Vuolas Electronics Oy Ltd.

Part No.	**TFT320-1 & TFT320-2**
Description	**Graphic TFT Display Devices for Lifts**
Hardware	**1.8**
Software	**2.15**
Documentation	**Rev. 1.00**

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Introduction

TFT320-1 and TFT320-2 are graphic color displays with a resolution of 320 by 240 pixels. The only technical difference between these models is the type of the backlight. The TFT320-1 has a cold cathode fluorescent tube backlight and the TFT320-2 has a LED backlight. In the following text, the type code TFT320 is used to cover both versions.

The TFT320 has electrical interfaces, which can be used for downloading information into it and for controlling the presentation of the information in real-time. Advanced features include support for animation and anti-aliasing of font edges.

TFT320 device can present several media types: full color bitmap images, monochrome bitmap images with 64 gray levels, monochrome fonts, full color bitmap animations, sequence of images (diashows) and text files. These are used like visual components. We call these visual objects.

In addition there is a special media type – setup object. It determines the device's response to different control combinations. Modifications to this object change the behavior of the device.

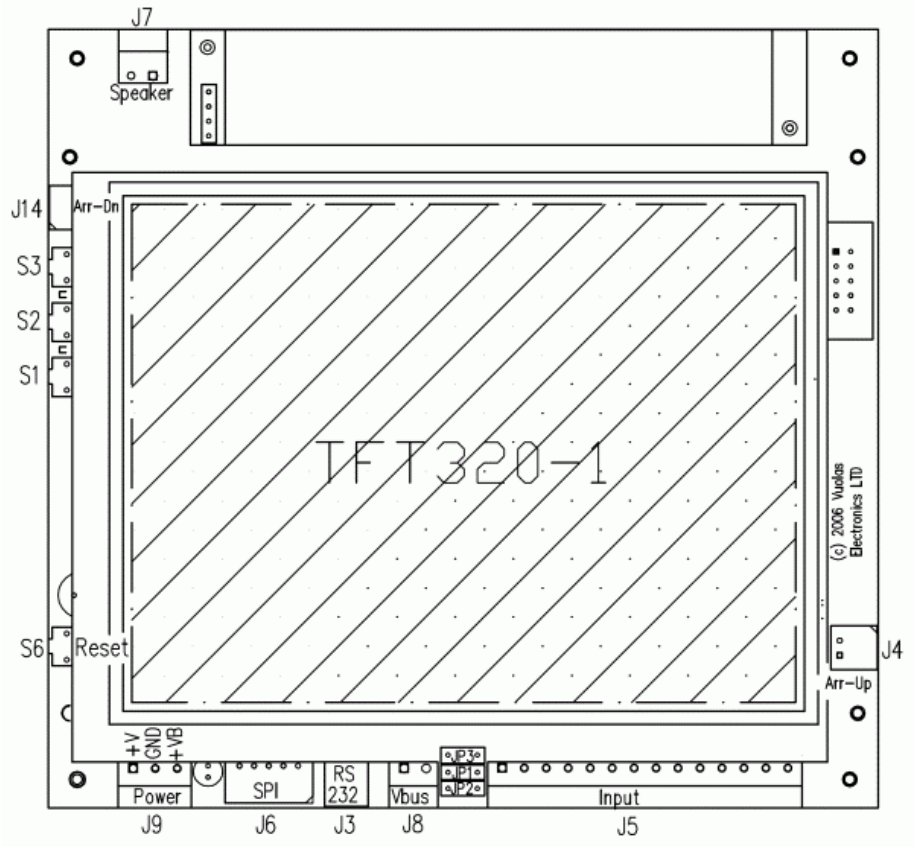
Note *Available features depend on purchased device version. All here described features are not necessarily available in all device versions.*

Lift application support

TFT320 has full lift application support. It can be assembled either to the car or to a level. It can present floor markings, direction arrows and the other graphical symbols needed for special indications. Also a variety of other information can be presented. Graphical elements are user editable and can be associated with certain floor(s). Audible signaling is implemented by direction dependent gong sounds (three style choices).

