

OE5JFL Tracker

Version DIY ON4BCB

OE5JFL tracking system

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USER MANUAL

GENERAL INFORMATION OF SYSTEM

This version of the OE5JFL tracker is based on the original version from Hannes OE5JFL.

It was intended to be a DIY version with some extra features added by Hannes over the years.

This “stripped down” single PCB version is mainly for use with the Megatron MAB encoders.

It also uses external High power H-Bridges for more motor current.

SYSTEM OVERVIEW

- Tracking of moon,sun,Cygnus,Sagittarius,Cassiopeia,Taurus,Leo and Aquarius
- Azimuth and elevation motor controlling for all targets plus two free choice positions
- Transmission of antenna position via **LAN cable** from antenna down to the controller in the shack
- Standard interfacing with absolute encoders : 10..12bit , MAB25,ETS25,MAB28,HH-12
- With optional hardware: USdigital A2-S-S, Prosistel inclino,incremental encoder
- Selectable stepsize for tracking
- Selectable offset for azimuth and elev. up to +/- 9.9 deg
- Motor control output cw/ccw up/down, **including soft-start and soft-stop** (by PWM)
- Local operation by 4 buttons at controller, non volatile storage of all parameters
- Real - Time – Clock + 4 x 20 character LCD – display
- DC motor H-bridges for AZ and EL

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NEW FEATURES

- Automatic calibration of the encoders by Sun or Moon position
- Support of new encoders (MAB28,ETS25,Positel inclino)
- PWM speedcontrol in manual mode with CW,CCW,UP,Down buttons

PCB overview

- A single layer PCB (large tracks + wire jumpers) => DIY
- External H-bridges (high power, low cost)
- USB => to serial converter
- PCB headers for external buttons and leds
- All new features present on PCB headers
- Almost all components thruhole & DIL
- Megatron encoders via a PCB header (use own connectors)
- IC buffered inputs and outputs (encoders & H-bridges)
- LCD via PCB header (large LCD possible 4x20)

PCB connectors

P1 Azimuth encoder:

Pin 1	Gnd	Gnd
Pin 2	DO	Data
Pin 3	CLK	Clock
Pin 4	CSN	Chip select
Pin 5	+5V	VCC

P2 Elevation encoder:

Pin 1	Gnd	Gnd
Pin 2	DO	Data
Pin 3	CLK	Clock
Pin 4	CSN	Chip select
Pin 5	+5V	VCC

P3 Serial interface:

Pin 1	TXD	Txdata
Pin 2	RXD	Rxdata
Pin 3	RTS	RTS
Pin 4	CTS	CTS
Pin 5	Gnd	Gnd

P4 Control button's:

Pin 1	Gnd
Pin 2	Calibrate
Pin 3	El Speed
Pin 4	Az Speed
Pin 5	Auto
Pin 6	+
Pin 7	-
Pin 8	Menu

P5 Motor button's:

Pin 1	+5V
Pin 2	CW
Pin 3	CCW
Pin 4	Up
Pin 5	Down

P6 LCD display:

Pin 1	VSS	Pin 2	VCC
Pin 3	Vo	Pin 4	RS
Pin 5	VSS	Pin 6	E
Pin 7	nc	Pin 8	nc
Pin 9	nc	Pin 10	nc
Pin 11	D4	Pin 12	D5
Pin 13	D6	Pin 14	D7
Pin 15	Vbacklight	Pin 16	VSS

P7 Power Supply:

Pin 1	+12V	Pin2	Gnd
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P8 Azimuth H-bridge:

Pin 1	CW
Pin 3	PWM
Pin 5	nc
Pin 7	VCC

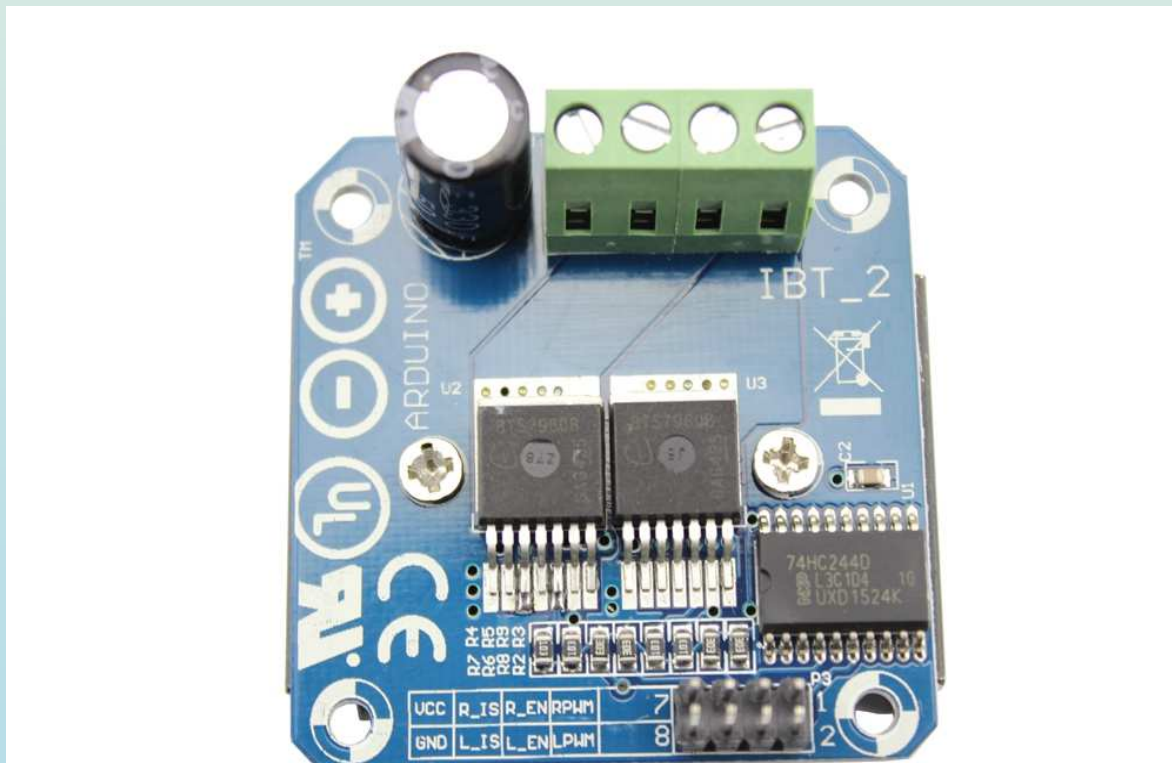
Pin 2	CCW
Pin 4	PWM
Pin 6	nc
Pin 8	Gnd

P9 Elevation H-bridge:

Pin 1	Up
Pin 3	PWM
Pin 5	nc
Pin 7	VCC

Pin 2	Down
Pin 4	PWM
Pin 6	nc
Pin 8	Gnd

IBT2 H-bridge module:



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IBT2 H-bridge module Pinout:

Input port

1	2	1、RPWM	: Forward level or PWM signal input, active high
■	○	2、LPWM	: Inversion level or PWM signal input, active high
○	○	3、R_EN	: Forward drive enable input , high enable , low close
○	○	4、L_EN	: Reverse drive enable input , high enable , low close
○	○	5、R_IS	: Forward drive –side current alarm output
○	○	6、L_IS	: Reverse drive –side current alarm output
7	8	7、VCC	: +5 V power input,connected to the microcontroller 5V power supply
		8、GND	: Signal common ground terminal

Usage one:

VCC pick MCU 5V power supply, GND connected microcontroller GND
R_EN and L_EN shorted and connected to 5V level, the drive to work.
L_PWM, input PWM signal or high motor forward
R_PWM, input PWM signal or high motor reversal

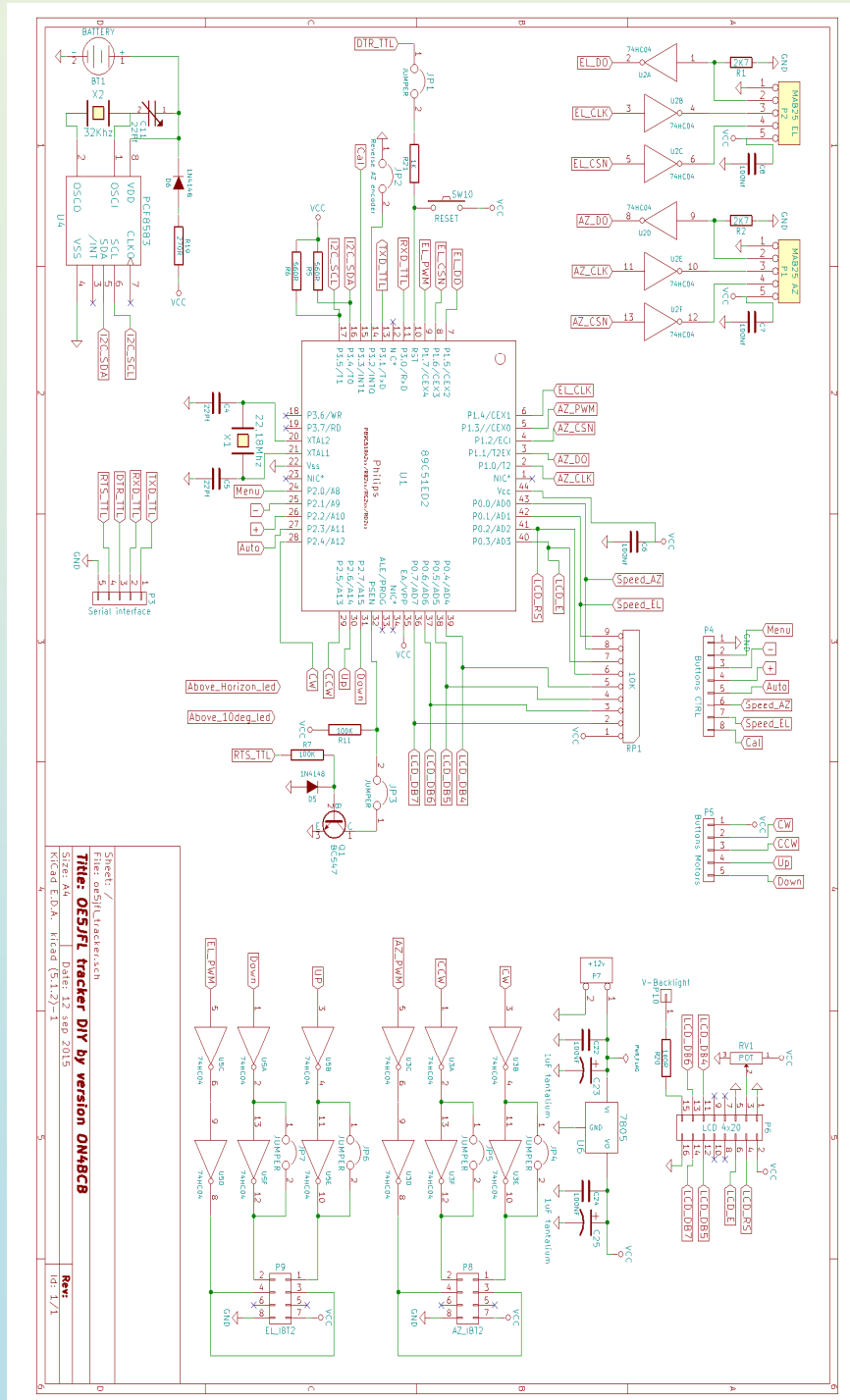
Usage two:

VCC pick MCU 5V power supply , GND connected microcontroller GND
R_EN and L_EN short circuit and PWM signal input connected to high-speed
L_PWM, pin input 5V level motor is transferred
R_PWM, pin input 5V level motor reversal

Component list:

Name:	Description:	Number:	TME	Reichelt	Farnell
BT1	BATTERY	1x			524-864
C11	22Pf trimmer	1x			
C6,C7,C8,C22,C24	100Nf	5x	C320C104K5R5TA		
C23,C25	1uF tantalium	2x	TAP105K035SCS		
C4,C5	22Pf	2x	CC-22		9411674
D5,D6	1N4148	2x	1N4148		
JP1,JP2,JP3	JUMPER	3x			
JP4,JP5,JP6,JP7	JUMPER	4x	SMD0805-0R		
P1,P2,P3,P5	Pin Header 1x05	4x	-	PS 25/5G WS	
P10	Pin Header 1x01	1x			
P4	Pin Header 1x08	1x	MLSS100-08	PS 25/8G WS	
P6	Pin Header 2x08	1x	T821-1-16-S1		
P7	Pin Header 1x02	1x	MLSS100-02	PS 25/2G WS	
P8,P9	Pin Header 2x04	1x	T821-1-08-S1		
Q1	BC547	1x	BC547A		
R1,R2	2K7	2x	AR05BTCW2701		
R7,R11	100K	2x	M0.4W-100K		
R19	270R	1x	M0.4W-270R		
R20	100R	1x	KNP05WS-100R		2118054
R21	1K	1x	M0.4W-1K		
R5,R6	560R	2x	M0.4W-560R		
RP1	10K	1x	DR10K-8/9		
RV1	POT	1x			
SW10	RESET	1x	TACT-67N-F		
U1	89C51ED2	1x	-	AT 89C51ED2 PLCC	1095726
U2,U3,U5	74HC04	3x	SN74HCT04N	74HCT 04	
U4	PCF8583	1x		PCF 8583 P	
U6	7805	1x	L7805ACV		
X1	22,1184 Mhz	1x	22.1184M-HC49- S		1842230
X2	32Khz	1x	26-HX5F-32.768K		1652573
IC socket	PLCC44	1x	PLCC-44		
IC socket	DIP14	3x	GOLD-14P		
IC socket	DIP8	1x			
P8 connector			T812-1-08		
P9 connector			T812-1-08		
P6 connector			T812-1-16		

Schematic:



Sheet: /
 File: 05/FL_tracker_diy by version 0N49C8
 Title: 05/FL_tracker_diy by version 0N49C8
 Size: 26
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 Date: 12 sep 2015
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