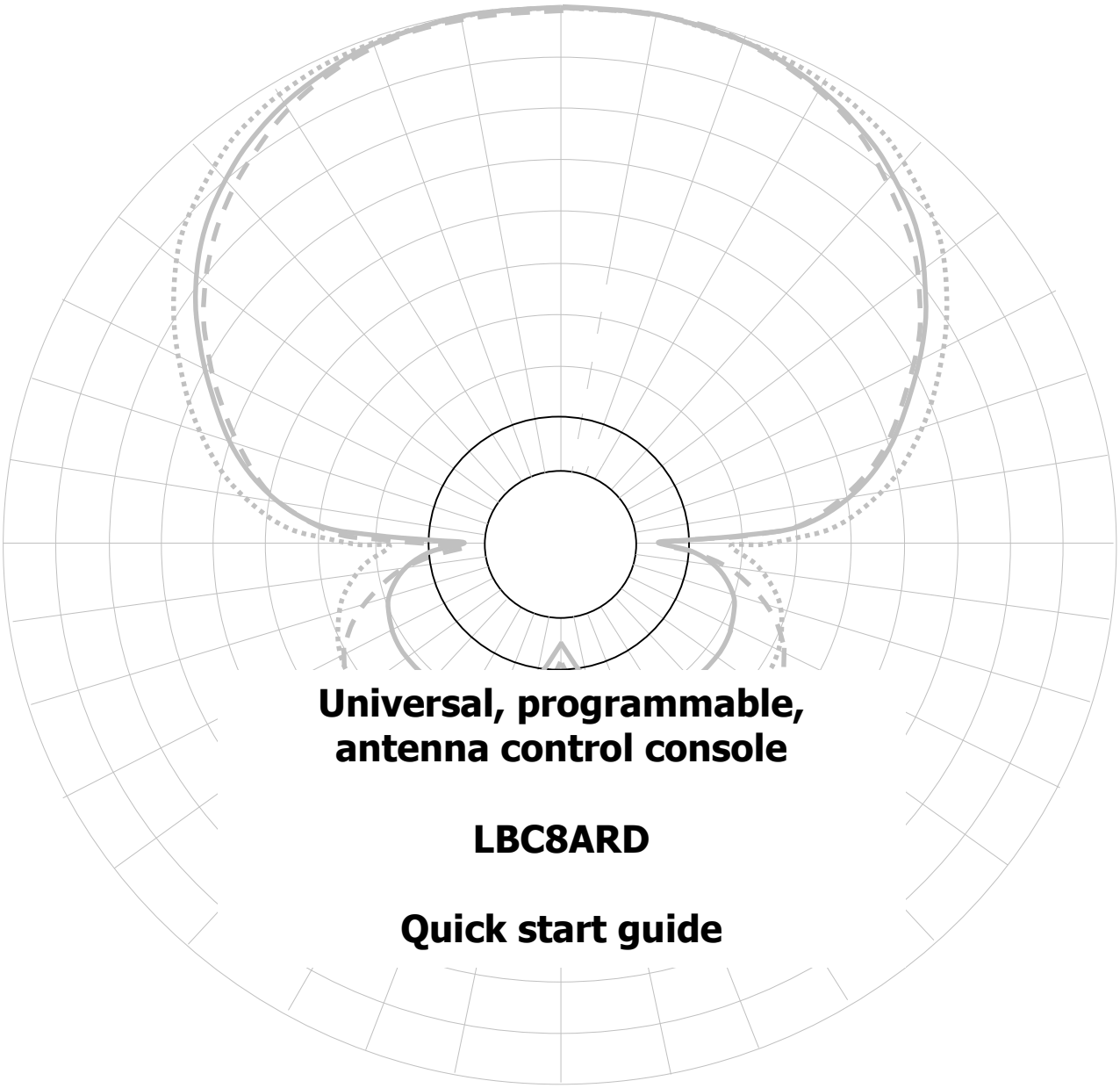
LOW BAND SYSTEMS



Universal, programmable, antenna control console

LBC8ARD

Quick start guide

Manual v.3

HW v2.1
SW v2.5

Volgodonsk, Russia
Tech Support:
ra6lbs@gmail.com
+7 9185574507
WWW.LOWBANDSYSTEMS.COM

Content:

I. Introduction

LowBandSystem`s Control Console LBC8ARD is the 8 position controller with unique features.

It is used to control antenna switches and array`s controllers that uses a 12 to 30Vdc, SINK or SOURCE, Positive or Negative. Based on Arduino Micro board, with driver IC to energized 8 output relays. LowBandSystem`s LBC8ARD Software © written in C+ and consists of few thousand lines.

Band switching rotary, 2 x Amplifier and 2 x Extra buttons are wired directly to output connector.

- Input power: 13-20VDC, 1.5A maximum;
- Secondary power: 13-30VDC, 2A maximum, Positive or Negative;
- Microcomputer power lines protected by resettable fuse 0.5A;
- All output control lines protected by glass fuse 2A;
- Not active programmable output lines can be grounded or floating depending on internal jumper setting;
- Controller has many pre- programmed truth tables;
- Custom truth table can be created by end-user;

Designed to control equipment of:

- **LowBandSystems:**
  - Reversible and classic Beverage antenna systems;
  - K-98 receive antenna;
  - 4 SQUARE RX systems;
  - 8 Circle array;
  - any of the Remote relay switch with BPFs and Pre Amplifiers;
  - distribution systems 8A2R, DS8x2, DS8x4, DS4x4;
  - 4 SQUARE Transmit systems, 4 and 8 directions;
  - Stack Matches 1x2, 1x3, 1x4;
  - any of the Remote Relay Transmit systems switches;
- **DX Engineering**
  - Eight Circle receive system;
  - Beverage Antenna Systems;
  - 4SQUARE Transmit system;
  - Any of the Remote Relay Transmit systems switches;
- **Hi-Z Antennas**
  - Any of the HiZ-2, HiZ-4, HiZ-8, and Triangular antenna systems;
- **Comtek**
  - ACB-4 Four Square systems;
- **YCCC**
  - Vertical Receive antenna system;
- **RemoteQTH**
  - All antennas and switches;
- **Array Solution:**
  - Antenna phasing systems;

REPLACES:

- **DX Engineering**: EC-8, EC-4BCD, CC-8A Control Consoles, EC-DVA Directional Control Consoles;
- **Hi-Z Antennas**: HIZ-SS4ELEMENT, CTRL-421, CTRL-821, SW-421, SW-422, SW-821, SW-822, and all the Controllers for 2-3-4-8 element systems;
- **COMTEK** ACB-4A Series Four-Square Control Consoles COM-ACB4A

II. Key Features

Very intuitive controls:

- 8 buttons on a circle map.
  - AZ MAP of your QTH can be made on special orders.

- Rotary band pass filter switch
  - 2 and 3 band systems configurations available

- Two Push buttons to switch ON-OFF two preamplifiers
- Two Push buttons to switch ON-OFF other gear.

Can managed very complex systems of receive antennas, arrays and remote switches.

- With two Extra buttons and unique software options you can control few antenna systems with one only controller

Universal outputs, can be reconfigured by user:

- 8 relay output control lines;
- Sink or Source or both permanently;
- Positive or Negative;
- High voltage for older equipment;

Very flexible control logics:

- Preprogrammed, 7 sets of many truth tables (relay logic), 8 output lines, for almost all know remote relay and array switches, combiners and other devices on a HAM market.

- USER defined truth table, 8 output lines.

Protection for your valuable gear:

- Can use TX_Gnd (PTT) signal from transceiver to switch OFF all the RX gear (filters, preamps.) to protect them of your station transmitted power.

- Same TX_GND (PTT) signal used for Hot Switch Protection in a Transmit systems application of this controller. When TX_GND (PTT) is active (short to common) no relays will switch if a control pushbutton is pushed.

