

## MULTIFUNCTION UNIVERSAL CONTROLLER OF RESISTIVE TYPE TOUCHSCREEN



**TSC-206IM**

**Functional purpose:** this device is intended for the «removal» of co-ordinates of pushed-in point of screen during the physical connecting to touchscreen of regular monitor or touchpanel set, transmissions of co-ordinates of pushed-in point to the peripheral, additionally set, navigation device; and to the management commutation of peripheral devices;

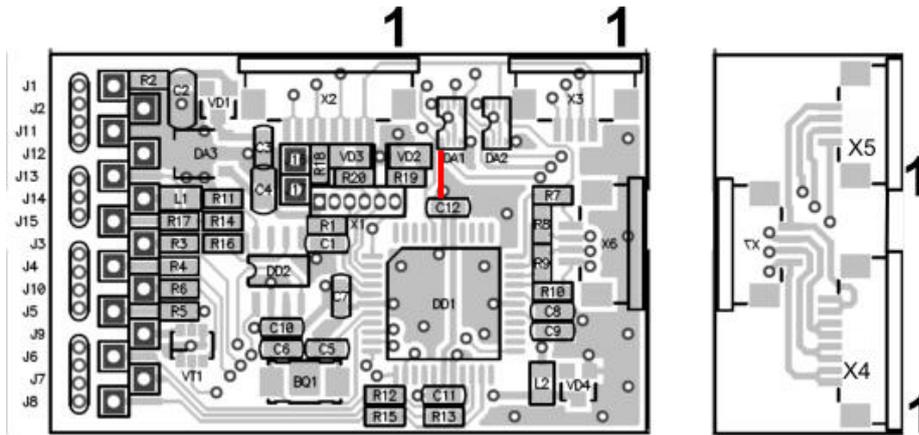
### ADVANTAGES

- Suitable for majority resistive type touch panels;
- Original touchscreen connecting in parallel with regular circuits;
- Easy-to-use set touchpanel operating(if original touchpanel is absent);
- Semiautomatic touchpanel lines X,Y detection ;
- NAVI type automatic selection(if both lines RX TX if NAVI connected) devices are: GVN53, LM7200, F1(Kenwood), Phantom (Kenwood), GVN54(mode Kenwood original);
- Transmissions of co-ordinates of pushed-in point to the peripheral, additionally set, navigation device.
- Control of external sources switcher(potential or pulsed);
- Infra red port (up to 64 control commands) for all sources (NAVI, DVD, TV ) manage;
- 9 virtual knobs(9 screen areas) managed by customer.

Attention: IR receiver purchase separately.

- Source switching by external knob pushing;
- Tuning of controller without PC.
- Comfortable parameters programming by service program SerPro and standard usb interface.
- Low level of power consumption(15 mA) ;
- All needed cables and connectors are pcb gathered;
- Small dimensions 30x48x7mm.

## ASSIGNMENTS



**Fig.1**

1. X2, X3 CONNECTORS(MAIN PCB upper).are output to original connector where original touchpanel was connected to. Contacts are down. .There are two connectors because of 4 or 8 lines has panel's fpc cable. Pin-to-pin spacing is 1 mm.
2. X4, X5 connectors are mount in the extra pcb that connected to main board by 4 lines fpc through X6, X7 connectors. This is an extender only. If settled touchpanel has 4-line fpc you can connect it just to main board by X6 connector.

**Attention:** it is necessary to follow the rule: the first line of FPC of a regular touchscreen got on the first pin of a regular connector. Otherwise the regular controller will not function correctly.

**Attention:** the first pin of connectors is marked by 1 (see figure).

3. Lines of harness and the corresponding contact places are marked as J1-J15. Functions description of J1-J15 you can see in the table:

	Pin	Pin description
	<b>J1</b>	+12V. Power of TSC206IM.Red cable line
	<b>J2</b>	Ground of TSC206IM.. Black cable line.
	<b>J11</b>	SB+ system (programming) bus line plus. Grey cable line
	<b>J12</b>	SB- system (programming) bus line minus. Grey cable line.
	<b>J13</b>	Programming line SB+. Green cable line. Must be connected with the same colour line of the programming harness.J13 and J11 are connected together in the pcb
	<b>J14</b>	Programmer (DTI-M) ground line. Black cable line. Must be connected with the same colour line of the programming harness.
	<b>J15</b>	Programmer line SB-. White cable line. Must be connected with the same colour line of the programming harness.
	<b>J3</b>	NAVI communication line TX.
	<b>J4</b>	NAVI communication line RX.
	<b>J10</b>	IR diode cathode (minus) pin connection line.
	<b>J5</b>	Multimedia unit remote input.
	<b>J9</b>	External sources switching control line.
	<b>J6</b>	Sources switching knob connecting line. Two modes line: 1) Knob must be connected to voltage source 5V-12V. 2) Regular touchpanel disconnection control input. Physically disconnection touchpanel lines from the regular touchscreen controller. Switching level can be set by SerPro program.
	<b>J7</b>	Two modes line: 1) Touchpanel status (connected/disconnected to/from regular circuits) output. Status level(when disconnected) (0V or 5V is setting by SerPro) 2) IR control code receiver output connection line.
	<b>J8</b>	Two modes line: 1) NAVI mute output. Mute level (when NAVI speaks) is setting by SerPro to 0V or 5V. 2) External IR receiver 5V power line.

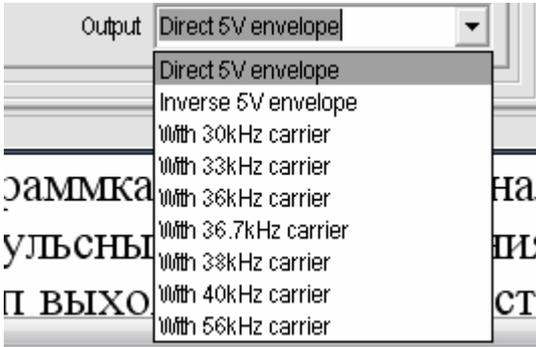
**Attention:** TSC206 has two groups of system bus lines. It did for comfort controller use. When one group connected to another controller from HarLad (TIM-201 as example), the second may connected to programmer DTI-M.

**You may not do hot plug in and hot plug out.**

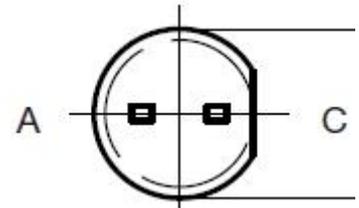
**NAVI connection**

- 3.1. **J3** – TX line of the connected navigator.
- 3.2. **J4** – RX line of the connected navigator.

**IR control lines**



- 1. **J10** – IR control output line. Output stage is the same type as Open collector stage. You need connect to this line cathode of the IR emitting diode (diode is included in the set. See pinning in the fig). Maximum voltage you may supply to anode of the diode is 14 Volt. You don't need to use an external current limiting resistor. It mounted on pcb. To control by IR diode you must set output mode with carrier. If you don't know it value, experiment. Usually its value is one from 36, 38, 40 KHz. But



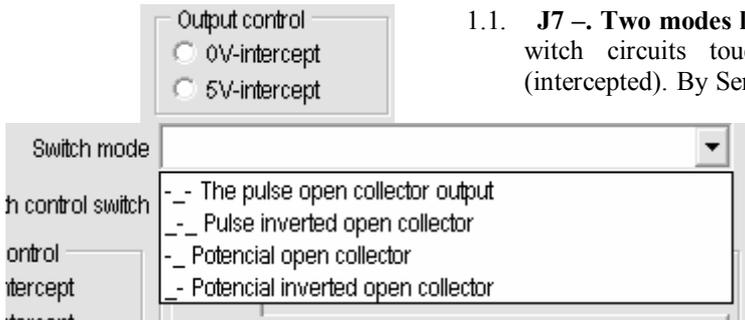
control may be good for every because of functional structure of the photoreceiver. As the carrier will be the same as for remote control unit- receiving of control commands quality will be the best.

- 2. **J5** – output of low frequency control- envelope curve control output. Can be connected to remote input of multimedia unit. Standard type or inverse type is setting by SerPro. You must set one from two: direct or inverse (multimedia unit depend).

