TFT entertainment system for private jets	Fully customized TFT controller according to customers specification and custom OSD
TFT controller with touch	Custom version for industrial touch monitor
TFT controller for periscope application	Custom version with wide range voltage input
Custom OSD in iPhone® look	Prisma OSD Firmware for Night Vision application
Custom OSD for robotics	Cross hair application integrated in OSD
Media Player for retail shops	11.000 media players, custom open frame chassis, custom programming software, operating manual in 12 languages
Touch Service Monitor (USB)	7" panel in custom monitor chassis
Digital signage Monitor	40" full custom monitor for English pubs, integrated PC, true flat design, full glass front

More than 50% of our projects require custom modifications of TFT controller, firmware or mechanical changes and designs.

Our company network supports you worldwide with offices in Germany, Great Britain, Italy, Turkey and the USA.

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