



**FEATURES
CELESTION
SPEAKERS**

Congratulations on your purchase of the MTS3200 all tube amplifier. Carvin has been building tube guitar amplifiers since 1949. They have been used by top professionals like; Frank Zappa, Steve Vai, Craig Chaquico, Allan Holdsworth, Larry Carlton, Chet Atkins and other great musicians. You will discover that these amplifiers represent a significant sound improvement over conventional tube amplifiers. Spend time with your new MTS3200 head or your MTS3212 combo and get to know it's many sounds.

TECHNICAL DESIGN OF THE MTS3200

The MTS3200 design criteria was to build an all-tube guitar amp that sounded better than anything else on the market. This meant that the MTS3200 was going to be totally new from the ground up and that it was going to be an all tube design with no IC's or transistors.

HIGH IMPEDANCE GUITAR INPUT

Carvin has long known about the effects of miss-loading a guitar pickup which can cause high frequency loss. The MTS3200 guards against this loss with its ultra high input impedance. Also, we considered the capacitance of the average shielded guitar cable which can reduce the high frequency response of your guitar pickups. Unlike other amplifiers, we purposely avoided adding capacitance anywhere in the preamp to control high frequency oscillations. Instead, we controlled oscillations through careful component layout and lead placement allowing its shimmering highs to be reproduced.

CLEAN AND OVERDRIVE CHANNELS

The equalization of the clean and overdrive channel is designed to offer clarity to your instrument. Special mud-cutting circuits eliminate the unwanted sounds in the 500 to 700 Hz range which normally take away the tone definition of your instrument. You will also take notice of the clean channels PRESENCE switch which adds acoustic voicing to your instrument. This switch boosts only the guitars very highest harmonics which are in the 10k Hz range instead of the normal 3K Hz of a bright switch. The PRESENCE control on the lead channel is designed to adjust the "edge" on your sound. It's dynamic range allows for super-smooth sounds or an edge for

RECEIVING INSPECTION—read before getting started

INSPECT YOUR AMP FOR ANY DAMAGE which may have occurred during shipping. If any damage is found, please notify the shipping company and CARVIN immediately.

SAVE THE CARTON & ALL PACKING MATERIALS. In the event you have to re-ship your unit, always use the original carton and packing material. This will provide the best possible protection during shipment. CARVIN and the shipping company are not liable for any damage caused by improper packing.

SAVE YOUR INVOICE. It will be required for warranty service if needed in the future.

SHIPMENT SHORTAGE. If you find items missing, they may have been shipped separately. Please allow several days for the rest of your order to arrive before inquiring.

RECORD THE SERIAL NUMBER on the enclosed warranty card or below on this manual for your records. Keep your portion of the card and return the portion with your name and comments to us.

your lead channel to reach out.

DYNAMIC 5881 POWER TUBES

Your amp is equipped with 5881 power tubes because of their smooth distortion, responsive sound and reliability. The compression characteristics of these "soft clip" power tubes respond to the dynamic range of lead guitar playing. These tubes react even to the most subtle touch—if you play soft, the tubes remain clean and if you increase your attack they respond accordingly.

TONE CONTROLS

The T-Bridge passive BASS, MID and TREBLE tone controls offer a wide range of tone settings. Take full advantage by setting them where they sound best. Your sound may not be at center 5 on the dial. These controls will not affect or color your sound when set at extreme settings, nor do they interact with each other. The greater range of these controls comes from the high impedance 1 meg sealed pots (most guitar amps use 250k pots). The frequency of the bass control is set at 80 Hz while the mid control is set at 650 Hz. The treble control is set at a very high 11k Hz giving the MTS3200 it's dynamic highs.

REVERB

The FS22 footswitch for the long tailed REVERB system in the MTS3200 switches only the reverb "send" leaving the tail of the reverb to decay naturally, the way it's done in the studio. A special pre filter eliminates the spring "boing" normally heard in other systems giving it a "lush" sound. The all tube reverb system offers vibrant clarity with full depth reminiscent of the sixties tube amps. Guitar Player magazine rated this system as one of the best they have heard.

MODEL MTS3200 HEAD SPECS:

RMS Power: 50 or 100 watts
Output Impedance: 4, 8 & 16Ω
Input Impedance: 100,000 ohms
Tone Controls: BASS: 80Hz
 MID: 600-700Hz
 TREBLE: 11k Hz
Both Channels: 1mV for clipping
Ch 1 Sensitivity: 16mV for full output
Ch 2 Sensitivity: 2—switching
Channels: 1.5 VAC @ 100 watts RMS
Voiced Line Out: 5—12AX7's (dual stage)
Preamp Tubes: 4—5881's (power pentode)
Power Amp Tubes: 120VAC, 300VA
 3A 250V slow blow, 5 x 20mm
USA Model: 230VAC, 300VA
Export Model: 1.5A 250V slow blow, 5 x 20mm
Export Fuse: 24.25W x 10.5H x 9.5"D
Cabinet Size: 7-ply poplar wood
Cabinet: 35 lbs
Net Weight: One Year
Warranty: CV3200 cover, FS22 footswitch
Options:

MODEL MTS3212 COMBO SPECS:

Speakers: 2 Celestion G12T-75 speakers
RMS Power: 50 or 100 watts
Output Impedance: 4, 8 & 16Ω
Input Impedance: 100,000 ohms
Tone Controls: BASS: 80Hz
 MID: 600-700Hz
 TREBLE: 11k Hz
Both Channels: 1mV for clipping
Ch 1 Sensitivity: 16mV for full output
Ch 2 Sensitivity: 2—switching
Channels: 1.5 VAC @ 100 watts RMS
Voiced Line Out: 5—12AX7's (dual stage)
Preamp Tubes: 4—5881's (power pentode)
Power Amp Tubes: 120VAC, 300VA
 3A 250V slow blow, 5 x 20mm
USA Model: 230VAC, 300VA
Export Model: 1.5A 250V slow blow, 5 x 20mm
Export Fuse: 26W x 10.25D x 17.5"H
Cabinet Size: 7-ply poplar wood
Cabinet: 55 lbs
Net Weight: One Year
Warranty: CV3212 cover, FS22 footswitch
Options:

For your records, you may wish to record the following information.

Serial No. _____ Invoice Date _____



MTS3200 FRONT & REAR PANEL CONTROLS

GETTING STARTED QUICKLY

If you are like most players, you probably want to plug in your new amp and get started playing it right away. You can read the rest of the manual later to learn the finer points of operating your amp. In order to get started you will need your MTS3200 amp, a 120 or 230 AC grounded power outlet, your instrument and a standard guitar cord. With the amp turned off, you may now plug it into the proper AC voltage.

Now turn all the volume and drive controls off and set tone controls at their mid center position. If you have purchased the FS22 foot switch, plug it into the rear foot switch jack for switching the channels and reverb. Note: The channel SELECT button must be in the OUT position (CH 1) for the FS22 to function (a hum will be heard if it's in the wrong position).

Now, turn the power switch and standby switch ON. Allow 60 seconds for the tubes to warm up. Gradually raise the volume controls and re-adjust the tone controls and your ready to go. The brass knobs can feel hot after the amp has been on awhile. This is normal because brass conducts heat while plastic does not. This will not cause a problem for the controls. Please call if you feel your amp is malfunctioning. Occasionally tubes are damaged in shipping.

FRONT PANEL

1. GUITAR INPUT

A standard 1/4" input jack feeds both channels through using the SELECT switch. Use a professional quality guitar cord no longer than 25 feet. Typical cable capacitance should be under 50pf—the longer the cord, the greater the capacitance (you can measure this with a capacitance meter). A long cable with high capacitance will reduce the overall treble response from your pickups.

2. CHANNEL SELECT

Set the channel SELECT switch to the desired channel. The LED's next to the volume controls will let you see what channel is functioning. Use channel 2 for clean playing. Use channel 1 for overdrive/sustain. For the FS22 foot switch to function, set the channel SELECT to the "OUT" channel 1 position.

LEAD CHANNEL 1

3. LEAD CHANNEL INDICATOR

The red LED will illuminate when the LEAD channel is selected.

4. LEAD VOLUME

The volume of the lead channel is to be used as a master level control. For partial clean output, set the VOLUME control to 10 and turn the DRIVE nearly off—under 1. By reducing the guitar volume, you can use this channel as an alternate clean channel.

5. LEAD DRIVE

For mild tube saturation, set the DRIVE control between 1 & 2. For some of the best saturation, set the control between 4 & 6. For full blown overdrive, set the control between 6 and 10 (your guitar volume should be turned all the way up). Because the MTS3200 has been "Hot Rodded" with so much gain in the DRIVE control, you will have an abundance of guitar feedback. However, if feedback is a problem, reduce the amount

of DRIVE or move the guitar to the side or away from the speaker(s).

6. LEAD—BASS, MID & TREBLE

To start off with, set the BASS, MID & TREBLE controls at their center (5) position. These controls are to be set according to the type of pickups used (dual or single coil). It's normal to decrease the BASS at higher playing levels. Try the PRESENCE control also when adjusting the treble.

7. LEAD PRESENCE

Channel 1 features it's own LEAD PRESENCE control for added clarity. It's frequency range is set at the mid range of the tonal spectrum. Careful adjustment with the TREBLE control will make this feature very useful.

CLEAN CHANNEL 2

8. CLEAN CHANNEL INDICATOR

The red LED will illuminate when the CLEAN channel is selected.

9. CLEAN VOLUME

Channel switching from the Lead channel into Channel 2 gives you crisp, clean playing. Thanks to special mud-cutting circuits that work between the frequencies of 500 and 700 Hz, your guitar tones will be full and vibrant.

10. CLEAN PRESENCE

For added clarity, the CH 2 PRESENCE switch increases only the highest guitar harmonics in the 8-10k Hz range which is ideal for acoustic guitars. A normal bright switch works only in the 3k Hz range leaving your sound somewhat flat. Single or dual coil pickups will determine the need for this switch.

11. CLEAN—BASS, MID & TREBLE CONTROLS

You can start at 5 on the dial for each of the tone controls. However, these settings do not represent a normalize (flat) sound. You need to set them where they sound best! Most musicians like to reduce the MID'S between 1 and 4 for deeper bass and crisper highs. If your sound is too bright with single coil pickups, you may want to keep the PRESENCE switch off.

MASTER SECTION

12. MASTER REVERB

Set the REVERB control for the desired amount (this works in both channels).

13. STANDBY SWITCH

Use the STANDBY SWITCH if you are taking a break. This turns the high voltage off, increasing the life of your power tubes while keeping the power and preamp tube filaments on for immediate use.

14. POWER SWITCH & INDICATOR

The power switch is to be utilized as the master ON/OFF switch. As the amp is turned on, the RED portion of the power switch will illuminate as your ON indicator.

MTS3200 Head as shown
MTS3212 Combo front & rear panels reversed



REAR PANEL

15. SPEAKER JACKS

Two 1/4" SPEAKER JACKS are featured to operate several speaker systems at the same time. Calculate the total speaker impedance based on parallel wiring as both speaker jacks are wired in parallel. Select the IMPEDANCE SWITCH for the correct impedance.

16. SPEAKER IMPEDANCE SWITCH

The IMPEDANCE SWITCH offers the selection of 4, 8 or 16 ohms to match your speaker system. The correct setting for two 16Ω speakers or cabinets would be 8 ohms. Select the proper impedance. The impedance of the MTS3212 combo amp is 8 ohms. In the case of adding another 8 ohm extension cabinet, keep the switch at 4 ohms.

17. 4 TUBE 100 WATT OR 2 TUBE 50 WATT OPERATION

For maximum output power, be sure the power tube selector switch is selected for 4 TUBE operation. For lower overall levels and early power amp clipping, move this switch to the 2 TUBE operation. The volume reduction will only be 3 dB.

18. POWER TUBE BIAS SWITCH

If you desire to change from 5881 (6L6GC) to EL34 power tubes, you may do so by selecting the external BIAS switch to the EL34 position on the rear panel. Be sure that this switch is selected to the proper position or excessive heat will damage your tubes.

The internal P11 bias trim control can be set by a qualified technician. To set the bias, measure the current across the terminals of the STAND BY switch (set this switch to the off position when the amp is on). Set the idle current to 100 mA for all tube types.

19. VOICED LINE OUT

The LINE OUT 1/4" jack is "CABINET VOICED" to prevent excessive bass or highs going to your mixer. This greatly aids in sound quality because you do not have to move your mixer EQ setting to the extreme. The 1.5 VAC output (reference to 100 watts output at 8 ohms) is more than adequate to drive any professional mixer or power amp.

20. FS22 FOOTSWITCH

Most foot pedals with 2 switches, a stereo cord and plug will work. However, Carvin's FS22 is recommended because of the correct identification label on the foot switch. First, the channel SELECT switch on the front panel must be selected to the "OUT" channel 1 position before the footswitch will work. Now that you are connected correctly, the channels and reverb can be switched remotely. If a hum is heard in the speakers, the select switch is in the wrong position (this will not harm the amp).

21. EFFECTS LOOP

For the lowest possible noise from an effects processor, use the effects loop instead of plugging the guitar into the effects and then into the amp. To use the EFFECTS LOOP, plug the INPUT of your effects into the SEND jack and the OUTPUT of your effects into the RETURN jack. Use shielded cables, not speaker cables. It's normal to have a slight gain reduction of several dB with some effects units. However, the amp has plenty of gain to overcome any loss.

22. AC POWER & FUSE

The detachable AC POWER CORD supplied is designed to operate with one type of voltage (the European 230V export model uses a CEE-7 plug cord set). Check the rear power cord label for the proper voltage and fuse value. Make sure the cord is securely inserted into the back of the unit. Plug the cord into a grounded "3" prong" power source. No attempt should ever be made to defeat or use the amp without the ground connected.

The FUSE (some models have circuit breakers) is located within the AC power cord receptacle. To check or replace the fuse, remove the power cord, place a screwdriver under the "FUSE" cap and pull the fuse holder out. The fuse type is a 250V Slow Blow SB 5 x 20mm rated at 3A for 120V & 1.5A for 230V models. Do not use fast acting fuse, only a SLOW BLOW (SB) type fuse will work.

HELP SECTION

a) FEEDBACK FROM THE LEAD CHANNEL

The MTS3200 will feedback when the LEAD volume, DRIVE, TREBLE and PRESENCE are turned all the way up. Like other highly modified tube amps, this is normal. To help reduce feedback and noise, keep the DRIVE control set around 5 to 7 on the dial. Some of the best lead saturation will be at around 5—not 10. Sometimes replacing V1 (12AX7A) can help reduce feedback.

b) TUBE REPLACEMENT GUIDE

It is not uncommon for tubes to malfunction during shipping. If your amp is not working properly, please call or refer to the following replacement guide.

- 1) The 12AX7A preamp tubes are located in the following order on your chassis: V1, V2, V3, V4, V5. To start with, V1 is located next to the outside of your chassis behind the output transformer. It is recommended to turn your amp upside down to replace tubes. Replacing V1 will help reduce feedback in channel 1. Replacing V2 and V3 can also help but V1 is the main tube to replace. Replacing V4 will correct problems with the reverb system unless there is a defective reverb tank or tank cables. If the power amp is not functioning, check or replace the 5881 power tubes and check V5 by inserting a signal into the Effects RETURN jack. All tubes are keyed in the same direction.
- 2) The 5881 power tubes are located in the following order on your chassis: V6, V7, V8, V9. Normally you'll want to replace these tubes as a set. Please call for our latest prices. Sometimes you can spot defective power tubes when they are glowing red-hot along with an audible hum in the speaker when the amp is idling. If this happens, shut the amp down immediately. After they have cooled down, remove by pushing the retainers on the base of the tubes down and rock the tubes in a circular motion while pulling them out. It is recommended to turn your amp upside down to replace tubes. All tubes are keyed in the same direction. Running defective power tubes could damage the amp. It is recommended that you have a spare set of power tubes along with several 12AX7A preamp tubes.



Guitarist Magazine, England

MTS3212 Combo Review—By Simon Bradley

"Actually, the MTS3212 is a more versatile beast than I at first assumed, because, in the process of turning the drive control all the way up, there are some excellent crunch tones along the way.

Maybe it's the British Series (BR12) speakers, or the simple fact that the amp bristles with glowing tubes of loveliness, but these mid-driven sounds are of that responsive type that you just can't beat. It's warm, of course, but vibrant enough to cut through, and the tone's dynamic qualities would seem to offer musical assistance to all but the most colourless of blues players.

However, I would argue that it's at high gains that this Carvin comes into its own. In this situation, it's one of the most satisfying amps I have played in a long time. EVH was once quoted as saying that you know when you have a good sound when the guitar seems to play itself, and if Sir Edward of Van plugged into this combo, he would be more than happy with the brown-ness of the tone.

High octane rock sounds? No problem. Is mid-scooped thrash of angst-core your bag? Just step this way, Sir. The EQ is simple because it has no reason to be anything else, such is the efficiency of both the amp section and speakers to kick out a tone full of balsy clout and high end shimmer. Putting it through a 2 x 12 extension cab merely enhances the tone further.

Just when you thought it was safe to think 'so...it's like a Peavey 5150' (yes, the overdrives really are that good), a flick to Clean 2 will see you reaching for a Strat and switching to position 4. An amp's clean sound is, if anything, a more subjective affair than its dirty compadre, but I would say that the MTS3212 has the best clean sound I've ever heard from a 100w combo. Others might prefer a black-faced Fender Twin or even a Roland JC120, but the bass end available here is nothing short of incredible. It has the potential to turn the sound of a single coil solid into something akin to that of a monstrous f-hole jazz beast (should you so desire). Those in-betweeny Strat tones are well served, as is the neck position of a Gibson ES335, and the fact that the combo can handle such diverse sounds with equal aplomb is a major feat.

Conclusion

Whatever styles of music you play, I have a feeling that you may well be blown away by this Carvin. The price tag represents excellent value, and it could give other amplifiers costing twice as much a serious run for their money."



This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



IMPORTANT! FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:

WATER AND MOISTURE: Appliance should not be used near water (near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

POWER SOURCES: The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

GROUNDING OR POLARIZATION: Precautions should be taken so that the grounding or polarization means of an appliance is not defeated.

POWER CORD PROTECTION: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

SERVICING: The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

FUSING: If your unit is equipped with a fuse receptacle, replace only with the same type fuse. Refer to replacement text on the unit for correct fuse type.

SAFETY INSTRUCTIONS (EUROPEAN)

The conductors in the AC power cord are colored in accordance with the following code.

GREEN & YELLOW—Earth BLUE—Neutral BROWN—Live

U.K. MAIN PLUG WARNING: A molded main plug that has been cut off from the cord is unsafe. NEVER UNDER ANY CIRCUMSTANCES SHOULD YOU INSERT A DAMAGED OR CUT MAIN PLUG INTO A POWER SOCKET.

LIMITED WARRANTY

Your Carvin product is guaranteed against failure for ONE YEAR unless otherwise stated. Vacuum tubes are guaranteed for 90 days. Carvin will service and supply all parts at no charge to the customer providing the unit is under warranty. Shipping costs are the responsibility of the customer. CARVIN DOES NOT PAY FOR PARTS OR SERVICING OTHER THAN OUR OWN. A COPY OF THE ORIGINAL INVOICE IS REQUIRED TO VERIFY YOUR WARRANTY. Carvin assumes no responsibility for horn drivers or speakers damaged by this unit. This warranty does not cover, and no liability is assumed, for damage due to: natural disasters, accidents, abuse, loss of parts, lack of reasonable care, incorrect use, or failure to follow instructions. This warranty is in lieu of all other warranties, expressed or implied. No representative or person is authorized to represent or assume for Carvin any liability in connection with the sale or servicing of Carvin products. CARVIN SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

When RETURNING merchandise to the factory, you may call for a return authorization number. Describe in writing each problem. If your unit is out of warranty, you will be charged the current FLAT RATE for parts and labor to bring your unit up to factory specifications.

HELP SECTION

1) AMP WILL NOT TURN ON

Check the power to the amp. Check for tripped circuit breakers, unplugged extension cords or power-strip switches that may be turned off. Check the fuse. If a dark brownish color or no wire can be seen within the glass tube, then replace. The amp may be perfectly fine but occasionally a fuse may blow because of high AC voltage surges. After the fuse has been replaced with the proper Slow Blow value and if the fuse fails again, the amp will require servicing.

2) NO OUTPUT with POWER LIGHT ON

Tubes damaged in shipping will be the primary reason for your amp to not function properly. Please give us a call to help guide you through this simple repair.

3) KEEP YOUR AMP LOOKING NEW

Use a damp cloth to wipe the controls on the front & rear chassis panels. Wipe the black vinyl covering with a damp cloth.

REPLACEMENT PARTS LIST (for circuit cards)

Ref. No.	Carvin P/N	Description	Part No.	Description	Part No.	Description	Part No.	Description			
B1	Jumper, 0.35", 0Ω		C37	Capacitor, Poly, 0.01μF 100V, 10%	46-10312	Regulator, 7805 +5V, 1A	60-78050	R33	Resistor, 220Ω, .35 prep., 5% Carbon	50-22025	
B2	Jumper, 0.50", 0Ω		C38	Capacitor, Electrolytic, 10μF 50V, 20%	47-10051	Q1	Spade Terminal, QC Vertical, 0.205	06-40045	R34	Resistor, 47K 1W, 0.8 prep., 5% Carbon	50-47045
B3	Jumper, 0.35", 0Ω		C39	Capacitor, Poly, 0.001μF 400V, 10%	46-10242	Q2	Spade Terminal, QC Vertical, 0.205	06-40045	R35	Resistor, 2.2M, .35 prep., 5% Carbon	50-22065
B4	Jumper, 0.35", 0Ω		C40	Capacitor, Poly, 0.047μF 100V, 10%	46-47312	Q3	Spade Terminal, QC Vertical, 0.205	06-40045	R36	Resistor, 220K, .35 prep., 5% Carbon	50-22055
B5	Jumper, 0.35", 0Ω		C41	Capacitor, Ceramic, 27PF 500V, 5%	45-27052	Q4	Spade Terminal, QC Vertical, 0.205	06-40045	R37	Resistor, 1.5K, .35 prep., 5% Carbon	50-15035
B6	Jumper, 0.50", 0Ω		C42	Capacitor, Mylar, 0.047μF 400V, 10%	41-47342	Q5	Spade Terminal, QC Vertical, 0.250	06-40050	R38	Resistor, 220K 5W, 0.5 prep., 5% Carbon	52-22055
B7	Jumper, 0.50", 0Ω		C43	Capacitor, Mylar, 0.047μF 400V, 10%	41-47342	Q6	Spade Terminal, QC Vertical, 0.250	06-40050	R39	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B8	Jumper, 0.50", 0Ω		C44	Capacitor, Electrolytic, 47μF 63V, 20%	47-47061	Q7	Spade Terminal, QC Vertical, 0.250	06-40050	R40	Resistor, 1.0M, .35 prep., 5% Carbon	50-10065
B9	Jumper, 0.8", 0Ω		C45	Capacitor, Mylar, 0.047μF 630V, 10%	46-47362	Q8	Spade Terminal, QC Vertical, 0.250	06-40050	R41	Resistor, 1.5K, .35 prep., 5% Carbon	50-15035
B10	Jumper, 0.35", 0Ω		C46	Capacitor, Ceramic, 10PF 500V, 5%	45-10052	Q9	Spade Terminal, QC Vertical, 0.250	06-40050	R42	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B11	Jumper, 0.8", 0Ω		C47	Capacitor, Electrolytic, 1000μF 25V, 20%	47-10225	Q10	Spade Terminal, QC Vertical, 0.250	06-40050	R43	Resistor, 22K, .35 prep., 5% Carbon	50-22045
B12	Jumper, 0.35", 0Ω		C48	Capacitor, Electrolytic, 22μF 500V, 20%	42-22052	Q11	Spade Terminal, QC Vertical, 0.250	06-40050	R44	Resistor, 22K, .35 prep., 5% Carbon	50-22045
B13	Jumper, 0.35", 0Ω		C49	Capacitor, Electrolytic, 22μF 500V, 20%	42-22052	Q12	Spade Terminal, QC Vertical, 0.250	06-40050	R45	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B14	Jumper, 0.35", 0Ω		C50	Capacitor, Electrolytic, 22μF 500V, 20%	42-22052	Q13	Spade Terminal, QC Vertical, 0.250	06-40050	R46	Resistor, 560Ω, .35 prep., 5% Carbon	50-56025
B15	Jumper, 0.50", 0Ω		C51	Capacitor, Electrolytic, 22μF 500V, 20%	42-22052	Q14	Spade Terminal, QC Vertical, 0.250	06-40050	R47	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B16	Jumper, 0.8", 0Ω		C52	Capacitor, Electrolytic, 22μF 500V, 20%	42-22052	Q15	Spade Terminal, QC Vertical, 0.250	06-40050	R48	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B17	Jumper, 0.50", 0Ω		C53	Capacitor, Mylar, 0.047μF 630V, 10%	46-47362	Q16	Spade Terminal, QC Vertical, 0.250	06-40050	R49	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B18	Jumper, 0.35", 0Ω		C54	Capacitor, Electrolytic, 2200μF 6.3V, 20%	47-22260	Q17	Spade Terminal, QC Vertical, 0.250	06-40050	R50	Resistor, 220K, .35 prep., 5% Carbon	52-22055
B19	Jumper, 0.8", 0Ω		C55	Capacitor, Electrolytic, 22μF 500V, 20%	42-22052	Q18	Spade Terminal, QC Vertical, 0.250	06-40050	R51	Resistor, 220K, .35 prep., 5% Carbon	50-22055
B20	Jumper, 0.35", 0Ω		C56	Capacitor, Ceramic, 180PF 500V, 5%	45-18152	Q19	Spade Terminal, QC Vertical, 0.250	06-40050	R52	Resistor, 220K, .35 prep., 5% Carbon	50-22055
B21	Jumper, 0.8", 0Ω		C57	Capacitor, Poly, 0.0047μF 100V, 10%	46-47212	Q20	Spade Terminal, QC 90° Horizontal, 0.250	06-40060	R53	Resistor, 22K, .35 prep., 5% Carbon	50-22045
B22	Jumper, 0.50", 0Ω		D1	Diode, 1N4745A 16V, 1W	60-47450	Q21	Spade Terminal, QC 90° Horizontal, 0.250	06-40060	R54	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B23	Jumper, 0.8", 0Ω		D2	Diode, 1N4745A 16V, 1W	60-47450	Q22	Spade Terminal, QC 90° Horizontal, 0.250	06-40060	R55	Resistor, 4.7K 1W, 0.8 prep., 5% Carbon	53-47035
B24	Jumper, 0.50", 0Ω		D3	Diode, 1N4745A 16V, 1W	60-47450	Q23	Spade Terminal, QC 90° Horizontal, 0.250	06-40060	R56	Resistor, 2.2K 1W, 0.8 prep., 5% Carbon	53-22035
B25	Jumper, 0.50", 0Ω		D4	Diode, 1N4745A 16V, 1W	60-47450	Q24	Spade Terminal, QC Vertical, 0.250	06-40050	R57	Resistor, 350Ω 10W SDOF Sand Bar, 10%	56-35010
B26	Jumper, 0.8", 0Ω		D5	Diode, 1N4003, 1A 200V	60-40030	Q25	Spade Terminal, QC Vertical, 0.250	06-40050	R58	Resistor, 0.56K, .35 prep., 5% Carbon	50-05605
B27	Jumper, 0.35", 0Ω		D6	Diode, 1N4007A 1000V, 1A	60-10000	Q26	Spade Terminal, QC Vertical, 0.250	06-40050	R59	Resistor, 0.56K, .35 prep., 5% Carbon	50-05605
B28	Jumper, 0.35", 0Ω		D7	Diode, 1N4007A 1000V, 1A	60-10000	Q27	Spade Terminal, QC Vertical, 0.250	06-40050	R60	Resistor, 0.56K, .35 prep., 5% Carbon	50-05605
B29	Jumper, 0.35", 0Ω		D8	Diode, 1N4007A 1000V, 1A	60-10000	Q28	Spade Terminal, QC Vertical, 0.250	06-40050	R61	Resistor, 100K, .35 prep., 5% Carbon	50-10055
B30	Jumper, 0.35", 0Ω		D9	Diode, 1N4007A 1000V, 1A	60-10000	Q29	Spade Terminal, QC Vertical, 0.250	06-40050	R62	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B31	Jumper, 0.35", 0Ω		D10	Diode, 1N4007A 1000V, 1A	60-10000	Q30	Spade Terminal, QC Vertical, 0.250	06-40050	R63	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B32	Jumper, 0.35", 0Ω		D11	Diode, 1N4007A 1000V, 1A	60-10000	Q31	Spade Terminal, QC Vertical, 0.250	06-40050	R64	Resistor, 350Ω 5W SDOF Sand Bar, 5%	56-35025
B33	Jumper, 0.35", 0Ω		D12	Diode, 1N4007A 1000V, 1A	60-10000	Q32	Spade Terminal, QC Vertical, 0.250	06-40050	R65	Resistor, 350Ω 5W SDOF Sand Bar, 5%	56-35025
B34	Jumper, 0.35", 0Ω		D13	Diode, 1N4007A 1000V, 1A	60-10000	Q33	Spade Terminal, QC Vertical, 0.250	06-40050	R66	Resistor, 350Ω 5W SDOF Sand Bar, 5%	56-35025
B35	Jumper, 0.50", 0Ω		D14	Diode, 1N4007A 1000V, 1A	60-10000	Q34	Spade Terminal, QC Vertical, 0.250	06-40050	R67	Resistor, 350Ω 5W SDOF Sand Bar, 5%	56-35025
B36	Jumper, 0.50", 0Ω		D15	Diode, 1N4007A 1000V, 1A	60-10000	Q35	Spade Terminal, QC Vertical, 0.250	06-40050	R68	Resistor, 100Ω, .35 prep., 5% Carbon	50-10025
B37	Jumper, 0.50", 0Ω		D16	Diode, 1N4007A 1000V, 1A	60-10000	Q36	Spade Terminal, QC Vertical, 0.250	06-40050	R69	Resistor, 100Ω, .35 prep., 5% Carbon	50-10025
B38	Jumper, 0.50", 0Ω		D17	LED, Red small, 3mm T-1.0	60-75320	Q37	Spade Terminal, QC Vertical, 0.250	06-40050	R70	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B39	Jumper, 0.50", 0Ω		D18	LED, Red small, 3mm T-1.0	60-75320	Q38	Spade Terminal, QC Vertical, 0.250	06-40050	R71	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B40	Jumper, 0.50", 0Ω		D19	Fuse Clips, (1 pair)	23-03529	Q39	Spade Terminal, QC 90° Horizontal, 0.250	06-40060	R72	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B41	Capacitor, Electrolytic, 10μF 50V, 20%	47-10051	H1A	Conn. Header, 4 Pin Vert, 2.5mm	23-11004	Q40	Spade Terminal, QC 90° Horizontal, 0.250	06-40060	R73	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B42	Capacitor, Mylar, 0.047μF 400V, 10%	41-47342	H1B	Conn. Header, 4 Pin Vert, 2.5mm	23-11004	R1	Resistor, 100K, .35 prep., 5% Carbon	50-10055	R74	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B43	Capacitor, Poly, 0.001μF 100V, 10%	46-10212	H2A	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R2	Resistor, 1.5K, .35 prep., 5% Carbon	50-15035	R75	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B44	Capacitor, Poly, 0.033μF 100V, 10%	46-33312	H2B	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R3	Resistor, 220K 5W, 0.5 prep., 5% Carbon	52-22055	R76	Resistor, 4.7K, .35 prep., 5% Carbon	50-47035
B45	Capacitor, Ceramic, 120PF 500V, 10%	45-12152	H2C	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R4	Resistor, 150K, .35 prep., 5% Carbon	50-15055	R77	Resistor, 350Ω 5W SDOF Sand Bar, 5%	56-35025
B46	Capacitor, Poly, 0.01μF 100V, 10%	46-10312	H3A	Conn. Header, 4 Pin Vert, 2.5mm	23-11004	R5	Resistor, 100K, .35 prep., 5% Carbon	50-10055	R78	Resistor, 350Ω 5W SDOF Sand Bar, 5%	56-35025
B47	Capacitor, Ceramic, 330PF 1000V, 10%	45-33113	H3B	Conn. Header, 4 Pin Vert, 2.5mm	23-11004	R6	Resistor, 1.5K, .35 prep., 5% Carbon	50-15035	R79	Resistor, 100Ω, .35 prep., 5% Carbon	50-10025
B48	Capacitor, Ceramic, 560PF 500V, 10%	45-56152	H3C	Conn. Header, 4 Pin Vert, 2.5mm	23-10002	R7	Resistor, 220K 5W, 0.5 prep., 5% Carbon	52-22055	R80	Resistor, 100Ω, .35 prep., 5% Carbon	50-10025
B49	Capacitor, Electrolytic, 10μF 50V, 20%	47-10051	H4A	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R8	Resistor, 2.2K, .35 prep., 5% Carbon	50-22065	R81	Resistor, 100Ω, .35 prep., 5% Carbon	50-10025
B50	Capacitor, Mylar, 0.047μF 400V, 10%	41-47342	H4B	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R9	Resistor, 1.5K, .35 prep., 5% Carbon	50-15035	R82	Resistor, 470K, .35 prep., 5% Carbon	50-47055
B51	Capacitor, Poly, 0.001μF 100V, 10%	46-10212	H4C	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R10	Resistor, 220K 5W, 0.5 prep., 5% Carbon	52-22055	R83	Resistor, 22K, .35 prep., 5% Carbon	50-22045
B52	Capacitor, Ceramic, 560PF 500V, 10%	45-56152	H5A	Conn. Header, 4 Pin Vert, 2.5mm	23-11004	R11	Resistor, 47K, .35 prep., 5% Carbon	50-47045	S1	Switch, DPDT Lift Tall Bat, PCB MTG	25-76286
B53	Capacitor, Electrolytic, 10μF 50V, 20%	47-10051	H5B	Conn. Header, 4 Pin Vert, 2.5mm	23-11004	R12	Resistor, 1.5K, .35 prep., 5% Carbon	50-15035	S2	Switch, DPDT Lift sm Bat, DPDT, PCB MTG	25-62656
B54	Capacitor, Mylar, 0.01μF 400V, 10%	41-10342	H5C	Conn. Header, 4 Pin Vert, 2.5mm	23-11004	R13	Resistor, 220K 5W, 0.5 prep., 5% Carbon	52-22055	S3	Switch, DPDT Lift Tall Bat, DPDT, PCB MTG	25-62657
B55	Capacitor, Poly, 0.001μF 100V, 10%	46-10212	H6A	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R14	Resistor, 150K, .35 prep., 5% Carbon	50-15055	S6	Switch, DPDT 90° LG, Chassis, PCB MTG	25-32833
B56	Capacitor, Poly, 0.022μF 100V, 10%	46-22312	H6B	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R15	Resistor, 100K, .35 prep., 5% Carbon	50-10055	S7	Switch, DPDT 90° LG, Chassis, PCB MTG	25-32833
B57	Capacitor, Ceramic, 250PF 500V, 5%	45-25152	H7A	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R16	Resistor, 22K, .35 prep., 5% Carbon	50-22045	SW1	Switch, Stand By, Switch LG DPDT, STAND BY	25-31350
B58	Capacitor, Electrolytic, 1000μF 25V, 20%	47-10225	H7B	Conn. Header, 2 Pin Vert, 2.5mm	23-10002	R17	Resistor, 22K, .35 prep., 5% Carbon	50-22			