



SECD-710A-35

User Manual

General introduction

SECD-7I0A-35 is a monitoring and control platform specially designed for construction machinery and agricultural machinery of Shanghai Rising Digital Co.,Ltd. The display is based on ARM platform and adopts TFT industrial LCD with resolution of 7.0 inches and 800 x 480. It has good human-computer interaction performance.

In addition to display function, it also integrates camera and communication function: support the input of four analog cameras, support CAN, GPRS, GPS communication, and can seamlessly dock with remote monitoring center.

The front panel of the display panel is designed with a beautiful industrial shape. Electromagnetic compatibility, IP protection, high shock resistance, can meet the requirements of environmental indicators in harsh working conditions.

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Functions and Characteristics

1、Integration of Control, Display and Communication

- Display: Delicate and practical industrial TFT LCD screen, which can display various components.
- Video: Support NTSC, PAL analog camera, support single, 4-segment, picture-in-picture display mode
- Communication: support a variety of wired and wireless communication technologies, compatible with J1939/CANOpen/CAN2.0B protocol; support USB programs and fast image download
- The function overview is as follows:

NO.	Function	Number	Subfunction	Describe
1	Display	1. 1	Picture switching	Press the button to turn the page.
		1. 2	Variable Display	Display variable values at specified locations
		1. 3	Icon display	Display custom icons at specified locations
		1. 4	Bar chart display	The progress bar displays the value of the associated variable
		1. 5	Cut pictures	Cut the picture to a custom target location
2	communication	2. 1	CAN communication	After receiving the CAN data processing of Huaxing controller, it is sent to the configuration software, and the data of the configuration software is sent to the controller.
		2. 2	GPRS Communication and GPS Communication	Upload data to remote monitoring center; Receive data from monitoring center; Receive longitude and latitude of satellite, etc.
		2. 3	GPRS Remote Debugging	Remote Technical Support Center can debug
		2. 4	USB Update Program and Pictures	After inserting USB with HMI configuration, the configuration and pictures are automatically updated by power-on.
3	human-computer interaction	3. 1	Keyboard Scanning	Support 5 keys
		3. 2	Energy-saving function	Automatic/manual adjustment of screen brightness
4	Input and output	4. 1	Switching Input	Support switching input
		4. 2	Analog output	Support analog output
5	camera	5. 1	Camera acquisition and display function	Support NTSC/PAL analog camera, can access 4 channels, support single, 4 segmentation, picture-in-picture display

2、Special display and control development environment

The self-developed LM Studio display and control development environment, based on IEC61149 standard, provides LM Studio-GUI screen compilation tools, and integrates a large number of functional blocks, which can quickly develop the screen and configuration program.

3、Adapt to harsh environment

- Can be used in cold and hot environment: - 25 degrees low temperature, 65 degrees high temperature

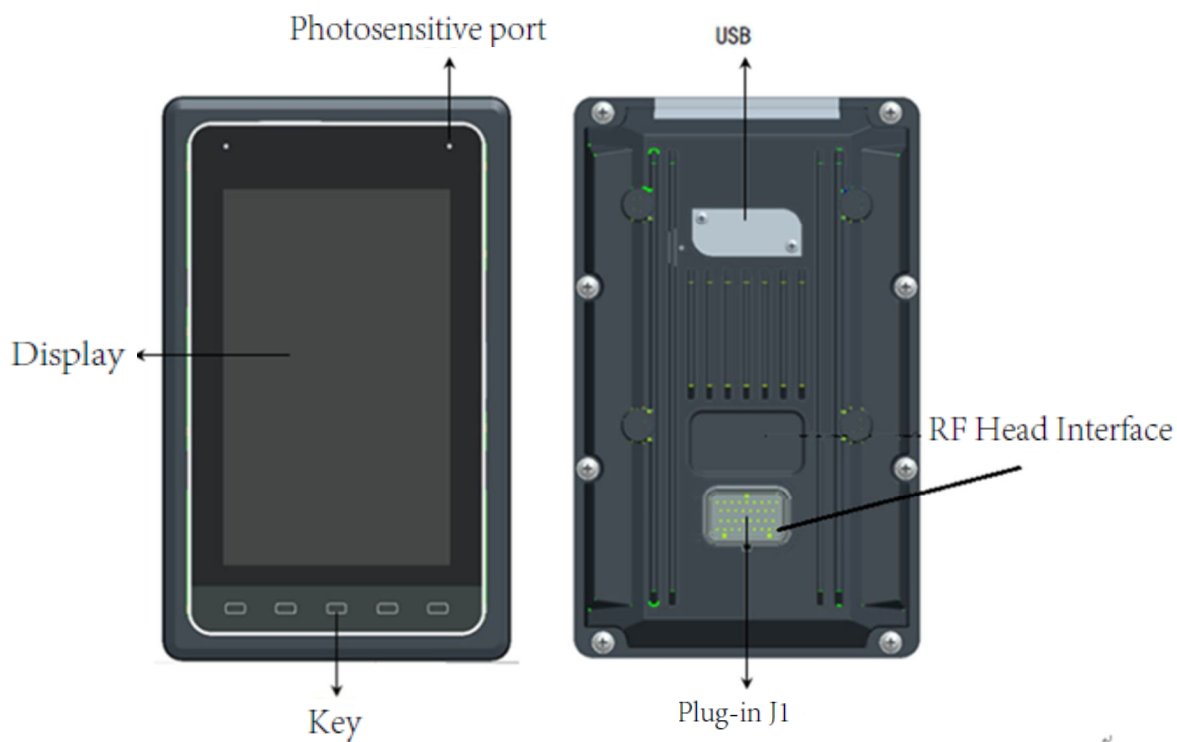
- Power supply anti-reverse connection design, greater than 37V self-protection, prevent burnout
- Suitable for strong vibration, dust, rainwater, lightning and other environment in field operation

