REMOTE CONTROL UNIT HARDWARE SPECIFICATIONS
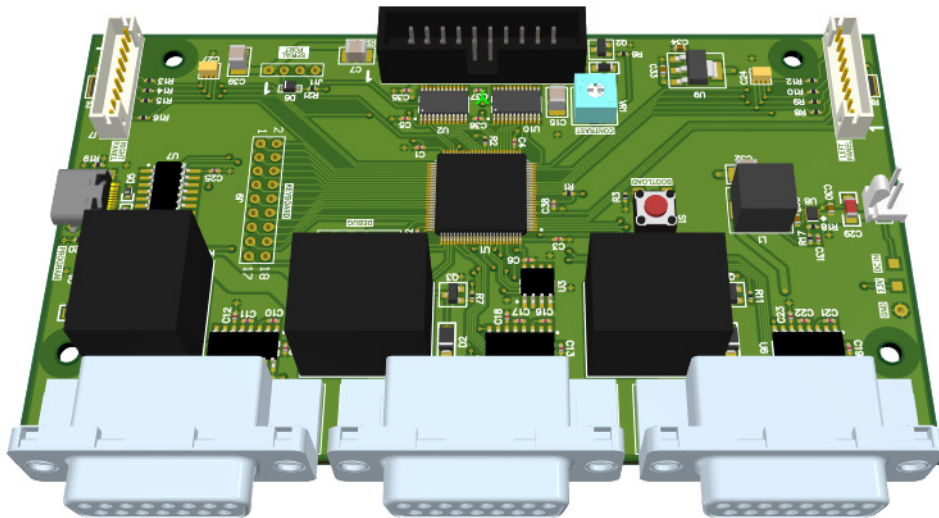

GPD
06/2024

V1.1

VERSIONS

V1.1
- Fixed errors and typos

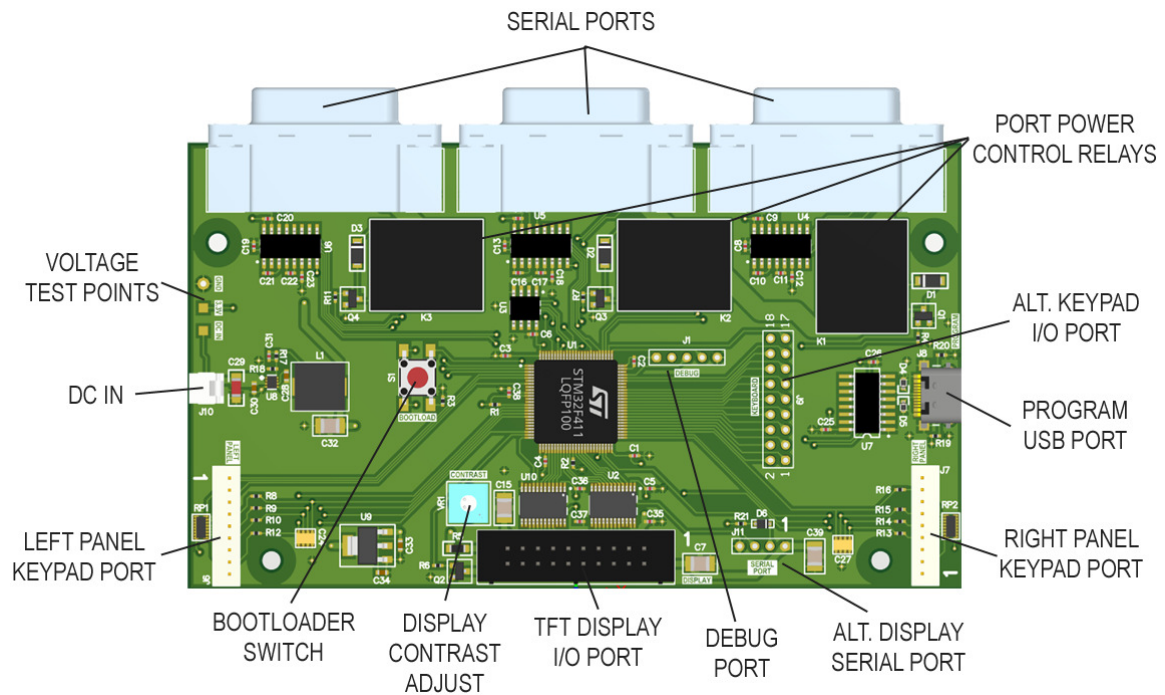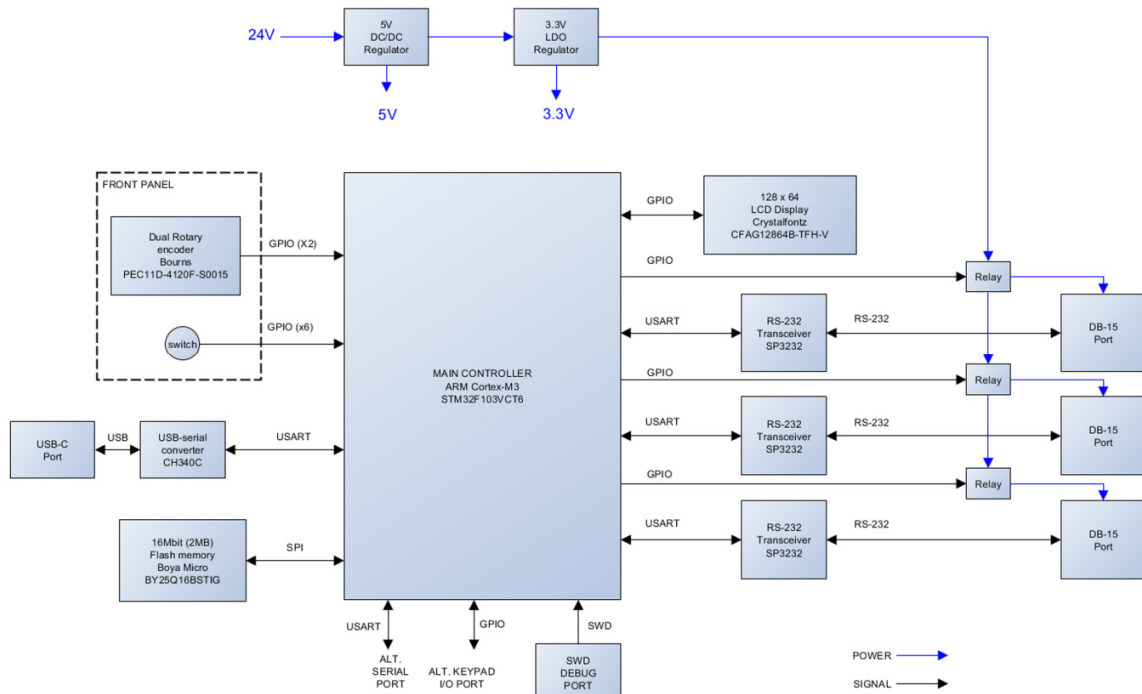**V1.0**
- First version