DIFERENT APPLICATIONS OF THIS CONTROLLER DESIGN

LBC8ARD RX systems

LBC8ARD 4SQUARE 8 direction transmit systems

Universal control console, transmit systems:

Stack Match controller:

III. HARDWARE

1) General:

- 8 programmable relay outputs:
    - Sink or Source for all 8 lines;
        - For example, you can control 8 direction antenna relay switch or array system with 3 lines BCD control logic and at the same time up to 5 output lines for other antenna systems with user defined logic;
    - Can be configured as a Source to control 3 lines and a Sink to control 5 lines at the same time;

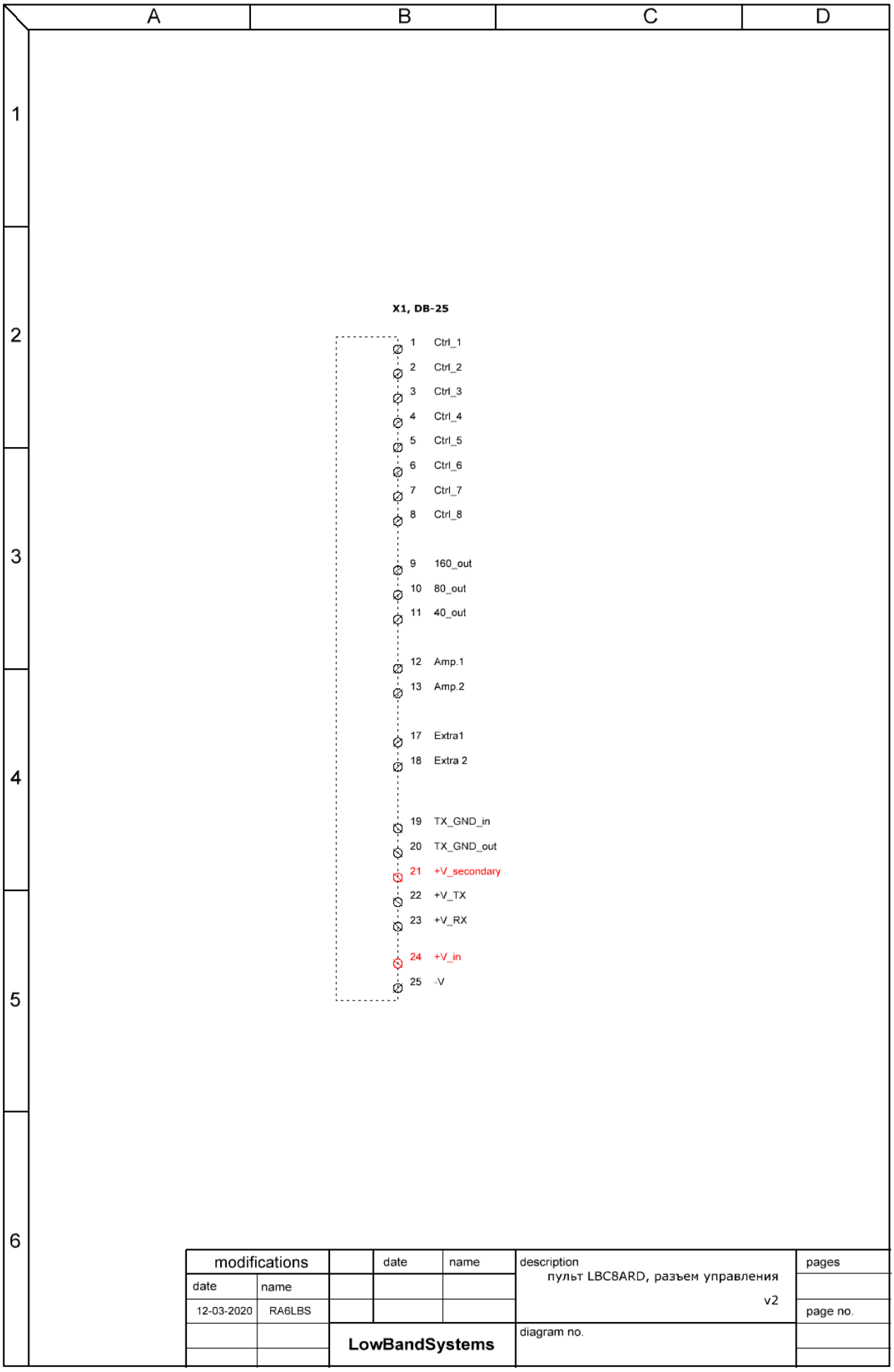
- Can use second, high voltage power supply (or NEGATIVE polarity) for long runs of control cables to distant remote switches or other relays switches requiring other than +12Vdc control voltage;
- 3 band selector for Receive BandPassFilters control with Bypass option;
- 2 buttons to switch First, Second or Both RX Preamplifiers;
- 2 EXTRA buttons, to control some other equipment, like remote switches, remote preamplifiers, CW STUB switch of Vertical arrays;
- LowBandSystem`s RX chains (Remote Relay switches, Array switches, BPFs, RX amps) is PROTECTED by switching OFF all control lines while transmit using TX_GND (PTT) signal from transceiver;

- TX_GND_OUT signal to Power Amplifier, delayed 8 milliseconds;

- TX_on and RX_on control signals for other gear;

- Output connector: DB-25(m)

2) Output connector DB-25(m), pins description: ЗАМЕНИТЬ



Pin	Name:	Description:
#1	Ctrl1	programmable output*, relay #1;
#2	Ctrl2	programmable output*, relay #2;
#3	Ctrl3	programmable output*, relay #3;
#4	Ctrl4	programmable output*, relay #4;
#5	Ctrl5	programmable output*, relay #5;
#6	Ctrl6	programmable output*, relay #6;
#7	Ctrl7	programmable output*, relay #7;
#8	Ctrl8	programmable output*, relay #8;
#9	160_out	band selector output, band 160;
#10	80_out	band selector output, band 180;
#11	40_out	band selector output, band 40;
#12	Amp.1	output to Preamp. #1;
#13	Amp.2	output to Preamp. #2;
#17	Extra.1	output from button Extra1 (CW STUB);
#18	Extra.2	output from button Extra2, (only when used in F2 mode);

All of the output lines #1- #18 interrupted on PTT signal from your transceiver.

#19	TX_Gnd_in	input for TX_Gnd (PTT) signal from transceiver;
#20	TX_Gnd_out	output, delayed 8 msec. TX_Gnd (PTT) to Power Amplifier;
#21	+V_Secondary	input for secondary (higher voltage or Negative) power supply
#22	+V_TX	output_V**, on TX state of transceiver (when TX_Gnd (PTT) activated);
#23	+V_RX	output_V**, on RX state of transceiver;
#24	+V_in	power to controller, +V, (+13-15B, 1A, poly fused);
#25	-V_in	Common for all the connections, should be bonded to station ground;

*****

Programmable output – depending on internal jumper settings can be Sink, Source, Positive, Negative, Primary or Secondary Voltage

******

output_V – depending on internal jumper settings can be Primary (+12V) or Secondary power source

3) Notes on controls:

- **Direction control:**
  - 8 POSITION control
- **Band selector:**
  - You can control 3 BandPassFilters Pin#9 - Pin#11 respectively
- **Amp #1 and Amp #2 buttons:**
  - You can switch ON/OFF 2 separate Preamps (when band selector is in BAND position only), Pin#12 and Pin#13 respectively;
- **Extra #1 and Extra #2 buttons:**
  - With this buttons you can control some extra devices at Pin#17 and Pin#18:

    - **Extra1** switches V_RX to Pin#17;

    - **Extra2 button**, has 2 different modes:
    - When connected to S13 "Extra2" connector on a PCB, it switches V_RX to Pin#18.
    - When switched to S9"Extra3" connector on a PCB (default state), it switches and locks one only BCD code to control lines #1-#3 at Pins #1-#3. This feature is used when you need to control multiple receive antenna systems from a single controller. The output BCD code (relay switch input) must be programmed in a "FIXED" subprogram;
- **CW STUB switch:**
  - CW STUB Switch button used instead of **Extra1** in transmit systems controllers

4) Notes on inputs and outputs:

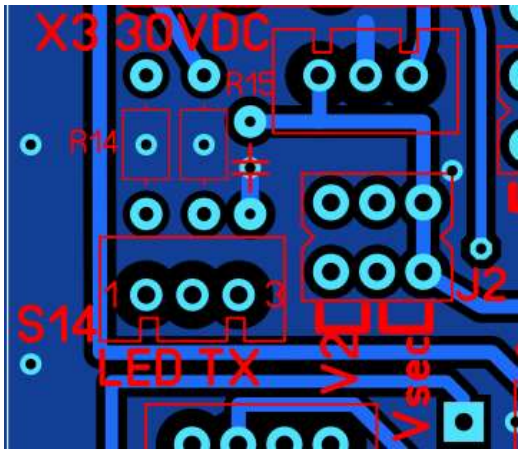
- **TX_GND IN/OUT pins #19 - #20 action**
  DO NOT FORGET TO USE THIS FEATURE!
  USED for your valuable gear protection and HOT SWITCHING protection in a transmit applications

  When TX_GND_IN signal from transceiver exists (short on Pin#19 to Pin#25), next sequence is taking place:
    - Switch **OFF** +V_RX output line and all the control lines;
    - Switch **ON** (delayed 8 msec.) TX_Gnd_out at Pin#20 (short to Pin#25);
    - Switch **ON** (delayed 8 msec.) +V_TX output at Pin#22:

    - ✓ When +V-RX disappears, all the LowBandSystem`s gear: remote relay switches, band pass filters, preamps is switching OFF. All the antenna`s inputs are terminated with resistors in the remote relay switches made by LowBandSystems;
    - ✓ TX_Gnd_out can be used to switch on Power Amplifier to transmit mode;
    - ✓ TX_Gnd_out can be used to switch on Detuning on a LowBandSystem's matching units for Vertical antennas;

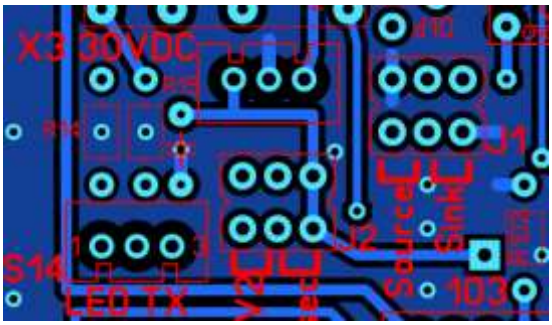
- **V_rx, V_tx outputs at pins #22-#23**
    - ✓ Depending on TX_Gnd input signal only one output is active. Fused, relayed output;