**Attention:** you need to do choice which type of output must be: IR control or envelope through the SerPro.

**Control and status lines**

- 1.1. **J7** – Two modes line. Touchpanel status output. This line voltage indicates to witch circuits touchpanel connected in a time regular or TSC206IM (intercepted). By SerPro you can set 0V or 5V will indicate interception. In the



mode of IR control code save, this line is input and must be connected to IR receiver output. This line is directly connected to MCU pin through 1 KOhm resistor. You may not connect a relay coil to this line. Maximum input/output current must not to be more than 25 mA. Maximum voltage value you may supply to

the pin is 5 Volt. Type of output signal is shown at the left by mnemonic, “-\_-” as matter as “pulse to GND” as example.

**Output sources switch control**

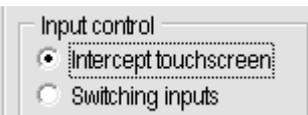
- 2. **J9**- control line. You have to be choice between switch modes we offer. Type of output stage of this pin is open collector. Output signal can be pulsed or leveled. Pulsed type can control such types interface as GVIF transcoder with serial sources switching. The potential type of output can control RGB type of switch. You may connect relay coil to this pin directly. But current must not to be more than 0.25Ampers Type of output signal is setting by SerPro. Output stage has two states: open or closed. When cloused- output is connected to GND, when open- output disconnected from GND similarly to relay works .

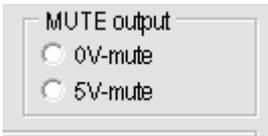
Attention: To control GVIF, you need set “The pulse open collector type”, “-\_-”. To control of GVIF transcoder you need use its external knob control. Cut a knob and connect line with voltage of 3.3V to pin **J9**. Every pulse has such parameter as duration. Minimum pulse whidth to control of GVIF is 0.3 sec. You can set it in the window “Pulse width control switch”. Its value may be from 0,001 up to 5 seconds with step of 0.001 sec.

- 3. **J6**.Input control. This is two modes line.

- 3.1. Control of touchpanel interception. If high voltage level 5-12 Volt will applied, interception done, i.e. touchpanel physically disconnect from regular circuits and connect to TSC206IM.
- 3.2. Sources switch button connection line. Knob must connect to high voltage 12V by another terminal. Every push to button will generate a pulse in the **J9** line (if set pulse mode) or change the state of output stage to opposite (if set potential mode), if open to closed and vice-versa. Input type set by SerPro.

- 4. **J8**. Two modes line.

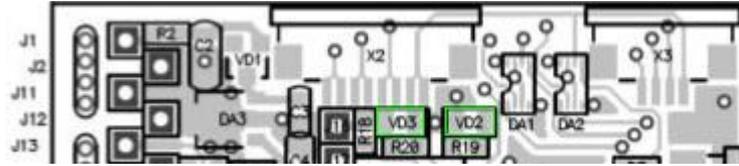




4.1. In general, this is a mute output. If NAVI has no such output, we generate it ourselves. You need to set an active level of output voltage 0V or 5V. This line is directly connected to MCU pin through 220 Ohm resistor. You may not to connect relay coil directly to this pin.

4.2. 5V power output to supply power to external photo receiver. You need push knob  with prompt "Apply 5 Volt to the IR receiver". After the reset (OFF-ON power) mute mode will return.

**Indication**



Two LEDs indicate current state or tuning phase(tuning without PC). «STATE»-VD2 (right) and «TOUCH»-VD3 (left), see figure above.

«TOUCH» is lighting when power on. When TSC206 IM catch touching, led is blinking in step with touch. LED «STATE» active only in the tuning mode or indicate error state (touchpanel don't connect) by quick flashing.

**How to tune controller**

You have two ways to work with TSC206IM: with and without computer:

**TUNING WITHOUT COMPUTER.**

**Attention:** Before you begin tuning you need to do all needed connections reliably and correctly!!

Controller has presetting by default. They are:

Presetting by default	
Timeout after power on is 5 sec. Maximum timeout may be set up to 50 sec by SerPro.	
The only one source is connected- NAVI module, other inputs are masked. You may control up to 6 sources(regular source has number 0, number of additional source begins from 1)	
NAVI type recognition is automated. Attention: be sure both lines RX and TX of NAVI interface must be connected	
Switch mode is The pulse open collector output. pulse width is 0.3 sec	
After power on "to restore the last state", i.e. the source that shown on display before power turn off will shown after power on	

Supported NAVI types

- a. LM7200;
- b. GVN53
- c. Garmin GVN54, Kenwood KNA-G420 (controller set Kenwood Original)
- d. Phantom, F1 (NAVI interface set must be Kenwood ).

