INSTRUCTION MANUAL
1. REAR DIFFERENTIAL

1681 standard diff. grease
1685 silicone grease 50,000 visc.
1686 silicone grease 100,000 visc.

REAR DIFFERENTIAL ASSEMBLY
1. REAR DIFFERENTIAL

1.1 BAG A
Hint: use the gear-end of the diff. shafts to push the bushings into the diff. halves.

1.2 NOTE: pay attention to the correct position of the gears

1.3 Hint: the standard diff. grease gives a relative free running diff. Other silicone based diff. greases are available (see expl. view).
To obtain best traction on the rear wheels however, a free running rear diff. is preferred.

1.4 Assemble the 2 diff. halves, and tighten together with screws G14.

1.5 NOTE: Do not force drive cups too close to diff. housings. Leave a little clearance so that the diff. does not bind during operation.

1.6

1.7 Slide ball bearings U13 over each end of the assembled diff.
2. Slide shims M17 over the diff. shafts. Slide drive cups onto diff. shafts and secure with set screw J16.

COMPLETED REAR DIFFERENTIAL
2. FRONT DIFFERENTIAL

- 1681 standard diff. grease
- 1685 silicone grease 50,000 viscosity
- 1686 silicone grease 100,000 viscosity

FRONT DIFFERENTIAL ASSEMBLY
2. FRONT DIFFERENTIAL

2.1 BAG B

1. Press the 10mm long bushings into the diff. halves.
2. Slide shims M17 over long ends of diff. shafts. Then slide diff. shafts through bushings in diff. halves.

2.2

1. Place pins P16 into the diff. housing and place the gears over the pins.
2. Place the short pin P11 in the cavity in the diff. shaft.

2.3

Hint: the standard diff. gear gives a relative free running diff. To increase the resistance (aper) a thicker grease can be used: 1685 sil. grease 50,000 visc. 1686 sil. grease 100,000 visc.

Increasing the aper of the front diff. is used to improve high speed cornering.

A special solid front axle is available to have a fully locked front axle (#801240).

2.4

Assemble the 2 diff. halves, and tighten together with screws G14.

2.5

NOTE: Do not force drive cups too close to diff. housings. Leave a little clearance so that the diff. does not bind during operation.

1. Slide ball bearings U13 over each end of the assembled diff.
2. Slide shims M17 over the diff. shafts. Slide drive cups onto diff. shafts and secure with set screw J16.

2.6

Completed front differential
3. SHOCK-ABSORBERS

Nylon frame parts: 909401

1. Shock body front
2. Shock body rear
3. Top pivot point
4. Fixed Piston
5. Adjustable Piston
6. End cap
7. Spring support washer
8. Piston rod front
9. Piston rod rear
10. Ball joint
11. Alum. collar
12. Adjusting nut

NOTE: shocks are extremely important for the performance of your car. These unique 4-step adjustable shocks must be assembled with great precision. After removing the nylon parts from the frame, make sure to remove the parts with which they were connected to the frame with a sharp knife.

SHOCKABSORBER ASSEMBLY

1. Press C-clips R2 onto shock rod.
2. Slide shim N3 over shock rod.
3. Turn piston onto shock rod.
4. Apply C-clip R1 onto shock rod.
3. SHOCK-ABSORBERS

3.3 Insert shock-rod with piston in cylinder.
- Long rod in long cylinder (Rear)
- Short rod in short cylinder (Front)

3.4
1. Insert O-ring Y17 in adjusting nut.
2. Apply adjusting nut to cylinder.

Note: Apply little oil to the O-rings

3.5 Cross view of assembled adjusting nut.

3.6
1. Place O-ring Y16 over the shock rod. Use some shock-oil to lubricate the O-ring.
2. Apply the end-cap to the bottom part of the cylinder and slide it over the locking cams, turn to lock the end cap.

3.7 Hold the shock rod firm, using pliers, grip on the end of the threaded part, do not damage the shock rod.
Turn the ball-joint clockwise on to the shock rod.