- **Secondary power supply input at pins #21:**
  - If you need some other control voltage to remote equipment (not 13VDC), you can use this Pin#21 to supply it to all outputs by changing jumper **J2** from **V2** to **Vsec.** terminals on PCB. Open the case, find the jumper, it is double for security, move both:



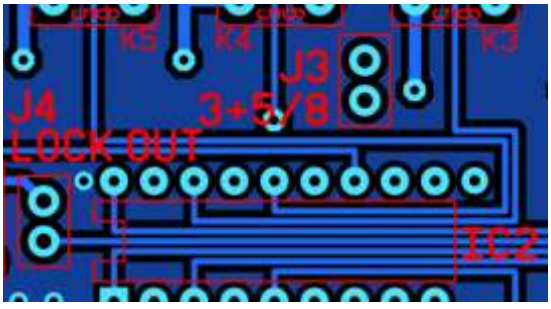
- **SINK/SOURCE**

  - **SINK control** *(default state)***:**
    - Uses power source selected by internal jumper **J2**
  - **SOURCE control** *(jumper J1 relocation is needed)***:**
    - Max load is 30VDC, 2A on each relay, but limited to 2A total by fuse.
      - You have to switch jumper **J1** by changing from Sink to Source, it is double for prudence, change both:



  - **SINK / SOURCE control at the same time:**

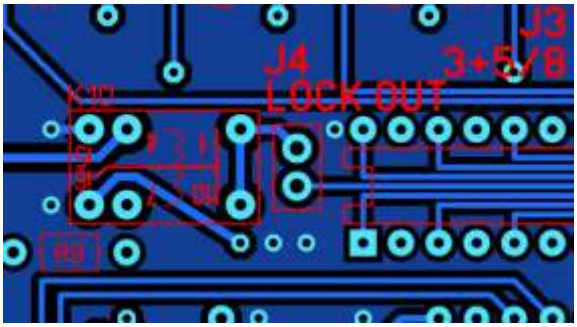
    - If you need Source, at Pin#1 - Pin#3, and SINK at Pin#4 - Pin#8, remove jumper J3 on PCB:
      - Use “mirror truth table” to make switching, as you have to switch relays OFF to make SHORT on this pins. Please see attached schematic.



- **Lock Out control in transmit control system applications:**

  - When Transmit state is defined at Pin#19 TX_GND_IN (short to Pin#25), it locks out direction switching;

    - If you don't need this feature, but still need TX GND OUT signal, remove jumper J4



IV. Software:

User can:

1) Change the Truth Table.
   There are 7 preprogrammed sets of Truth Tables and user can create custom - #8;

   Software for Receive and Transmit systems is separated.

2) Set Directions of reverse reception to control LowBandSystem's reversible Beverages antenna systems output (Setting up DC inject on particular directions to antennas coax);

3) Set "Locked input antenna port" for remote relay switches that uses BCD type of control only.

   Used to manage multiple receive array systems, this function is activated by Extra2 button (should be switched to F3 connector on PCB).

4) Create custom Truth Table*

---

*

A **Truth Table** is a table which sets out combination of active output lines (active relays) on each of the selected directions.

How to change Truth Table:

1) **Power OFF**
2) **Push and hold 0-degree direction button**
3) **Power ON**

Control console:

- Start program mode (subsection Truth Tables selection)
- Send CW “MAP?”
- Blink ALL the direction Buttons

With 8 direction buttons you can select one of 8 Truth Tables.

Each Truth Table controls 8 output relays on Pins #1 - #8, DB-25 control connector.

Direction buttons vs Truth Table correlation:

0 deg. button => Truth Table #1 (Preprogrammed)
45 deg. button => Truth Table #2 (Preprogrammed)
90 deg. button => Truth Table #3 (Preprogrammed)
135 deg. button => Truth Table #4 (Preprogrammed)
180 deg. button => Truth Table #5 (Preprogrammed)
225 deg. button => Truth Table #6 (Preprogrammed)
270 deg. button => Truth Table #7 (Preprogrammed)
315 deg. button => Truth Table #8 (User programmable)

Select Truth Table you need and Push appropriate button.

Example:

If you want to use Custom Truth Table, push 315 degrees.

Control console:

- will send CW “8 R TU”
- microcomputer will use this Truth Table
- switch to normal operation mode
- switch to 315 degrees direction.

How to define reversible beverage antenna system switching scheme

When using reversible Beverage antenna systems, single output, you need to inject DC voltage into coax cable to Reverse direction of reception.

Switch OFF controller, push 45 degrees, Switch Power On, at the CW "REVERSE?" request push appropriate direction buttons in REVERSE directions for all pairs of Beverage antennas.

You will hear "E" confirmation or "?" if input is not correct.
At the End of routine "R TU" will be send.

This control signal will appear at output Pin #8 when operating with Turn Tables #4-#6.

How to define "Locked input port" for remote relay switch with BCD control

Using LowBandSystems remote relay switches with BCD control you can use multiple antennas and few arrays using only one 8 position controller.

Example:

If you are lucky to have 4 Reversible Beverage antennas systems and 8 circle array, then you need one of the multiple input remote relay switches from LowBandSystems (like RS8BCD or LBSuper III) :

4 input ports will be used for beverages and one of the 4 left for 8 circle Array!

To toggle between Beverage antennas and 8 circle array you will need only to press Extra 2 button!

And then you can use Same 8 buttons for direction contro.
No more multiple control consoles on a table!

Relay switch will be controlled by Output Pins#1-#3 and 8 circle array controller by outputs at Pin#4 - Pin#8).

Switch OFF controller, push 90 degrees, Switch Power On, at the CW "FIXED?" request push appropriate button:

- input #1 – 315 direction button
- input #2 – 0 direction button
- input #3 – 45 direction button
- input #4 – 90 direction button
- input #5 – 135 direction button
- input #6 – 180 direction button
- input #7 – 225 direction button
- input #8 – 270 direction button

You will hear "port +number" confirmation and "R TU" if input is correct.

How to create custom Truth Table #8:

1) **Power OFF**
2) **Push and hold 315-degree button**
3) **Power ON**

Control console:

- Start program mode (subsection Custom Truth Table definition)
- Send CW “DIR1”
- Blink 315 direction button four times (the first direction to be defined)
- Send CW “?”
- Light ON all 8 direction buttons
- Wait for your actions

Now you have to define ACTIVE output pins 315 deg. direction
You must let microcomputer know which of the 8 relay outputs has to be ACTIVE (Sink or Source depending on a jumper settings) on this direction.

How to set active outputs:
When you **push*** one of the direction buttons, you define particular relay output.
8 direction buttons = 8 relay outputs

DB-25 output pins (relays&&) vs direction buttons correlation:

Pin#1 – 0 deg. button
Pin#2 – 45 deg. button
Pin#3 – 90 deg. button
Pin#4 – 135 deg. button
Pin#5 – 180 deg. button
Pin#6 – 225 deg. button
Pin#7 – 270 deg. button
Pin#8 – 315 deg. Button

Once you set all the needed outputs on this particular direction, go to next one or EXIT program mode.

***Three "types" of push is available and used with different value:**

Short push
(just push and release button)

- Sets output PIN to be ACTIVE
  - Controller will send CW "R"
  - Then light ON all the buttons waiting for the next Pin to be defined
    - *You can push buttons in any sequence.*

You will need as many Short pushes as many active output relays needed

Middle push
(push and hold for 2-3 sec.)

- End of current direction definition, Jump to next direction, and controller will:
  - Send CW "TT",
  - Send CW "PORT *next number*"
  - Blink next direction button four times
  - Send CW "?"
  - Light ON all 8 direction buttons
  - Wait for your actions

As you supposed to control 8 direction system, you will need 8 jumps to 8 directions and hence 8 Middle pushed
If you have only 4 directions as in a 4square systems, then less of course

Long push
(push for more then 4 sec.)

- END of CUSTOM TRUTH TABLE programming
  - Will send CW "RR TNX"
  - Jump to operational mode,

Just once to finish with custom truth table definition

CW sounds generated by controller description:

Self-explaining for those who knows CW.

