



## 工具箱 CJ750 toolbox

### Assembly Instructions for M1, M1M and M1-Super by Ray Costa

If you have never assembled a motorcycle before, the assembly of Chang Jiang takes about 15 hours. Some jobs, such as installing the engine in the frame or mounting the sidecar body, are more easily done with two people rather than one, but one person can do it. You don't have to do these steps in the same order, but doing it this way you will save some time by not doing things twice.

No two kits arrive disassembled the same way, so there are more instructions here than you will probably need. If the procedure covered in the instructions has already been performed, consider yourself lucky.

You will need some additional parts in order to pass D.O.T. inspection in most states, although very few states actually inspect the vehicle. These parts are:

- Tires - Kits are no longer sent from China with tires (although they do occasionally show up). Tubes usually do come with your kit. You will have to provide tires, which are available inexpensively from J.C. Whitney by mail. If your kit is shipped with tires, you cannot pass inspection with them since they are not D.O.T. approved, although this is something inspectors rarely check. My bike has Chinese tires on it. You can, however save them for later use, and the tubes are fine.
- Headlight - A standard 7-inch sealed beam headlight costs about \$7 and is available from a local auto parts store. The bulb is number 6014 for 12V models and 6006 for 6-volt models. You can also use a 12V halogen headlight bulb which is #6024.
- Battery - Some kits have arrived with a (very LARGE) battery. Consider that a bonus. If your kit arrives without a battery, purchase a CB18-A battery for a 12V motorcycle (M1M and M1-Super). Purchase whatever fits for an M1 6V. J.C. Whitney is also a cheap source of batteries. Dennis Kirchner is another good on-line source.
- High-beam indicator: If you want a high beam indicator light, purchase a 12V indicator light from your local auto parts store. They cost about \$2.
- Front Brake Light Switch: Domi Racer, in Cincinnati, OH sells a Triumph part that will work. It costs about \$10.

about \$12. The part number is 95602085. This switch mounts on the front brake cable. You have cut the cable housing and solder on a new cable end to install the switch. Connect the wires in parallel to the rear wheel brake switch. You can also purchase a heavy-duty cable with the switch already mounted from F2Motorcycles in England. They will FedEx it to your door.

The owner's manual for Chang Jiang motorcycles includes instructions for adjusting the points, timing and carburetors, and setting up the sidecar. It is a good idea to download the entire manual and read through before beginning assembly. It is also a good idea to download the parts drawings to use as reference. They are both available online at [DTE](#). The wiring diagram in the owner's manual is not the same as the one listed separately. Use the latter one since it is much more complete. The South African dealer has revised the manual into acceptable English. It is online at [ATST](#).

### Torque Specifications (selected)

(These are all I can find, however Chilton's published a manual for R series BMW's in 1973 that has more complete information, much of which is transferable.)

Cylinder heads	29-33 Nm/21.4-24.4 ft. lbs.
Flywheel screws	22-25 Nm/16-18.5 ft. lbs.
Cylinder base	38-42 Nm/28-30 ft. lbs.
Top shock absorber pinch bolt	21-30 NM/16-22 ft. lbs.
Bottom shock absorber pinch bolt	36-50 Nm/26.5-37 ft. lbs.
Bearing nut	30-34 Nm/22-25 ft. lbs.
Oil pump bolt	16-18 Nm/12-14 ft. lbs.
Engine sump	8-10 Nm/6-7.5 ft. lbs.
Final drive case nuts	14-18 Nm/10-13 ft. lbs.
Pinion bearing nut	7-9 Nm/5-7 ft. lbs.
Reverse gear lever	22-28 Nm/16-21 ft. lbs.
Steering head nut	14-16 Nm/10-12 ft. lbs.

Important: Most reported engine failures come from improperly adjusted intake and exhaust valves or improperly adjusted and synchronized carburetors. Before taking to the road with your new Chang Jiang, please make sure these items are adjusted correctly. In addition, it is a very, very good idea to re-adjust these items after 600 to 700 kilometers. (Exhaust valves - .004 in., Intake valves - .004 in. Spark plugs - .016 to .020 in. Timing 6 degrees BTDC, static timing).

Pictures of different parts of the assembly process for an M1-Super are on the Instructions sheet of my website, [popscycle.com](http://www.popscycle.com). The first series of pictures show the various kits as shipped. The following are pictures of the frame assembly, wheels, engine assembly, sidecar body, sidecar frame, and fenders.

Uncrate: Your Chang Jiang may have been delivered in one, two or three crates. Carefully uncrate the parts and unwrap them. You will notice that some of the parts, such as the frame and fenders, have chips in the paintwork that are not the result of shipping. This is because the motorcycles are assembled and tested before shipping. Leave the frame rails wrapped and do not untie the clutch release lever.

Unwrap the sidecar tonneau cover. Inside you will find the rubber base that fits under the battery, a pair of

mirrors (right and left are “mirror” images and not interchangeable), the gas cap and strainer, a rubber loc which holds down the battery, battery cables, and a tool kit. Some of the tools are special and will be of use assembling the motorcycle. Indeed, you could probably assemble the whole thing with nothing but the tools in the kit. Since some of these are “new old stock,” the case may have become mildewed. Wash the case (not the tools) in a soap-and-water mixture with commercial soap that fights mildew. Let the case dry thoroughly before using it. I actually do most of the maintenance on my bike using the tools that come with it. They are pretty good quality, but the finish is old-fashioned black, and not chrome.

**Assemble Cylinder Barrels and Cylinder Heads (M1-Super):** Some engines arrive partially disassembled. Assembly is very simple and takes about two hours.

- If your engine came with the pistons sticking out and the cylinder barrels removed, clean both very well.
- Rotate the engine until the pistons are sticking all the way out. Put a block of wood behind one piston to keep it from being damaged by colliding with the case when the engine turns.
- Make sure that all four tappets have the cupped end outwards and not the flat end. Assemble this wrong and you will screw up the camshaft and the tappets. You will also void any possible warranty claims!
- Clean the base gasket on the other side of the engine from the one on which you blocked the pistons.
- Oil the piston and piston rings with motor oil thoroughly.
- Get a wide spiral hose clamp at the hardware store. Use it to clamp the piston rings in place. You just barely get all three rings compressed by the clamp. Tighten it all the way and then back off a little.
- Oil the bore of one cylinder barrel (both sides are the same). While holding the cylinder barrel with one hand, carefully feed the piston into the bottom of the barrel. You may have to rock it a little and rotate it a little to go in. The hose clamp should slide down the piston. Be careful that the ends of the piston rings do not get caught in the cut outs in the bottom of the barrel. Rings are brittle and easily broken.
- Once you get all three rings into the barrel, remove the clamp and slide the barrel all the way down until it is seated on the cylinder base gasket. Secure it with 4 chrome plated 16 mm nuts. I'm sure you don't have a 16mm wrench in your garage, since this is not a common size. Don't despair! A 16mm open-end wrench comes with the Chang Jiang tool kit. Get the bolts tight – there is no torque setting. Don't be a 500 lb gorilla, though, and strip the studs.
- Next, slip the cylinder head in place making sure everything is clean. Insure that you have the right head on the right side. The exhaust ring goes forward. Make sure the oil drain tube at the bottom of the cylinder head lines up with the oil drain in the cylinder barrel. There are two small studs that connect the head to the barrel. Put nuts and washers on these and tighten carefully. One nut is in the spark plug well, so take the spark plug out to make sure it isn't damaged. The other, on the bottom side of the head, has an aluminum drain tube next to it. Be very, very careful not to damage this drain tube. It can be fixed, but not easily.
- Clean and insert the pushrods. They are the same at both ends and all four are the same.
- Figure out which rocker is exhaust and which is intake. They only go one way.
- Take the exhaust rocker assembly and slide it over the head studs. Make sure everything is clean and oiled. One end of the rocker should contact the pushrod head and the other the valve head. Loosen the valve adjuster locknut and back it off a couple of turns. Install the black 17mm nuts and tighten 25 lbs. Now do the intake side.

- Adjust the valves by making sure that each pushrod is at the bottom of its stroke, and use a screwdriver, wrench and feeler gauge to adjust each valve to about .006" clearance. You can go as tight as .004, but for now .006 will do.
- Install the valve cover taking care that the gasket is straight. Tighten the two 10mm nuts on the outside first and then tighten the big chrome plated nut in the center. Use non-hardening Permatex gasket sealer to glue the gasket to the valve cover. Next time you adjust the valves, the gasket will stay with the valve cover.
- Repeat this process on the other side of the engine.
- Install the carburetors with two 15mm nuts provided. There is a gasket, or sometimes two, that go between the carburetor and the cylinder head. If you have four of these gaskets, use two on each side.
- Install the carburetor-to-air-box tubes with the spiral clamps provided.
- Do not install the air cleaner at this time.

### **Assembly differences for M1M and M1 engines**

- Most engines are shipped with the cylinders and valve assemblies already installed. All that is left to do is to mount the cylinder heads.
- At first glance the heads look the same for both sides, but careful inspection will reveal that they are not perfectly symmetrical and only one head will fit each side.
- The cylinder head gaskets are identical for both sides.
- Make sure that the gaskets don't get bent or kinked in anyway or they will fail under use.
- There are eight bolts that hold the head in place. They have 13mm square heads and the right tool to use is a 1/2" or 13mm 12-point socket. Some tool kits have a square head socket in them for this job. If you have one, use it.
- Torque the bolts to about 25 foot-pounds, which isn't much.
- Place a cylinder head gasket on the cylinder block and then put the head in place and hold it with one hand while you screw in a couple of bolts finger tight. Now screw them all in finger tight.
- Tighten one of the top head bolts to 25 ft. lbs. Now count 5 bolts counter clockwise and tighten the bolt to 25 ft. lbs. Keep on going around counterclockwise, counting 5 bolts from the one just tightened. In this way you will go all the way around the cylinder head tightening bolts that are approximately opposite from each other.
- Install the spark plugs if not already installed.

### **Installation of starter, M1M and M1-Super**

- The starter fits into the cradle on top of the engine.
- Put a dab of grease or some oil on the end of the starter shaft and on the gear.
- Loosen the starter-mounting clamp at both bottom bolts and remove the top clamp bolt.

- Holding the starter so that the electrical connection is on the right side of the engine, slide the start into the big hole in the front of the engine. You may have to tap it to get it all the way in. When inserted all the way, the two “ears” that stick out in the front will clear the starter hold down clamp.
- Install the hold down clamp and tighten up the three bolts.

Note: Some engines (like mine) have been machined so that the O-ring on the starter does not seal well. That will cause engine oil to weep down all over the top of the engine and make a mess. I cured the prob by using silicon gasket goo around the starter. The result was no more leaks. Don't do this unless you h to, because it will make the starter harder to remove if you ever have to work on it.

### **Installation of the “Distributor,” M1M and M1-Super**

Properly speaking, this unit is not a distributor, but merely a housing for the points.

The distributor plugs into a large round hole, mounted at an angle at the left front top of the engine block.

- A spur gear on the camshaft turns the gear on the bottom of the distributor shaft.
- Rotate the engine to 6 degrees before top dead center (see timing instructions, below).
- Remove the nut, washer and lock nut from the distributor timing hold down stud.
- If possible, hold the engine so that it is standing on the right cylinder head. As ridiculous and dangerous as this sounds, it's the best way to do this operation. You can mount the engine on an engine stand or block it in place with blocks of wood. You can even hang it on a rope from a garage rafter.
- Loosen the timing locking screw on the bracket attached to the bottom of the distributor so that the distributor can turn in the bracket.
- Put a dab of grease on the bottom of the distributor shaft.
- Find a spot where either cam lobe is just barely opening the points.
- Now drop the distributor into place in the hole, being careful that the slot in the locking bracket goes over the stud on the engine case. Make sure the distributor and bracket are seated all the way into the hole. You may have to do this a few times to get the distributor seated all the way. Try rotating distributor. If the cam stays put when the body of the distributor rotates, the shaft is engaged.
- Put the nut, washer and lock washer on the stud and tighten it up with the timing bracket slot right the middle of its range.
- Now rotate the distributor until the points just start to open. This is best observed with a volt/ohm meter, continuity checker, or a piece of cigarette paper.
- Tighten the clamp screw on the locking bracket. The timing should be close enough to start the engine.
- Carefully return the engine to its proper upright position.

Clean: Parts, especially the chromed parts, are covered with protective grease. Wipe off as much of this grease as possible with paper towels. The parts can then be completely degreased with spray bathroom cleaner or engine degreaser. Both work. Spray down each assembly separately. Dry the parts when do

with paper towels or rags. When cleaning the engine and transmission assemblies, try not to spray the points cover, air cleaner, or the connection for the speedometer cable (located on the top, back, right side of the transmission). Cover the tops of the carburetors so that water does not leak into the float bowls. A plastic bag does the job nicely.

**Wheels and Tires:** If your wheels were shipped with tires, deflate the inner tubes completely and remove the inner tube valve. Remove the tires from the rims with tire irons, being careful not to pinch the tubes or scratch up the rims. The inner tubes can be reused. The tires are not legal for use in the U.S. and a CJ cannot be inspected as a home-built vehicle with these tires installed in some states.

Some bikes are shipped with the wheels disassembled. Lacing wheels is not difficult. The best instructions for lacing wheels are in Sloan's "The Complete Bicycle Book," of which there are several editions. The thing to remember is that there are two different lengths of spokes, one for the brake side and one for the other side. This makes the spoke pattern different from a bicycle. Here is a step-by-step way to do it.

- Clean the rims and wheel hubs well with a degreaser and dry them. It's easier to do this before the wheels are built up.
- Start by taking the short and long spokes and dividing them into piles of 20 each. Put a rubber band around each pile. You will need 20 long and 20 short spokes for each wheel.
- Take off all the spoke nipples and clean both the ends of the spokes and the nipples. When the bikes are fumigated before leaving China a little steam gets into the spoke nipples causing some surface rust. This is no big deal. Place 20 nipples in each of eight zip-loc bags. This way you won't lose them or knock them over.
- Place the hub large-flange (brake side) up on a workbench. Put a short spoke in every other hole on the underside up and fan out the spokes. The spoke heads will be down, or to the inside of the wheel. If you look carefully, you will see that every other hole has the paint chipped a little bit. Try to get the head ends of the spokes into the chipped holes. This is the way the wheels were originally assembled, and it means less paint touch up.
- Place the rim around the hub and spokes, flat on the bench. You will notice that the spoke dimples on the rim are pointed either forward or backward, and every other one is either up or down. That makes four different kinds.
- Take a short spoke and stick it into an up and forward hole. Put a nipple on the end of the spoke and give it a couple of turns to hold it.
- Take the next spoke around the flange (remember it's every other spoke, since you have put in on half of the spokes so far) and stick it into the next up and forward facing hole, which is four holes over. Put a nipple on it and give it two complete turns. Work your way around until you have all ten spokes in place, all of them in the up and forward holes.
- Next, **IMPORTANT!** Rotate the hub against the rim so that the spokes are at an angle to the rim at the hub and the nipples are all seated in their wells in the rim.
- Now insert a set of 10 spokes from top to bottom in the other ten holes. The spoke heads will be on the outside of the wheel. Take one spoke, seat the head, and fan it around until it crosses the spoke next to it. If it forms a nice "X" and lines up with an up and backward hole, great, insert it in the hole and install the nipple. If it doesn't line up, you crossed the spoke in the wrong direction. If you crossed the spoke in front, rotate it so that it crosses the spoke in back. It should now line up with a hole at which you can install the nipple. Do all ten spokes making nice "X"s. Do not tighten anything yet. You want the hub to be able to flop around in the rim.
- Turn the wheel over. The small flange has ten double key holes, rather than 20 discreet little holes.

Insert a long spoke in the middle of a key hole from underneath the flange and pull it to the right, in position. The spoke head will be facing you (up). Rotate the spoke until it lines up with a hole in the rim. This should be (remember, you flipped the rim over) and up and back facing hole. Insert the end of the spoke in the rim and put on a nipple, giving it only one or two turns.

- Put in the next spoke in the next key hole clockwise in the hub. You can actually go counterclockwise if you wish, but I like to go clockwise. This spoke should line up with an up and back rim hole four spaces (empty or filled) on the rim from the first hole. Install a nipple.
- Work your way around until all ten spokes are in place. Sometimes the spokes fall out at the flange don't worry, just stick them back in. Once everything is in place and tight, nothing will fall out.
- Now you're ready for the last ten spokes, and these will be the hardest, although this is still not rocket science (and I can say that because my father really was a rocket scientist. No lie.) Take a spoke stick it head down through the middle of the key hole and pull it to the left with the head facing down. You may have trouble getting the head of the spoke in place. Try holding the spoke almost vertical and lining up the head with the small part of the keyhole. This usually works to get the head in place. A few spoke heads are a little larger than they should be, and you can adjust them *slightly* with a file. Once the head is in place, count 15 spaces (filled and unfilled) from the other spoke in the key hole with the head up. The spoke should line up with an up and forward hole in the rim. Insert the end of the spoke and screw on a nipple.
- Work your way around, one spoke at a time. A few of the spokes may take a little bending to get them in position. The wheel will begin to firm up as you work your way around and the rim will no longer be on the work surface. It will be more-or-less in the middle of the hub.
- With all the spokes in place you are ready to start truing the wheel. If your spoke nipple has a screwdriver slot in the head, you are in luck. If not this next step will take a little longer, but not much. Tighten all the short spokes so that the end of the spoke is even with the end of the nipple. You can use your fingers, an electric screwdriver, or a wrench. I like to use a 4" adjustable wrench. There is a spoke wrench in the tool kit – it's a notch in a funning look tool that has two pins in the other end and is stamped on it. The 27mm is the wrench you need to tighten the spare tire nut on the sidecar. After tightening all the short spokes first you will get the wheel nearly round right off the bat, and you will also get it "dished" correctly – more about that later.
- Now tighten all the long spokes so that they are not flopping around. If you do these two steps, so the steps below will be a lot easier, and maybe even unnecessary.
- Mark a spot on the rim with masking tape right in the middle of where two spokes from the small flange attach to the rim, one position apart. The spokes will be parallel, one from each side of the flange. One will be a heads up spoke and one a heads down spoke. Do the same thing directly opposite on the other side of the wheel. Now mark two spots at right angles to the first pair of marks. You should now have four marks each 90 degrees from each other, evenly spaced around the wheel. Take a ballpoint pen and mark the tape marks 1,2,3 and 4. Marks 1 and 3 will be opposite, and 2 and 4 will be opposite.
- Tighten the two spokes at position one three turns each. Then tighten the spokes at position 3 three turns each. Now tighten the spokes at position 2 three turns each. Finally, tighten the spokes at position 4 three turns each.
- Flip the wheel over and do the same thing with the spokes coming from the large flange at points 1 through 4. This will keep the hub pretty well centered in the wheel.
- Now go around the wheel and tighten all the rest of the spokes three turns each, working in opposite pairs if possible. If any spokes on the small flange fall out, put them back in.

- **Dishing:** It is important that the wheel be “dished” correctly, or you will break some short spokes. E now you will have noticed that the large flange is not at 90 degrees to the hub – it’s at an angle pointing in to the center. You want to adjust the spokes –side-to-side so that both the inner and out short spoke shanks do not touch the flange at its outer edge. If you tighten all the short spokes first you will probably be pretty close. The ideal is to have the gap between the spoke shanks and the flange is the same for both the inner and out spokes. You can achieve this by tightening all the short spokes and loosening all the long spokes, or vice versa, to move the rim back and forth to change angle of the spokes. The spoke angle for the long spokes is unimportant. The hub will not be in the center if you dished it correctly. Remember that there is also a brake plate that is part of the hub. When you add that, the wheel will be more-or-less in the middle.
- **OK – back to the main program -** The wheel will still be a little loose. Repeat the last three steps a many times as necessary until the spokes are reasonably tight. They should “ping” when tapped with a screwdriver and not “thunk.”
- Once all the spokes are reasonably tight and the spoke nipples well seated in the dimples in the rim is time to mount the wheel and spin it. You can make a truing jig that makes the job easier, or you mount each wheel on the front or sidecar axle. If the sidecar body and fender are already attached to the sidecar, you will have to use the front axle. Screw the front axle in place. The front axle has a hand thread. When you spin the wheel it will wobble from side to side (run out) and up and down. You will need to attach some indicators to the fork to gauge your progress. A piece of wood taped across the fork above the wheel will work well enough for up and down movements. Tape it in place so the wheel just barely rubs at its highest spot. Tape a couple of 1/4”x20 nuts attached to a long bolt to the fork at the rim level so that when you screw in the bolt it just touches the edge of the rim.
- You want to get the up and down variation of the rim to within a couple of millimeters from true. Do this by adjusting pair of spokes. Tighten spots opposite a high spoke and loosen spokes at the high spot. Do this no more than one turn at a time. The wheel rims are usually a little out of round at the weld, so as long as you are not going to go 90 mph, a 2mm variation will not be noticeable.
- Next true the wheel from side to side. Adjust spokes from opposite sides of the wheel to move the rim back and forth. This takes time and patience, but you can get the rim very close to perfect. I figure a millimeter of run out is close enough, and I can usually get better than that.
- Re-check the spokes to make sure none go “thunk” and you’re done.

Most general books on motorcycle maintenance have information on how to true wheels. The local library will have at least a couple of general motorcycle maintenance books. You can also follow the directions in Sloan’s bicycle book, mentioned above.

Finally, grind off the ends of spokes that stick out so that they won’t puncture the inner tube. I use a cheap stone on the end of an old electric drill. If you have access to an angle grinder it will save you time, but be careful with it because it will cut very fast. If you have trued the wheels well, only a few spokes will stick out. Clean the inside of each wheel and put the rim strip back on before you mount the new tires. This is the single most time-consuming process in assembling the motorcycle. You may want to have this done at a local motorcycle shop.

**Headlight:** The headlight that comes with the kit is not a sealed beam unit and will not pass inspection in most states. Replace M1 headlights with sealed beam unit #6005 and M1 and M1-Super headlights with sealed beam unit #6014 or #6024. Remove the screw at the bottom of the headlight rim. Remove the old bulb unit (if installed) from the rim by carefully unclipping the springs with a needle-nose pliers. There are eight clips. Install the new sealed beam bulb noting that 12 o’clock on the bulb is at 12 o’clock in the rim. You cannot clip right at the top of the bulb, or the rim will not fit in the shell. Space the four pair of clips around the bulb as closely as possible in opposite pairs. While the headlight shell is apart, make sure the connections to electrical components inside are tight. This applies mainly to the connections held in place by Phillips-head screws. Reinstall the rim. You will have to push on it a little bit.

If you are going to install a high beam indicator light, do it while the headlight is removed.

**Installation of Engine Unit:** If your kit was shipped with the sidecar assembled and attached to the motorcycle frame, disconnect the wiring to the sidecar and the two top bolts at the knife-and-fork joints. Turn back off the locking screws and unscrew the clamshell/ball joints. Wheel the sidecar out of the way.

- With the frame sitting on the ground, remove the gas tank by removing the gasoline hoses and the four connecting bolts. (You can also do this with the wheels and tires on and the center stand down. If you do, block the front wheel so that it cannot roll.) The two bolts that connect the tank to the headstock are straight forward. The two bolts at the back are underneath the tank on either side. Remove these, taking care that two rubber spacers go above the bracket and one below the bracket on each side. Remove the tank and put it in a safe place.
- Remove the electrical package, which is located on a bracket beneath the seat. There are two 8 mm screws that hold it in place. Leave the wires attached and place it up where the seat goes. Remember that there is a brown ground wire attached to one of the bracket screws.
- Remove the air cleaner assembly from the engine, if attached, and put it aside. There are set screws on either side of the engine to hold it in place.
- Remove the coil and its bracket from the top of the engine. Disconnect the yellow wire to the points housing. Put the assembly aside.
- If you are doing this with the frame on the floor and the wheels off, put a length of 2x6 lumber, 18" long next to the frame, and put some lengths of 1x4 or 1x3 on top of them. You can nail these blocks of wood together if you want to, but it isn't necessary. Place the engine unit on the wood blocks next to the frame and lined up with the frame on the left side (facing forward). (The next step is easier with two people, but one person can do it.) While raising the right side cylinder, slide the crankcase off of the wood blocks, over the frame rail and down between the frame rails. It goes easily. The top of the starter (or generator) may scrape the gas tank-mounting bracket, so be careful. You can always touch it up with silver paint later. The engine will slide back and forth about an inch. Slide it as far forward as possible (or pull the frame back as far as possible) and align the two drive shaft tips with the holes in the transmission output shaft rubber block. While they are aligned, pull the engine back in the frame until the tips are inserted into the holes. A little dish detergent will act as a lubricant. Do not use grease or petroleum jelly as it corrodes the rubber. Unwrap the padding from the frame rails.
- Lift the frame around the engine and put some wooden blocks in place underneath so that the mounting holes in the frame align with the mounting holes in the crankcase. The thicker spacers go on the left side of the engine and the thinner spacers go on the right side. Run the forward mounting shaft through the holes and spacers and attach the lock washers and bolts. Do not tighten yet. Run the rear shaft through the engine, spacers and frame. The foot pegs go on the ends of the shaft outside the frame rails. The left peg is the short one and the right peg is the long one. Install by putting a lock washer and nut on each end. Tighten the front shaft nuts. Do not tighten the rear shaft nuts because the exhaust pipes have to be attached at the points as well.
- Re-install the coil assembly. Make sure that the brown ground wire at the front of the frame is attached to one of the mounting studs. Do not forget to re-install the yellow wire to the points unit. Connect the spark plug wires.
- While the electrical package is removed, install the battery cables. The red cable attaches to the upper right hand corner, where there are two other red wires attached. The black cable attaches to any ground, but a convenient one is the lower right mounting bolt on the back of the electrical package. It has a 10 mm nut. This is the bolt that holds the bottom of the starter solenoid in place. While you are at it, make sure all of the screw connections across the top of the electrical package are tight. Reinstall the electrical package.
- Attach the thick yellow wire to the lug on the side of the starter.
- Reinstall the air cleaner assembly.

- Untie the clutch release lever and attach the clutch cable. Adjust following directions in the owner's manual. On some bikes the lever is curved. On some bikes the lever is straight, which will require some adjustments. If the clutch cable appears to be way too short, loosen the bolt on the ring clamp at the back of the engine to which the clutch release lever is attached. Now slight the clamp away from the engine just a little bit – until you can get the end of the clutch cable into the fork on the lever. Making sure that the clutch lever does not touch the drive shaft drum, tighten the ring clamp. After some use the clutch cable will stretch a little, and you will have to repeat this procedure for adjusting the ring clamp. Eventually you may be able to seat it all the way against the engine.
- Unscrew the two screws that hold on the alternator/generator cover at the front of the engine. Attach the wires to the generator or alternator. Follow the diagram provided. If you don't have the diagram, the three white wires (on some bikes these three wires are red) go to the three connectors in a row at the top of the alternator. The blue wire attaches to the "J+" connector, and the black wire goes to the "N" connector. There is one connector left over which is not used. Reinstall the cover. There is a diagram at the end of the instructions for the alternator and for the whole bike. The alternator diagram was drawn by Ted Smith. The wiring diagram for the whole bike comes from "Butch," of the Shangri-La Bikers.
- Install the throttle cables in the carburetors. Unscrew the ring nut at the top of each carburetor. Remove the top unit. Carefully remove the slide and needle, taking care not to get it dirty. Run the end of the throttle cable through the ring nut and the pipe through the top of the carburetor. Take the throttle return spring and put it around the end of the throttle cable. Carefully compress the spring so that the end of the cable with the ball end sticks out. Slide the end of the cable under the bottom of the slide and lace the cable through the slit in the throttle slide. The throttle slides go with the cutouts away from the cylinder head (the test unit was shipped with the slides in backwards). The spring valves then sit in their proper wells. Turn the twist-grip to make sure that the cable is free and moves the slides. Insert the slide back into the carburetor body, taking care to get the needle into the main jet orifice. This is made easier if you place a finger on top of the needle and wiggle it around a bit until you find the hole. Put the top in place (there is a locating lug) and tighten up the ring nut. Repeat on the other side. Adjust the carburetor cables according to the instructions in the owner's manual. This completes the engine installation.

**Kickstand and Rear Brake Springs:** The kickstand spring is large and black. The front loop is bigger than the rear loop. The front loop slips over the left rear engine mount spacer. With the kickstand in the down position, grip the rear loop with a vice grip and pull it over the pin on the kickstand.

The rear brake return spring attaches to a pin sticking out of the bottom of the transmission. The other end attaches to the forked lever on the inside of the frame from the brake pedal. Loosen the rear engine mounting rod nut (right side) until the foot peg is loose. Rotate the brake pedal all the way in the up position and slip the aft end of the spring over the fork in the lever. Reset the foot peg and tighten the nut.

It is now time to get the motorcycle off the floor. Lift the rear of the motorcycle and put it on something like a milk crate. Flip down the kickstand. Raise the front end by placing a jack under the front axle. An old scissor jack or a hydraulic floor jack will work well. Bring the machine up to level. Put some blocks under the sump to be on the safe side.

**Exhaust:** The exhaust system consists of a header pipe and a muffler for each side. The sides are not interchangeable. Install the header pipes into the exhaust ports of the cylinder heads. Tighten the finned nuts somewhat, but do not tighten completely. The mounting ears attach to the foot peg studs. Loosen the nut, slip on the mounting ear and reattach on each side. Next, slip the mufflers over the ends of the header pipes. The mufflers are hung from the inside on the lower shock absorber pinch bolt. On the right side this is a tight fit. On the left side it is quite easy. Tighten this bolt on each according to the torque listings. The castle nut on the front of the muffler can be tightened with the special tool in the tool kit that looks like a hammer and punch (ouch!) or a pipe wrench/channel lock. If using a pipe wrench or channel lock pliers, wrap duct tape or masking tape around the nut at least two layers thick. This will prevent the chrome from being ruined. Lastly, tighten the ring nuts on the cylinder heads until the packing is comfortably tight and nothing is slipping. Over tightening risks stripping the threads in the cylinder head.

**Handlebars:** Clean the protective grease from the handlebars and tighten the clamps. Tighten the bolts, then tighten the nuts. The nuts are lock nuts. The switches are held in place by set screws. One set screw

has a point that seats in a hole in the handlebars. The switches, then, are fixed in position. Don't take them apart or little springs will fly all over the place. Control Levers can only be removed or adjusted by removing first the cable, and then the lever itself from the base. This reveals a clamp screw that faces the end of the handlebar. Loosen this clamp screw to adjust or remove the lever, and then reassemble the lever handle and cable.

**Rear fender and Seat:** Attach the tail light assembly to the fender with the four 10mm screws provided. Make sure the wires stick out through the right side. Connect the taillight wires to the fender wires like this (some bikes may vary in color. If yours is one of them, you will have to test each wire.):

Green-red = Brake light

Blue-black = Right turn

White-black = Tail light

Blue-red = Left turn

You might want to take a roll of black electrical tape and tidy up the wiring, since the wires are a lot longer than they need to be.

- Remove the outside nuts from the lower shock absorber bolts. Remove the bolts from the attachment bracket for the driver's seat and rear fender and the lower frame mounting point. Lower the fender carefully, making sure the cut out clears the drive shaft, and the wire for the rear brake switch not pinched between the fender and the frame. Slip the rear fender stays over the ends of the lower shock bolts and put the nuts back on loosely. Next, install the two large fender-to-frame mounting bolts.
- Remove the nuts from the upper shock absorber bolts. Attach the package carrier to the fender with the four 10mm bolts provided. It only fits one way. Slip the support legs over the ends of the upper shock mount bolts. Replace the nuts and tighten all four shock mount bolts.
- Install the passenger seat on top of the package carrier with the three bolts provided. I found it easiest to put the nuts on top and the bolt heads underneath.
- The wiring harness for the rear fender plugs into the main wiring harness with a big rectangular plug. A smaller rectangular plug is for the sidecar lights, and another small plug is for the brake light switch. Leaving the driver's seat and gas tank off until the end allows tidying up the wiring when it is complete.
- There is a small spring at the front of the brake light switch. It connects to a clamp on the brake rod. Adjust this after the rear wheel is in place and the rear brake is adjusted.

**Front Fender:** The front fender attaches to the front fork with four small bolts and two big ones. Attach the two upper nuts first so that the fender is hanging in place. These 14mm nuts are the ends of the pinch bolts that hold the fork from twisting, so tighten them well. Next attach the fender stays to the four small bolts. Don't over tighten the small nuts or you will snap the bolts. Tighten the two large nuts nice and tight. There are brackets on the top of the fender for a front license plate, not required in the United States. You can fashion a license plate if you want to, or simply remove the brackets.

**Rear Wheel:** It is a good idea to take some fine sand paper and clean the inside of each brake drum before installation. Remove the rear axle by removing the castle nut and the cotter pin. Pull out the axle. Remove the lower shock absorber pinch bolt outer nuts and the fender stays. Tilt the fender up at the hinge and tilt it in the up position. Slide the wheel over the brake shoes and make sure the splines on the wheel connect with the splines on the drive hub. Push the axle back in, attach the nut, tight it, and install the cotter pin. Lower the rear fender. Attach the fender stays to the lower pinch bolts, put on the nuts and lock washers and tighten the nuts. Adjust the brake by turning the big wing nut at the front of the brake rod. Adjust the brake light switch by either moving the attaching clamp, or moving the switch back-and-forth in the holder using

two large nuts. Do not over tighten the nuts!

**Front Brake and Wheel:** Remove the jack from the front of the motorcycle. If the bike will not stay up w the front axle off the ground, puts some weights on the passenger seat (a sack of sand works), or have someone sit on the seat. Loosen the pinch bolt that holds the axle tight, unscrew the front axle and pull it out. Put the front brake plate into the brake drum of the front wheel and jockey the wheel and brake into position. There is a pair of guides welded to the inside of the front fork that meshes with the lug on the br plate. Slide the lug up and into the guides while lifting the wheel into position. As soon as you get it there push the axle into place, screw it in tight, and tighten the pinch bolt. You can now thank your "passenger" put the bag of sand away. Adjust the front brake cable using the adjuster at the wheel.

**Battery:** Put the rubber pad at the bottom of the battery carrier. Drop the battery in place and connect th cables, red to "+" and black to "-." The fat rubber loop is to hold down the battery, but I found it a bit to sh I made a triangle out of a black wire coat hanger and put this on the front of the battery. I used the rubbe loop over the top. It works fine and looks OK. You might want to do something else. (Some people hav relocated the battery to the sidecar trunk. You can use the same battery carrier, however you will need to install longer battery cables and drill a hole in the side of the sidecar trunk for the cables. Remember to li the hole with a rubber grommet, some silicon caulk, or the like. You do not want to cut trough the insulatic and short the battery cables.)

**Driver's Seat and Gas Tank:** Install the gas tank carefully. Attach the front mounting ears to the steerin stem. The rear attaches to the brackets with the two rubber pads above the bracket and one underneath each side. DO NOT OVER TIGHTEN! It is a good idea to use new rubber gas line and hose clamps available at any auto parts store.

The driver's seat attaches with a pivot bolt in the front and a shock absorber bolt at the back. It is as simp as it looks.

**Miscellaneous:** Adjust the clutch cable, throttle cables, timing, points adjustment valve lash, and front ar rear brakes accordingly to the directions in the owner's manual. Remember, these adjustments are important! Adjust the handlebars to suit yourself. Adjust the headlight so it is aimed properly. Check the levels in the engine (SAE 20-50 in summer, 10-40 in fall and spring), transmission (EP 90) and rear end ( 90) and make sure that things that need to be greased are greased (like the rear shocks). Since the part: your kit may have been sitting somewhere for a long time, consider changing the fluids before running the engine very far.

Start the engine and make sure everything is adjusted properly. You may want to ride the motorcycle for few days to make sure everything is working properly before attaching the sidecar. Be careful with the ce stand. It is way too long for casual use and it is difficult to get the motorcycle on the stand. Some owners who use their bikes without the sidecar modify the stand by cutting out 1 ¼" and having the stand rewelded.

**Sidecar Fender:** The sidecar fender attaches with three bolts in the front, two on the side, and one at the rear. Mount the sidecar fender bracket to the outside spring shackle. Loosen the U-bolts and remove the Put the bracket on top of the spring, aimed towards the back of the frame, and replace the U-bolts. Tight well! Hang the fender on the fender bracket with one bolt so that you can attach the rear bolt and the fron bolts. Hand-tighten everything until while you adjust the fender and then tighten all the bolts. Run the running light wires across the axle and secure with wire retainers supplied.

**Sidecar Seat and Body:** With the sidecar chassis sitting on supports (plastic milk crates work well), plac the two rubber bumpers on the top of the round front frame member with the flanges on the outside. Mak sure the u-shaped body hanger on the rear springs is in the "down" position and slid out to about one inch from the ends of the springs. Left the body onto the chassis (Two people are better than one person for t job,) being careful to locate the groove in the bottom of the front of the body on top of the rubber bumpers Next, locate the rear body hanger so that it lines up with the two reinforced holes in the bottom of the side trunk. Insert bolts through these holes and the hanger and tighten. Attach the lower rubber bumpers anc their u-shaped housings to the bottom of the sidecar with four bolts each. Put a washer on either side of bolt. I wasn't happy with the washers that came with the kit, so I used thicker and heavier washers for thi job.

Install the lower seat cushion. There is a prong at the front that fits into a hole in the floor. That's it! The

cushion is installed by sliding it in place and pushing the two studs through the mounting holes in the side body. Install the nuts and lock washers from inside the trunk.

**Sidecar Wheel and Spare:** Slide spacer onto the axle with the large part toward the outside of the sidecar. Slide the round disk onto the axle all the way, with the painted surface toward the inside of the sidecar frame. Slide a wheel onto the axle. Tighten the nut to about 10 ft. lbs and install the cotter pin.

The spare tire fits over the spindle and bracket on the sidecar trunk lid. Use the chrome nut to hold it in place. Tighten it to about 10 ft-lbs. Use the wheel that is least true for the spare. The sidecar is now complete and ready to attach to the motorcycle.

**Sidecar Frame to Motorcycle Frame:** There are four mounting points that connect the sidecar frame with the motorcycle frame. With the motorcycle on the stand, wheel the sidecar next to the bike. Put a dab of grease on each of the lower mounting balls on the motorcycle frame. Push the "claws" of the lower mounting on the sidecar frame all the way out. Mate up either the front or rear joint by putting the "claws" over the ball. Tighten the draw bolt that draws the claws inward, but don't make it tight. Now do the same with the other end.

Next, connect the rear upper attachment, which is held in place with a knife-and-fork joint. Make the connection and insert the bolt that holds the knife in the fork. Don't tighten it yet. Take the motorcycle off kickstand. Now attach the front upper stay, which connects just like the rear one.

At the back of the sidecar there are two pinch bolts that allow the rear attachment to telescope in or out a little bit. The sidecar frame should be adjusted so that there is a little bit of toe-in between the sidecar wheel and the motorcycle. Follow the directions in the owner's manual. Tighten the pinch bolts when done, and tighten the lower connector draw bolts. Put cotter pins through the draw bolt heads.

Lastly, adjust the two upper stays so that the motorcycle is about 2 degrees past vertical. Now tighten the upper stay bolts.

Connect the wires of the sidecar lights to the wiring harness by plugging in the plug.

If you have never driven a sidecar rig, take the corners slowly and don't go too fast. Remember that you are stopping considerably more weight with the same brakes, and there are two brakes on one side, and none on the other! This takes practice. Go for a ride and see if the rig is tight and reasonably steady. Start the engine, and after it is warm and running evenly, go enjoy yourself. Take your helper along. Please wear a helmet, and don't celebrate with beer or wine until you get back.

**Carburetor tuning:** The carbs have to be synchronized for the engine to run well. If you can find a flow meter gauge, commonly used on old British sports cars, this will make life easier. Mine is called a Unisyr and I've had it for 25 years. If you have the tool, you know how to use it, so 'nuff said.

Start with a warm engine. There are three adjustments on each carburetor. These are the cable adjuster on the top, the idle speed stop on the bottom (at an angle) and the idle air bleed screw on the side. Start by loosening the locknut on the bleed screws of both carbs and screwing them in gently all the way. Now back both out 1.5 turns and tighten the lock nuts just a bit. Next, loosen the lock nuts on the idle speed screws. Turn these screws out until no resistance is felt. Now run them back in until you can barely detect upward movement of the throttle slide. This is better accomplished with a clean finger than by eye. Now tighten the lock nut on one side. On the other side, disconnect the spark plug wire and ground it by plugging an old spark plug in and laying it on top of the cylinder head. Screw in the speed screw a couple of turns and start the engine. Run the screw in and out until you get the lowest idle you can get without the engine stalling. Tighten the lock nut. Now back out the idle air bleed screw one half turn at a time. The idle speed should come up. At some point the mixture will become too lean and the engine speed will start to decrease again. Back the screw in to maximum RPM and then run it in again one more half turn. Set the lock nut and turn off the engine. Repeat the process on the other side. Now hook up both spark plugs and start the engine. It should start and idle smoothly. If the idle speed is too low, adjust both idle speed screws in an equal amount. Back the throttle. If the engine hesitates or coughs, adjust both air screws in one half additional turn. Do this until the hesitation disappears and the idle speed is steady and not too slow. If it gets too slow, adjust the stop screws again.

Lastly, adjust the cable adjusters until there is almost no free play on either side. Now, with the engine off and the slides all the way in the down position, look at one slide at the same time you have a finger lightly placed on the other side (because you can't see both at the same time). Turn the twist grip slightly and adjust the cables so that both throttle slides lift off at precisely the same time. This takes a few tries. Remember to keep your hands clean! Replace the rubber dust boots.

Now go ride the bike and see how it runs on the road. If things are good, ride it for a few days and then remove the spark plugs. The color of the electrode should be brown or tan. If it is white, the mixture is too lean, and if it is black, the mixture is too rich. Adjust the mixture by lowering or raising the metering needle. Raising it a notch at a time richens the mixture, and lowering it leans out the mixture. To get to the metering needle, loosen the ring nut at the top of the carb and pull out the slide. There is a little clip that holds the needle in place. Slide off the clip, move the needle up or down, and replace the clip. Don't lose the % clip! Now do the same for the other carburetor. Drive the bike again for a few days and check the spark plugs again. If your bike is still not running beautifully, check the points and timing.

The 1973 Chilton BMW manual describes this process a little differently. It recommends at each step of the operation to pull a spark plug wire and listen to the engine, then pull the other one. Whichever side runs slower, adjust the idle speed screw so that both cylinders run independently at the same speed. Then do the same thing with the air bleed screws. The idle speed will then be too fast, so back off the idle speed screw an equal amount for both cylinders. Chilton recommends a millimeter of free play on the throttle cables.

**Timing:** First adjust the points at maximum opening to between .016 and .020 inches. This is easy. No need to take the rubber plug out of the flywheel cover on the left side of the engine. Rotate the engine with the kick starter until the "6" is in the center of the hole. Loosen the hold down screw on the points assembly (M1N and M1-Super). Hook up a 12V test light from the point wire to ground. Rotate the body of the points cover until the light just goes out. Tighten the lock nut and replace the rubber plug. You can also do this with a timing light. With the engine at minimum RPM the timing should be at 6 to 8 degrees BTDC, and at maximum RPM it should be approximately 30 degrees BTDC. Either way, test drive the bike and make sure it is running well. The compression is low on these bikes, so it is possible to get the timing advanced way past where it should be and still not have the engine ping. The best test is to balance the mid-range torque with the idle speed. By retarding the spark you can get a nice even idle, but mid-range acceleration will suffer. If you adjust the spark for good mid-range acceleration, the idle will be a little ragged. I prefer the latter.

Happy motoring!

Appendix

Customers have noted a few problems which may crop up from time to time on individual machines.

- On some motorcycles the front fork slider assembly does not come from the factory screwed into the fork leg top plugs. These are the large, chromed nuts on top of the forks. Unscrew these using the special wrench in the tool kit. Screw the slider into the top plug and tighten the lock nut. While you have the fork tubes open, take out the bottom drain screws and drain out the fluid that comes from the factory. Refill with 100 cc of power steering fluid. This will give a better ride. Screw in the top plug.
- The three wires that come out of the alternator and are soldered to the little terminal board are sometimes not soldered correctly. Re-solder if necessary.
- The original voltage regulator is mechanical. This is fine if all you do is potter around the streets of Beijing at 35 mph. If you go out cruising at a higher speed, the vibration will eventually kill this unit and often wreck the alternator in the process. Alternators are expensive. The rectifier bridge that comes with the bike is enormous, but fairly robust. The two units can be replaced with a much smaller, solid-state universal-fit module available from Dennis Kirk, Inc. You can also replace just the rectifier, and you can replace the voltage regulator with a Bosch unit from an early 1970's BMW or (but not a bug). I use a replacement made in the U.S.A. by Standard Motor Products. The Standard regulator is number SMP VR124. The black wire goes to ground. The green wire connects to the black wire on the bike, and the red wire connects to the black/white wire. You will have to come up with some sort of wire connectors, or you can just solder the wires together. I would strongly suggest me

this conversion as soon as possible. Your bike will be more reliable.

- The decals on the tank and sidecar can be removed by carefully peeling them backwards, peeling back against the un-peeled portion rather than at 90 degrees to the surface. The goo can be removed with automotive goo remover or hardware store paint thinner. Do not use lacquer thinner! It will ruin the paint!
- The gasket in the gas tank petcock comes apart in a 10% gasohol mixture used in some areas. You can make a new gasket out of red rubber gasket material available at Ace hardware. If you want a pre-cut, contact me and I'll send you one. These gaskets need to be soaked in fuel for a few days before they seal, but then they work well.
- Somebody noted that I forgot to mention that the two tubes on the bottom of the gas tank are to connect a balance tube from side to side. If you don't, gas will go all over the floor. Also, the gasket the gas cap will eventually swell so that it doesn't fit. You can make one out of sheet cork, or get it from a John Deere tractor – or a really old VW that has its gas cap under the hood (1963 or earlier). I sell you an original, it will distort too.
- New pattern (modern) carburetors will be available soon from China. These will be made by Keihin and be similar in design to older Mikuni carburetors. They will eliminate the problem some owners have had with fuel boiling and float problems and will provide much smoother engine performance. You should know – I did the sting!