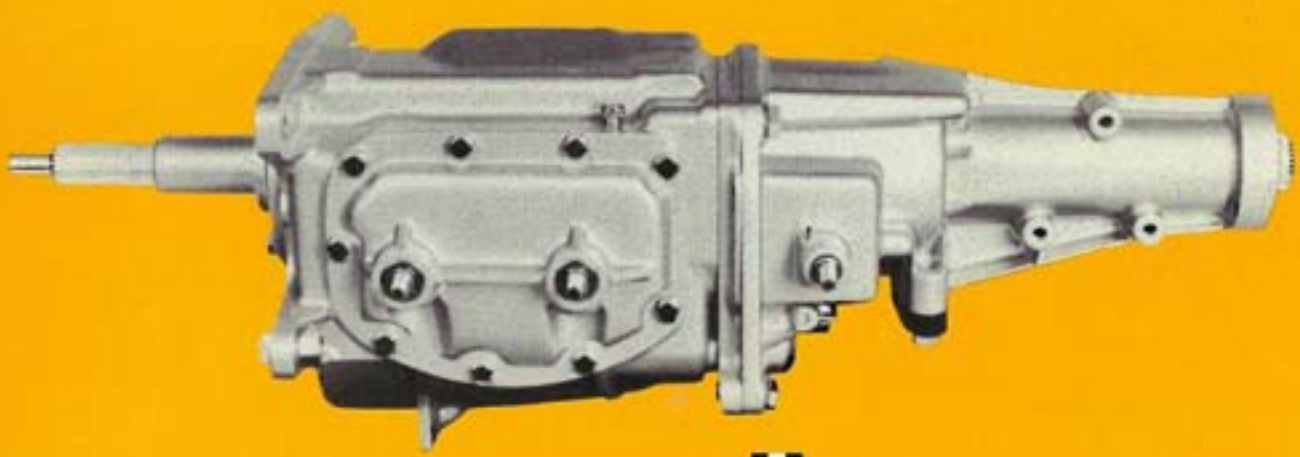
WARNER GEAR

T10



AUTO GEAR

Sports

$4

November 1989

Gentlemen:

You may already know AUTO GEAR COMPANY as a supplier of quality manual transmission gears and parts for cars and trucks.

You may not know that AUTO GEAR SPORTS is a new unit concentrating on high-performance and specialty gear products: Borg-Warner and Doug Nash transmissions and gears, Richmond and Zoom rear end gears, and more.

Competitive prices, deep inventory, and knowledgeable people are an AUTO GEAR tradition. Whether a long time customer or a new friend, I look forward to putting AUTO GEAR SPORTS to work for you.

Very truly yours,

Mark D. Livingston
AUTO GEAR SPORTS

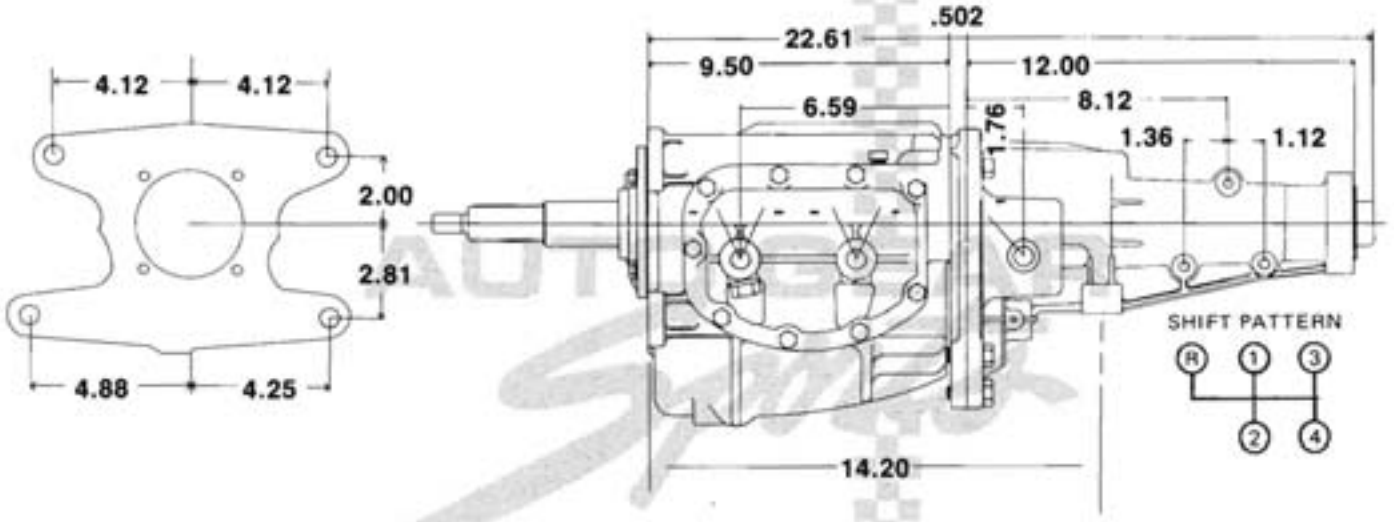
WARNER GEAR T10

In 1957 the Warner T10 gave the Corvette a high-performance four-speed manual equal to those in English and Continental sportscars.

Throughout the 'Muscle Car' era synchronization in all forward gears, enormous strength, and continuous development, made it the transmission of choice.

Today the Warner T10 remains the most reliable and least expensive transmission for high horsepower applications.