TRUTH TABLES FOR RECEIVE SYSTEMS APPLICATION (software v 2.5)

Truth table #1

(Switch OFF controller, Push 0 degrees, Switch Power On, at the CW "MAP?" Request push 0 degrees, you will hear confirmation number)

- **Used to control:**
  - **Remote relay switches**

- **Control codes:**
  - **Plain 1 of 8 to Pin#1 – Pin#8**

Direction, degrees: \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	1	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
45	0	0	1	0	0	0	0	0
90	0	0	0	1	0	0	0	0
135	0	0	0	0	1	0	0	0
180	0	0	0	0	0	1	0	0
225	0	0	0	0	0	0	1	0
270	0	0	0	0	0	0	0	1

Truth table #2

(Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?" Request push 45 degrees, you will hear confirmation number)

- **Used to control:**
  - **remote relay switches LBSuper III, RS8BCD, 8A2R;**
  - **receive array 8Circle by LowBandSystems, BCD control;**
  - **receive array Hi-Z8A, Hi-Z Antennas;**

- **Control codes:**
  - **BCD 8_of_8, to Pin#1 – Pin#3**
  - **"Mirror code" for Hi-Z8A, to Pin# 4 – Pin# 8**

Direction, degrees \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	0	0	0	1	1	1	0	0
0	1	0	0	0	1	1	1	1
45	0	1	0	1	0	1	1	1
90	1	1	0	1	1	0	1	1
135	0	0	1	1	1	1	0	1
180	1	0	1	0	1	1	1	0
225	0	1	1	1	0	1	1	0
270	1	1	1	1	1	0	1	0

Truth table #3 *(changed in software v 2.4)*

(*Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?" Request push 90 degrees, you will hear confirmation number)*

- **Used to control:**
  - **remote relay switches LBSuper III, RS8BCD;**
  - **receive array Hi-Z 4-8 pro8;**

- **Control codes:**
  - **BCD 4_of_8, to Pin# 1 – Pin# 2;**
  - **BCD code for Hi-Z 4-8 pro8, 8 element array, to Pin# 4 – Pin# 6**

Direction, degrees \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	0	0	-	0	0	0	-	0
0	1	0	-	1	1	1	-	0
45	0	1	-	0	0	1	-	0
90	1	1	-	1	0	0	-	0
135	0	0	-	1	0	1	-	0
180	1	0	-	0	1	0	-	0
225	0	1	-	0	1	1	-	0
270	1	1	-	1	1	0	-	0

Truth table #4

(Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?" Request push 135 degrees, you will hear confirmation number)

- **Used to control:**
  - **remote relay switches LBSuper III, RS8BCD;**
  - **remote relay switches LBSuper II;**
    - ✓ **Reversible Beverage systems RB2;**

- **Control codes:**
  - **BCD 4 of 8, (8 directions – 4 inputs of the relay switch), at Pin#1 – Pin#2, for LBSuper III, RS8BCD and BCD controlled switches;**
  - **LBSuper, (8 directions - 4 inputs of the relay switch), at Pin#4 – Pin# 7, for LBSuper II relay switch;**
  - **«Reverse direction» – extra signal to switch reversible beverages, at Pin#8** *(you have to program it);*

Direction, degrees \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	0	0	-	1	0	0	0	0
0	1	0	-	0	1	0	0	0
45	0	1	-	0	0	1	0	0
90	1	1	-	0	0	0	1	0
135	0	0	-	1	0	0	0	0
180	1	0	-	0	1	0	0	0
225	0	1	-	0	0	1	0	0
270	1	1	-	0	0	0	1	0

Truth table #5

Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?" Request push 180 degrees, you will hear confirmation number

- **Used to control:**
  - **remote relay switches LBSuperIII, RS8BCD, LBSuperII;**
    - ✓ **Beverage systems RB, RB22;**
  - **Antenna K-98;**

- **Control codes:**

  - **BCD 8 of 8, (8 directions - 8 relay switch inputs), to Pin#1 – Pin#3, for LBSuperIII, RS8BCD;**
  - **BCD 4 of 8, (8 directions – 4 inputs of the relay switch), at Pin#1 – Pin#2, for LBSuper II, RS8BCD and other BCD controlled switches;**
  - **K-98, to Pin# 4 – Pin# 7, for antenna K-98;**
  - **«Reverse direction» – extra signal to switch reversible beverages, at Pin#8,** *(you have to program it);*

Direction, degrees \	Pin# 1	Pin# 2	Pin# 3	Pin# 4	Pin# 5	Pin# 6	Pin# 7	Pin# 8
315	0	0	0	0	1	0	1	0
0	1	0	0	0	0	0	1	0
45	0	1	0	1	0	0	1	0
90	1	1	0	0	0	1	1	0
135	0	0	1	0	1	0	0	0
180	1	0	1	0	0	0	0	0
225	0	1	1	1	0	0	0	0
270	1	1	1	0	0	1	0	0

Truth table #6

Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?" Request push 225 degrees, you will hear confirmation number:

- **Used to control:**
  - **remote relay switches LBSuperIII, RS8BCD;**
    - ✓ **Reversible Beverage systems RB2 requires switching;**
  - **Antenna K-98;**

- **Control codes:**

  - **BCD 4 of 8, (8 directions - 4 relay switch inputs), to Pin#1 – Pin#2, for LBSuperIII, RS8BCD;**
  - **K-98, to Pin# 4 – Pin# 7, for antenna K-98;**
  - **«Reverse direction» – extra signal to switch reversible beverages, at Pin#8,** *(you have to program it);*

Direction, degrees \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	0	0	-	0	1	0	1	0
0	1	0	-	0	0	0	1	0
45	0	1	-	1	0	0	1	0
90	1	1	-	0	0	1	1	0
135	0	0	-	0	1	0	0	0
180	1	0	-	0	0	0	0	0
225	0	1	-	1	0	0	0	0
270	1	1	-	0	0	1	0	0

Truth table #7

Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?" Request push 270 degrees, you will hear confirmation number

- **Used to control:**
  - **remote relay switches BCD, SINK configuration;**
  - **antenna system Hi-Z8A, Hi-Z Antennas, SINK control;**

- **Control codes:**

  - **BCD 8 of 8, (8 directions - 8 relay switch inputs), to Pin#1 – Pin#3, for SINK control *(jumpers Sink/Source should be rearranged)*;**
  - **K-98, to Pin# 4 – Pin# 7, for antenna K-98;**

Direction, degrees \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	0	0	0	0	0	0	1	1
0	1	0	0	1	0	0	0	0
45	0	1	0	0	1	0	0	0
90	1	1	0	0	0	1	0	0
135	0	0	1	0	0	0	1	0
180	1	0	1	1	0	0	0	1
225	0	1	1	0	1	0	0	1
270	1	1	1	0	0	1	0	1

TRUTH TABLES FOR TRANSMIT SYSTEMS APPLICATION (software TX v 1.1a)

Truth table #1

(Switch OFF controller, Push 0 degrees, Switch Power On, at the CW "MAP?" Request push 0 degrees, you will hear confirmation number)

- **Used to control:**
  - **Remote relay switches**

- **Control codes:**
  - **Plain 1 of 8 to Pin#1 – Pin#8**

Direction, degrees: \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	1	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0
45	0	0	1	0	0	0	0	0
90	0	0	0	1	0	0	0	0
135	0	0	0	0	1	0	0	0
180	0	0	0	0	0	1	0	0
225	0	0	0	0	0	0	1	0
270	0	0	0	0	0	0	0	1

Truth table #7

Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?" Request push 270 degrees, you will hear confirmation number, control console will go to NORMAL mode of operation with TruthTable #7

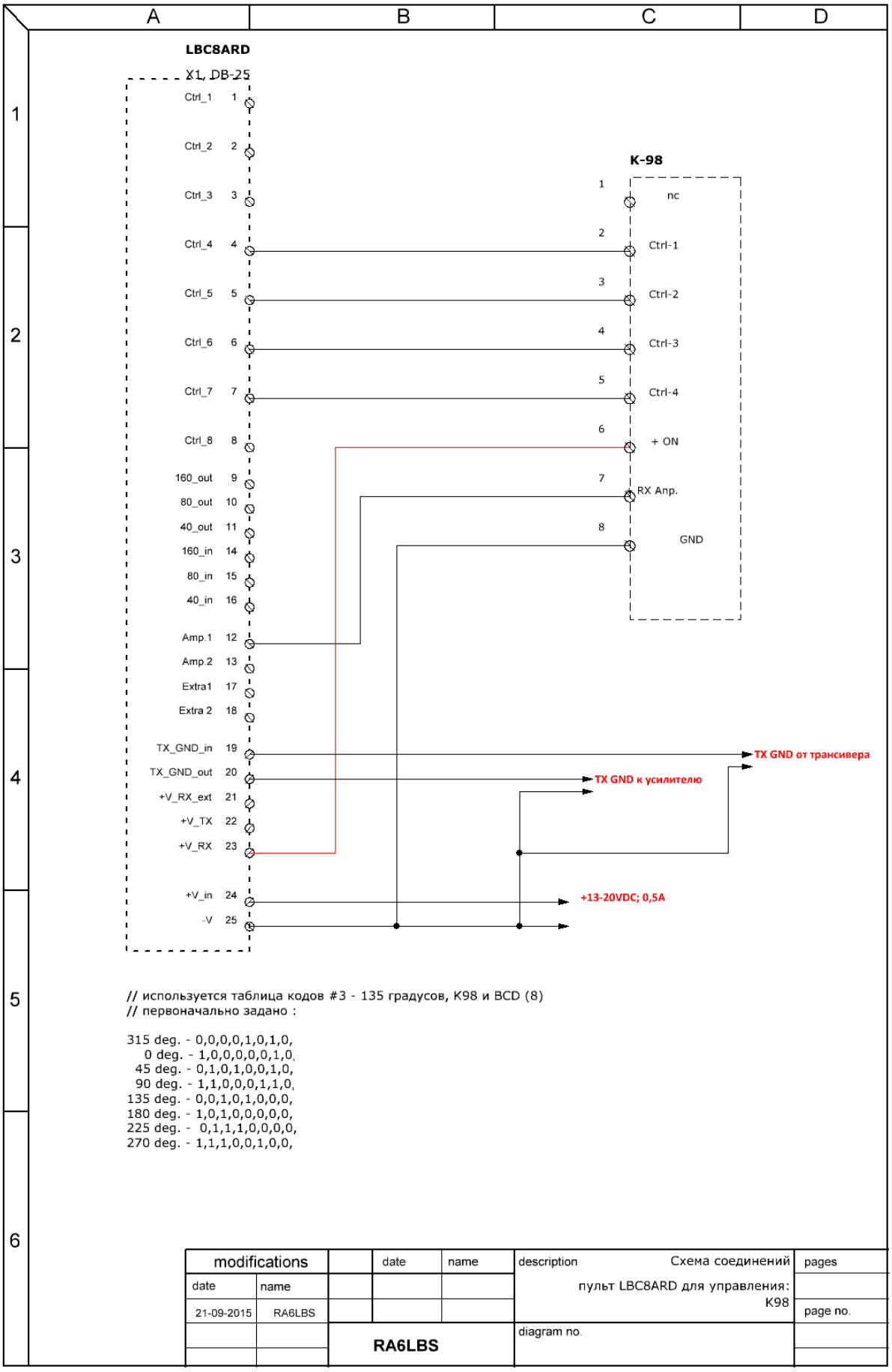
- **Used to control:**
  - **4SQUARE 4 and 8 direction systems;**