**Attention:** we can add such type of NAVI as you need by your request.

**Important:** you must calibrate (tune) controller first

**Important:** You need to calibrate NAVI after controller tuned.

**Important:** The first signal after ACC applied at sources switcher output must be regular source. It has number 0.

Calibration (tuning) of TSC206IM without PC

Step	Indication		Action and Effect
	Touch LED	State LED	
1	Light on	Once blinks	To launch tuning mode e you need connect two holes (see red line on Fig.1) for more 1 second by tweezers.
	Light on	Light on	TSC-201 can't recognize NAVI type. You need to control all connections and NAVI interface protocol settings. TX, RX must be connected with J3,J4 both.
	Light off	Blinks quickly	Touchpanel don't connect. You need to control all connections of the touchpanel.
2	Light on	Once blinks	You need to touch on the top left corner of the touchpanel more 1 second and release. + See appendix to understand how to choice touch points.
3	Light on	Blinks twice	You need to touch on the bottom right corner of the touchpanel more 1 second.
4	Light on	Once blink	Repeat steps 2 and 3

## How to work with service program SerPro

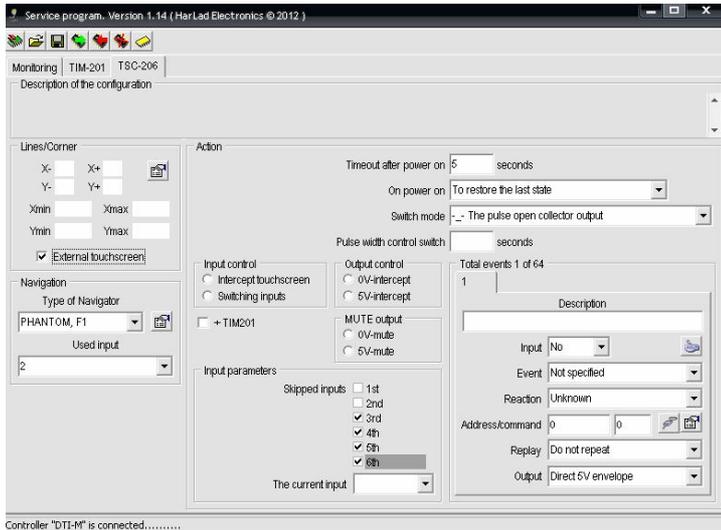
### Attention!!

**Never use an AC/DC power adapter for power supply without grounding. This can damage TSC206IM.**

You can't set parameters by PC directly. To do this you need use interface module. Its name is DTI-M. See photo below



Except interface device you need adapter- wire harness. Adapter  has three wires: green, white, black insulation. You need to connect wires with the same color of insulation. After you connect adaptor and usb cable, may turn on power and launch service program.



In the left you can see a window of service program to control working parameters. All knobs have a pop up prompts when you run over by cursor.

If you want to change language, you need run cursor up to upper field (to the right-empty part) where knobs arranged and push right mouse knob. Pop up menu will appear where you can change language (English and Russian only)

1. To reset configuration parameters to default value you need push knob 
2. Attention: after you will set or change any parameter, you need to write configuration to controller by knob with prompt "Write configuration to the device". Otherwise changes or settings of parameter will not active.

Calibrating of TSC206IM by SerPro. To launch calibrating program you need push knob . Then

follow the instructions.

Attention: If you will set toucpanel, you need mark it by left mouse knob in the window left from inscription "External touchscreen" (lines/corner window).

The same knob  (at the right from Type Navigator window) pushing will launch the automatic finding NAVI program. Attention: number of input navigator connected to switcher must be set **surely** in the window Used input. For GVIF interface NAVI has number 1 (RGB input). Number 0 is regular source. RX and TX lines of NAVI interface must be connected both.

- 2.1. Window «on power on». You can choose which input must show after power on.

