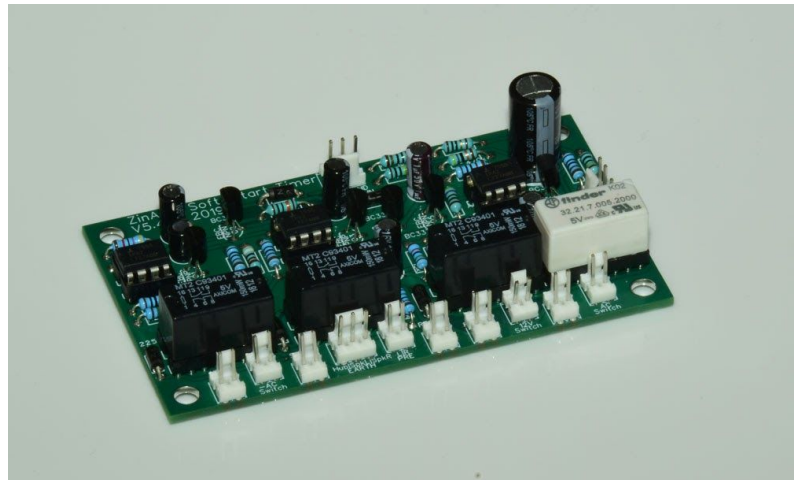


Application & Purpose:

Timer module to manage the order in which AC and DC voltages are switched on when the amplifier is switched on

This module is referred to as the Start-up Timer and Soft-start Timer - these terms are interchangeable.

This module also controls auto-power off and restart



Specification:

Voltage Input	7.5-7.9v DC
Max Current Load	200mA
Functions	<ul style="list-style-type: none"> - Soft-start - Auto-power-off - Auto-restart
Main devices	<ul style="list-style-type: none"> 4 x DPDT Relays 3 x 555 Timers

Details:

Soft Start Timer for controlling start-up routine and auto-power-off and restart. Soft-start refers to the act of switching on the AC supply to the main transformer before closing the DC circuit to power amplifiers. This minimises the effects of inrush current to the main transformer which can cause arcing and pitting of the main switch and control relays.

All ZinAmp power supplies have snubbers to minimise arcing, but soft start is still necessary to prolong the life of the timer relays.

Signal Detector

The signal detector module can be connected to the timer to provide an intermittent DC voltage that is a rectification of the input signal to the amplifier. This is stored in a capacitor and the auto-power off will trigger when this capacitor is empty.

Relays:

Four relays are fitted to the timer and can be replaced by pulling them out of their DIP/DIL sockets and reinserting replacements. Relays are a tried, tested and very effective way of controlling large electrical currents and isolating these from the music signal path. However, they do occasionally fail, but can be easily replaced in your ZinAmp without soldering or disassembly.

There are four relays. three are the same and one is different. One of the relays is of a higher current rating as it switches the main transformer on and off. See parts list for details. Do not mix these relays up! The high current relay inserts in the far right-hand DIP/DIL socket.

DIP/DIL sockets are also used for the three 555 timers - these can be replaced in the same way

NOTE: never solder a 555 timer or relay directly to the PCB. Always use a DIP/DIL socket; 16pin socket for relays, 8 pin socket for 555 timers.