- **Control codes:**
  - **BCD 4 of 4, to Pin#1 – Pin#2;**
  - **8 direction 4square transmit system, to Pin# 3 – Pin# 8;**

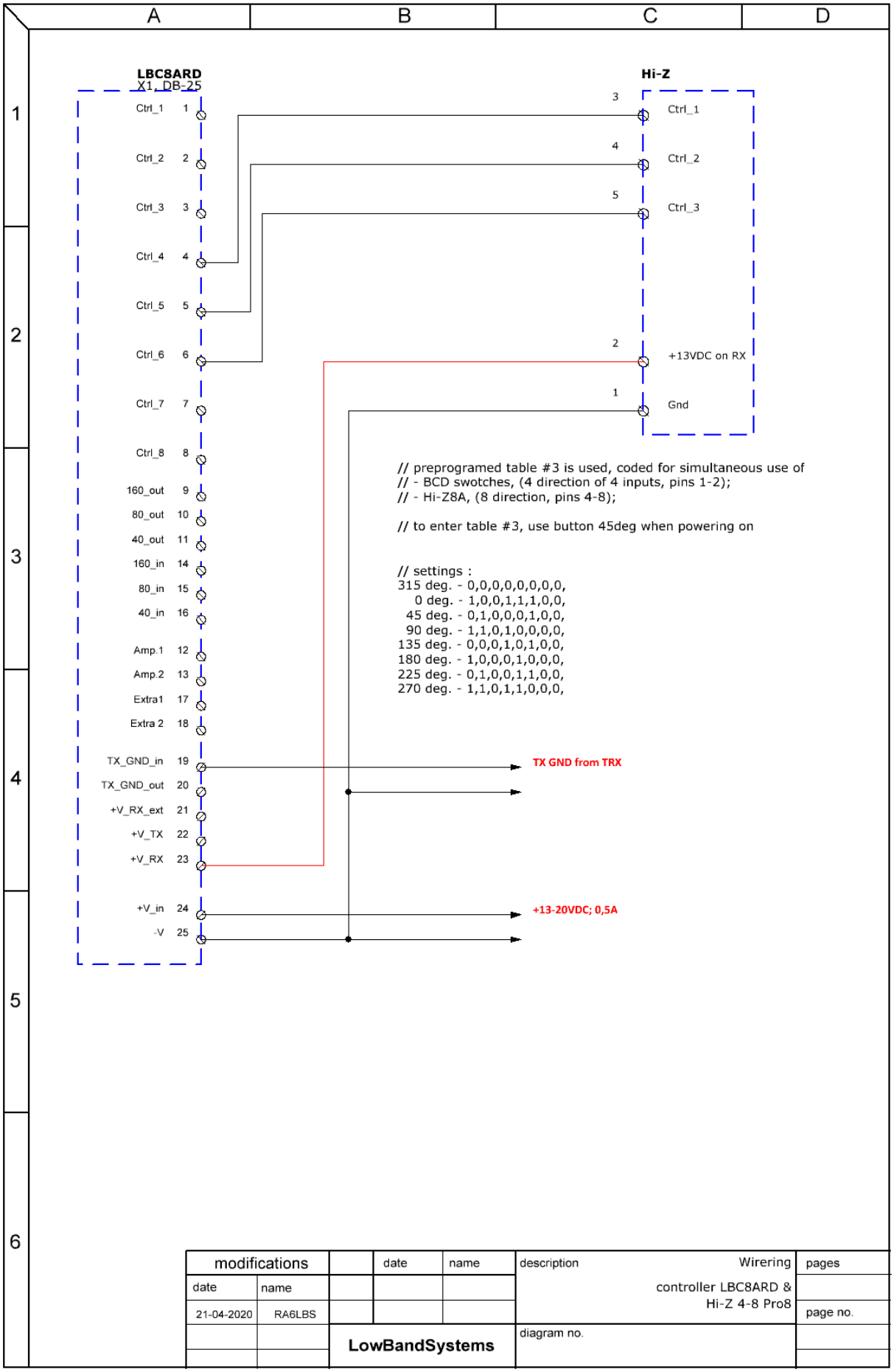
Direction, degrees \	Pin#1	Pin#2	Pin#3	Pin#4	Pin#5	Pin#6	Pin#7	Pin#8
315	1	1	1	1	1	1	0	0
0	1	1	1	0	0	1	0	0
45	0	0	0	0	0	0	0	0
90	0	0	0	0	1	1	0	1
135	1	0	1	1	1	1	1	1
180	1	0	0	1	1	0	0	1
225	0	1	0	0	0	0	1	1
270	0	1	1	1	0	0	0	1