Electrical connections

Supply voltage is applied to J9 connector. The device is controlled through a 14-pin connector J5 (all the pins are inputs). Connectors J4 and J14 are outputs. Speaker can be connected to the J7 connector. Please, refer to electrical specifications for voltage levels and other details. Section “Parallel Control Interface” describes logical function of connector J5 in detail.



In lift applications J5 / 1…6 are used for position status, J5 / 7…10 for the symbol indications, J5 / 11…12 for the gong, J5 / 13…14 for direction arrows and J5 / 6 activates arrow scrolling. Connectors J4 and J14 are for optional auxiliary arrow lanterns.

Parallel Control Interface

Presentation running on TFT320 can be controlled in real-time by means of Parallel Control Interface. It has 6-bit input for coded status control, 7 on/off inputs for the symbol control and 2 inputs for audio control. One of the inputs belongs either to the coded status control or to the symbol control, so that total amount of input lines is 14.

Coded status input is 6-bit wide, so it covers the range 0…63. But if B5 input is assigned to symbol control, coded status input is 5-bit wide, covering the range 0…31. Coding is selectable: bin, Gray, 1/n, 7-segment

Symbol control input is divided to two groups. J5 / 7…10 are individual inputs; each of them can trigger appearance of an individual object (only one symbols is displayed at a time). They have priority: pin 9 overrides pin 10, pin 8 overrides pins 9 and 10, etc. So that pin 7 has the highest priority. Objects triggered by the symbol inputs always appear as foremost item, covering any information that previously existed in that position.

Note *For lift applications "fire alarm" is the factory default object for SYM1, "overweight" for SYM2 and "service" for SYM3.*

The other symbol control input group consists of J5 / 6,13,14 inputs. They can be understood as a 3-bit binary input with exception, that pin 6 can't trigger appearance of any object by itself. It can only change the object that is triggered by pin 13 or pin 14 to its prior assigned alternative (another object). Pin 6 has no effect if pins 13 and 14 are both in the same (active or inactive) state.

Please refer to application specific "Setup file" -documentation for practical information and assistance on your application area.

Serial Control Interfaces

VEBUS

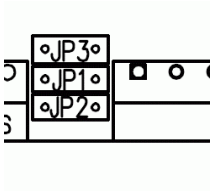
VEBUS is a serial communication port based on RS-485. Two protocol levels are available, levels 1.0 and 2.0. The VEBUS 1.0 is for one-way communication only. We recommend the level 2.0 protocol, because it supports the configuration and downloading of the images. Driver boards are available for the VEBUS 1.0 and VEBUS 2.0. See the documents of these boards for the detailed specification of the bus.

SPI

SPI is a serial communication port for Kone compatible systems.

Electrical adjustment

Three jumpers should be set to match the input signal polarity of connector J5. JP1 is for inputs B0…B5 and JP2 for the others. Set the JP3 to the same position as the JP1.



Configuration

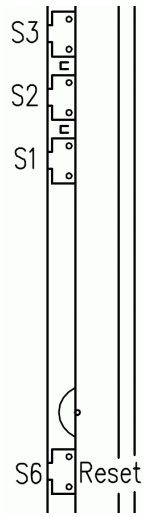
Device can be configured by means of "TFTTool" PC-software. Please refer to the TFTtool application documentation for more information.

Setup menu and reset buttons

With the aid of the setup menu the user can make changes to certain properties of the device. Three push buttons (S1, S2 and S3) are assigned to browsing of the menu. S3 switches setup menu on and off. S2 is for selecting menu item. S1 is for selecting a value. Reset button S6 is for applying a HW reset. After changing any important operational parameter or downloading new images, resetting the device is highly recommended.