INDEX

1. SUMMARY

- Main board description.
- Front panel keypad description
- Port Pin Out description
- Electrical Specifications

2. DESIGN OVERVIEW

3. BLOCK DIAGRAM

3.1. Main controller

- STMicroelectronics STM32F103VCT6
- ARM Cortex M3 processor
- 256KB of Flash
- 64 Kbytes of SRAM

3.2. LCD Display

- I/O port for Crystalfontz CFAG12864I-STI-TN graphic LCD display module
- Neotec NT7108 controller

3.3. Serial transceivers

- RS-232 and NMEA 0183 compliant ports
- DTR/DSR support (remappable for cross-over connections to CDU)

3.4. Sub-D Ports

- 3 x Sub D-F, 15 pin x 2 rows, PCB to wire connectors
- Any connector can be discarded for RCU mode
- Same pinout than COM 2KR transceiver port
- 24VDC pin included. Switch controlled by software

3.5. Relays

- 10A, 250VAC max, for powering peripherals, either RCU or end radio transceivers

3.6. SWD Debug Port

- Optional debug por for developers
- Intended to be used with ST-Link v2.x debug tool from STMicroelectronics

3.7. Alternative Keypad Port

- Access to 18 general purpose GPIO for reading external button arrays
- Designed for keypads of up to 81 buttons (9 rows x 9 columns)

3.8. Alternative Serial Port

- General purpose serial port
- 5V TTL levels
- Intended for displays with serial interfaces, like Nextion series
- Can be used with RS-232 end devices with an external serial-to-RS232 converter.

3.9. Flash Memory

- 16Mbit (2Mbytes) NOR Flash IC Boya Micro BY25Q16BSTIG

3.10. USB port

- Programming port
- Alternatively can be used as a general purpose serial port for console applications, debug tools, etc.

3.11. Front Panel Connectors

- 9 pin connectors for panel-mounted keypads
- Pins for reading 3 general purpose switches (each side)
- Pins for reading a dual rotary encoder with push button (each side)

4. PIN OUT DESCRIPTION

4.1. SubD 15 ports

Pin	Name	I/O/P*	Description
1	SERIAL_TX	O	RS232 transmit pin
2	--	--	N/A
3	--	--	N/A
4	--	--	N/A
5	--	--	N/A
6	--	--	N/A
7	GND	P	Power/signal ground
8	VS	P	Relay-controlled 24V output
9	SERIAL_RX	I	RS232 receive pin
10	--	--	N/A
11	--	--	N/A
12	--	--	N/A
13	--	--	N/A
14	DTR	O	RS232 Data Terminal Ready output
15	DSR	I	RS232 Data Set Ready input