### How to control a multimedia device

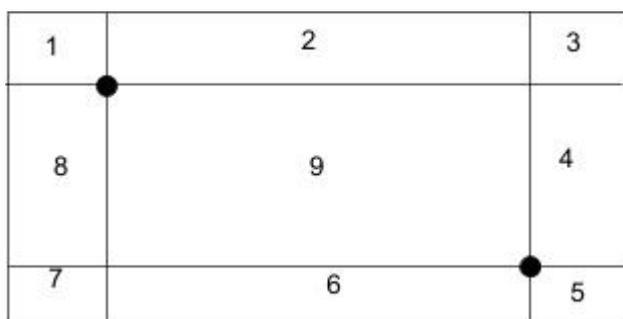
We got you a possibility to control a multimedia device set.

1. When you calibrate controller you determine 9 regions- virtual knobs (how to see Appendix).
2. Event window. Here you can assign to every virtual knob a control code. 9 codes for every from 6 sources.
3. All codes you can write to controllers flash memory. To do this you need next:
  - a. Connect appropriate lines of external photo receiver and controller.

<p style="text-align: center;">Wires of Photo receiver</p> 	<p style="text-align: center;">Lines of TSC206IM</p>
<p>Red or orange line. 5 Volt power line</p>	<p><b>J8</b> . Power 5V output line. Output resistance 220 Ohm.5V supply only after push knob </p>
<p>Dark line. GND line.</p>	<p><b>J2</b>. GND line of TSC206IM</p>
<p>White or light grey. Output line</p>	<p><b>J7</b> input line to write the control code. To begin write push knob </p>
<p>If you use another type of photo receiver, the output signal must not be more 5 Volt</p>	<p>After you reset(turn off- on the power) TSC206IM, lines J7,J8 will return to their standard mode.</p>

## APPENDIX

### How to fix calibration points for touch.



When you connect touchpanel to controller you need to calibrate it in first. Controller “need” to probe touchpad. Two points you touch(black circles) will designate 9 regions actually virtual knobs as you can see in the fig left. So only **you determine** each from 9 knobs when controller calibrate. In the service program SerPro all regions show patently(left upper corner as example). In the table below you can see correspondence between region and name of knob You can assign for every knob(region) control code to control multimedia unit in the future, i.e.you touch any point of region to emmit control command.

Region	Region name(virtual knob name)
1	Upper left corner
2	The top of the center
3	Upper right corner
4	Screen right
5	Lower Right cornerПравый нижний угол
6	Bottom of center
7	Lower left corner
8	Left of center
9	Screen center

### Assignments in brief

	Pin	Pin description	
	<b>J1</b>	+12V. Power of TSC206IM.Red cable line	<b>POWER</b>
	<b>J2</b>	Ground of TSC206IM.. Black cable line.	
	<b>J11</b>	SB+ system (programming) bus line plus. Grey cable line	<b>SYSTEM BUS. PROGRAMMING</b>
	<b>J12</b>	SB- system (programming) bus line minus. Grey cable line.	
	<b>J13</b>	Programming line SB+. Green cable line. Must be connected with the same colour line of the programming harness.J13 and J11 are connected together in the pcb	
	<b>J14</b>	Programmer (DTI-M) ground line. Black cable line. Must be connected with the same colour line of the programming harness.	
	<b>J15</b>	Programmer line SB-. White cable line. Must be connected with the same colour line of the programming harness.	
	<b>J3</b>	NAVI communication line TX.	<b>NAVI interfacing</b>
	<b>J4</b>	NAVI communication line RX.	<b>Multimedia unit control</b>
	<b>J10</b>	IR diode cathode (minus) pin connection line.IR out	
	<b>J5</b>	Multimedia unit remote input.	
	<b>J9</b>	External sources switching control line.	<b>SOURCES switching control</b>
	<b>J6</b>	Sources switching knob connecting line. Two modes line: 1) Knob must be connected to	

		<p>voltage source 5V-12V.</p> <p>2) Regular touchpanel disconnection(interception) control input. Physically disconnection touchpanel lines from the regular touchscreen controller. Switching level can be set by SerPro program.</p>	
	<b>J7</b>	<p>Two modes line:</p> <p>1) Touchpanel status (connected/disconnected to/from regular circuits) output. Status level(when disconnected) (0V or 5V is setting by SerPro)</p> <p>2) IR control code receiver output connection line.</p>	<p>IR remote control codes get and assign. Two modes pins</p>
	<b>J8</b>	<p>Two modes line:</p> <p>1) NAVI mute output. Mute level (when NAVI speaks) is setting by SerPro to 0V or 5V.</p> <p>2) External IR receiver 5V power line.</p>	