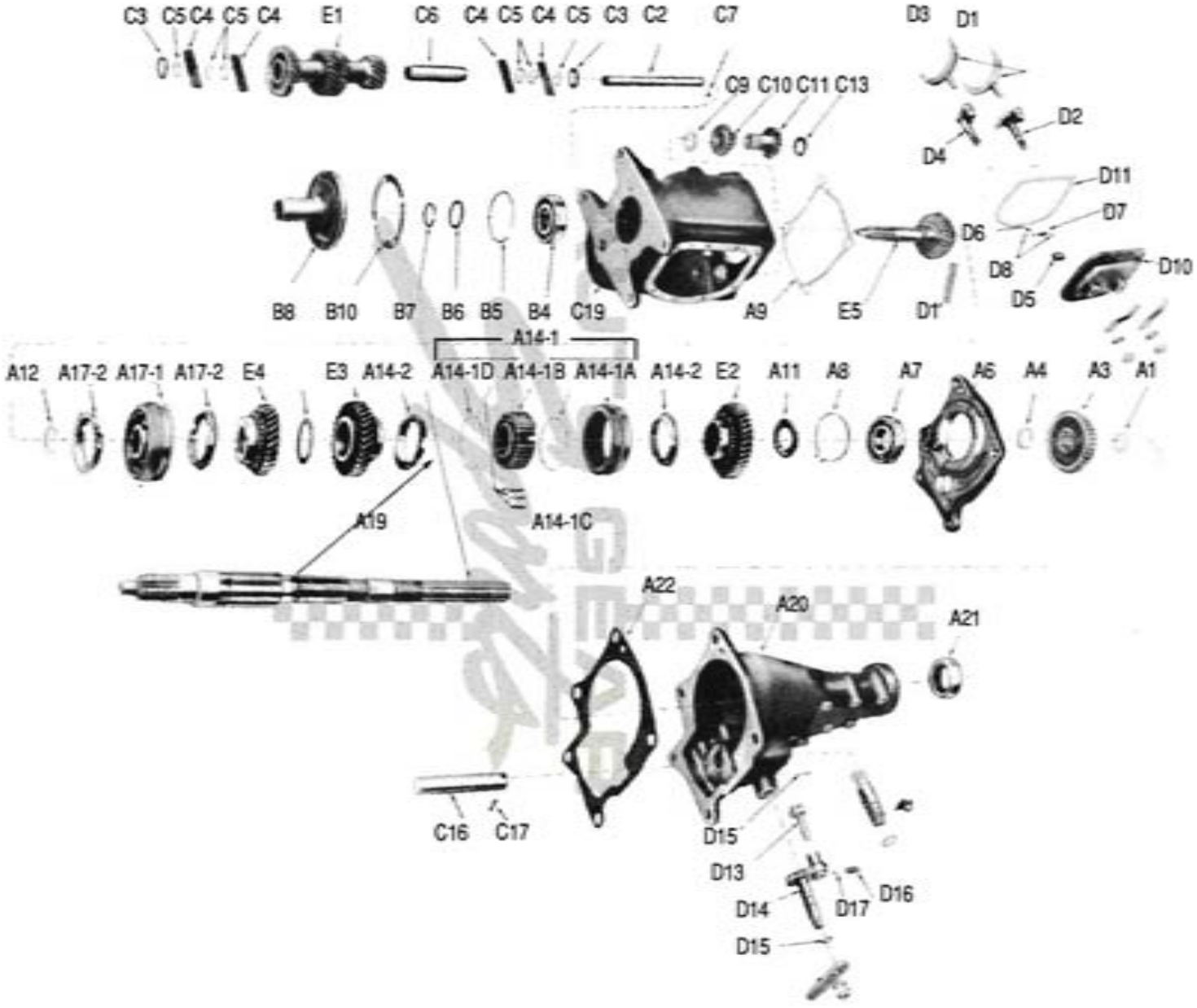
Every manufacturer used it, but first and last the Warner T10 was GM's muscle gearbox. The parts list covers 1974-88 Corvette, Camaro, and Firebird (parts availability for other applications is incomplete: we invite your inquiries). The service notes cover all applications.



Replacing earlier GM transmissions is easy. Use the 1974-82 assemblies. Compare overall length, speedometer gears, and:

For 1957-71 Warner T10 and GM Muncie (with 10 spline clutch and 16 or 27 spline mainshaft) use a 26 spline clutch and 32 spline mainshaft yoke.

For 1971-74 GM Muncie (with 26 spline clutch and 32 spline mainshaft) no changes are necessary.


C3 C5 C4 C5 C4
E1
C6
C4 C5 C4 C5 C3 C2
C7
C9 C10 C11 C13
D3
D1
D2
D4
D11
D7
D6
D8
D10
D5
B8 B10 B7 B6 B5 B4 C19
A9
E5
D1
A14-1
A12 A17-2 A17-1 A17-2 E4
E3 A14-2 A14-1D A14-1B A14-1A A14-2 E2 A11 A8 A7 A6 A4 A3 A1
A19
A14-1C
A22
A20
A21
C16 C17
D15
D13
D14
D17
D16
D15

WARNER GEAR T10 (GENERAL MOTORS)

COMPLETE TRANSMISSION ASSY

(NOTE: 1974-76 assemblies use 1/4-20 speedo screw and 7/16-14 crossmember bolts.
1977-88 assemblies use M6-1.0 speedo screw and M10-1.5 crossmember bolts.
1974-79 assemblies use a thrust washer behind the rear idler gear assembly.
1980-88 assemblies use a thrust bearing behind the rear idler gear assembly)

2.43 low w/ 7T speedo	(1974-76)	361658	*13-04-000-058
2.43 low w/ 7T speedo	(1977-79)	460861	*13-04-000-066
2.43 low w/ 7T speedo	(1980) ..	14000361	13-04-000-070
2.43 low w/ 8T speedo	(1974-76)	346361	*13-04-000-051
2.43 low w/ 8T speedo	(1977-79)	460859	*13-04-000-064
2.43 low w/ 8T speedo	(1980) ..	14000359	13-04-000-068
2.64 low w/ 7T speedo	(1974-76)	361657	*13-04-000-057
2.64 low w/ 7T speedo	(1977-79)	460860	*13-04-000-065
2.64 low w/ 7T speedo	(1980) ..	14000360	13-04-000-069
2.64 low w/ 8T speedo	(1974-76)	346359	*13-04-000-050
2.64 low w/ 8T speedo	(1977-79)	464862	13-04-000-063
2.88 low w/ 8T speedo (32 spline yoke)	(1980-82)	14020828	13-04-000-072
2.88 low w/ 9T speedo (27 spline yoke)	(1982) ..	14036171	13-04-000-075
2.88 low w/ 9T speedo (32 spline yoke)	(1982) ..	14030831	13-04-000-076
3.42 low w/ 8T speedo (aluminum case) .	(1980-82)	14008203	13-04-000-071
3.42 low w/ 8T speedo (iron case)	(1980-82)	14020829	13-04-000-073
3.42 low w/ 9T speedo (aluminum case) .	(1980-82)	14024966	13-04-000-074
2.88 low w/ overdrive (307 rear brg) ..	(1984) ..	14053641	
2.88 low w/ overdrive (308 rear brg) ..	(1985) ..	14091362	
2.88 low w/ overdrive (308 rear brg) ..	(1986) ..	14105925	
2.88 low w/ overdrive (308 rear brg) ..	(1987-88)	10065221	

GROUP A: MAINSHAFT

A1 Speedometer Circle Gear

L7T green nylon	361002	13-04-110-003
L8T blue nylon	6260705	13-04-110-002
L9T white nylon	14038093	13-04-110-004

A2 Speedometer Circle Gear Snapring

all	req.2	3709351	4734

A3 MAINSHAFT REVERSE GEAR

S39-s32T: w/o overdrive	(1974-79)	360804	*13-04-070-001
S39-s32T: w/o overdrive	(1980-82)	14024321	13-04-070-002
S39-s32T: w/ overdrive	(1984-88)	14081174	

A4 Mainshaft Bearing/Shaft Snapring

0.087"	as req.	3709351	4734
0.090"	as req.	3709352	4734A
0.093"	as req.	3709353	4734B
0.096"	as req.	3709354	4734C
0.099"	as req.	3709355	4734D
0.102"	as req.	3709356	4734E

A5 Mainshaft Bearing/Shaft Spacer

all	3709350	4652U

A6 MAINSHAFT BEARING SUPPORT ASSY

w/o overdrive: aluminum	(1974-82)	3931531	AT10-107A
w/o overdrive: iron	(1980-82)	14024313	13-04-672-001
w/ overdrive	(1984)	14081177	
w/ overdrive	(1985-88)	14091353	

A6-1 MAINSHAFT BEARING SUPPORT

w/o overdrive: aluminum	(1974-82)	NSS	T10-107A
w/o overdrive: iron	(1980-82)	NSS	13-04-172-001
w/ overdrive	(1984)	NSS	
w/ overdrive	(1985-88)	NSS	

A6-3 Dowel Pin

all		NSS	10-00-043-008

A7 MAINSHAFT BEARING

w/o overdrive	(1974-82)	907458	10-00-130-004
w/ overdrive	(1984)	907458	10-00-130-004
w/ overdrive	(1985-88)	9441624	

A8 Mainshaft Bearing/Support Snapring

w/o overdrive	(1974-82)	3911967	4829
w/ overdrive	(1984)	3911967	4829
w/ overdrive	(1985-88)	14091354	

A9 Mainshaft Bearing Support Gasket

w/o overdrive	(1974-82)	3787721	T10-145.5C
w/ overdrive	(1984-88)	14081165	

A10 Mainshaft Bearing Support Fasteners

1/2-13 x 1-1/8 hex head bolt			4737D

A11 Mainshaft 1st Gear Thrust Washer

w/o overdrive	(1974-82)	6260715	13-04-193-002
w/ overdrive	(1984)	6260715	13-04-193-002
w/ overdrive	(1985-88)	14091352	

E2 MAINSHAFT 1ST GEAR

L34-s36T		360803	13-04-080-004
L30-s36T		14013082	13-04-080-023

A13 Mainshaft 1st Gear Sleeve

all		6260712	13-04-103-001

A14 1ST/2ND SYNCHRONIZER ASSY

stamped strut design			
cast strut design		14101337	13-04-590-010

A14-1 1ST/2ND SYNCHRONIZER ASSY

stamped strut design			13-04-590-001
cast strut design			13-04-590-009

A14-1a Clutch

stamped strut design			T10-15
cast strut design			13-04-089-005

A14-1b Hub

all			13-04-090-008

A14-1c Strut

stamped strut design	req.3	3709306	T85B-13
cast strut design	req.3	3870793	T16-13

A14-1d Spring

stamped strut design	req.2	3709349	T91A-26
cast strut design	req.2	3870810	4682AJ

A14-2 1ST/2ND SYNCHRONIZER RING

s36T	req.2	360812	13-04-091-002

E3 MAINSHAFT 2ND GEAR

L25-s36T		474035	13-04-080-001

E4 MAINSHAFT 3RD GEAR

L22-s36T ..... 474034 ..... T10S-11
L20-s36T ..... 3931524 ..... T10U-11
L21-s36T 14024322 13-04-080-019

A17 3RD/4TH SYNCHRONIZER ASSY

stamped strut design ....
cast strut design 14101338 13-04-590-008

A17-1 3RD/4TH SYNCHRONIZER ASSY

stamped strut design AT10-2.5
cast strut design 13-04-590-007

A17-1a Clutch

stamped strut design T10-15
cast strut design 13-04-089-005

A17-1b Hub

stamped strut design T10-2.5
cast strut design 13-04-090-007

A17-1c Strut

stamped strut design ..... req.3 ..... 3709306 ..... T85B-13
cast strut design ..... req.3 ..... 3870793 ..... T16-13

A17-1d Spring

stamped strut design ..... req.2 ..... 3709349 ..... T91A-26
cast strut design ..... req.2 ..... 3870810 ..... 4682AJ

A17-2 3RD/4TH SYNCHRONIZER RING

s36T ..... req.2 ..... 360812 13-04-091-002

A18 3rd/4th Synchronizer Snapring

0.087" ..... as req. ... 3709351 4734
0.090" ..... as req. ... 3709352 ..... 4734A
0.093" ..... as req. ... 3709353 ..... 4734B
0.096" ..... as req. ... 3709354 ..... 4734C

A19 MAINSHAFT

s6-10-32-32T: w/o overdrive ..... (1974-82) 6260713 13-04-171-005
s6-10-32-27T: w/o overdrive ..... (1982) .. 14053394 13-04-171-007
s6-10-32-32T: w/ overdrive ..... (1984-88) 14081170 ....

A20 MAINSHAFT EXTENSION (ADAPTER) ASSY

(NOTE: 1974-76 extensions use 1/4-20 speedo screw and 7/16-14 crossmember bolts. 1977-88 extensions use M6-1.0 speedo screw and M10-1.5 crossmember bolts. REFER TO SERVICE NOTES)

#13-04-066-903: 32 spline mainshaft ... (1974-76) 360809 .....*13-04-566-001
#13-04-066-903: 32 spline mainshaft ... (1977-79) *13-04-566-003

(NOTE: these TWO (2) IRON extensions used with thrust washer supported idler)

#13-04-066-905: 32 spline mainshaft ... (1980-82) 14013088 13-04-566-005
#13-04-066-906: 27 spline mainshaft ... (1982) .. 14055005 13-04-566-006

(NOTE: these TWO (2) ALUMINUM extensions used with thrust bearing supported idler)

: w/ overdrive ..... (1984-88) 14082724 ....

A20-1 MAINSHAFT EXTENSION (ADAPTER)

#13-04-066-903: 32 spline mainshaft ... (1974-76) NSS 13-04-066-001
#13-04-066-903: 32 spline mainshaft ... (1977-79) NSS 13-04-066-003
#13-04-066-905: 32 spline mainshaft ... (1980-82) NSS 13-04-066-005
#13-04-066-906: 27 spline mainshaft ... (1982) .. NSS 13-04-066-006
: w/ overdrive ..... (1984-88) NSS .....

A20-2 Mainshaft Bushing

32 spline mainshaft ..... (1974-82) NSS 10-00-127-002

(NOTE: production bushing reamed in place. For service use 3978765)

27 spline mainshaft ..... (1982) .. NSS R10H-77

(NOTE: production bushing reamed in place. For service use 6260048)

A21 MAINSHAFT OILSEAL

32 spline mainshaft ..... (1974-82) 6260707 ..... T22-110A
27 spline mainshaft ..... (1982) .. 14053338 10-00-044-015

A22 Mainshaft Extension Gasket
- w/o overdrive ..... (1974-82) 3787720 ..... T10-146A
- w/ overdrive ..... (1984-88) 14081178 ....

A23 Mainshaft Extension Fasteners
- 7/16-14 x 1-1/8 hex head bolt req.2 179859
- 1/2-13 x 1-7/8 hex head bolt req.3 179888

(NOTE: these TWO (2) items used on 1974-82 assemblies w/o overdrive)

GROUP B: MAINDRIVE AND RETAINER

B1 Mainshaft Pilot Bearing
- all ..... req.16 .... 9423039 ..... T85G-26

B2 Mainshaft Pilot Bearing Washer
- all ..... 389677 ..... T85G-25

E5 MAINDRIVE GEAR
- L21-s36T: 9.00" long 360807 13-04-085-006
- L20-s36T: 9.00" long 360814 13-04-085-016
- L17-s36T: 9.00" long 14024319 13-04-085-023
- L19-s36T: 9.00" long 14024318 13-04-085-022

B4 MAINDRIVE BEARING
- all 908216 10-00-130-005
- all ..... 9441907 .....

B5 Maindrive Bearing/Case Snapring
- all ..... 2830050 ..... T90A-6.5

B6 Maindrive Bearing/Shaft Spacer
- all ..... 3709350 ..... 4652U

B7 Maindrive Bearing/Shaft Snapring
- 0.087" ..... as req. ... 3709351 4734
- 0.090" ..... as req. ... 3709352 ..... 4734A
- 0.093" ..... as req. ... 3709353 ..... 4734B
- 0.096" ..... as req. ... 3709354 ..... 4734C
- 0.099" ..... as req. ... 3709355 ..... 4734D

B8 MAINDRIVE RETAINER
- #T89C-6A: 9.00" maindrive 360806 13-04-027-001

B9 MAINDRIVE OILSEAL
- CR#12363 ..... 3987936 ..... T89C-54

B10 Maindrive Retainer Gasket
- all ..... 1359473 ..... T85B-145C

B11 Maindrive Retainer Fasteners
- 5/16-18 x 7/8 hex head bolt req.4 179817
- 5/16 lockwasher req.4 114605

GROUP C: COUNTERSHAFTS AND CASE

E1 COUNTERSHAFT CLUSTER GEAR
- R27-23-20-18T 360805 13-04-077-009
- R28-23-20-18T 360810 13-04-077-008
- R31-25-20-16T 14024316 13-04-077-016
- R29-24-20-18T 14024317 13-04-077-017

C2 COUNTERSHAFT
- all 6260711 13-04-068-001
- all ..... 14105969 ....

C3 Countershaft Thrust Washer
- all ..... req.2 ..... 6260714 13-04-193-001

C4 Countershaft Rollers
all ..... req.112 ... 435847 ..... T86-166
C5 Countershaft Roller Spacers
all ..... req.6 ..... 6260709 13-04-053-004
all ..... req.6 ..... 474037 .....
C6 Countershaft Roller Tube
all 6260708 13-04-053-003
all ..... 474036 .....
C7 Countershaft Key
all 124545 103905
C9 Idler Gear (Front) Thrust Washer
all ..... 3774909 ..... T10-88A
C10 IDLER GEAR (FRONT)
L16-s27T ..... (1974-79) 3936254 .....*T10T-10
L16-s27T ..... (1980-88) 14024315 13-04-084-005
L15-s27T ..... (1980-88) 14024314 13-04-084-004
C11 IDLER GEAR ASSY (REAR)
S19-s27T: used w/ thrust washer ..... (1974-79) 3774905 ..... AT10-34C
S19-s27T: used w/ thrust bearing ..... (1980-82) 14024320 13-04-584-002
S19-s27T: w/ overdrive ..... (1984-88) 14081171 ....
C11-1 IDLER GEAR (REAR)
S19-s27T: used w/ thrust washer ..... (1974-79) NSS T10-34C
S19-s27T: used w/ thrust bearing ..... (1980-82) NSS 13-04-084-003
S19-s27T: w/ overdrive ..... (1984-88) NSS .....
C11-2 Idler Gear Bushing
all ..... req.2 ..... NSS T10-85A
C12 Idler Gear Snapring
all ..... 3774910 ..... 4821A
C13 Idler Gear (Rear) Thrust Washer
all ..... (1974-79) 3870799 ..... T16-32
C14 Idler Gear (Rear) Thrust Bearing
w/o overdrive ..... (1980-82) 361143 ..... 4830G
w/ overdrive ..... (1984-88) 9441010 .....
C15 Idler Gear (Rear) Thrust Race
w/o overdrive ..... (1980-82) 14013087 11-20
w/ overdrive ..... (1984-88) 14082798 ....
C16 IDLER SHAFT
all ..... 3746277 ..... T10-35
C17 Idler Shaft Lockpin
all 456876 456876
C18 Idler Shaft Lockpin Plug
all 4572W
C19 CASE
#13-04-065-903: aluminum ..... (1974-82) 6260710 13-04-065-003
#13-04-065-904: iron ..... (1980-82) 14034921 13-04-065-004
: w/ overdrive ..... (1984-88) 14081162 ....
C20 Filler/Drain Plug
w/ magnet ..... req.2 ..... 3968034 10-00-052-021
C21 Breather
all 10-00-072-002

GROUP D: INTERNAL SHIFT LINKAGE

D1 1ST/2ND SHIFT FORK

#13-04-096-902		360088	13-04-096-002

D2 1ST/2ND SHIFT LEVER ASSY

w/o overdrive	(1974-76)	360087	13-04-598-009
w/o overdrive	(1977-82)	474031	13-04-598-012
w/ overdrive	(1984-88)	14081168	

D2-1 1st/2nd Shift Lever

all		NSS	T10-40A

D2-2 1st/2nd Shift Shaft

w/o overdrive		NSS	13-04-122-005
w/o overdrive		NSS	13-04-122-007
w/ overdrive		NSS	

D3 3RD/4TH SHIFT FORK

#13-04-096-902		360088	13-04-096-002

D4 3RD/4TH SHIFT LEVER ASSY

w/o overdrive	(1974-76)	360086	13-04-598-008
w/o overdrive	(1977-82)		13-04-598-013
w/ overdrive	(1984-88)	14081169	

D4-1 3rd/4th Shift Lever

all		NSS	T10-40

D4-2 3rd/4th Shift Shaft

w/o overdrive		NSS	13-04-122-005
w/o overdrive		NSS	13-04-122-007
w/ overdrive		NSS	

D5 INTERLOCK SLEEVE

1.01025" long	as req.	360089	13-04-103-002
1.01175" long	as req.	360090	13-04-103-003
1.01325" long	as req.	360091	13-04-103-004
1.01475" long	as req.	360092	13-04-103-005
1.01625" long	as req.	360093	13-04-103-006
1.01775" long	as req.	360094	13-04-103-007
1.01925" long	as req.	360095	13-04-103-008
1.02075" long	as req.	360096	13-04-103-009
1.02225" long	as req.	360097	13-04-103-010
1.02375" long	as req.	360098	13-04-103-011
1.02525" long	as req.	474032	13-04-103-012
1.02675" long	as req.	474033	13-04-103-013

D6 Interlock Pin

all		3709315	T85B-87

D7 Detent Spring

all		3709310	T85B-42

D8 Detent Ball

all	req.2	453593	453593

D9 SHIFT LEVER OILSEAL

all	req.2	6260717	T90A-108

D10 SHIFT COVER

#13-04-097-901			13-04-097-003
#13-04-097-901		360811	13-04-097-004

D11 Shift Cover Gasket

all		3709316	T85B-115

D12 Shift Cover Fasteners

5/16-18 x 3/4 hex head bolt	req.9	9424877	179816

D13 REVERSE SHIFT FORK

w/o overdrive	(1974-82)	3743478	T10-24
w/ overdrive	(1984-88)	14081173	

D14 REVERSE SHIFT LEVER ASSY

w/o overdrive: 32 spline mainshaft	(1974-82)	6260716	13-04-598-003
w/o overdrive: 27 spline mainshaft	(1982)	14053395	13-04-598-014
w/ overdrive	(1984-88)	14081175	

D14-1 Reverse Shift Lever

all		NSS	T10-41

D14-2 Reverse Shift Shaft

w/o overdrive: 32 spline mainshaft		NSS	13-04-122-003
w/o overdrive: 27 spline mainshaft		NSS	13-04-122-008
w/ overdrive		NSS	

D15 Reverse Shift Lever Taper Pin

all			103565

D16 Detent Spring

all		3773017	T10-42

D17 Detent Ball

all		453593	453593

D18 SHIFT LEVER OILSEAL

w/o overdrive: 32 spline mainshaft	(1974-82)	5696537	3-188
w/o overdrive: 27 spline mainshaft	(1982)	6260717	T90A-108
w/ overdrive	(1984-88)	6260717	T90A-108

GROUP E: VARIABLE GEARSET

	T10S RATIO	T10W RATIO	T10CC RATIO	T10Z RATIO
1ST	2.43	2.64	2.88	3.42
2ND	1.61	1.75	1.91	2.28
3RD	1.23	1.34	1.34	1.46
4TH	1.00	1.00	1.00	1.00
REV	2.35	2.55	2.78	3.51

E1 COUNTERSHAFT CLUSTER GEAR

R27-23-20-18T	R28-23-20-18T	R29-24-20-18T	R31-25-20-16T
13-04-077-009	13-04-077-008	13-04-077-017	13-04-077-016
360805	360810	14024317	14024316

E2 MAINSHAFT 1ST GEAR

L34-s36T	L34-s36T	L34-s36T	L30-s36T
13-04-080-004	13-04-080-004	13-04-080-004	13-04-080-023
360803	360803	360803	14013082

E3 MAINSHAFT 2ND GEAR

L25-s36T	L25-s36T	L25-s36T	L25-s36T
13-04-080-001	13-04-080-001	13-04-080-001	13-04-080-001
474035	474035	474035	474035

E4 MAINSHAFT 3RD GEAR

L27-s36T	L27-s36T	L21-s36T	L20-s36T
T10S-11	T10S-11	13-04-080-019	T10U-11
474034	474034	14024322	3931524

E5 MAINDRIVE

L21-s36T	L20-s36T	L19-s36T	L17-s36T
13-04-085-006	13-04-085-016	13-04-085-022	13-04-085-023
360807	360814	14024318	14024319

E6 IDLER GEAR (FRONT)

L16-s27T	L16-s27T	L16-s27T	L15-s27T
*T10T-10	*T10T-10	13-04-084-005	13-04-084-004
3936254	3936254	14024315	14024314

WARNER GEAR T10 KITS AND SPECIAL PARTS

Small parts kits contain the snaprings, thrust washers, loose roller bearings and spacers required when rebuilding your transmission. When halfway done you realize a snapring can't be reused you'll appreciate the kit. **For ALL Warner T10 applications.**

SMALL PARTS KIT

all w/o mainshaft thrust flange ..... (1957-65) SP10-50
all w/ mainshaft thrust flange ..... (1965-74) SP10P-50
(NOTE: this ONE (1) kit used with 0.88" diameter countershaft)
all w/ mainshaft thrust flange ..... (1974-84) SP10W-50
(NOTE: this ONE (1) kit used with 1.00 diameter countershaft)
Corvette w/ overdrive ..... (1984) SP10W-50
Corvette w/ overdrive ..... (1985-88) .....

Gasket sets contain the paper gaskets to complete your rebuild. Substituting RTV sealant may reduce or eliminate required clearances. **For ALL Warner T10 applications.**

GASKET SET

all w/o overdrive ..... (1957-82) T10-55
Corvette w/ overdrive ..... (1984-88) .....

Ball bearings with plastic retainers can't handle racing temperatures. These special bearings have steel retainers and special inner races developed specifically for the T10. **For ALL Warner T10 applications.**

MAINDRIVE BEARING

all ..... (1957-88) 10-00-130-005

MAINSHAFT BEARING

all w/o overdrive ..... (1957-84) 10-00-130-004

Stock sliding clutches are for stock transmissions. Special clutches may be better for race or high powered street applications. **For ALL Warner T10 applications.**

SLIDING CLUTCHES

stock design (w/o back taper splines) T85B-15
(NOTE: this ONE (1) clutch used with hollow struts T85B-13)
stock design (w/o back taper splines) 13-04-089-005
torque lock design (w/ back taper splines) 13-04-089-006
(NOTE: these TWO (2) clutches used with solid struts T16-13)
power shift design (18 spline) T10N-15
(NOTE: this ONE (1) clutch may be used with or without synchronizer rings. NOT FOR STREET APPLICATIONS)

Worn or broken struts can cause shift problems. Synchronizer repair kits contain three struts and two springs to repair one synchronizer. **For ALL Warner T10 applications.**

SYNCHRONIZER REPAIR KITS

hollow struts 13-04-410-001
solid struts 13-04-410-002

WARNER GEAR T10 SERVICE PROCEDURE

GENERAL

Do not open a healthy transmission except for pre-race inspection or to change ratios. Improper rebuilding may damage the assembly. List all symptoms and study the troubleshooting guide before opening the unit. Use proper tools on a clean bench. Carefully follow the procedure, refrain from using unnecessary force, and work at a sensible speed.

LUBRICANTS AND SEALANTS

Choose an operating lubricant to meet the vehicle service cycle. Follow manufacturer recommendations or (for racing) common practice for your form of competition.

Use the operating lubricant to lubricate the running surfaces of all gears and bushings during assembly.

Retain loose rollers, thrust washers, and spacers with petroleum jelly during assembly. **Do not use grease**. Grease provides inadequate lubrication and will not dissolve in oil.

Apply sealing cement to all through bolts, fill and drain plugs, and idler shaft cup plug during assembly.

When called for, use gaskets to seal mating parts. Substituting RTV sealant may reduce or eliminate required clearances.

DISASSEMBLE

Follow the manufacturers recommended procedure to remove the transmission from the vehicle. *Threading TWO (2) STUDS in the upper mounting holes will support the transmission and protect the clutch disc .*

If not done previously, drain the lubricant.

Shift the transmission into neutral. Remove the shift cover assembly, gasket, and fasteners.

Remove the maindrive retainer, gasket, and fasteners.

Remove the reverse shift lever taper pin by driving toward the rear.

Remove the extension assembly, gasket, and fasteners. Use a soft hammer to free the extension, pulling the reverse shift lever assembly outward to separate the reverse shift fork and mainshaft reverse gear.

Remove the rear idler gear, rear idler thrust race and bearing (washer on some models).

Remove the speedometer circle gear and mainshaft reverse gear.

Remove the mainshaft and mainshaft bearing support as an assembly.

Remove the mainshaft pilot rollers and synchronizer ring.

Remove the front idler gear and front idler gear thrust washer.

Remove the maindrive bearing/shaft snapring and spacer. Carefully press the maindrive into the case and remove.

Remove the maindrive bearing assembly by tapping from the inside of the case outward.

Drive the countershaft toward the rear and remove. Remove the countershaft cluster gear assembly and separate the countershaft thrust washers, rollers, roller spacers, roller tube, and countershaft cluster gear.

From the mainshaft assembly, remove the 3rd/4th synchronizer snapring, 3rd/4th synchronizer assembly, and mainshaft 3rd gear *(also thrust bearing, 2nd gear, and synchronizer ring on flangeless 1957-65 assemblies).*

With the pilot end down, support the mainshaft assembly under the mainshaft bearing support. Spread the mainshaft bearing/support snapring and press the mainshaft assembly through the support.

With the pilot end down, support the mainshaft assembly under the mainshaft 2nd gear *(synchronizer hub on flangeless 1957-65 assemblies).* Remove the mainshaft bearing/shaft snapring and spacer. Press the mainshaft through and separate the mainshaft bearing, mainshaft 1st gear and sleeve, 1st/2nd synchronizer assembly, and mainshaft 2nd gear.

From the extension assembly, remove the idler shaft lockpin plug. Drive the idler shaft lockpin into the idler shaft clearance hole and remove the shaft and pin. Remove the reverse shift fork. Drive the reverse shift lever assembly inwards and remove the lever, detent ball, and detent spring.

CLEAN AND INSPECT

Wash the case, extension, mainshaft bearing support, shift cover, and maindrive retainer thoroughly inside and out, removing all dirt, metal, and loose contaminants. Inspect all mating surfaces for dings and burrs and remove where found.

Wash the ball bearings in cleaning solvent. Blow out with dry compressed air while slowing turning the bearings by hand. **Do not allow the bearings to spin.** Lubricate and inspect. Replace the bearings if rough, noisy, or excessively loose.

Inpect all loose rollers, thrust washers, and spacers for wear and replace if necessary. Replace all spread or twisted snaprings. Use new parts (from a small parts kit) whenever possible.

Inspect the countershaft for wear and replace if pitted or worn.

Inspect all gears for missing, broken, or damaged teeth and replace if necessary. Small chips and blemishes can be blended with a die grinder to reduce induced noise. Replace any heat damaged ('blued') gear or shaft.

Inspect the synchronizer rings and gear cones for complete clutching teeth without burrs. The rings should have straight (not flared or 'bell mouthed') strut pockets, fit the mating cones without rocking, and leave a gap when pressed tight. The gear cones should not show excessive polish, but have a uniform taper without ridges. Replace if necessary.

Inspect the synchronizers for broken, distorted, or worn struts. Hubs should be without burrs, and with straight strut pockets. Replace if necessary.

Remove and discard old oilseals and gaskets.

ASSEMBLE

Press maindrive bearing on maindrive. Assemble maindrive bearing/shaft spacer and retain with the thickest snapring that will go on *(endplay should not exceed 0.005")*. Some early assemblies used a left-handed nut which should be tightened and staked.

Assemble the countershaft cluster gear assembly. Retain the countershaft roller tube, rollers, and roller spacers in the gear with petroleum jelly. Lock each roller track by installing the last roller endwise.

Rest the case with the side opening up. Place the countershaft thrust washer tangs in the notches provided and retain with petroleum jelly.

Carefully, set the countershaft cluster gear assembly in the case without disturbing the countershaft thrust washers. **Do not install the countershaft at this time.**

Pass the maindrive assembly through the side opening and gently tap into place. Retain with the maindrive bearing/case snapring.

Place the countershaft cluster gear assembly in mesh with the maindrive. Install the countershaft key and press in the countershaft until flush with rear of case. *The ccountershaft cluster gear must spin freely and endplay must not exceed 0.025".*

Assemble the synchronizers. The 1st/2nd synchronizer assembly *(10 spline)* is correctly assembled when the clutch taper faces 1st gear and the long hub faces 2nd gear. The 3rd/4th synchronizer assembly *(6 spline)* is correctly assembled when the clutch taper and the long hub face the maindrive.

Assemble the mainshaft 2nd gear, synchronizer ring, and 1st/2nd synchronizer assembly *(synchronizer only on flangeless 1957-65 assemblies)* on the mainshaft. Press the mainshaft 1st gear bushing until seated against the synchronizer hub. Assemble a second synchronizer ring, mainshaft 1st gear, and mainshaft 1st gear thrust washer on the mainshaft. *Insure that the oil grooves on the thrust washer face 1st gear and the synchronizer struts fall in the ring strut pockets.*

Press the mainshaft bearing tightly against the mainshaft shoulder. Assemble the mainshaft bearing/shaft spacer and retain with the thickest snapring that will go on *(endplay should not exceed 0.005").*

From the front of the mainshaft assemble the mainshaft 3rd gear, synchronizer ring, and 3rd/4th synchronizer assembly *(also synchronizer ring, 2nd gear, and thrust bearing on flangeless 1957-65 assemblies).* Retain with a **narrow** *(0.087")* snapring.

Assemble the mainshaft bearing support on the mainshaft. Spread the mainshaft bearing/support snapring and press the mainshaft assembly downward until the snapring relaxes in the bearing groove.

Assemble the mainshaft reverse gear with the shift flange toward the rear.

Assemble the speedometer circle gear and retain. Early General Motors assemblies use a press-fit steel gear which should be driven until centered 4-1/2" behind the rear face of the mainshaft bearing support.

Stand the case upright, resting on the front face with maindrive down.

Assemble the mainshaft pilot rollers in the maindrive and retain with petroleum jelly. Place the remaining synchronizer ring on the maindrive cone and the mainshaft bearing support gasket on the case. Place the front idler thrust washer and front idler gear on the case idler boss.

Lower the mainshaft assembly into the case. Turn the maindrive synchronizer ring until the struts fall in the strut pockets. Install and tighten the mainshaft bearing support bolt.

Assemble the rear idler gear through the mainshaft bearing support, engaging the front idler gear already in the case. Place the mainshaft extension gasket on the support.

Press the idler shaft into the extension. Retain with the idler shaft lockpin and seal the opening with the idler shaft lockpin plug. Assemble the rear idler gear thrust race and bearing (washer only on some assemblies) on the idler shaft and retain with petroleum jelly.

Shift both synchronizers to neutral *(centered clutches).*

Assemble the detent ball, detent spring, reverse shift lever assembly and reverse shift fork in the extension. **Do not install the reverse shift lever taper pin until the extension is installed.**

Pull the reverse shift lever assembly outwards and toward the extension front. Start the extension onto the mainshaft until the reverse shift fork will fall in the reverse gear flange. Push the reverse shift lever assembly inward and toward the rear as the extension seats. Install and tighten the extension bolts.

Line up the groove on the reverse shift lever assembly with the extension hole and press in the reverse shift lever taper pin.

Assemble the maindrive retainer, maindrive oilseal, and gasket. Install and tighten the retainer bolts.

Place forks in each sliding clutch groove. With the shift levers in neutral, assemble the shift cover and shift cover gasket on the forks and seat against the case. Install and tighten the cover bolts. **Check that all ranges are present and that the levers will overshift slightly in all gears before installing the transmission in the vehicle.**

Follow the manufacturers recommended procedure to install the transmission in the vehicle. *Threading TWO (2) STUDS in the upper mounting holes will support the transmission and protect the clutch disc .*

FILL THE TRANSMISSION WITH LUBRICANT BEFORE DRIVING.

TORQUE VALUES (clean new fasteners)

	initial	recheck
Maindrive Retainer Bolts ... 5/16-18 x 7/8	15-20 lb ft ..	%8-10 lb ft
Shift Cover Bolts ..... 5/16-18 x 3/4	15-20 lb ft ..	%8-10 lb ft
Extension Housing Bolts .... 7/16-14 x 1-1/8 ...	20-30 lb ft ..	%14-21 lb ft
Extension Housing Bolts .... 1/2-13 x 1-7/8	35-45 lb ft ..	%25-32 lb ft
Bearing Support Bolt ..... 1/2-13 x 1-1/8	30-40 lb ft ..	%21-28 lb ft
Drain Plug	15-25 lb ft ..	
Fill Plug	25-35 lb ft ..	

(NOTE: Recheck torque after 24 hours to meet minimum values marked %.)

WARNER GEAR T10 TROUBLESHOOTING

ALL GEARS MISSING BUT SPEEDOMETER FUNCTIONS

(1) Broken mainshaft or driveshaft yoke

ALL GEARS MISSING AND SPEEDOMETER DOES NOT FUNCTION

(1) Broken maindrive or clutch

ALL INDIRECT GEARS MISSING/DIRECT GEAR PRESENT

(1) Broken teeth on maindrive or countershaft cluster

ALL INDIRECT GEARS PRESENT/DIRECT GEAR MISSING

(1) Broken clutching teeth on maindrive or sliding clutch

ONLY ONE GEAR MISSING/OTHERS PRESENT

(1) Broken teeth on mainshaft gear or countershaft cluster
(2) Broken clutching teeth on mainshaft gear or sliding clutch

TRANSMISSION LOCKED IN ALL GEARS

(1) Worn or bent shift fork
(2) Worn or broken synchronizer rings
(3) Worn or broken detent spring
(4) Worn or broken interlock

TRANSMISSION LOCKED IN ALL GEARS BUT ONE

(1) Siezed mainshaft gear

PERSISTENT MAINSHAFT OILSEAL LEAK

(1) Worn universal joint
(2) Bent or unbalanced driveshaft assy
(3) Worn mainshaft bushing

WARNER GEAR T10 TROUBLESHOOTING

NOISE WITH THE TRANSMISSION IN NEUTRAL

(1) Low oil level or improper oil used
(2) Worn bearings
(3) Worn countershaft thrust washers
(4) Loose material in transmission
(5) Worn or spread case

NOISE IN ALL GEARS (QUIETEST IN FOURTH)

(1) Low oil level or improper oil used
(2) Worn bearings
(3) Broken or damaged maindrive or countershaft drive teeth

NOISE IN ONE OR MORE INDIRECT GEARS

(1) Broken or damaged mainshaft gear or countershaft gear teeth
(2) Broken or missing snaprings, washers, or spacers

GEAR CLASH IN SHIFTING

(1) Clutch not releasing fully
(2) Bound clutch pilot bushing or bearing
(3) Worn synchronizer rings or mating gear cones
(4) Worn or broken synchronizer struts
(5) Broken or missing synchronizer rings

HARD SHIFTING

(1) Worn or bent external shift linkage
(2) Worn or broken synchronizer struts
(3) Broken or missing synchronizer rings
(4) Excessively heavy oil used

JUMPS OUT OF FOURTH (DIRECT) GEAR

(1) Misaligned transmission case or clutch housing
(2) Low oil level or improper oil used
(3) Worn clutch pilot bearing or bushing
(4) Worn clutching teeth or sliding clutch
(5) Worn or broken detent spring
(6) Worn or bent shift fork
(7) Excessive maindrive endplay
(8) Worn maindrive bearing

JUMPS OUT OF ONE OR MORE INDIRECT GEARS

(1) Low oil level or improper oil used
(2) Worn mainshaft pilot or pilot rollers
(3) Worn clutching teeth or sliding clutch
(4) Worn or broken detent spring
(5) Worn or bent shift fork
(6) Excessive mainshaft endplay
(7) Worn mainshaft bearing