4、Seamless connection with remote monitoring system

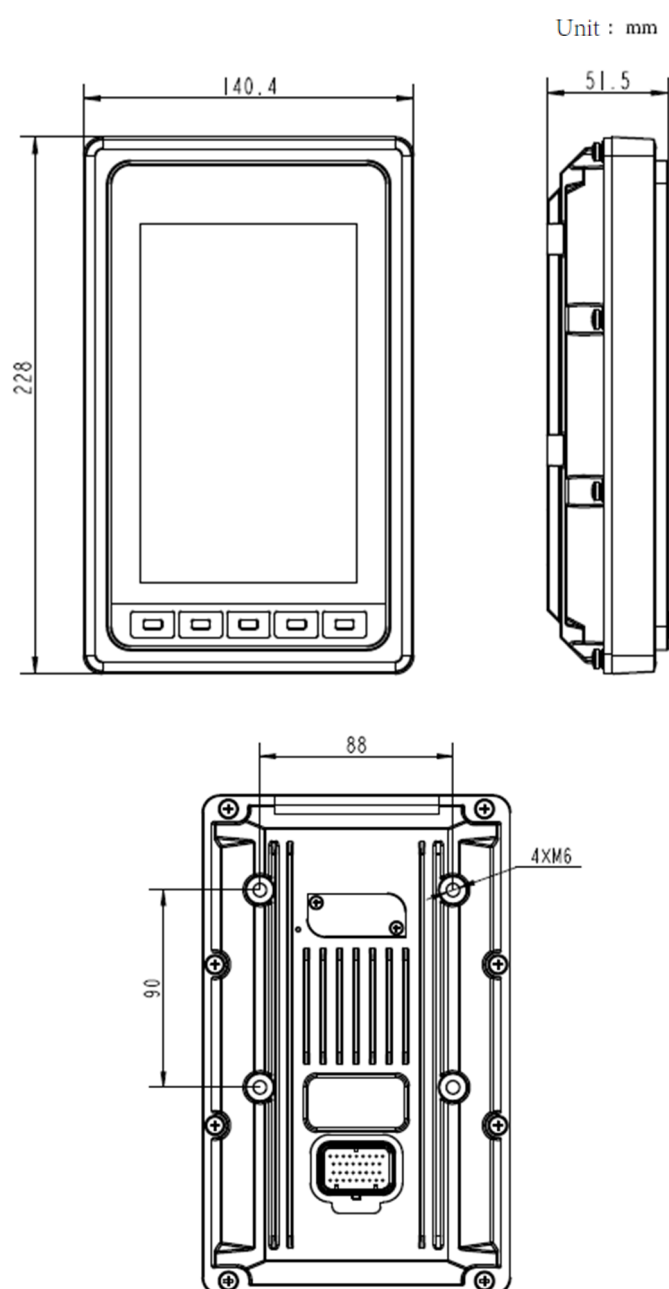
- Support remote debugging and brushing process to facilitate after-sales maintenance
- Supporting remote unlocking machine to facilitate creditor's rights management