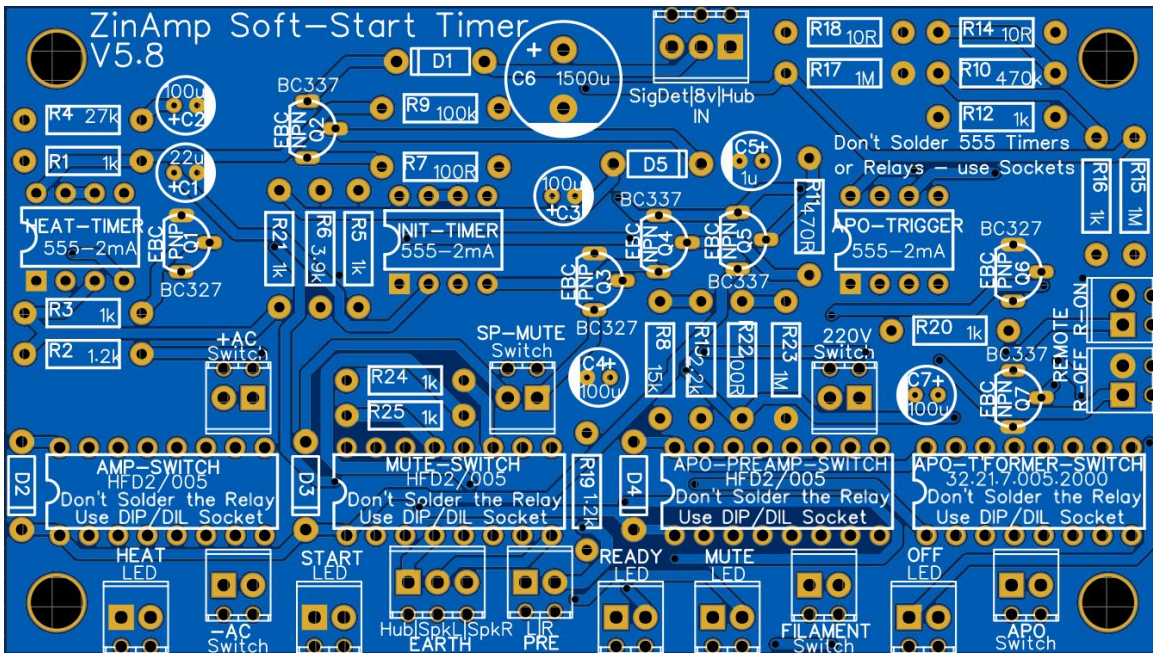
Installation and Safety:

The timer can be thought of as the 'brain' of the amplifier controlling its main electrical functions, in the same way as the control module in a washing machine controls water supply, drainage and drum rotation. Consequently, there are a number of connections to consider, some which carry high voltages and currents, so care must be taken to avoid electrical shock. There are no high voltage capacitors in this module, but the timer is connected to power supplies that do have large capacitors. Always disconnect the AC power cable and discharge all power supplies before removing or refitting any connections from or to the Start-up Timer module.

Connections:

- LEDs - Low voltage LEDs on the front panel of the amplifier - indicating amplifier status during start-up, auto-power-off and restart
- Speaker Earth - Used to mute the speakers during startup.
- Audio earth - to mute the pre-amp audio signal during start up
- AC Supply - switched connection for the AC supply to the main transformer - triggered during auto-power-off and restart
- DC Supply - switched connections for both high and low voltage supplies to the tube pre-amps - triggered during auto-power-off and restart

Bare PCB - Note Relay and Timer Positions - IC sockets are soldered into these footprints. Do not solder 555 timers and relays into the PCB. If they fail, they are easier to replace using sockets.



Parts List:

CONNECTORS: Both blank and ready-built PCB requires connectors be purchased and soldered on by the constructor. This is to give the constructor a choice of how they wire their own particular installation. Terminal block connectors are indicated in the list below in blue and can be swapped for equivalent 2.54mm pitch connectors e.g. Molex KK254 headers, which are provided to the constructor in self-wire kits.

Designator	Value/Spec	Footprint	Qty	Manufacturer	Manufacturer Part	RS Part No
R22L,R22R	1.5k	AXIAL-0.4	2	Vishay	MRS25000C1501FCT00	683-3219
C4L,C4R	1.5n	CAPACITOR_5MM_PINS	2	Wima	FKP2/1500/100/5	115-708
C11L,C11R	1.5u	CAP_POLY_WIDE_15MM	2	Panasonic	ECWFE2W155J	105-1071
L-LOW,R-LOW, L-HIGH,R-HIGH,L-ME D,R-MED	3 Row Jumper	JUMPER2	2	Harwin	M20-9980346	745-7046
R26R,R26L,R17R,R17L	100k	AXIAL-0.4	6	TE Connectivity	LR1F100K	125-1168
R26R,R26L,R17R,R17L	100k	AXIAL-0.4	2	TE Connectivity	LR1F100K	125-1168
C9L,C9R,C1L,C1R	220n	CAPACITOR_10MM_PINS -2	4	Panasonic	ECWFE2W224J	105-1073
C1	100n	CAPACITOR TH 5MM	1	Epcos	B32529C1104K007	896-1339
C2R,C2L	100p	CAPACITOR_5MM_PINS	4	Wima	FKP2/100/100/5	484-1978
R1,R12R,R12L,R23R, R23L,R1	100R	AXIAL-0.4	5	TE Connectivity	LR1F100R	125-1155