V. Wiring examples:

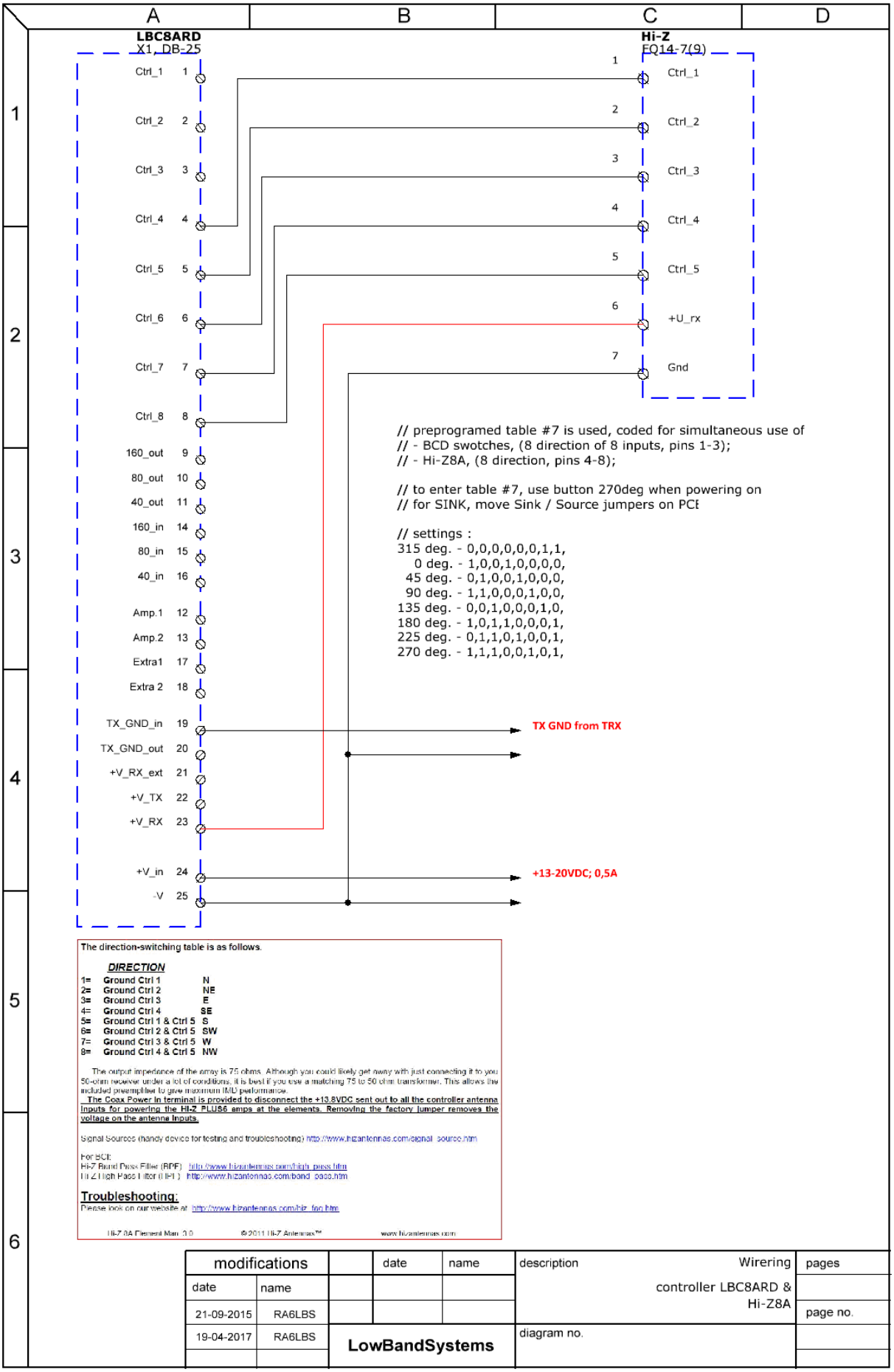
LBC8ARD & antenna K–98



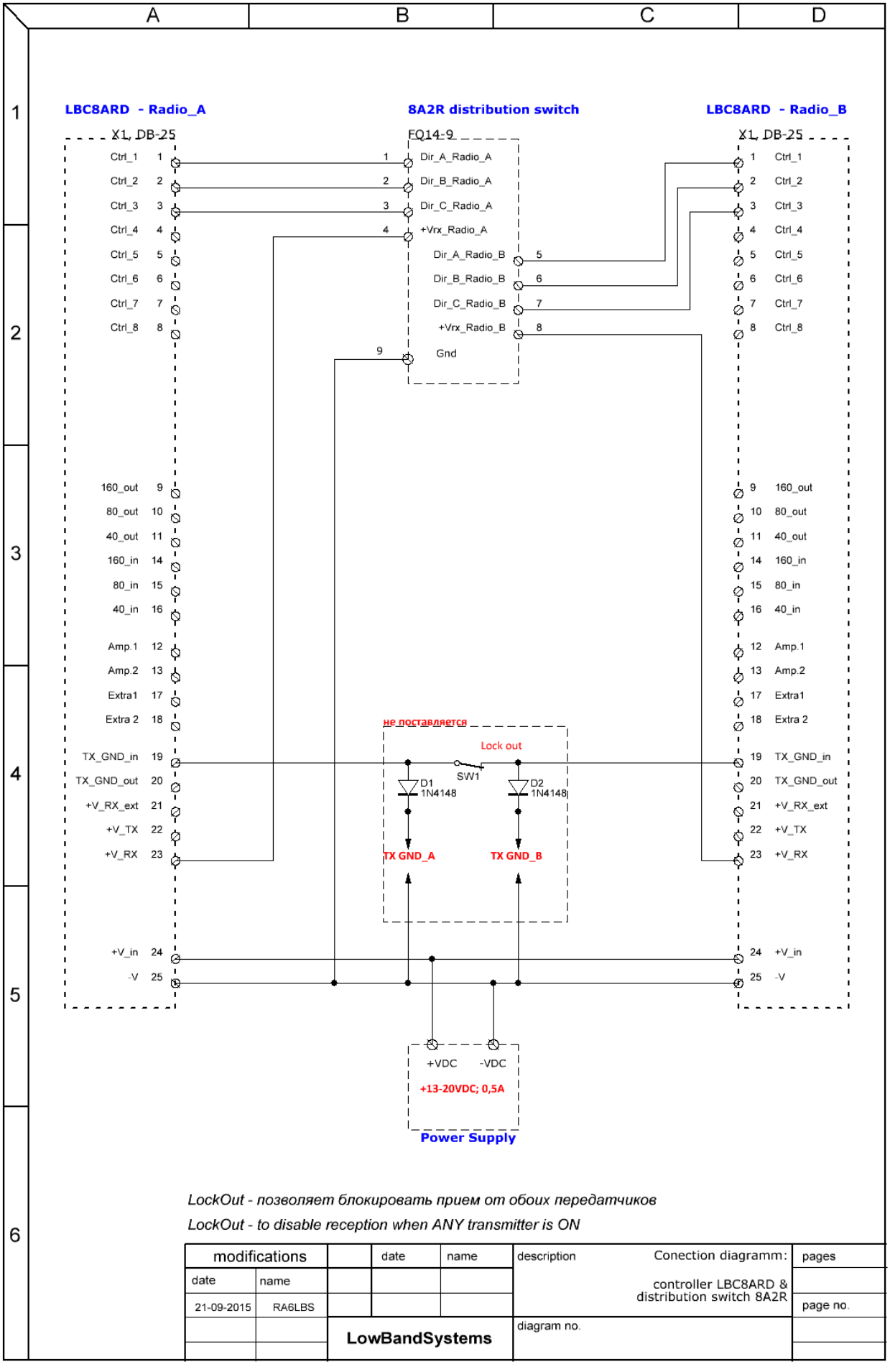
LBC8ARD & antenna Hi-Z 4-8 Pro8



LBC8ARD & antenna Hi - Z8A



LBC8ARD & distribution switch 8A2R:



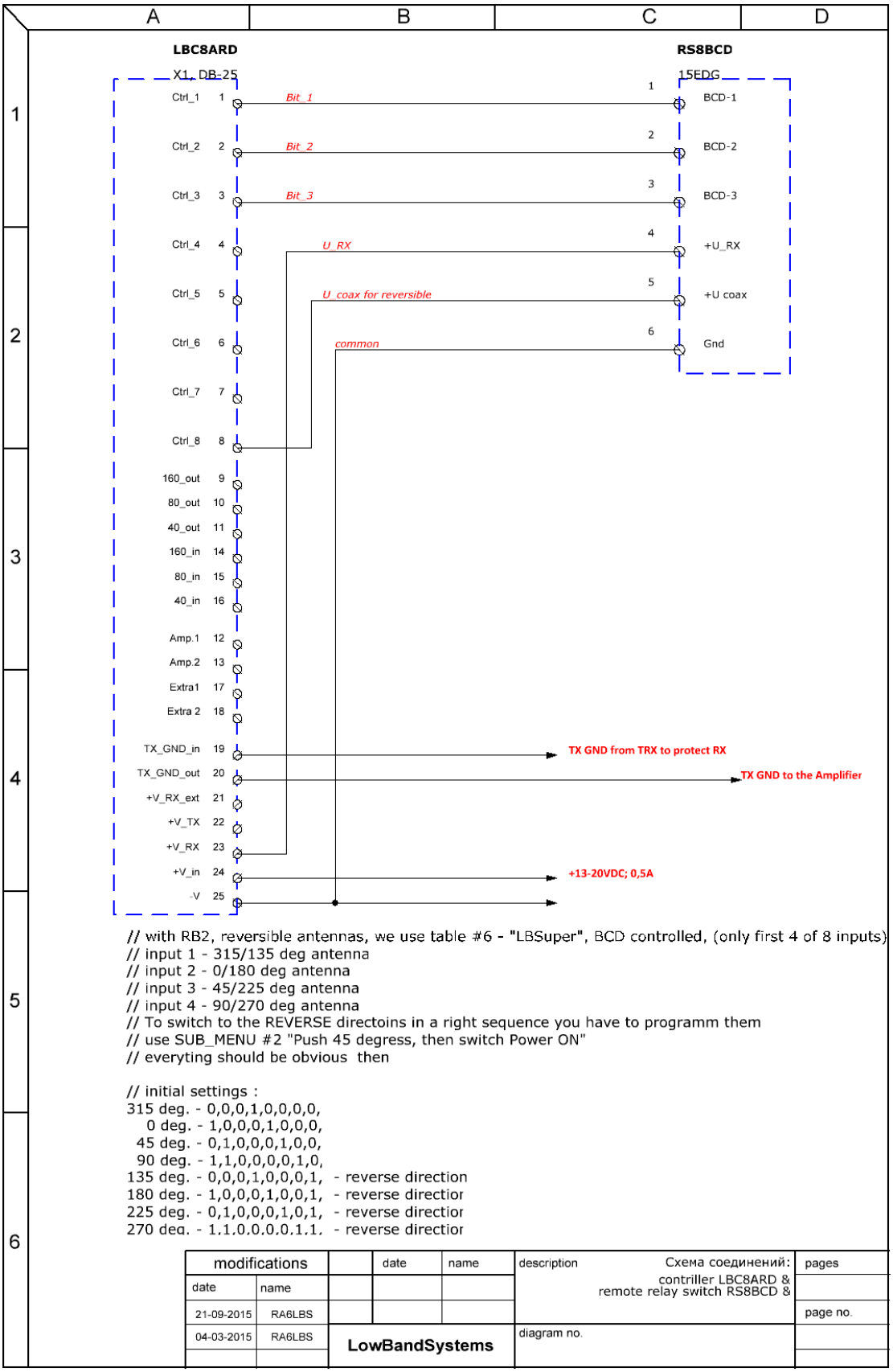
LockOut - позволяет блокировать прием от обоих передатчиков