Functional description of External interface

1、External interface definition



2、 Installation dimensions



Fixed installation with 4 *M6 screw (including spring washer and flat washer)

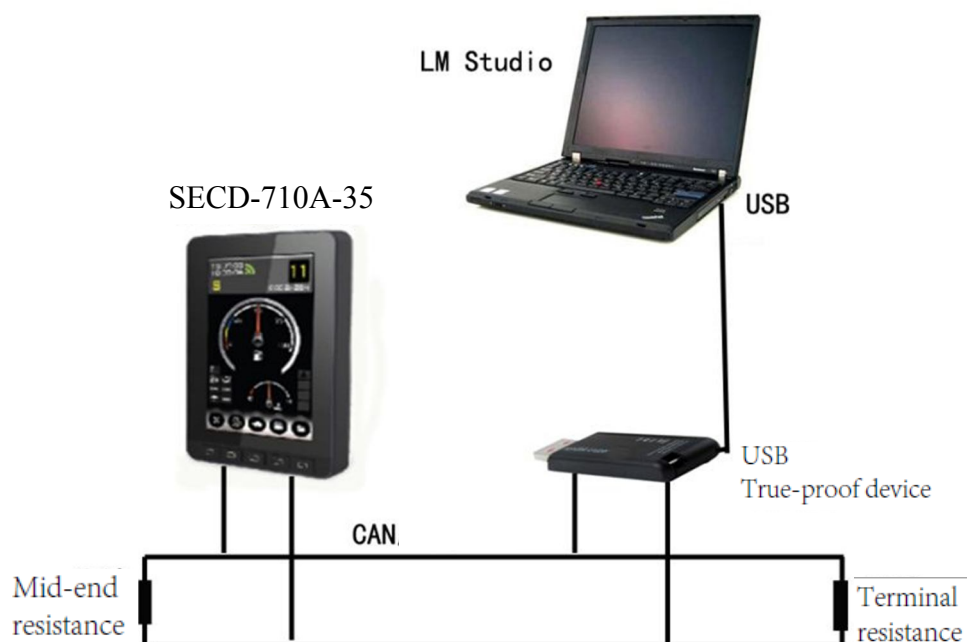
3、 Plug-in Port Definition

Port Definition	Terminal name	Functional description	Remarks
1	CAN_L	CAN Bus Negative	Communicate with the controller; program download and debugging
2	CAN_H	CAN Bus forward	

3	CAMRA1-	No. 1 Camera Signal-	
4	CAMRA2-	No. 2 Camera Signal-	
5	CAMRA3-	No. 3 Camera Signal-	
6	CAMRA4-	No. 4 Camera Signal-	
7	Reset	Program Reset	
8	GND	GND	
9	+12V OUT	12V OUT	Camera power supply
10	NC		
11	NC		
12	CAMRA1+	No. 1 Camera Signal+	
13	CAMRA2+	No. 2 Camera Signal+	
14	CAMRA3+	No. 3 Camera Signal+	
15	CAMRA4+	No. 4 Camera Signal+	
16	NC	Reserve	
17	SMI	Key switch	Ignition signal
18	NC	Reserve	
19	NC	Reserve	
20	NC	Reserve	
21	NC	Reserve	
22	NC	Reserve	
23	NC	Reserve	
24	NC	Reserve	
25	+24V in	Power input	
26	NC	Reserve	
27	NC	Reserve	
28	NC	Reserve	
29	A0_1	Analog output, 0~5V	
30	DIL_3	Switching Input,	
31	DIL_2	Switching Input	
32	DIL_1	Switching Input	
33	GND	GND	
34	+24V in	Power input	

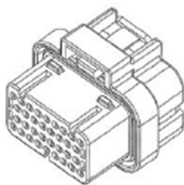
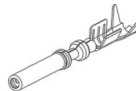
Development and debugging

1、Hardware Development Platform



PC is connected with LM USB simulator through USB, and the other end of the simulator is connected with SECD-710A-35 display screen through CAN. Install LM Studio on PC. Complete the construction of hardware platform.

When choosing and purchasing products, relevant development and debugging accessories should be equipped at the same time, as shown in the table below.:

NO.	Name	Model	Icon	Manufacturer
1	AMP Plug-in socket sheath	4-1437290-0		Tyco Electronics
2	AMP Plug-in metal pin	3-1447221-3		Tyco Electronics
3	USB Analog Debugger	HX-USB-SIMULATOR		Shanghai Rising Digital Co.,Ltd.

2、Software Development Platform

LM Studio Support the application development based on Huaxing special LM language. Provide a software platform integrating project management, code compilation, compilation and debugging functions for Huaxing controller and display product application development, and improve the efficiency and quality of application development.

With the help of LM Studio's GUI programming module, users can develop in a graphical way. They just need to create some controls on the interface and associate them with the corresponding variables. At the same time, some key corresponding LM scripts are added to realize WYSIWYG.

LM Studio is installed on PC and the development environment is well configured. It can realize engineering creation, page creation, control addition, script generation, burning, debugging and other functions. See the Help Content under the Help menu of LM Studio Software.

LM Studio integrates a large number of mature and easy-to-use component libraries, as follows:

No.	Large class	Category description	Function introduction
1. 1	system kernel	system function	Implementing System Definition
1. 2		Task control	Definition of Implementation Task Body
2. 1	Basic services	Process Control	Implementing Sequence, Branch and Cycle Relations in Task Body Software
2. 2		Parameter feature odification	Definition of Component Parameter Format
2. 3		Integer Operations	Integer definition, assignment, extremum, limit, four operations, logical operations, comparison and other functions
2. 4		Floating-point arithmetic	The functions of floating-point definition, assignment, extremum, limit, four-rule operation, elementary function operation and comparison are realized.
2. 5		Data Conversion Processing	Normalization processing, data conversion between different types of data and data between different s cope of engineering quantities are realized.
2. 6		Selection function	The Selective Relation between Realized Number and Number
2. 7		Approximation function	Approximate calculation methods of Taylor series approximation and multi-segment straight line approximation of curves providing piecewise continuous functions
3. 1	communication	CAN communication	Implementing data transmission
3. 2		GPRS/GPS	Realization GPRS/GPS data transmission
3. 3		Serial Communication	Realization of RS232 Serial Port Data Transmission
4	Input and output	I/O Driver	Realize switching input and output, analog input and output, pulse input and motor output, as well as real-time clock, keyboard and encoder.

5. 1	Typical applications	Time function	Implementing a class of functions for discrete manufacturing and batch process industries related to time and output with switching and analog quantities
5. 2		Process Quantity Processing	A class of function functions for process industry automation (including flow rate, temperature, etc.) are provided.
5. 3		Typical Control Links	Typical links for controller design and control system simulation are provided.
5. 4		PID Controller	The PID controller which accounts for more than 90% of the total control loop is provided.
5. 5		Special TSO Controller	A transient-steady-state-overshoot controller and two controllers unique to LM measurement and control components are provided
5. 6		Wave filter	Butterworth filter for process industry automation is provided.
6. 1	GUI Frame	GUI system	Building GUI System
6. 2		GUI Graphic Control Library	Create controls such as pages, icons, text, bar charts, instrument pointers, etc.
6. 3		GUI Script Library	Flow control, numerical operation and timer functions for GUI system

For specific component applications, see LM Reference Manual under the Help menu of LM Studio Software.

Description of environmental indicators

- Working temperature: -20°C ~ $+50^{\circ}\text{C}$ Storage temperature: -25°C ~ $+80^{\circ}\text{C}$
- Anti-vibration: 8. 3-400hz 10mm 6. 8g Shock resistance: 50g, 6ms&11ms
relative humidity: 10%~95%
- Protection Level: IP65
- Anti-jamming Performance of Electrostatic Discharge: Power-on mode Air Discharge $\pm 15\text{kv}$,
Contact Discharge $\pm 8\text{kv}$, Power-off mode Air Discharge $\pm 25\text{kv}$, Contact Discharge $\pm 8\text{kv}$

Connect with external controller

Connecting with external controller devices through CAN bus, supporting CAN2.0B, Canopen, J1939 protocol.