C34L,C3R	100u 16v	CAP_ELECTROLYTIC_D5 MM	2	Rubycon	16PK100MEFC5X 11	763-9396
R5.2L,R5.2R,R6L,R6 R	10k	AXIAL-0.4	4	TE Connectivity	LR1F10K	125-1164
R14L,R14R,R10L,R10R	15k	AXIAL-0.4	2	Vishay	MRS25000C1502F CT00	683-3055
R4R,R4L,R2R,R2L,R7 L,R7R,R21L,R21R,R2 4,R25	1k	AXIAL-0.4	10	Vishay	MRS25000C1001F CT00	683-3165
R25R,R25L	1M	AXIAL-0.4	2	Vishay	MRS25000C1004F CT00	683-4159
C7L,C7R	1u	CAP_POLY_WIDE_15M M	2	Panasonic	ECWFE2W105JA	105-1068
R9L,R9R	2.2k	AXIAL-0.4	2	Vishay	MRS25000C2201F CT00	683-3449
C6L,C6R	2.2n	CAPACITOR_5MM_PINS	2	Wima	FKP2/2200/100/5	115-714
R5.1L,R5.1R	20k	AXIAL-0.4	2	TE Connectivity	LR1F20K	125-1166
R3L,R3R	220k	AXIAL-0.4	2	TE Connectivity	LR1F220K	149-060
R13L,R13R,R19L,R1 9R	22k	AXIAL-0.4	6	TE Connectivity	LR1F22K	125-1167
R15L,R15R	39k	AXIAL-0.4	2	TE Connectivity	LR1F39K	148-871
C8R,C8L	470p	CAPACITOR_5MM_PINS	2	Wima	FKP2/470/100/5	484-2016
C1+,C1-	470u 25v	CAP-DIA_10MM,_5MM PIN-PIN	2	Nichicon	UVY1E471MPD	739-5285
C5L,C5R	47n	CAPACITOR_10MM_PIN S_-2	2	Kemet	R71VF24704030K	171-9182
D4L,D2L,D3L,D1L,D4R ,D2R,D3R,D1R	5.1v	DO-204	8	Nexpera	BZX79-B5V1,113	508-359
R24L,R24R	56R	AXIAL-0.4	2	Vishay	MRS25000C5609F CT00	683-4203
R8L,R8R,R18R,R16L,R 16R,R18L	8.2k	AXIAL-0.4	2	TE Connectivity	LR1F8K2	148-714
R11L,R11R	82R	AXIAL-0.4	2	Vishay	MBB02070C8209 FCT00	506-4784
R-OUT, DC-IN,L-OUT	3 Pole Terminal (self-wire only)	TERMINALBLOCK_PHEO NIX_MPT-2.54MM_3PO L	3	RS-PRO	790-1092	790-1092
EXT-R,EXT-L	2 Pole Terminal (self-wire only)	TERMINALBLOCK_PHEO NIX_MPT-2.54MM_2PO L	4	RS-PRO	790-1098	790-1098
Q1L,Q7R,Q3L,Q4L,Q 1R,Q4R,Q3R,Q5L,Q 5R,Q7L	BC327	TO-92_LEG	10	On Semi	BC32716BU	761-9819
Q2L,Q2R,Q6L,Q6R	BC337	TO-92_LEG	4	On Semi	BC33740BU	761-3943
R-EQ,L-EQ,A-IN	4 Pole Terminal (self-wire only)	TERMINALBLOCK_PHEO NIX_MPT-2.54MM_4PO L	3	RS-PRO	790-1102	790-1102

L,R	Shorting Link	Jumper2	2	RS-PRO	251-8575	251-8575
K1	5v 3A DPDT Relay	HFD3/24V	1	Hongfa	HFD2/024-S-D	176-2943
R7,R22	100R	AXIAL-0.4	2	TE Connectivity	LR1F100R	125-1155
R11	470R	AXIAL-0.4	1	TE Connectivity	LR1F470R	125-1158
R9	100k	AXIAL-0.4	1	TE Connectivity	LR1F100K	125-1168
R4	27k	AXIAL-0.4	1	TE Connectivity	LR1F27K	148-837
R10	470k	AXIAL-0.4	1	TE Connectivity	LR1F470K	149-149
APO-T'FORMER-SWITCH	SPDT-6A-5v	DIP-16	1	Finder	32.21.7.005.2000	492-6625
AMP-SWITCH,MUTE-SWITCH,APO-PREAMP-SWITCH	5v 3A DPDT Relay	HFD3/24V	3	Hongfa	HFD2/005-S-D	176-2891
D2,D3,D4,D1,D5	50v 1A	DO-204	5	Vishay	1N4001-E3/54	628-8931
HEAT-TIMER,APO-TRIGGER,INIT-TIMER	8 Pin DIP Socket	DIP-8	3	Assman	A 08-LC-TT	674-2435
R8	15k	AXIAL-0.4	1	Vishay	MRS25000C1502FCT00	683-3055
R1,R16,R5,R12,R3,R20,R21	1k	AXIAL-0.4	7	Vishay	MRS25000C1001FCT00	683-3165
R2,R19	1.2k	AXIAL-0.4	2	Vishay	MRS25000C1201FCT00	683-3187
R13	2.2k	AXIAL-0.4	1	Vishay	MRS25000C2201FCT00	683-3449
R6	3.9k	AXIAL-0.4	1	Vishay	MRS25000C3901FCT00	683-3641
R17,R23,R15	1M	AXIAL-0.4	3	Vishay	MRS25000C1004FCT00	683-4159
C1	22u 16v	CAP_ELECTROLYTIC_D5 MM	1	Nichicon	UPW1C220MDD	715-2524
C6	1500u	CAP-DIA_10MM,_5MM PIN-PIN	1	Nichicon	UPW1C152MHD	715-2580
Q4,Q5,Q7,Q2	BC337	TO-92_LEG	4	On Semi	BC33740BU	761-3943
Q6,Q1,Q3	BC327	TO-92_LEG	3	On Semi	BC32716BU	761-9819
C2,C3,C4,C7	100u 16v	CAP_ELECTROLYTIC_D5 MM	4	Rubycon	16PK100MEFC5X11	763-9396
START,MUTE,HEAT,READY,220V,FILAMENT,SP-MUTE,APO,-AC,+AC,PRE,R-ON,R-OFF,OFF	2 Pole Terminal (self-wire only)	TERMINALBLOCK_PHEONIX_MPT-2.54MM_2POL	14	RS-PRO	790-1098	790-1098
IN,EARTH	3 Pole Terminal (self-wire only)	TERMINALBLOCK_PHEONIX_MPT-2.54MM_3POL	2	RS-PRO	790-1092	790-1092
AMP-SWITCH,MUTE-SWITCH,,APO-PREAMP-SWITCH,APO-T'FORMER-SWITCH	16 Pin DIP Socket	DIP-16	4	Winslow	W30516TRC	813-137

AMP-SWITCH,MUTE-SWITCH,APO-PREAMP-SWITCH	5v 3A DPDT Relay	HFD3/24V	3	Hongfa	HFD2/005-S-D	176-2891
APO-T'FORMER-SWITCH	SPDT-6A-5v	DIP-16	1	Finder	32.21.7.005.2000	492-6625
C5	1u 50v	CAP_ELECTROLYTIC_D5 MM	1	Wuth	860010672005	839-7046
HEAT-TIMER,APO-TRIGGER,INIT-TIMER	555-2mA		3	Renesas	ICM7555IPAZ	921-5374

Parts available from [RS Online](#). Also try [Farnell](#), [Mouser](#) and other online suppliers.

Parts from different manufacturers can be substituted where spec is sufficient

Supplier trading names may differ by country.