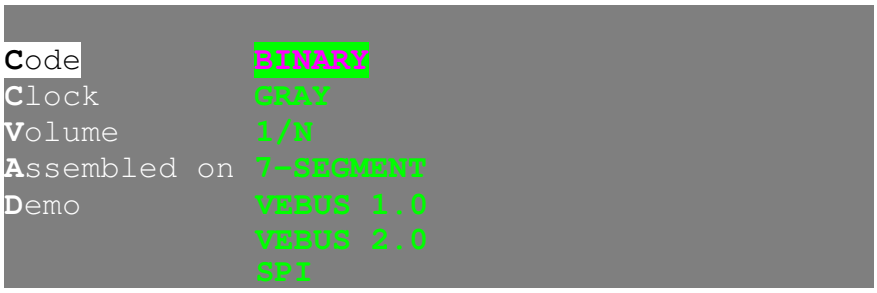
Setup menu:

- Input coding (BIN, GRAY, 1/N, 7-SEGMENT, VEBUS, SPI)
- Clock (Off, 00:00) *(clock setting not available, use TFTTool)*
- Volume (Off, Soft, Medium, Loud)
- Assembled on (CAR/ FLOOR)
- Demo (Demo 1)



Setup menu tutorial:

Press S3 push button to activate the setup menu. First item displayed is the selection of input coding: “Code”.



Assistance can be found on the bottom row for some menu items.

Press S2 push button again to go to next menu item: “Volume”.

Press S1 push button to change the volume setting. Next volume value is highlighted and if a loudspeaker is connected it makes a sound with the selected volume. Press S1 push button again to go thru all possible volume levels. After the last value (Loud), selection jumps back to the first value (Off).

Press S2 push button again to go to next menu item. It is labeled “Assembled on” and it is used for defining where the device is installed, to the car or to a level.

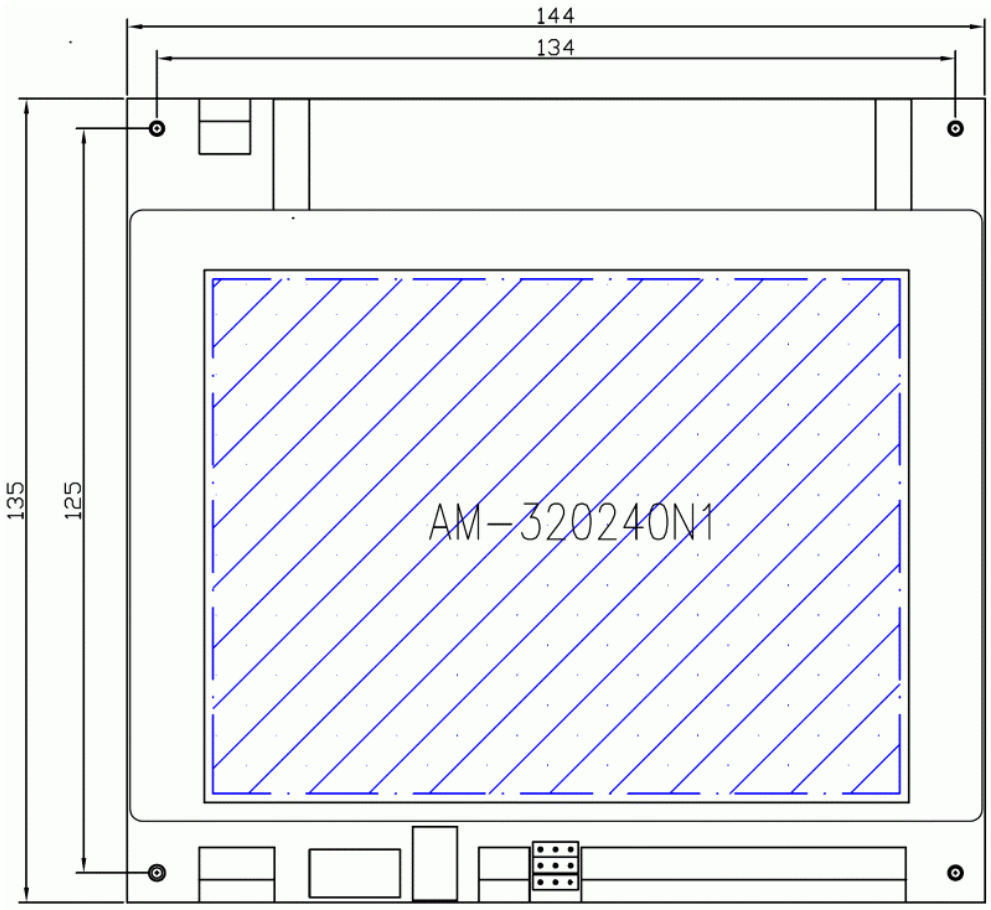
Press S2 push button again to go to next menu item “Demo”. It is for running a predefined sequence on the display.