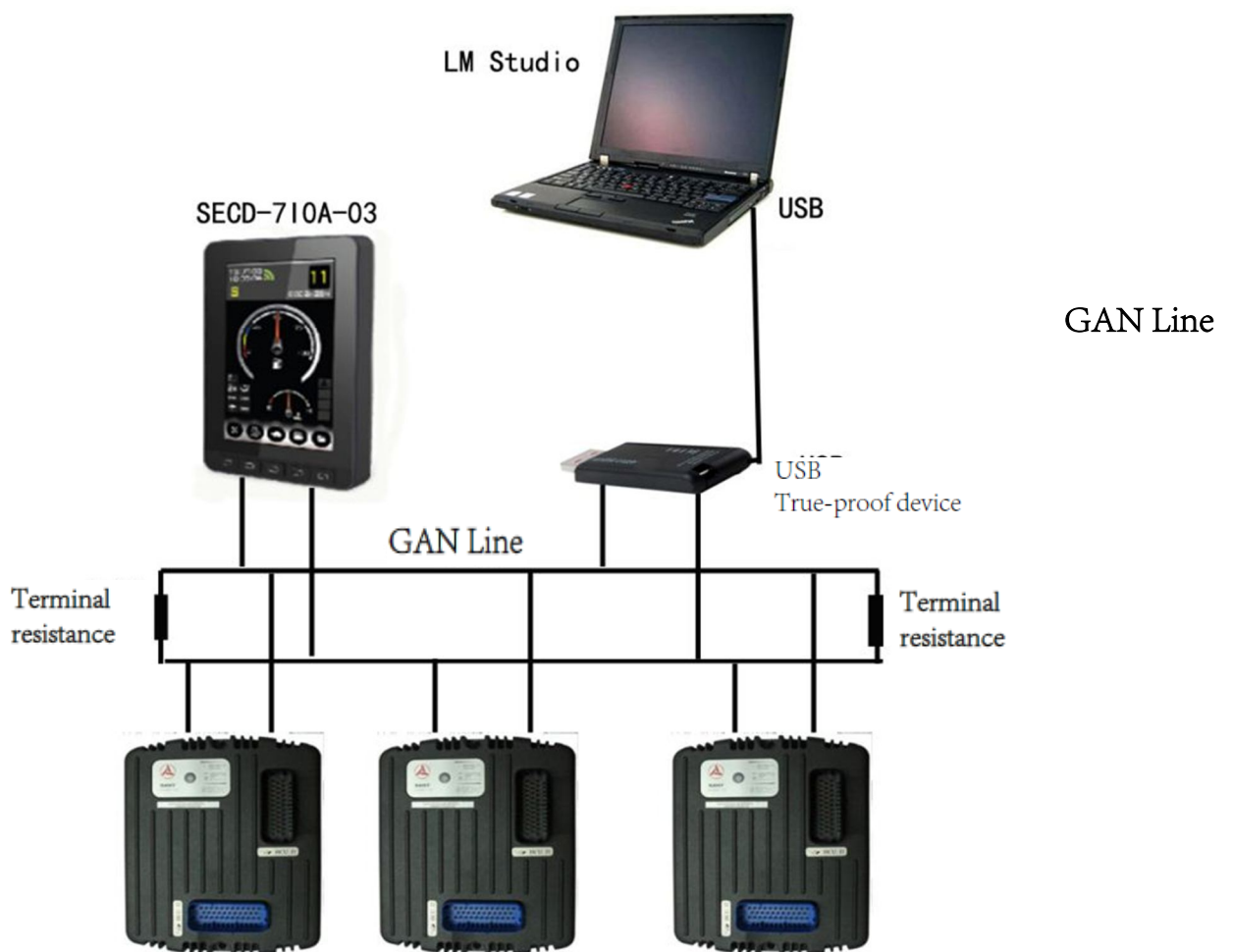


Chart 2 External Controller Connection Diagram

Common troubleshooting

1. The connection between the display case and the grounding metal parts should have a low impedance value. The following tests are carried out to determine whether they are qualified or not. During the transient interference injection, the voltage drop between the controller shell and the grounding metal parts is measured. It is required that the voltage U_{max} on the shell should not be greater than 0.8V (TTL low level threshold value) during the whole process of interference injection. According to some characteristic parameters of interference injection, the required grounding impedance range is calculated: 0-100MHz. In the frequency band, the impedance value shall not exceed 60 milliohms.
2. In addition to the good grounding of the display case, all the input and output points of sensors, loads and so on connected with the display screen must be closed-loop, that is, all input and output points must be connected with the display screen accordingly.
3. The common reasons for the unsuccessful burning of picture libraries are as follows:
 - Configuration file does not exist or content error
 - Naming errors for folders to be burned, files not to be burned, or file naming format errors
 - U-disk or motherboard Ontology
 - Unburnt or version error of underlying program

FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.