* I: input, O: Output, P: Power

4.2. Alt. Keypad I/O Port

Pin	Name	I/O/P	Description
1	GPIO1	I/O	General purpose GPIO pin. 3.3V max
2	GPIO2	I/O	General purpose GPIO pin. 3.3V max
3	GPIO3	I/O	General purpose GPIO pin. 3.3V max
4	GPIO4	I/O	General purpose GPIO pin. 3.3V max
5	GPIO5	I/O	General purpose GPIO pin. 3.3V max
6	GPIO6	I/O	General purpose GPIO pin. 3.3V max
7	GPIO7	I/O	General purpose GPIO pin. 3.3V max
8	GPIO8	I/O	General purpose GPIO pin. 3.3V max
9	GPIO9	I/O	General purpose GPIO pin. 3.3V max
10	GPIO10	I/O	General purpose GPIO pin. 3.3V max
11	GPIO11	I/O	General purpose GPIO pin. 3.3V max
12	GPIO12	I/O	General purpose GPIO pin. 3.3V max
13	GPIO13	I/O	General purpose GPIO pin. 3.3V max
14	GPIO14	I/O	General purpose GPIO pin. 3.3V max
15	GPIO15	I/O	General purpose GPIO pin. 3.3V max
16	GPIO16	I/O	General purpose GPIO pin. 3.3V max
17	GPIO17	I/O	General purpose GPIO pin. 3.3V max
18	GPIO18	I/O	General purpose GPIO pin. 3.3V max

4.3. Alt. Serial Port

Pin	Name	I/O/P	Description
1	VDD	P	5VDC supply to display
2	GPIO2	I	Display TX - MCU RX
3	GPIO3	O	Display RX - MCU TX
4	GPIO4	P	GND

4.4. Front Panel keypad ports

Pin	Name	I/O/P	Description
1	GP_SW1	I	General purpose switch input
2	GP_SW2	I	General purpose switch input
3	GP_SW3	I	General purpose switch input
4	A1	I	Inner encoder 'A' signal input
5	B1	I	Inner encoder 'B' signal input
6	B2	I	Outer encoder 'B' signal input
7	BUTTON	I	Encoder push button
8	A2	I	Outer encoder 'A' signal input
9	GND	P	Ground

4.5. LCD Display Port

Pin	Name	I/O/P	Description
1	VSS	P	Ground
2	VDD	P	Supply Voltage for Logic
3	VO	O	Contrast signal out
4	D/I	O	Supply Voltage for LCD
5	R/W	O	Read/write
6	E	O	Enable Signal
7	DB0	O	Data bus bit 0
8	DB1	O	Data bus bit 1
9	DB2	O	Data bus bit 2
10	DB3	O	Data bus bit 3
11	DB4	O	Data bus bit 4
12	DB5	O	Data bus bit 5
13	DB6	O	Data bus bit 6
14	DB7	O	Data bus bit 7
15	CS1	O	Chip Select for IC1
16	CS2	O	Chip Select for IC2
17	/RES	O	Reset Signal
18	VOUT	I	Negative Voltage Output from LCD
19	A	O	Backlight LED array anode
20	K	O	Backlight LED array cathode

4.6. DC IN Port

Pin	Name	I/O/P	Description
1	DC IN	P	Supply input, 6V to 28VDC
2	GND	P	Ground

5. ELECTRICAL SPECIFICATIONS

5.1. Power supply

Parameter	Min	Nom	Max	Unit	Comments
Voltage	6	9	28	V	
Current	-	-	0.9	A	
Protections	Overload, thermal shutdown				

5.2. Sub D 15 ports

Parameter	Min	Nom	Max	Unit	Comments
Voltage	6	9	28	V	VS supply output
Current	-	-	0.9	A	VS supply output
Bitrate	-	9.6	250	kbps	
Driver input voltage	-0.3	-	6	V	TX, DTR
Receiver input voltage	-25	-	25	V	RX, DSR
Driver output voltage	-13.2	-	13.2	V	TX, DTR
Receiver output voltage	-0.3	-	3.6	V	RX, DSR
Shortcircuit current	-	-	50	mA	TX, RX, DTR, DSR
ESD protection	-	-	8	KV	Any polarity

5.3. LCD Display port

Parameter	Min	Nom	Max	Unit	Comments
Voltage	4.95	5	5.05	V	
LCD current	-	-	3	mA	
Backlight current	48	64	80	mA	
Driver input voltage	-0.3	-	6	V	
Receiver input voltage	-25	-	25	V	
Driver output voltage	-13.2	-	13.2	V	
Receiver output voltage	-0.3	-	3.6	V	
Data bus voltage	0	-	5	V	
VOUT pin range	-3.4	-3.7	-4	V	

5.4. Alt. Keypad I/O Port

Parameter	Min	Nom	Max	Unit	Comments
Voltage	0	-	3.3	V	
Current	-8	-	8	mA	
Total current	-120	-	120	mA	all pins
ESD protection	-	-	2	KV	Any polarity

5.5. Alt Serial Port

Parameter	Min	Nom	Max	Unit	Comments
Voltage	0	-	5	V	
Current	-8	-	8	-8	
Bitrate	-	-	2.25	Mbps	
ESD protection	-	-	2	KV	Any polarity

5.6. Panel Ports

Parameter	Min	Nom	Max	Unit	Comments
Voltage	0	-	3.3	V	
Current - switches	0	-	330	uA	GP switches, knob button
Current - encoders	0	-	160	uA	dual rotary encoders
ESD protection	-	-	2	KV	Any polarity

NOTES