After the last menu item (Demo), selection jumps back to the first item (Code).

Mechanical assembly

Device has 4 holes for mounting. Refer to separate mechanical drawings for accurate positioning of fixing points and display opening.

Please consider space needed for cables and connectors (plugged connectors exceed the outline of the device).



Technical information

Functional specifications

- Available features depend on purchased device version. All here described features are not necessarily available in all device versions.
- Supports lift applications
  - Applicable for assembly either to the car or to a floor.
  - Maximum number of floors is 64
  - Presents floor markings, direction arrows and graphical symbols needed for special indications
  - Floor mark consists of 0…3 characters
  - Audible signaling by a standard gong
- Adjustable loudspeaker volume

Display module specifications

- Display size and resolution: 5.7” with 320 x 240 pixels (H x V)
- Display type: TFT, 262 144 colors
- Backlight:
  - TFT320-1: long life, white CCFT
  - TFT320-2: white LEDs
- Active area: 115 mm x 86 mm
- Viewing angle: min 120° horizontally, 95° vertically
- Contrast ratio: min 60

Electrical connections

- Power supply input, J9
  - Operating voltage range, 12…30 VDC regulated or 18 V…30V filtered with max. 10% ripple voltage
  - Current consumption:
    - TFT320-1: 320 mA @ 24 VDC (without gong)
    - TFT320-2: 250 mA @ 24 VDC (without gong)
  - Additional supply terminal for battery backup
- Parallel control interface, J5
  - Internal pull-down or pull-up resistors depending on jumper settings
    - Jumpers are set to match control signal polarity
    - Two jumpers to individually set polarity for parallel position status inputs and for the other control signals
  - Pull-down/-up resistance: 10 kΩ
  - Input voltage range: 0…30 VDC
  - Logical levels:
    - Logic 0: -30...1 VDC
    - Logic 1: 5...30 VDC
  - Maximum input current: ±3mA (depending on input polarity)
  - Parallel mode position input coding is selectable: Binary/Gray/1 of N/ 7-segment

    - Symbol control inputs
        - 4 inputs for the symbol indications control
        - 2 inputs for the gong control (GONG UP, GONG DOWN)
        - 2 inputs for arrow direction control (ARR-UP, ARR-DOWN)
        - 1 input that activates arrow scrolling (MOVE)
- Programming interface, J3
    - RS-232 serial interface for TFTtool cable
- Serial control interface, J8
    - VEBUS connector based on RS-485
- Optional SPI interface, J6
- Loudspeaker output, J7
    - Speaker impedance: 8...32 Ω
    - Adjustable volume using setup menu and/or setup file
- External lanterns J4 and J14
    - Low driving outputs for LEDs or lamps, max 100 mA

Configuration

- TFTTool application build-up software
    - All graphics are editable with a PC
    - Requires TFTTool software and a cable, also picture editing software is needed
    - Configuration easily by editing the layout text file
    - For additional information, refer to the TFTTool documentation

Size and environment

- Physical dimensions: With case 150 mm x 140 mm x 32 mm, without case 144 mm x 135 mm x 28 mm
- Tolerances: ±0.3 mm
- Weight: 550g with case.
- Operation environment:
    - Temperature: 0…70 °C
    - Dry environment, RH: <85% (no condensation)
    - Not to be used in wet, moist or dusty environment

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