LockOut - to disable reception when ANY transmitter is ON

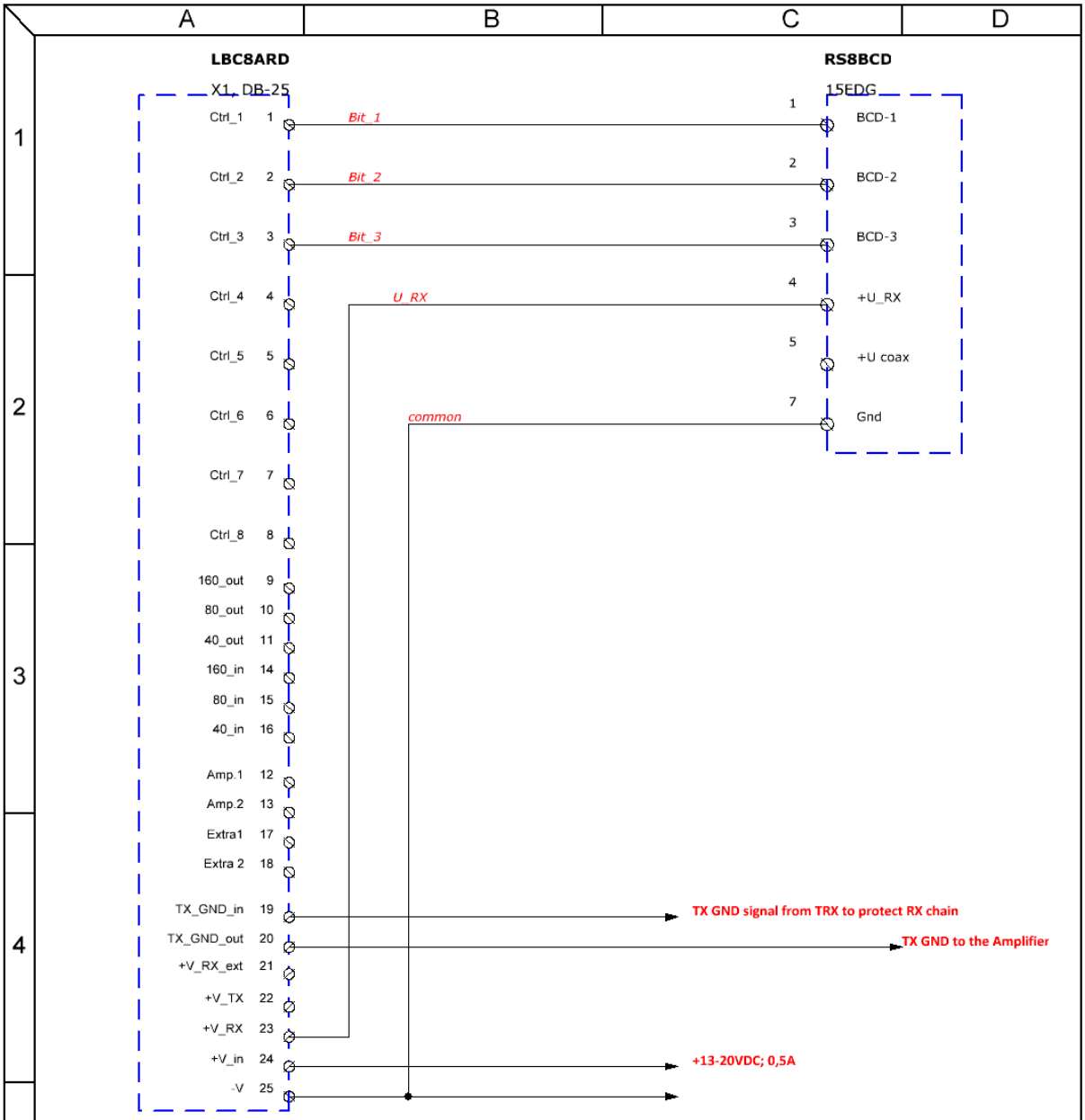
modifications			date	name	description	Conection diagramm:	pages
date	name					controller LBC8ARD & distribution switch 8A2R	
21-09-2015	RA6LBS						page no.
		LowBandSystems			diagram no.		

LBC8ARD & remote relay switch RS8BCD:

1) For reversible beverages



2) For eight single direction antennas:



Truth table #2

(Switch OFF controller, push 0 degrees, Switch Power On, at the CW "MAP?'
Request push 45 degrees, you will hear confirmation number)

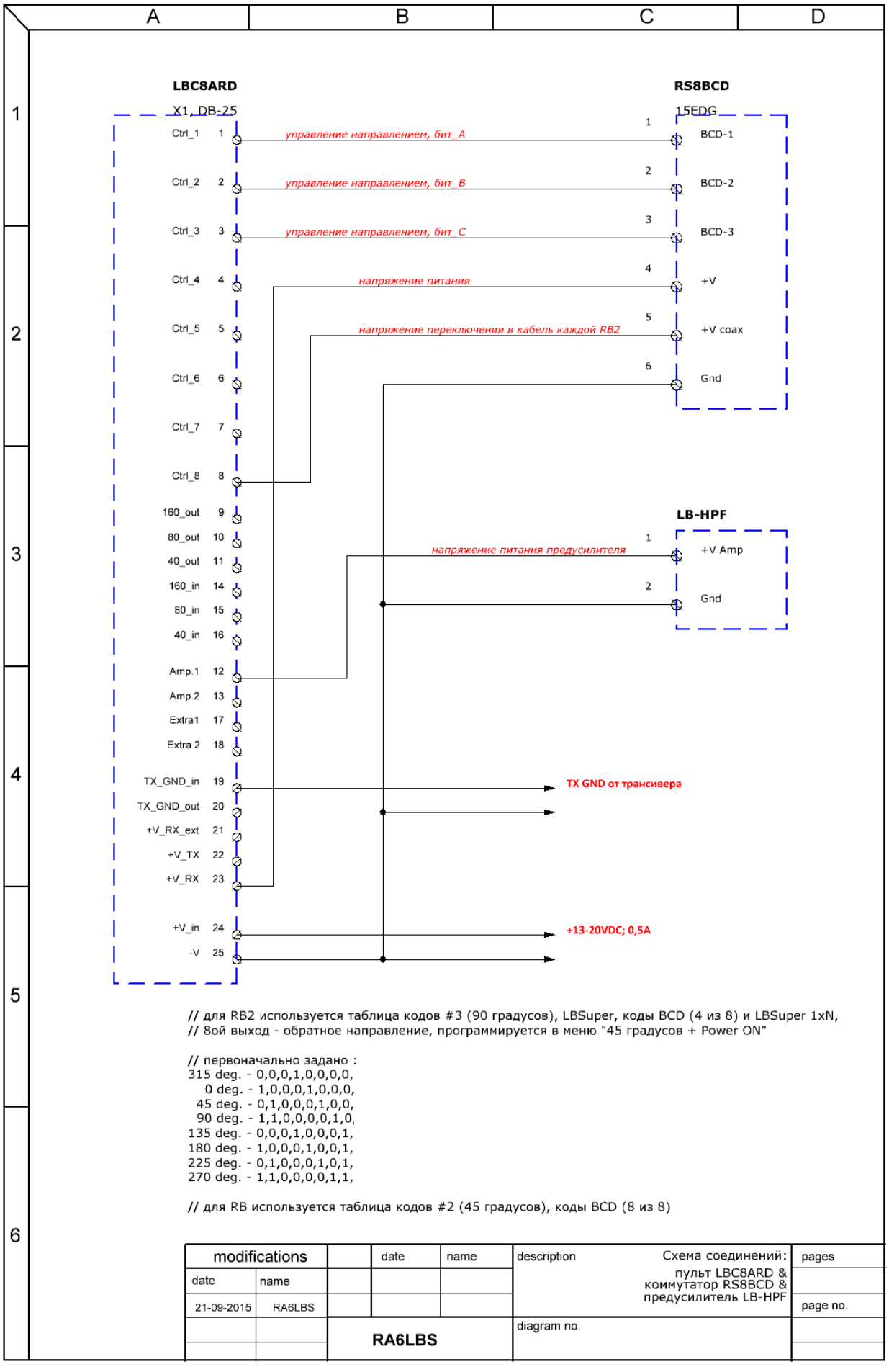
Used to control:
remote relay switches LBSuperIII, RS8BCD, 8A2R
receive array 8Circle by LowBandSystems, BCD control;
receive array Hi-Z8A, Hi-Z Antennas;

Control codes:
BCD 8_of_8, to Pin#1 - Pin#3
"Mirror code" for Hi-Z8A, to Pin# 4 - Pin# 8

Pin#1/Pin#2/Pin#3/Pin#4/Pin#5/Pin#6/Pin#7/Pin#8
Direction, degrees
315 00011100
0 10001111
45 01010111
90 11011011
135 00111101
180 10101110
225 01110110
270 11111010

modifications			date	name	description	pages
date	name				Схема соединений: contriller LBC8ARD & remote relay switch RS8BCD &	
21-09-2015	RA6LBS					page no.
25-10-2018	RA6LBS	LowBandSystems			diagram no.	