3.8 Fill the cylinder with shock oil, with the piston in the bottom position.

3.9 Bleeding sequence:
Let the oil settle and allow the air to escape. Slowly move the piston up and down until no more air bubbles appear.

3.10 Apply the rubber compensation membrane, to the top pivot-point with Ca glue.

3.11
1. Place the top pivot-point and the membrane onto the shock body.
2. Apply the aluminium collar, note the little notch. Turn the alu collar onto the cylinder, all the way until it stops against the little recess on the cylinder. Some excessive oil may escape.

Check the well functioning of the shock absorber. The shock must move up and down freely with only "Hydraulic" dampening. If any air is still in the shock, open it again and start the bleeding sequence again.

Damping adjustment:
Pull the piston rod all the way down, turn slightly to lock the piston in the cylinder. Then you can adjust the shocks in 1 of the 4 positions. Set the front shocks at position 2 (medium) and the rear shocks at position 1 (light) as a starting setting. All settings clockwise.

3.12
1. Apply the spring (short springs on short shocks)
2. Apply the spring support washer.

Shock length adjustment:
Check the length of the shocks, adjust with the ball-joint.
Shock front: 67.5 mm
Shock rear: 77.5 mm
In fully extended, locked position.
4. REAR TRANSMISSION

4.1

NOTE: steps 4.1 till 4.8 explain the assembly steps of the rear transmission for the single-speed version. For the 2-speed version, first assemble the 2-speed gearbox (chapter 7) and where referred to layshaft, use the 2-speed layshaft instead.

4.5

1. Press pins P16 in layshaft pulley.
2. Press pin P12 into hole near middle of the layshaft.
3. Slide pulley onto layshaft and seat pulley over pin.
4. Slide lock collar onto layshaft, and up against pulley. Secure lock collar with setscrew J16.
5. Place brake disk between brake pads.
6. Slide layshaft through brake disk and bearing in right bearing block.

Glue brake pads to the steel plates with quick CA/super glue. Scratch the steel with light sandpaper before gluing to strengthen bonding.
4. REAR TRANSMISSION

4.2
1. Press pins P6 into right bearing block until end of pins are flush with outer edge of bearing block.
2. Press ballbearing U6 into the right bearing block.
3. Press rollpins Q11 into chassis until bottoms of pins are flush with chassis bottom.

4.3
1. Mount right rear bearing block to the chassis using screws B13.
2. Apply C-clips R4 to the alum. brake cam.
3. Slide the alum. brake cam upward into the hole in bottom of the chassis and bearing block.
4. Slide assembled brake pads (linings together) over pins, and press against alum. brake cam.

4.4
Insert the completed rear diff. in the right bearingblock and apply the belt.

4.5
BAG F

4.6
1. Slide left bearing block over layshaft. Mount left bearing block to chassis plate using screws B13.
2. Slide ballbearing U6 over exposed end of layshaft, and press into cavity in left bearing block.

4.7
1. Mount disk brake bracket to bearingblocks using screws B13.
2. Press pin P12 into layshaft.
3. Slide the side pulley and spacer over end of layshaft.
4. Secure the side pulley to the layshaft using C-clips R5.

4.8
COMPLETED ASSEMBLY
5. REAR SUSPENSION

BAG G

Screw downstop (E11) and upstop (H19) adjusting screws into bottom of lower suspension arms.

REAR SUSPENSION ASSEMBLY

SERPENT IMPULSE
5. REAR SUSPENSION

5.1
1. Position lower suspension arms.
2. Insert lower hinge pins (83mm). Secure hinge pins in lower arms with setscrews J16.
4. Insert upper hinge pins (43mm). Secure hinge pins in upper arms with setscrews J16.

5.2
BAG H
1.2. Apply rear plate. Secure to chassis with screws B13; secure to bearingblocks with screws A13.
3. Mount the rear body-mounting bracket to the rear plate/bearingblocks with screws A14.

5.3
BAG I
1. Press ballbearings U12 into the uprights.
2. Push pivot balls into cavities in uprights. Place nylon rings into cavities, atop pivot balls. Ensure that curved side of nylon rings are against pivot balls. Thread alun. plugs into cavities. Adjust to minimum play, but maintain free movement of pivot balls.

5.4
BAG K
1. Slide axles through bearings.
2. Insert pin P1 through hole in axle.
3. Slide hex drive adapter over end of axle, atop pin.

5.5
NOTE: The pivot balls are used to adjust elevated camber (see Set-up step 5) and rear toe-in (see Set-up step 9).

5.6
Set-up: see BA-3, SU3, SU-5, SU-9
1. Position the drive shaft in the drive cups of the diff and the rear axle.
2. Mount the uprights screwing in the 2 pivot-balls. Screw each ball 2 turns at a time, check that driveshaft is in place.

Place screw G21 through the steel pivot ball, then place atop hole in upper suspension arm. Screw G21 into top of upright until the pivot ball snaps into the upper suspension arm, then tighten against upright.

COMPLETED ASSEMBLY
6. Two-speed transmission (depending on version)

TOOLS (optional)
909595, Geargripper
909596, Gear-nut wrench

BAG L
For clutch assembly, see page 20-21.

2-SPEED GEAR BOX ASSEMBLY
(depends on kit version)
6. Two-speed transmission (depending on version)

6.1 BAG M

Mounting the 2 clutch shoes:
1. Place the 2 shoes on 2-speed drive adapter
2. Place the spring over screw E14 and apply lock-nut L3. Turn the screws in until the head is flush with the lower part of the hole.
3. Position the shoes so that the larger holes are in line with the flats on the 2-speed drive adapter.
4. Insert the balls and turn the 2-speed adjusting nut in until the shoes are just pushed off the 2-speed drive adapter.

6.2

- Cut-away view
- Head is flush with side of hole
- NOTE: the position of the 2 spring loaded screws. They should be flush with the side of the hole. Final adjustment is made when the car is tested on the track. Turning the screws in will give a later shifting point, turning them out will advance the shifting point.

6.3

- Counter clockwise thread, marked with the small groove
- Clockwise thread
- 1. Mount the 50T 1st gear on the 2-speed drive flange, using alu. nut A with counter-clockwise thread (turn counter clockwise to tighten).
- 2. Mount the 47T second gear on the 2-speed clutch-bell, using the alu. nut B (turn clockwise to tighten).
- 3. Apply 2 ballbearings V5.

6.4

1. Apply the alu. spacer on the 2-speed lay-shaft.
2. Place the 2-speed clutch-bell over the lay-shaft and insert pin P12 through the hole of the 2-speed lay-shaft.

6.5

Place the 2-speed drive adapter with the clutch-shoes over the 2-speed lay-shaft.

Adjusting 2-speed clutch shoe gap:

Now adjust the 2 center screws. First release both screws to make sure that the shoes rest on the drive adapter. Now turn one screw in until the clutch shoe touches the clutch bell. This can be checked by spinning the clutch bell. Now turn the center adjusting nut half a turn, the clutch bell should spin freely. Repeat this adjustment for the other center adjusting screw.

6.6

- NOTE: the one-way bearing is very sensitive for lubrication. Use only Serpent One-Way Lube #1680 for highest reliability.

After the 2-speed clutch shoe gap has been adjusted, the drive adapter with the 1st gear can be mounted. Secure with clip R5. Apply the nylon dust-cap by pressing it over the drive-flange.

For the assembly of the 2-speed clutch refer to Clutch Assembly steps (page 20211).
7. REAR-END ASSEMBLY

NOTE: assembly step 7 shows the mounting of the single speed transmission. When using the 2-speed transmission, skip step 7.1, refer to steps 7.4 - 7.6 instead.

REAR END ASSEMBLY, (SINGLE SPEED SHAFT)
7. REAR-END ASSEMBLY

7.1 BAG N

1. Slide alum. gear adapter over end of layshafts. Secure to layshafts with pin P1.
2. Slide the 2nd gear clutchbell over the shaft, and insert pin P12 through the hole in the 2-speed shaft.
3. Secure the gear to the layshafts with flanged nut LF4.

7.2

1. Mount the tops of the rear shocks to the bearingblocks with the bracket and screws A7.
2. Mount the bottom balljoints of the rear shock to the uprights with pivot balls and screws A7.

7.3

Mount the rear body posts using screws A14 and lock-washers O3.

7.4

2-Speed version

7.5

Slide the clutchshoe adapter with the assembled clutchshoes (step 6) over the 2-speed shaft.

7.6

1. Place the assembled 1st speed drive-flange onto the 2-speed adapter.
2. Secure the 2-speed drive flange with C-clips R5. Press the nylon dustcap over the drive-flange.
8. FRONT TRANSMISSION

FRONT TRANSMISSION ASSEMBLY
8. FRONT TRANSMISSION

**8.1**
1. Mount the left front bracket to the chassis plate with screws B13.
2. Place the completed front differential into the left front bracket.

**8.2**
1. Place the front drive belt over the front diff.
2. Place the right front bracket over the front diff. Mount the right front bracket to the chassis plate with screws B13.

**8.3**
Press ball bearings U6 into the middle bearing block.

**8.4**
Mount the middle bearing block to the chassis plate with screws B13.

**8.5**
1. Insert pulley into free loop-end of belt. Place pulley side space beside pulley, against ball bearing.
2. Slide middle shaft through left ball bearing.
3. Press pin P12 into hole in middle shaft. Slide shaft through pulley and right bearing, so that pin rests in cavity in pulley.
4. Press C-clips R5 into end of middle shaft.

**8.6**
1. Press pin P12 into hole in middle shaft.
2. Slide side pulley spacer and side pulley onto middle shaft.
3. Secure side pulley to middle shaft with C-clips R5.

**8.7**
COMPLETED FRONT TRANSMISSION
9. FRONT SUSPENSION

9.1 Front down-stops
   1. Position lower suspension arms in front brackets.
   3. Screw downstop adjusting screws H19 into front brackets.
   4. Hint: use hinge-joon to stretch the holes for free movement of pins.

9.2 Caster adjustment
   1. Position upper suspension arms in front brackets.
   3. Apply the 3 caster spacers behind the upper arms.

9.3 BAG S
   1. Assemble left steering-block marked L.
   2. Press ballbearings U12 into steering block.
   3. Slide axle through bearings. Insert pin P1 through hole in axle. Slide hex drive adapter over end of axle, atop pin.

9.4 BAG R
   1. Place the driveshaft ends in the front diff. drive cups.
   2. Mount the steering-block assemblies by threading the pivot balls into the suspension arms. Turn each pivot ball approx. 2 turns at a time (see BA-1, BA-2, SU-1, SU4).

9.5 NOTE: lubricate the driveshaft ends with a heavy grease or graphite spray before inserting.

9.6 BAG T
   1. Mount the lower front bumper plate to the chassis plate with screws G20 and nuts L4.
   2. Hint: apply some grease to the alum. adjusting plugs before turning them into the steering-block.
   3. NOTE: remove flashes from threaded holes in steering blocks.
10. CLUTCH ASSEMBLY SINGLE SPEED

Using standard type

Shorten crankshaft to 15mm.
Use optional clutch adapter-nut 801548 in stead of standard clutchnut 801520.

STANDARD CLUTCH ASSEMBLY

CLUTCH ASSEMBLY, SINGLE SPEED

(2-Speed clutch assembly, see page 12)
10. CLUTCH ASSEMBLY

10.1 BAG L1 = 1 speed version
   BAG L2 = 2 speed version

NOTE: the clutch assembly is designed for use with engines with a crankshaft with an extended 5mm clutch-end such as the Nova MEGA SX-12E.

Mount the flywheel on the crankshaft. Tighten the clutch nut firmly while holding the flywheel in a vise or with large pliers.

10.2

1. Place the clutch springs in the clutch shoes.
2. Press the clutch shoes stop the pins on the flywheel.

5mm shaft extends 8.5 mm - 9 mm

Clutch shoes in assembled position

Hint: use small screwdriver to push the springs in place.

10.3

10.4

1. Thread the alum. pinion onto the clutch housing.
2. Insert ballbearings V3 into clutch housing.
4. Secure with screw F10 and shim N3.

10.5 BAG Y

NOTE: use some Locktite to prevent the screws from coming loose.

Assemble the engine mounts using screw F13.

10.6

NOTE: When using rear exhaust engine, header pipe is mounted with springs

NOTE: use allen bolts

NOTE: position of ball is horizontal

Assemble the header pipe together with the alu. gasket, using screws D16.
11. LINKAGES

11.1
- Mount the nylon radio-plate bracket to the chassis plate with screws B13.

11.2
- Assemble the throttle and the brake linkage, then mount them to the underside of the servo arm.
- Mount the brake lever to the brake cam with screw D11.

11.3
- Mount the front shock-absorbers to the front brackets and the lower suspension arms, using screws A7.

11.4
- See B4-4, SU-1, SU-8
1. Assemble the track rods (steering linkage).
   - Left track-rod length = 78 mm
   - Right track-rod length = 66 mm

11.5
- Mount the pivot balls on bottom of servo saver with screws C5. Snap track rod ball joints onto pivot balls.
2. Mount pivot balls on bottom of steering block arm with screws D11.

11.6
- Assemble the front bumper and the upper front bumper plate, using screws A13.
- Assemble the front body posts, using screws A1 and pins P5.
12. Radioplate & Final Assembly

NOTE: When using rear exhaust engine, chassis stiffener left is not to be used, special option part nr. 801132 can be obtained at your dealer.

Engine and exhaustpipe mounting are similar to shown side-exhaust version.

Radiator plate assembly

Optional: 808144 universal posts

808141 long posts
808142 shorts posts
12. RADIOPLATE & FINAL ASSEMBLY

12.1 BAG Z
The Impulse radio-plate requires a 5 cell battery pack using 14x35 cells.
Apply some double-sided tape to the top of the battery pack. Fix the battery pack with tape to the radio plate.

12.2
Hint: to protect the receiver against fuel and moisture, pack receiver in a balloon before mounting in the radio plate.
NOTE: only mid or small size receivers can be mounted in this way because of the compact radio-plate design.

12.3
1. Press the antenna rod into the antenna socket on top of the radio plate.
Insert the antenna wire through the hold in the radio plate and through the antenna rod.

12.4
BAG AA
1. Turn brass pressure nipple in tank cap.
2. Apply 2 rubber grommets and mount fuel tank onto radio plate with screws A6.

12.5
Mount the completed radio plate onto the chassis. Secure to the front brackets with screws B13.

12.6
1. Mount the left chassis stiffener, using only screw B14 to fix it to the rear bracket.
2. Mount the engine assembly onto chassis with screws G20 and alum. countersunk washers and adjust the gear-play.
12. Radioplate & Final Assembly

12.7
1. Mount the roll-over bar in the recesses in the radio plate, as shown. Apply screw B14 to the front hole of the left chassis stiffener.
2. Mount the right chassis stiffener with screws B14.

12.8
1. Apply the side belt over the side pulleys.
2. Insert the exhaust mounting wire into the hole at the rear of the front bracket. Secure with set screw H19.

12.9
1. Attach the exhaust pipe to the header with the rubber coupler, securing the coupler with pull-ties. Mount the exhaust on the mounting wire, and secure with set screw J24.
2. Connect fuel line between exhaust pipe nipple and fuel tank cap nipple. Connect fuel line between fuel tank outlet and carburetor.

12.10
1. Glue ends together.

12.11
NOTE: when using CA glue, always use safety glasses and gloves. Wipe off excess glue with a wet tissue.
1. Place foam insert inside of the rubber tire, and distribute it evenly.
2. Apply CA glue

12.12
1. Glue ends of the insert together with neoprene cement.
2. Apply the rubber tires (with inserts) onto the the wheels, and carefully glue the tires to the rim with CA glue.
3. Mount the wheels using the flanged lock-nuts LF4.
You have now completed the Impulse chassis, congratulations!