LBC8ARD – remote relay switch RS8BCD and preamp LB-HPF:



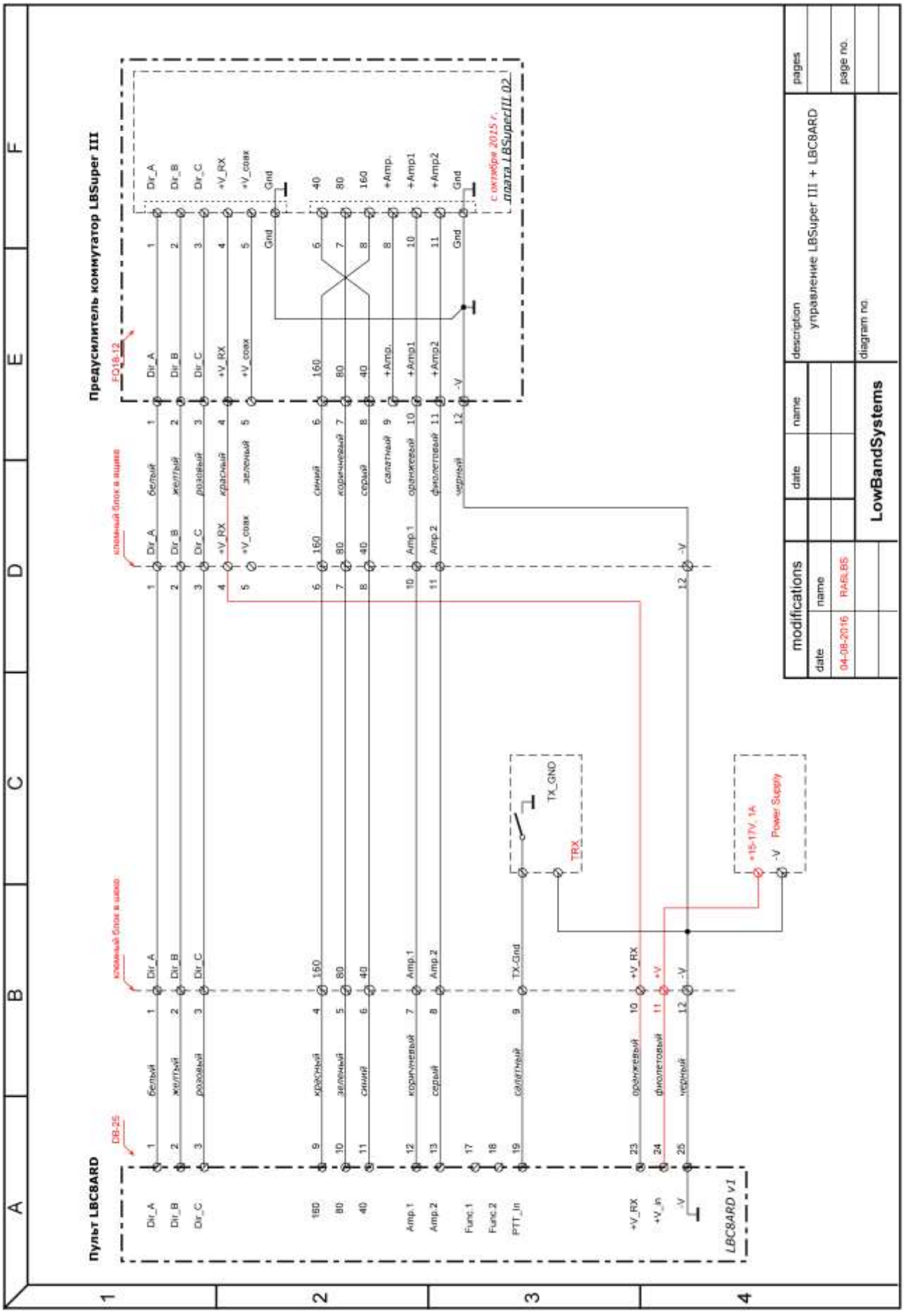
// для RB2 используется таблица кодов #3 (90 градусов), LBSuper, коды BCD (4 из 8) и LBSuper 1xN,
// 8ой выход - обратное направление, программируется в меню "45 градусов + Power ON"

// первоначально задано :
315 deg. - 0,0,0,1,0,0,0,0,
0 deg. - 1,0,0,0,1,0,0,0,
45 deg. - 0,1,0,0,0,1,0,0,
90 deg. - 1,1,0,0,0,0,1,0,
135 deg. - 0,0,0,1,0,0,0,1,
180 deg. - 1,0,0,0,1,0,0,1,
225 deg. - 0,1,0,0,0,1,0,1,
270 deg. - 1,1,0,0,0,0,1,1,

// для RB используется таблица кодов #2 (45 градусов), коды BCD (8 из 8)

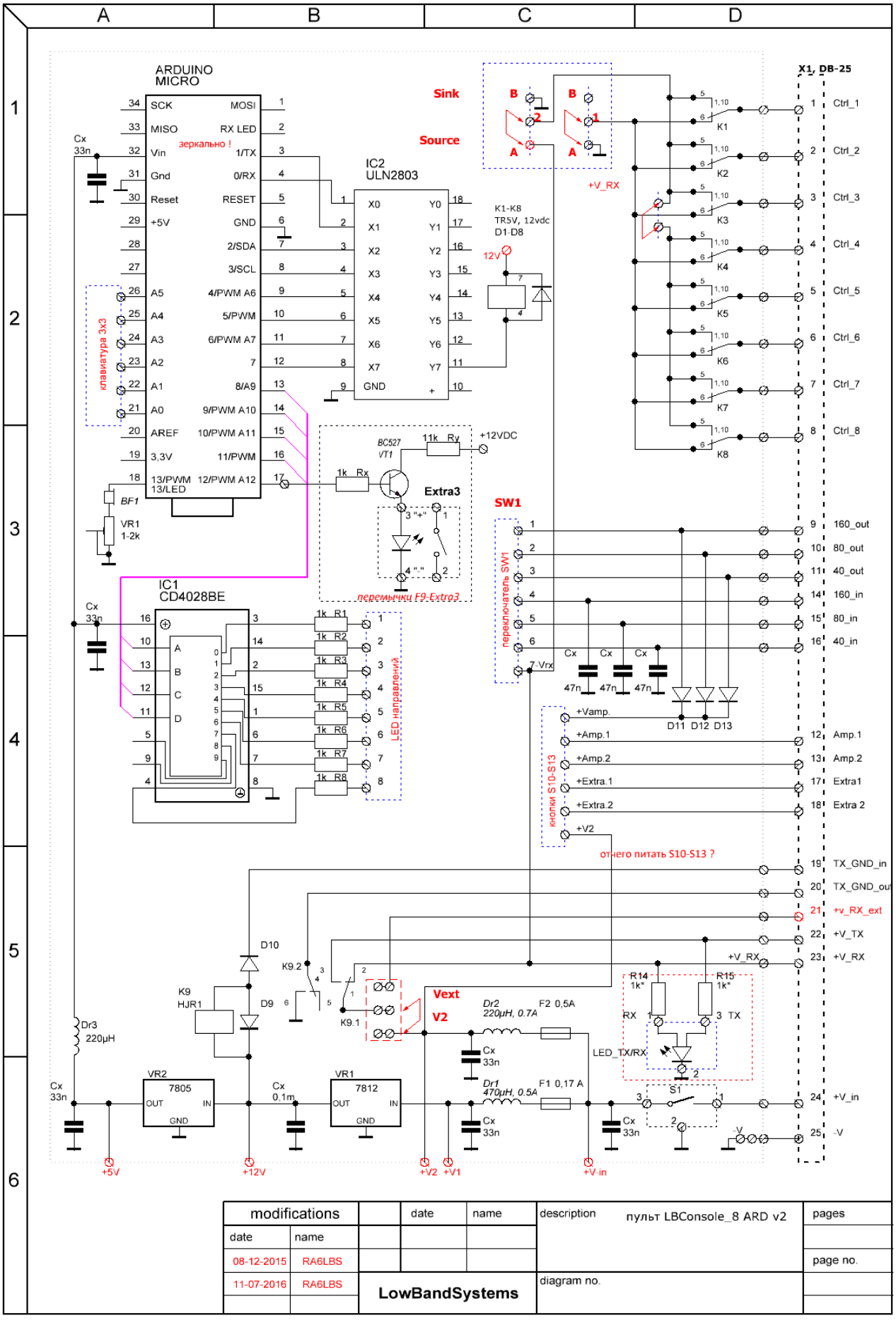
modifications			date	name	description	Схема соединений:	pages
date	name					пульт LBC8ARD & коммутатор RS8BCD & предусилитель LB-HPF	
21-09-2015	RA6LBS						page no.
		RA6LBS			diagram no.		

LBC8ARD – remote relay switch LBSuper III:



Schematics:

Microprocessor board:



Rotary switches: