

CONFIDENTIAL

FORD-PANTERA
(DeTomaso/Cobra)

ZF 5DS 25/1 OR /2 TRANSAXLE REQUIREMENTS

REPORT

on

FINALIZED PROGRAM DETAILS

STATUS DATE: OCTOBER 1, 1970

DISTRIBUTION:

To: Mr. R. A. Geddes

cc: Mr. L. A. Iacocca
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Mr. J. H. Passino

Info: Mr. A. R. Hamilton, Ford-Europe
Mr. Leonard Martin, Ford-Cologne

Mr. H. C. MacDonald
Mr. F. C. Schoonover
Mr. V. L. Vickland

By: F. L. Theyleg,
(On Special Program Detachment)

Ref: Report by Writer, Same Program, Dated March 9-23, 1970

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REPORT

1. BACKGROUND

The Ford-Pantera (DeTomaso-Cobra) program is based on the use of the Zahnradfabrik Friedrichshafen (ZF) transaxle 5DS 25/1 or /2, developed by ZF but adapted and improved by myself for suitability in the Ford GT 40 (5 Liter), Indianapolis and other Race and Speciality vehicles. These include the 1967 Ford-Mach II Prototype and the 1968/69 DeTomaso-Mangusta, Ford-powered, Limited Production midship-engine vehicles; the latter being superseded by the Pantera. (Attachment I)

The technical and production delivery problems encountered by DeTomaso Automobile SpA, compounded by personality difficulties between DeTomaso and ZF personnel (see Attachment III) endangered the Cobra program and required Mr. R. A. Geddes, Ford Program Manager, Mr. W. P. Benton, former Executive Assistant to Mr. L. A. Iacocca, and Sig. A. DeTomaso to request my personal intervention.

My responding action comprised the establishment of the technical and commercial program requirements and their implementation, including three consecutive trips to Europe reported on in my Trip Report of March 9 thru 23, 1970, and additional functions as pertinent to resulting developments. These were affected by subsequent program requirement reductions and organizational alignment changes resulting from the recent acquisition of the DeTomaso, Vignale and Ghia operations by the Ford Motor Company (NAAO).

With the completion of ZF Pantera test transaxle shipments in July, 1970, and the commencement of production shipments of Pantera transaxles as of August, 1970, my Pantera objectives are accomplished, except as may be required by future developments and as related to the Ford-Israel considerations.

The purpose of this report is to provide visibility of the present program status, for further attention by Continuing-Engineering activities, assumed to be the Special Vehicles Activity, Product Development Group, (NAAO), and by Ford-Europe, as applicable.

2. IMPLEMENTATION

A. Program Establishment:

The DeTomaso "Cobra-100" program established the following monthly transaxle production requirements:

Cobra "100" Program Requirements
(Excerpts)

	<u>1969</u>	<u>1970</u>	<u>1971</u>
January		8	400
February		10	Per
March		15	Month
April		20	
May		35	
June		75	
July		150	
August		150	
September		300	
October		400	
November		600	
December	37	600	

The Cobra (Pantera) transaxle differs from the superseded (Ford GT 40-equal) Mangusta design because of its new "upside-down" installation which necessitates significant internal (lubrication) and external (mounting configuration and suspension) changes, not yet verified by Ford or DeTomaso.

These changes, and the new gear ratios established for the Cobra (Pantera), preclude the use of many Mangusta transaxle components ordered by DeTomaso from ZF in May/June, 1969 (600 transaxles for delivery from November, 1969 thru June, 1971), and in process at ZF when the Cobra (Pantera) program was committed. (See Attachment II).

To reduce scrappage, to achieve optimal deliveries and to verify the new transaxle configuration and application, I established a program, highlighted in Attachment II, which includes the following key elements:

- To reduce scrappage of Mangusta parts in process and to obtain optimal delivery timing, the following Cobra/Pantera transaxle versions were developed:

<u>Version</u>	<u>Purpose</u>	<u>Delivery Timing</u>
—	Mangusta Phase-Out	January thru March, 1970
A	Show Cars	December, 1969
B	Production (Intermediate)	April thru June, 1970
C	Test (Prototypes)	April, 1970
D	Production (Intermediate)	July thru December, 1970
*E	Production (Final)	As of January, 1971

*With this version, the transaxle model designation will change from 5DS 25/1 to 5DS 25/2, to identify the introduction of the "B" synchronization.

- To achieve the required quantities, ZF was committed to the following production capabilities. (See Attachment III):

<u>ZF Total "In-House" Made</u>	<u>ZF Assembled With Components To Be Supplied by Ashot-Israel</u>
30 per month, January thru May, 1970.	400 per month as of September, 1970 (earliest).
60 per month, as of June, 1970.	

- To provide an automatic transaxle option for the Pantera, a program was established, utilizing Ford Livonia "C-6" components for minimum development, investment and unit cost effect; with ZF to provide the design (evolutionary from prior ZF Ford-Mach II designs) and Ford to manufacture, possibly at Philco-Anaheim and/or Ashot-Israel. (See Attachment IV).

B. DeTomaso Mangusta Order Amendments and Pantera Purchase Orders:

The materialization of the program, committed on December 5/6, 1969, required the timely issuance of Purchase Documentation by DeTomaso to ZF, to enable ZF's scheduling of internal and vendor operations. The required Purchase Orders were to be issued by Sig. Benzi at the meeting of December 5/6, 1969, (see Attachments II and III) but, instead, were issued as follows:

<u>DeTomaso Purchase Order</u>		<u>Usage</u>
<u>Date</u>	<u>Number</u>	
Feb. 3, 1970	10850	10 Test Transaxles Version "C"
Feb. 23, 1970	10780	80 Production Transaxles, Intermediate Version "B"
Feb. 23, 1970	10782	411 Production Transaxles, Intermediate Version "D"
Feb. 23, 1970	10781	720 Production Transaxles, Final Version "E"

With these Orders, the ZF "in-house" capacity of 60 units per month was purchased only.

The delayed issuance (approximately 3 months) of these Purchase Orders accordingly postponed ZF's ability of scheduling critical "in-house" and supplier capacities and contributed to ZF's subsequent confirmation and shipping revisions. (See Attachment II).

3. 400 UNITS PER MONTH CAPACITY (ASHOT-ISRAEL)

Because of the reduced Pantera program requirements, the capability of monthly producing 400 5DS 25/2 transaxles, developed to support the "Cobra-100" program (Attachment III), was not utilized, except for the assignment of DeTomaso's Tooling Order 500002.

The finalized Pantera requirement, based on the ZF "in-house" capacity of 60 units per month, was reconfirmed in Mr. Geddes' meeting with ZF on July 17, 1970. (See Attachment V).

In view of commitments made with Ashot-Israel and ZF in March, 1970, the unutilized Ashot capacity became accessible to ZF for other purposes. Since an agreement has been negotiated with the Government of Israel to credit the value at Ford-initiated orders to the Local Content program of the Ford-Israel distributor (Attachment VI), and to reduce competitive access to this capacity, the following arrangements are being pursued by Ashot-Israel, ZF and myself:

- To alleviate additionally developing "in-house" capacity limits, ZF placed with Ashot an order for differential gears and is negotiating additional purchases, comprising six quotations for various transmission, steering gear and differential components and the supply of certain yet undefined tractor replacement gears.
- I conceived a proposal for an Econoline-derived Low Floor Level vehicle package (Attachment VII) utilizing the 5DS 25/2 transaxle.
- ZF is prepared to license Ford with the rights to the 5DS 25/2 transaxle for DM 300,000.00 for technical data and sourcing access and a royalty of 5%, for manufacture at a mutually acceptable facility, presumably Ashot-Israel.

4. FUTURE PRODUCTION FOLLOW-UP, UNRESOLVED ITEMS AND RECOMMENDATIONS

A. Future Production Follow-Up:

Future production "on-the-spot" Pantera follow-up was assigned to Mr. Leonard Martin, Ford-Cologne. Mr. Martin was provided by me with relevant information.

B. Invoice Payments:

In view of previous invoicing problems, ZF made the initial Pantera production transaxle shipments to DeTomaso COD but agreed to conventional invoicing upon institution of Ford Motor Company payment procedures. It is strongly recommended that these procedures are implemented. (See Attachment II for payment status of September 14, 1970.)

C. Automatic Transaxle:

In accordance with recent DeTomaso decisions, the design of the automatic transaxle is to be performed by a vendor other than ZF. The incorporation of appropriate Project Assumptions into any relevant Purchase Order is strongly recommended; preliminary Project Assumptions are attached. (See Attachment IV.)

D. Pantera Vehicle Durability Testing:

Appropriate tests, per Ford Test Procedure P3-31M modified to include 160 MPH runs, to be conducted at Ford U.S. test facilities by March, 1970, should be implemented as soon as production - representative vehicles are available. (See also Attachment II.)

E. DeTomaso-Designed Manual Transaxle Proposal:

See writer's referenced report, Items 4 and 5.

F. Ford-Israel Local Content and Ashot Orders:

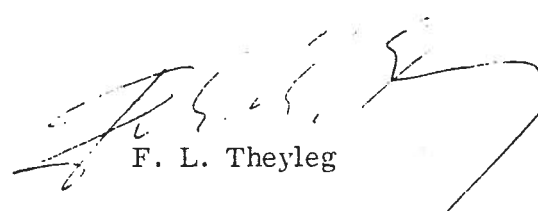
See Appendix to this report for further detail and recommendations.

G. Econoline-Derived, Drive-Shaftless Low Floor Level Vehicle Proposal:

See Appendix to this report for further detail and recommendations.

H. Pantera Improved Shift Linkage and Steering Shaft Joints:

To improve the Pantera shift linkage function and the steering shaft configuration, I involved the Nadella Corporation, S. A., Paris, France. This resulted in specific Nadella proposal designs, and component orders, from DeTomaso to Nadella. It is recommended that appropriate follow-up be established.


F. L. Theyleg

APPENDIX

A-1. FORD-ISRAEL LOCAL CONTENT

The Local Content credits accruable to the Ford-Israel distributor from Ford-initiated orders were projected by that distributor to potentially result in approximately 3,000 to 4,000 additional, incremental, Ford-Europe (Escort, etc.) annual unit sales, based on the anticipated value of the ZF orders to Ashot-Israel in support of the 400 per month Pantera requirements. In view of the reduced Pantera requirements, these orders were not implemented.

However, other orders were placed, respectively are negotiated, which equally qualify for Local Content Credits to the Ford-Israel distributor. These include orders by ZF to Ashot and negotiations for various components to be supplied to Ford-Europe and Ford-USA Truck Operations, via the good offices of the Ford-Israel distributor and myself outlined in the Executive Summary of the referenced report.

The present commercial and technical competence and vitality of Israel, enhanced by her significance to certain adjacent and African locations, are indicated in Minister Saphir's letter dated May 3, 1970 (Attachment VI) and elaborated in the Ford-Israel Distributor's letter dated March 16, 1970, appended to the referenced report.

In view of competitive activities, primarily by British Lleyland, Ltd. and Volkswagen AG, it is indicated that Ford activities require assistance in the following:

- Local Content Value should be increased, as economically practicable, with expanded technical and commercial support, concentrating on increasing the use of locally available labor and components. Detail feasibility studies should consider the potential local assembly of engines, transmissions, drive line, differential and chassis components, using imported and locally finish-purchasable or finish-machinable parts.
- The considerable inter-urban passenger and light cargo traffic in Israel is largely carried by a fleet of Jitneys ("Sherut"), consisting of surplus "New York/DeSoto" taxis and a variety of other vehicle models requiring replacement.

A number of Ford-Europe Transit vehicles was imported and determined to be a desirable replacement, offering also the possibility of fleet standardization. It is recommended that the Ford-Israel Distributor's efforts to establish the Transit be supported by considering the local assembly of this vehicle, supplementing the current Escort Assembly Operations.

- Pursuant to Minister Saphir's letter, US-Ford Truck Purchasing has invited quotations for potentially suitable components. Bids on large truck tires from two competing Israel sources were submitted to the pertinent Ford Purchasing Activity and are being evaluated. The Ford-Israel Distributor is investigating additional, potentially suitable, items which include the supply of critical and short-run machining operations for Ford-Europe. Because of the Local Content credits accurable to Ford, it is recommended that these efforts be expanded, commensurate with Company policies.
- Although Israel has an extensive and prosperous tourist industry (over 500,000 visitors in 1969), no Tourist Car Purchase Plan exists. I have developed and submitted to the Ford-Israel Distributor a Tourist Car Purchase Plan concept; appropriate Government action on required tax and duty considerations has been initiated. This plan, projected to provide an added sales potential of 500-3000 units per year, is based on the tourist export of suitable Ford-Europe models assembled in Israel or transhipped in bond. It is recommended that this plan be supported by appropriate Company action.

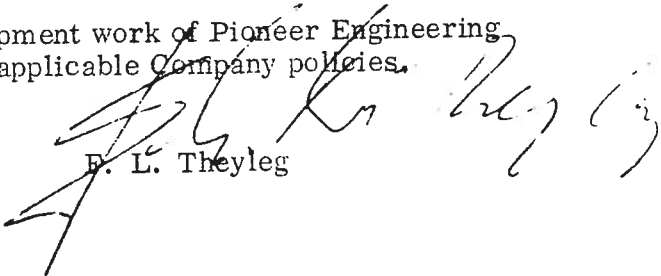
A-2. ECONOLINE-DERIVED, DRIVE-SHAFTLESS, LOW FLOOR LEVEL VEHICLE

Pioneer Engineering, Inc. has agreed to develop and manufacture this vehicle, if marketed by Ford. Pioneer is prepared to construct a prototype, without cost or obligation to Ford, requiring Ford support with hardware (Econoline vehicle, ZF transaxle and related part prints). It is intended to initially construct a commuter configuration, for use as an airport feeder and urban commuter vehicle, possibly in conjunction with a program as the "Dial-A-Ride" project.

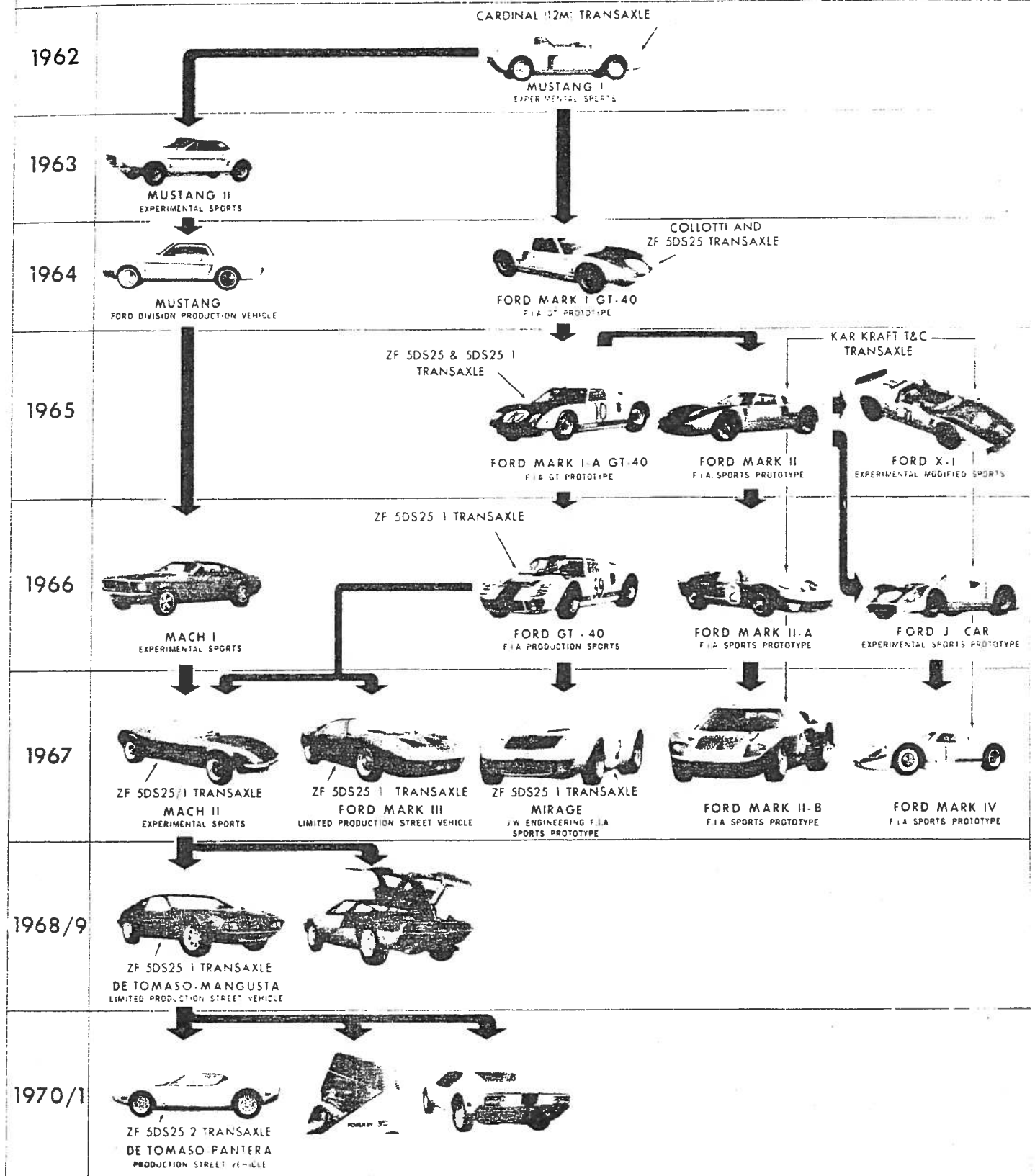
The vehicle will have the same height and width as the Econoline, sharing with it the major body panels and components. The absence of the driveshaft and rear-differential permits a headroom increase to approximately 6 feet -4 inches by lowering the floor to approximately 7 inches, and an increase of the interior useful space.

If successful, the related increase of the ZF 5DS 25/2 transaxle usage, a modular construction permitting 5, 4 or 3 speed transmission derivatives, would also benefit the Pantera program with volume cost reductions.

It is recommended that the development work of Pioneer Engineering be encouraged as denoted, within applicable Company policies.


F. L. Theyleg

THE EVOLUTION OF FORD MOTOR CO. EXPERIMENTAL AND SPORTS PROTOTYPE VEHICLES



PANTERA PROGRAM
ZF 305 25/1 OR ZF TRANSMAXLE
(COMPLETELY ZF "IN-HOUSE" MADE)
ORDER AND ZF SHIPPING STATUS
SHIPPING SCHEDULE VS LATEST ZF ORDER CONFIRMATION
STATUS DATE: September 30, 1970

ZF 305 25/1 - ZF TRANSMAXLE SHIPPING VS PROMISE-PERFORMANCE		PANTERA		PANTERA		PANTERA		PANTERA	
PU/TRANSAXLE	SHIP DATE	LISTING	CONFIRMATION	CONFIRMATION	CONFIRMATION	CONFIRMATION	CONFIRMATION	CONFIRMATION	CONFIRMATION
TRANSAXLE VEHICLES	10/1/70	10/1/70	10/1/70	10/1/70	10/1/70	10/1/70	10/1/70	10/1/70	10/1/70
TRANSAXLE AND SHIP NO.	101 001 059 (10 Units)	101 001 059 (10 Units)	101 001 059 (10 Units)	101 001 059 (10 Units)	101 001 059 (10 Units)	101 001 059 (10 Units)	101 001 059 (10 Units)	101 001 059 (10 Units)	101 001 059 (10 Units)
DE TMSO PURCH. ORDER NO.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
ZF ORDER CONFIRMATION NO.	22641	22642	22643	22644	22645	22646	22647	22648	22649
* ZF CONFIRMED	2	2	2	2	2	2	2	2	2
ZF SHIPPED	2	2	2	2	2	2	2	2	2
CALENDAR IN MONTH	N	D	J	F	M	A	M	J	J
	1970	1970	1970	1970	1970	1970	1970	1970	1971

VERSION ASSEMBLY NO.	DE TMSO PURCH. ORDER NO./DATE	PRODUCTION NUMBER	REASON FOR VERSION OR COMMENTS
A	101 001 059	101 001 059	Lead time for Cobra castings and gears
B	101 001 059	101 001 059	Lead time for Cobra castings and gears
C	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
D	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
E	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
F	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears

VERSION ASSEMBLY NO.	DE TMSO PURCH. ORDER NO./DATE	PRODUCTION NUMBER	REASON FOR VERSION OR COMMENTS
A	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
B	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
C	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
D	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
E	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
F	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears

VERSION ASSEMBLY NO.	DE TMSO PURCH. ORDER NO./DATE	PRODUCTION NUMBER	REASON FOR VERSION OR COMMENTS
A	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
B	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
C	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
D	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
E	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears
F	101 001 059	101 001 059	Lead time for 4th Cobra castings and gears

DE TMSO PUR. ORDER NO.	DATE	SHIPMENT	REVISION	REMARKS
10050	Feb 1, 1970	22641	1	***Partial OK (10/10) derived from CI delivery problems
10100	Feb 21, 1970	22641	2	***Partial OK (10/10) derived from CI delivery problems
10102	Feb 23, 1970	22642	1	***Partial OK (10/10) derived from CI delivery problems
10101	Feb 24, 1970	22643	1	***Partial OK (10/10) derived from CI delivery problems

BASED ON LATEST ZF CONFIRMATION TO VENDOR SHOWN.
** BEYOND ANNUAL ZF SHIPPING INVENTORY AND PENDING.
*** ZF CONFIRMATION SHIP DATES. EARLIEST DELIVERY STARTING MARCH, 1971.
*** CABLE ZF DATED JULY 26, 1970

ITEM	DATE SHIPPED	DE TMSO PURCH. ORDER NO.	ZF INVOICE NO.	ZF INVOICE DATE	DE TMSO CREDIT NO.	DE TMSO CREDIT DATE	BALANCE DM
N.A.							114.93
7 Transaxles	May 1970	10880	2/12/70	2-11-70			48,148.00
3 Transaxles	July 1970	10880	2/12/70	2-11-70			9,213.00
Cancellation of parts expanded by Pantera		8800 & 8734-8-30-69	3/2/70	3-2-70			8,805.66
Tooling costs with accrual	In Progress	10761	2/14/70	2-11-70			110,000.00
20 Transaxles	Aug. 1970	10769	2-23-70	2-23-70			81,000.00
20 Transaxles	Aug. 1970	10769	2-23-70	2-23-70			81,000.00
N.A.							9,308.00
TOTAL BALANCE							280,096.64

To: Mr. Ray A. Geddes

October 23, 1969
Updated November 10, 1969

Subject: Preliminary De Tomaso/Cobra ZF Transaxle Assumptions and Content of Meeting with ZF, Friedrichshafen, Germany, on October 21, 1969

To initiate the finalization of transaxle planning for the subject program, an exploratory meeting was held with ZF, at Friedrichshafen, Germany, on October 21, 1969.

Attended by: ZF - Mr. Buechelmeier and Ford - Messrs: R. A. Geddes
J. Kerr
F. L. Theyleg

The following was discussed and/or agreed upon:

A - 5-DS-25/1 ZF Transaxle to 351-2V Engine Torque Capacity

1. Unit cost, at 10,000 units per annum (ref. ZF Ford Mach II quotations to writer during early 1967):

Base:	DM.	1,295.00
cover cross-bolted:	DM.	+ 50.00
covered shift mechanism:	DM.	+ 25.00

DM. 1,370.00 : *4,00 = US \$342.00
(approx.)

This figure to be updated by ZF to consider present economics, design changes, and volume.

*Currency exchange rate since revised to DM 3.66 = US \$1.00

2. Unit to be vertically rotated 180 degrees with revised attaching points.
3. "B" type synchronized to make 5-DS-25/2 unit, to be used by ZF upon final De Tomaso/Cobra sign-off installation drawing by week ending 10/24/69 to be handed to ZF by the writer; incorporation cost by ZF.
4. If required, sample units to be furnished by ZF for installation and test verification by Ford/De Tomaso: 90 days upon order; otherwise:
5. Delivery: 60 units per month, starting January, 1970, to accumulate approximately 500 units by August 1970, utilizing existing ZF/De Tomaso purchase order commitment.
6. Additional capacity supporting ZF's facilities to be negotiated with purchase order extension to above (A/1) volume and to current price, to realize a total volume of 15,000 units over 3 years.

B - Automatic Transaxle Proposal, Maximum T&C/MX Component Usage (Ref. meeting with ZF, 10/21/69)

1. Feasibility study drawings to be submitted by ZF: by January 31, 1970
(One set of MX detail drawings was handed to ZF, at this meeting)

Mr. Ray A. Geddes

October 23, 1969
Updated November 10, 1969

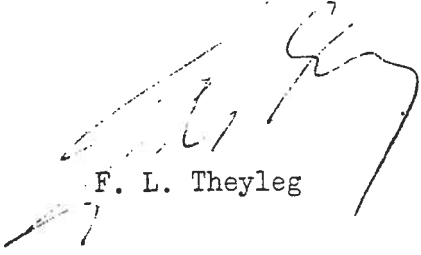
- B - 2. Assumed Engineering and Development charge (preliminary estimate Buechelmeier 10/21/69): DM. 50,000.00 to DM. 100,000.00, finalization to be negotiated.
- 3. Torque capacity: to 366 CID engine.
- 4. Ford/De Tomaso exclusivity rights available and to be negotiated with tooling cost share determination.
- 5. Vehicle installation interchangeability with ZF 5- and 4-speed transaxle companion units.

C - 4-Speed Adaption of 5-DS-25/2 ZF Transaxle to 366 Engine Torque Capacity
(Ref. meeting with ZF 10/21/69)

- 1. Feasibility study drawings to be submitted by ZF: by January 31, 1970.
- 2. Cost and timing: to be submitted two weeks after Ford/De Tomaso sign-off of ZF proposal drawing.
- 3. Vehicle installation interchangeability with 5-DS-25/2 ZF transaxle.

D - Engine Output

- 1. ZF was presented with the torque curves of the 351-4VC and 366-8V engines basic vehicle weights and performance objectives to which the above units are to be related.


F. L. Theyleg

Getriebe 5 DS-25/1 (5 DS-25/1 transaxle)Kegeltriebübersetzungen (bevel drive ratios)

i=	Ritzel (pinion)	Tellerrad (crownwheel)
3,20	1031 304 082 z=10	1031 309 042 z=32
3,40	1031 304 111 z=10	1031 309 057 z=34
3,56	1031 304 095 z=9	1031 309 050 z=32
3,77	1031 304 071 z=9	1031 309 034 z=34
4,0	1031 304 100 z=9	1031 309 051 z=36
4,22	1031 304 086 z=9	1031 309 045 z=38
4,50	1031 304 089 z=8	1031 309 047 z=36
4,62	1031 304 123 z=8	1031 309 075 z=37
4,87	1031 304 090 z=8	1031 309 048 z=39
* 5,25	1031 304 128 z=8	1031 309 078 z=42

Einzelradübersetzungen 1. Gg. (ratio 1st gear)

Antriebswelle (input shaft) getrieben (driven)

2,07	(vom Einbau abhängig	z=14 1031 304 130	z=29
2,23	(depending on installation)	z=13 1031 304 102	z=27
2,42		z=12 1031 304 047	z=29
2,58		z=12 1031 304 129	z=31

Einzelradübersetzungen 2. Gg. (ratio 2nd gear)

treibend (driving) getrieben (driven)

1,40	1031 202 C77 z=20	1031 304 108 z=28
1,47	1031 202 065 z=19	1031 304 098 z=28
1,52	1031 202 C78 z=19	1031 304 112 z=29
1,61	1031 202 052 z=18	1031 304 075 z=29
*1,72	1031 202 092 z=18	1031 304 135 z=31

Einzelradübersetzungen 3. Gg. (ratio 3rd gear)

treibend (driving) getrieben (driven)

1,04	1031 202 083 z=23	1031 304 120 z=21
1,09	1031 202 071 z=22	1031 304 103 z=24
1,14	1031 202 075 z=22	1031 304 109 z=25
1,21	1031 202 082 z=19	1031 304 118 z=23
*1,31	1031 202 093 z=19	1031 304 136 z=25
*1,41	1031 202 094 z=17	1031 304 137 z=24

Einzelradübersetzungen 4. Gg. (ratio 4th gear)

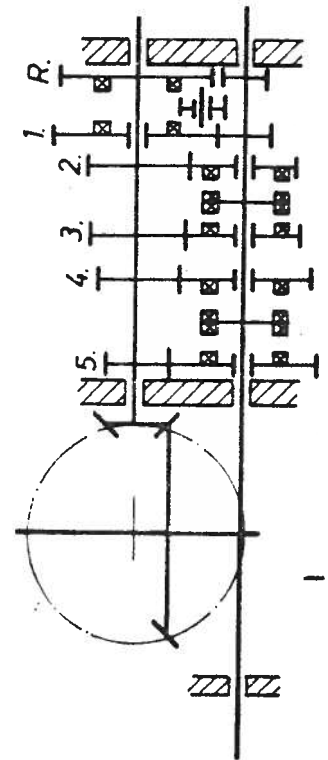
treibend (driving) getrieben (driven)

0,846	1031 202 088 z=26	1031 304 142 z=22
0,88	1031 202 097 z=25	1031 304 140 z=22
0,92	1031 202 072 z=24	1031 304 104 z=22
0,96	1031 202 076 z=24	1031 304 110 z=23
1,0	1031 202 054 z=21	1031 304 077 z=21
1,04	1031 202 067 z=23	1031 304 096 z=24
1,09	1031 202 081 z=22	1031 304 114 z=24
1,15	1031 202 095 z=20	1031 304 138 z=23

Einzelradübersetzungen 5. Gg. (ratio 5th gear)

treibend (driving) getrieben (driven)

0,705	1031 202 091 z=27	1031 304 134 z=19
0,724	1031 202 089 z=29	1031 304 131 z=21
0,74	1031 202 090 z=27	1031 304 133 z=20
0,778	1031 202 047 z=27	1031 304 072 z=21
0,807	1031 202 039 z=26	1031 304 056 z=21
0,84	1031 202 037 z=26	1031 304 050 z=22
0,88	1031 202 079 z=25	1031 304 113 z=22
0,92	1031 202 068 z=24	1031 304 097 z=22
0,96	1031 202 096 z=24	1031 304 130 z=23
1,0	1031 202 080 z=23	1031 304 115 z=23



* Bis Md Motor 35 mkn
 (For these ratios Md engine up/to 35 mkn)
 oder Putschmoment 230 mkn
 (Or slitting torque 230 mkn)
 $\mu = 1,2$
 (Friction coefficient 1,3)

Minutes of Meeting

Mr. RA Geddes

Subject: De Tomaso / Cobra 5 DS 25/1 and 2 transaxle requirements;
Results of writer's negotiations with ZF at Schwäbisch-Gmünd
October 24 and 25, 1969

Ref.: Meeting with ZF, same subject, in Friedrichshafen on 10-21-69

Present:

ZF

Management: Herr Tiefenbacher - General Manager

Sales: Herr Kalb, Herr Detzel

Production: Herr Boll and assistants

Ford

Mr. F. L. Theyleg.

The subject meeting was called in follow-up to the ref. meeting and to define program requirements and de Tomaso - ZF - Ford working relations.

ZF was, again, appraised of the program timing and technical detail, and informed that de T. is their sole commercial contract partner. Upon ZF's specific inquiry, ZF was advised that Ford US, in direct responsibility to Mr. L. Iaccoca via Mr. R. A. Geddes, will provide financial assurance and technical assistance if desired. ZF was further informed of the various liaison and delivery problems experienced by Mr. de Tomaso and Ford's willingness of assisting with capacity problems as and if requested by ZF. The following was agreed upon:

1. Committed Delivery of /1 Units (based on de Tomaso orders on hand):

Units per Month	Order No.	Date of Order	P/L	Quantity ordered
8 (Nov. 1969 thru Aug. 1970)	8580	May 30, 1969	032	80
8 (Sept. 1970 thru June 1971)	8736	June 6, 1969	032	80
22 (Nov. 1969 thru Aug. 1970)	8580	May 30, 1969	037	220
22 (as of Sept. 1970)	8736	June 6, 1969	037	220

Based on these orders, ZF promised to ship either version if specified with adequate leadtime (about 4 weeks):

<u>Year</u>	<u>Month</u>	<u>No. of Units</u>
1969	thru Dec	37
1970	Jan	30
	Feb	30
	March	30
	Apr	30
	May	30
	June	30 (217)
	July	60
	Aug	60
xx)	Sept	60
	Oct	60
	Nov	60
	Dec	60 (360)
	TOTAL	(577) accu.

xx) start shipment of /2 design

2. Rotation of Unit

Based on availability by November 21, 1969 (as promised by de T. engineering 10-22-69) of a transaxle out-line drawing marked with the final dimensions of changes as verbally relayed earlier.

- a) shipment of two (2) representative hand modified units: Jan 1970
- b) availability of 8-10 production samples and start of production: June 1970

- Note:
- . The timing of the production samples may be somewhat advanced but must be made of production tooling.
 - . Changes are described: rotate unit 180; increase dia. of clutch housing flange by 30 mm and increase front mounting holes pattern from 4 to 6 holes; new clutch spline; relocate shift mechanism to exit in same car position (R-H) as present; relocate unit attaching points from differential cover to tail cover; revise lubrication ducts as required by new position of unit.

No dimensions for any of these changes have been received by ZF to date. I agreed that these be furnished to ZF immediately, if necessary on piece-meal bases, to enable ZF to commence with drawings and tool changes. ZF reserves the right to finalize the timing of these changes within 4 weeks upon receipt of final change dimensions; related tooling charges will be determined at that time.

3. Strength of Unit

- a) Both side flanges and the rear cover must be either cast-or malleable iron. ZF is presently shipping the de T. units with aluminum side covers which are proven inadequate; therefore ZF was requested to change to either iron as soon as possible.
- b) We have earlier confirmed in race programs that the higher strength gear steel used by ZF (chrome nickel steel (15 Cr. Ni. 6), of ZF-controlled batch quality. This steel produced an approx. 20 % higher S-N value than the Ford gear steels (SAE 8620 or SAE 5315). Thus, the unit is rated 38 m/kp net and the present 1st and 2nd gears are regarded adequate. Since no tooling changes can be effected within acceptable timing, additional torque capacity can only be gained by reducing these gear ratios to those tooled, as shown in the attached list.

4. Production order for 15000 units (5000 per year for 3 years)

ZF has agreed to accept an order for this quantity with the following stipulations:

- a) Receipt of firm order no later than November, 1969.
- b) ZF will continue to ship 60 units minimum per month completely made in their own shops when the present de T. commitments are completed, in December 1970 (Item 1, above).

In addition, ZF has agreed to increase this quantity to a total of 400/mo. if either Ford Cologne or another source can subcontract from ZF all gears. It was resolved that any subcontractor will be sourced by ZF, as follows:

- . All material and/or forgings and cutting tools to be furnished by ZF.
 - . Subcontractors will supply to ZF all ring gears and pinions complete; all transmission gears complete to heat treat inclusive, but exclusive finish grinding and synchrocone splining.
 - . ZF will manufacture additional cases on its duplicate facility in Spain and believes that the shipment of larger quantities than the committed 60/mo. could commence earlier than January 1971, if our subcontractor negotiations are successful.
- c) ZF is willing to accept a satisfactory delivery delay penalty clause, if Ford assures the order financially, makes adequate cancellation charge provisions and provides the same technical assistance as in the prior Ford US/ZF racing programs.
 - d) The unit cost of the subject unit, quoted at DM 1,370.00 in 1967, is subject to economic changes as labor and material increases, which have occurred since that time. At present, the impact of these factors on the unit cost is assessed by ZF of approx. 30 %. ZF will recalculate the unit to obtain and quote the current value. A cost disadvantage, attributable to subcontractors, will be billed as separate item.
 - e) No design or cost reduction changes will be made by ZF, unless negotiated with and approved by de T., subject to satisfactory test results.

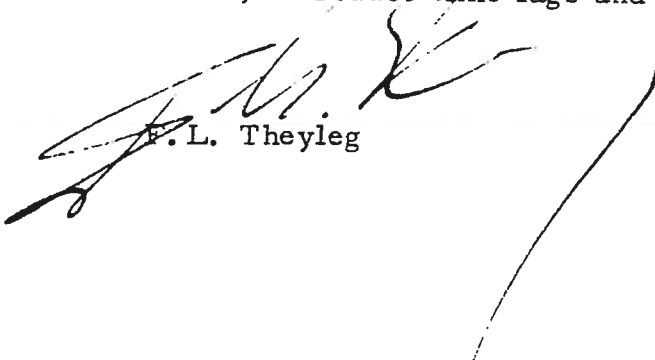
4. Liaison

To assure satisfactory prompt response and central ZF contacts, Mr. Tiefenbacher has designated the following Z F personnel to be personally responsible and as sole contact with de T.:

Sales
Herr Kalb, Sales Manager
(Schwäbisch-Gmünd)

Engineering
Herr Bidegast
Asst. Chief Engineer
(Friedrichshafen)

Correspondence and verbal contact may be in Italian via a ZF translator but should best be made in English or German, to reduce time lags and errors.



F.L. Theyleg

October 30, 1969

Translation
 MVAD Ku
 10.12.1969

ZAHNRADFABRIK FRIEDRICHSHAFEN AG

WERK SCHWÄBISCH GMÜND

M i n u t e s

on the meeting with

Mr. Theyleg
 FORD MOTOR COMPANY
 Engineering Staff
 Central Office Bld. room 273
 Dearborn, Mich. 4812

and Mr. Benzi, Purchasing Executive,
 DE TOMASO, Modena, Italy
 December 6, 1969

Present from ZF: Herr Tiefenbacher - General Manager
 Herr Schöllhammer - Asst. to Technical Manager
 Frl. Wamsler - Export Dept.
 Herr Henseler - Export Dept.

Orders on hand and committed deliveries:

From the orders on hand, it was promised to deliver 30 units per month. Starting July thru Dec. 1970, a monthly quantity of 60 units of the intermediate version. Starting 1971, definite Cobra version, FORD U.S.A. being willing to accept deliveries beginning at an earlier date.

ZF committed to supply quantities of 60 units per month also in 1971. ZF cannot give a binding promise for the requested 400 units per month, meanwhile it is not completely sure, whether all the necessary deliveries from subcontractors will arrive in time.

ZF will only take care of assembly and testing.

The required test bench is to be designed by ZFG.

Furthermore, by Dec. 12, 1969, the following was requested and promised

2 transaxles intermediate version *
 10 transaxles during first week of March
 with Cobra gear ratio.

ZF shall make corresponding testing and confirm that function of transaxle is o.k. in required new position of unit. These additional deliveries only within the scheduled 30 units per month.

CC: MR. THEYLEG FORD USA (3x), DE TOMASO, Modena (1x), ZF Export Dept. (2x)

Technical Data

Installation Drawing 1031 001 053 was given to Mr. Benzi. Further drawings were handed over to Mr. Theyleg. Mr. Schöllhammer took notice of the numbers. The machining of the gears for the desired 10 transaxles of the intermediate version can be accomplished by us. With the exception of one, drawings of the respective gears are available. On Monday December 12, Mr. Schöllhammer will approach Mr. Büchelmaier accordingly.

Final drawing for the intermediate version being provided by Mr. Büchelmaier. Remaining drawings for the production version, promised by Mr. Büchelmaier by December 19, 1969.

Ratios having been determined, see report December 5.
Required changes, see report December 5.

Mr. Schöllhammer will inform Mr. Büchelmaier that intermediate version requires change of 5th gear, the rest as per parts list being set up by Mr. Büchelmaier. As for the remaining data, see report December 5. Mr. Theyleg agrees to the intermediate version to be according to the version still to be determined, shipment July - December 1970.

Rotate unit including shift mechanism by 180° , keep connection of engine, change of 5th gear, ratio 0,705.

Mr. Benzi was asked to make a statement of true quantities required by Mangusta both in 1970 and 1971.

Transaxle Version with Limited Slip Differential and Normal Differential

We were asked to determine a transaxle version with normal differential. At present shipments are made with limited slip differential. Estimated price difference, made by Mr. Tiefenbacher DM 50 - DM 60. (Please effectuate calculation!) If possible, by 1971 transaxles are to be with normal differential, model 4 DS 10 is provided.

Licencing

The question of licencing remains open until start of production, as promised, ZF is prepared to negotiate with renowned firms being in a position to manufacture transaxles.

Servicing

ZF is considering, whether a network of service stations should be set up in U.S.A.

Warranty

ZF is prepared to give warranty to the transaxles, i.e. 6 months or 10.000 kms. ZF is willing to consider with fairness later complaints..No costs for dismounting and mounting will be charged by ZF.

Training

If need be, ZF will accomplish training and instruction for transaxle repair. Until then, FORD shall be authorized to decide whether repair will be made at their end, or whether we should request the parts.

Purchase and Delivery Commitment

For the 400 units per month requested by 1971, ZF can enter a delivery commitment only, provided that deliveries from subcontractors are secured. ZF commits herself only to assembly and testing, as well as shipment of 30 transaxles monthly until June and 60 units starting July 1970.

The decision for a final contract with regard to large quantities (400 units per month) will be made during the first quarter of 1970.

Costs for Cobra Version

The order will be for 15.000 units. For the Mangusta transaxle version, the price of DM 1.875.--, mentioned by Mr. Tiefenbacher, for the quantity in question, should be considered as a basis. The price is based on the production in our works. Changes of costs caused by subcontractors and presently requested changes by De Tomaso shall be considered as separate items upon final determination of price.

Costs for Intermediate Version

Costs resulting in addition for the intermediate version, will also be shown as separate items and will be assumed by De Tomaso.

Schwäbisch Gmünd, December 6, 1969
MVAS DH/Wa

* (see page 1)	with ring gear & pinion	4.22
	gear 1	2.42
	gear 2	1.47
	gear 3	1.09
	gear 4	0.96
	gear 5	0.84
	reverse gear	2.86

Thi

Tool Order Number 500,002

(Assigned by Telephone, Formal de Tomaso Tool and Production Purchase
Orders To Follow)

TYPED TRANSCRIPT OF ORIGINAL HANDWRITTEN Z-F QUOTATION

Schwaebisch Gmuend
March 19, 1970

de Tomaso Automobiles of America
Market Street
Livonia (Detroit), Michigan

QUOTATION

720 transaxles to Z-F parts list 1031 001 058

unit price - DM 2470 - ex factory

plus tooling charge - DM 250,000
(see List No. 1)

delivery - 60 per month from Feb. 1971

15,000 transaxles to Z-F parts list 1031 001 058

unit price - DM 1890 - ex factory

plus additional tooling charge - DM 330,000
(see List No. 2)

delivery - 400 per month from July 1971

Prices are based on present economic levels as of March 19, 1970. We reserve the right to increase or decrease our prices in case of changes in labor or material cost or other operating expenses.

This quotation is based on the assumption that the gear boxes are produced in house of Z-F - Gmuend.

Per request of Ford Motor Company and de Tomaso Automobiles of America, and upon the risk of these parties, Z-F will place orders upon receipt of production order on 15,000 units as quoted herein, to:

Ashot-Ashkelon, Israel
per their quotation No. 9079
dated March 16, 1970
being still subject to negotiations
and amendment.

Any additional cost arising or deletions arising from such sourcing action will be negotiated between seller and buyer upon availability of all financial data. If necessary, Ford-de Tomaso will agree to accept an amended selling price reflecting either an increase or decrease related not only to the unit price but also to the tooling cost defined in List No. 2.

Ford-de Tomaso request shipments of 400 units per month to start by Sept. 1970. Z-F declares that this is not possible but also agrees to give all possible effort for improvement of offered delivery thereby cooperating with Ashot-Ashhelon, Israel. Judging from present promises of Z-F sub-contractors of raw materials and purchased parts, this will require special negotiations by Z-F with such suppliers. Results can be expected not before 2 months after receipt of order.

Z-F will supply to Ashot all necessary technical assistance required by Ashot to execute the order. Expenses for personnel created will be paid for by Ashot and guaranteed by Ford-de Tomaso.

Z-F is very much interested in this order and is pleased about the fact that Ford Motor Company, Dearborn, is guaranteeing this order of de Tomaso of America financially to Z-F.

Z-F requests the buyer and agrees to deliver a minimum quantity of 300 gear boxes per month as per above.

If monthly requirements exceed 460 transaxles per month, Z-F agrees to negotiate on licensing another suitable source acceptable to de Tomaso and/or Ford provided Z-F is not able to take care of such increased volume.

This quotation is based on Z-F standard terms and warranties as per attached printed form.

Zahnradfabrik Friedrichshafen AG

Werk Schwaebisch Gmuend

Kurt Kalb
Export Manager

P. S. Z-F is free to manufacture any component in their own plant. Orders given to Ashot shall, however, be terminated with reasonable notice and only with the consent of Ford-de Tomaso which will not be withheld without good reason.

Kalb

March 19, 1970

LIST 1

Share of tooling cost for production of 60 transaxles
per month

Cost of changing existing die of housing (main housing)	DM 29,760
Rear cover, pattern (gray cast iron)	DM 4,600
Lower cover, pattern aluminum sand casting	DM 2,875
Shift support, pattern aluminum sand casting	DM 575
Shift housing, pattern aluminum sand casting	DM 7,920
Left flange, pattern gray cast iron	DM 2,875
Right flange, pattern gray cast iron	DM 2,875
Forging dies for gears	DM 6,612
Tools and fixtures including test fixtures, inspection tools and test stand	<u>DM 197,363</u>
Total	<u>DM 249,455</u>

March 19, 1970

LIST 2

Share of additional tooling cost for production
of 400 transaxles per month

Lower cover, die	DM 25,000
Case extension, die	DM 67,500
Shift support, die	DM 15,000
Shift housing, die	DM 25,000
Cover, shift housing, die	DM 15,000
Additional forging dies for input shaft, gears, etc.	DM 8,500
Stamping dies	DM 10,000
Additional Assembly fixtures	DM 62,500
Additional tools, jigs and fixtures and inspection tooling	<u>DM 101,500</u>
Total	<u>DM 330,000</u>

Turin, October 23, 1969

MEMORANDUM to: Mr. Ray. A. Geddes
from : Mr. A. de Tomaso

SUBJECT: ZF TRANSMISSION

Being stated that, following to the agreement axisting concerning the de Tomaso/Cobra, the type and the mark of the transmission to be used is a decision which will be taken only by de Tomaso Automobili (obviously we will be ready to discuss with you any indication or idea you may have in this respect) I would like to point out the following:

Our present position with ZF is the following:

1. QUALITY: we have nothing to say as far as the quality is concerned. We are satisfied, even if some of the transmissions are a little noisy, even if they are made in an artisan way and even if we think that probably they can be improved in some details.

So far we have had no problem with the units we have installed.

The ZF people have always granted us every change we have requested and we can say that presently the transmissions are perfectly relyable and that, generally speaking, they are very noiseless.

Sometimes however, our quality control turns a blind eye on them, since we have a great need of material.

2. SERIOUSNESS: the seriousness of ZF absolutely does not exist and we consider them at the lowest level among our suppliers. We continue to purchase from them only because we need material. As you know, in fact; we are preparing our own drawings in order to have the transmissions made here.

Many time we send cables and letters and they do not reply, they do not answer to our telephon calls, they write letters promising us certain delivery terms which they do not maintain, they adfirmmed not to have received letters, which, on the contrary, were regularly received.

To: Mr. R. A. Geddes

2

Moreover, one time that we requested a quotation for 5.000 units, they quoted us a ridiculously high price and this was probably the proof that they were not interested in doing business with us.

In few words I am convinced that if we would use the ZF transmission on the new car (being a matter of a production of 7.000/10.000 units) it would be a big mistake to trust them.

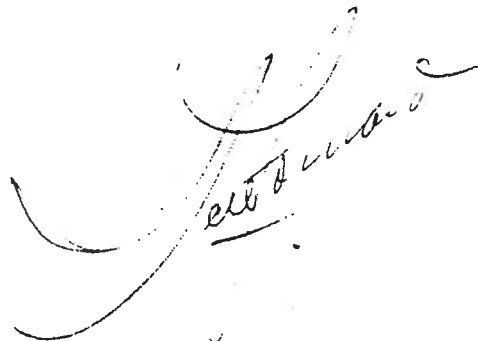
Besides this, there is also a psychological problem: ZF people are German and, as every German, they are convinced that Italian are inferior people.

As you know, I am not Italian and I met only the Sales Manager of ZF, to whom I have clearly told that I did not believe in what he was telling me, during a meeting held at 7 a.m. together with their Italian representative.

I am disposed to do business with them only if ZF people are disposed to accept to pay a penalty for every delay in deliveries, penalty which has to pay us also the non-profit from our part.

3. In Italy we are in a condition of finding suppliers able to build transmissions good and perhaps even better than the ZF ones. The metallurgical technicians in Italy can be very superior than the German ones and in this metallurgical department we have a big gap.

I authorize you to show this letter to the ZF people.

A handwritten signature in cursive script, appearing to read "R. A. Geddes", is written over a large, faint circular stamp or watermark.

LITERAL TRANSLATION

April 24, 1970

QUOTATION

Subject: Automatic transaxle for vehicle type Ford-Cobra

Dear Mr. Theyleg:

In follow-up to your recent visit at Friedrichshafen, as well as to the telex corresponde conducted since, we should like to confirm herewith our telex quotation of April 22, 1970.

Item: Redesign of your own automatic transmission into a transaxle with the continuation of existing components as extensively as possible. The design work to be carried out by ZF includes the design investigation and, upon concurrence by you and upon your release, the preparation of detail drawings and parts lists.

Cost: The total labor effort amounts to 3000 hours @ DM 35.00 =

DM 105,000.00

This value is based on the present cost level, if changes occur until the completion of the order, we reserve the right for a corresponding price correction.

Timing plan: To carry out the aforementioned work we require as pure labor effort, i.e., for continuous execution, a total of 8 months. An exact timing plan for the start and the completion of the design is to be agreed upon receipt of order.

Responsibility: Design responsibility and authority are to be determined.

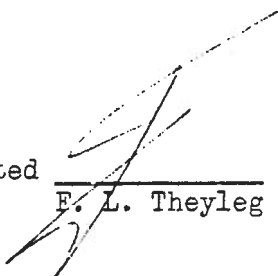
Prototypes: The manufacture of prototypes and/or their test are not contained in the above mentioned labor, resp. cost.

We ask you to regard this quotation as free and anticipate your response with interest.

With Kind regards

ZAHNRADFABREIK FRIEDRICHSHAFEN

Translated


F. L. Theyleg

Preliminary Project Assumptions

September 1, 1970

Proposed 3-speed automatic transaxle for use in Ford/Pantera sports car =====

I. Design Assumptions:

- Maximum internal component use, adaption and/or derivation of Ford USA "C-6" automatic transmission and ZF/Pantera 5DS25/2 manual 5-speed transaxle finished or semi-finished parts.
- Maximum vehicle installation interchangeability with ZF/Pantera 5DS25/2 transaxle.
- Minimum unit weight as practically attainable with aluminum components.
- Ratios as established by "C-6" production converter and gear sets, with adjustment in differential ratio as available from ZF (DeTomaso to specify or to confirm).
- Vehicle useage to be same as present Pantera.
- Durability and quality performance to be the same or better as Ford USA passenger car automatic transmissions (ref. "C-6").
- Minimum input torque and horsepower capacity to be the same as or compatible with 400 cu. in. displacement Ford USA mid-range V8 engine projected output.
- Curb and gross vehicle weights to be the same as projected for Pantera.
- Design propriety by Ford USA, with assignment rights as desired by Ford USA.
- Design authority by Ford USA.
- Design responsibility by ZF, Ford USA to consign upon ZF all technical data required to develop this design.

II. Design Development

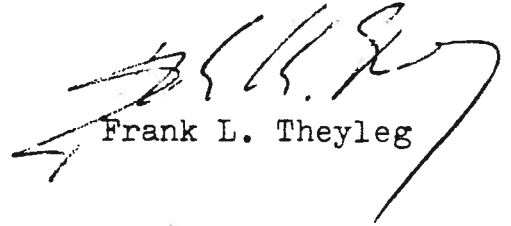
- Basis to be ZF quotation dated April 24, 1970
- ZF to deliver to Ford USA the complete and design-assessable layout with supporting engineering data for approval, prior to detail design.
- ZF to deliver to Ford USA the completely detailed design, suitably prepared for prototyping and production, upon layout approval by Ford USA.
- ZF to participate in the design confirmation by cooperating in Ford USA tests and by making the design adjustments required to effect the proper and specified function of the transaxle and to realize its manufacture, without causing project progress delays and at no added cost to Ford USA.
- ZF to perform these functions in accordance with a timing and payment schedule to be established by Ford USA design purchase order.

III. Production and Production Launch

Ford USA to appoint suitable production sources, using the Ford-selected

prototype source(s) as to be established for item II, above, if possible.

- ZF to participate in launch and production validation test to an extent to be defined with an appropriate purchase order amendment to the initial design order per item II, above. ZF to correct at no added cost to Ford USA, and within the context of the design purchase order and quotation per item II, above, any performance or quality deficiency attributable to faulty design and shall not relinquish its responsibility until Ford USA has released the trans-axle for production, upon satisfactory conclusion of the production validation test.



Frank L. Theyleg

Concur: _____
R.A. Geddes

ZAHNRADFABRIK FRIEDRICHSHAFEN

AKTIENGESELLSCHAFT

Spett.le
 Automobili De Tomaso
 Via J. Peri, 68

I 41100 Modena

POSTANSCHRIFT:
 7070 SCHWABISCH GMUND
 POSTFACH 119
 TELEGRAMME:
 ZAHNRADFABRIK SCHWABISCH GMUND
 FERNSCHREIBER 07/2+8601
 TELEFON:
 ORTSNETZKENNZAHL 07171
 VERMITTLUNG 6011
 DURCHWAHL 601 + HAUSRUF

TRANSLATION

IHRE ZEICHEN IHRE NACHR. V. UNS. ZEICHEN ABTEILUNG DURCHWAHL HAUSRUF 7070 SCHWABISCH GMUND
 MVA K/f/Sc July 21, 1970

Subject: 5 DS-25/1 and 2 Transaxles for COBRA

Gentlemen:

Reference is made to the visit of Mr. Geddes from Ford on 7/17/70, who informed us about the change in the ownership of your company.

As regards the supply of transaxles for the above mentioned car, we had regrettingly to point out that there was a delay caused by the late supply of the raw material for castings, mainly end covers and side flanges. The required raw material will infact be supplied by the end of July 1970 only, as in one case the trial castings received from a contractor were not satisfactory so that the pattern had to be modified considerably.

We regret the delay incurred very much, but wish to emphasize, however, that such basic design changes as required in this case normally take much more time. Our previous delivery promises have obviously been too optimistic and we kindly ask you to excuse the delay.

The following promises were made:

Your Order No. 10850 for
10 transaxles 1031 001 059

3 further transaxles have to be supplied against this order as the input shafts, which we manufactures as makeshifts, had to be scrapped after completion. These 3 transaxles will be shipped by the end of July 1970.

Your Order No. 10780 for
60 transaxles 1031 001 060

In consideration of our material stocks, it has been agreed to

- 2 -

BANKKONTEN: DEUTSCHE BANK, SCHWABISCH GMUND 163501 WURTTENBERGISCHE BANK STUTTGART-N 1360 KREISSPARKASSE SCHWAB GMUND 402 POSTSCHECK STUTTGART 41844

ZAHNRADFABRIK FRIEDRICHSHAFEN
AKTIENGESELLSCHAFT
WERK SCHWABISCH GMÜND

TAG 7/21/70

BLATT 2

EMPFANGER

Automobili De Tomaso
Modena / Italy

increase this order to 80 units. As already confirmed by Mr. Theyleg by phone, the side flanges on the differential housings of these transaxles will be made of light metal to enable us altogether to assemble these transaxles.

The following promise was made:

40 units	8/14/70
40 units	end of August 1970.

Your Order No. 10782 for
431 transaxles to Parts List 1031 001 061

We reduce this order to 411 pieces. Shipments will commence in September 1970 at a rate of 60 units per month.

Your Order No. 10781 for
720 transaxles 1031 002 001

From the above order on, we shall change over to the ZF B-type synchronization. Shipments will commence end of March/early in April 1971 at a rate of 60 units per month.

Mr. Geddes asked us to check whether we would be in a position to supply all 720 transaxles in 1971, which would mean that we would have to increase the monthly rate of 60 units correspondingly.

We promised to examine this possibility, but due to our production capacity, which is still rather limited, an increase of the monthly rate will probably be possible at the earliest in the second half of 1971. We will advise you on this item at a later date.

Subject: Prices

With our invoice No. 3/345872 dated 7/14/70, we charged you tooling cost to the amount of DM 249,455.—, as already announced in our letter of 5/25/70. The composition of this amount can be seen from our hand written quotation of 3/19/70. The total amount comprises DM 110,000.— for a new test bench, which is absolutely required if we are to increase our transaxle production to 60 units per month.

Up to now these transaxles have been produced in minor quantities and were submitted to an operational test, but not under the speed conditions you have in a car.

EMPFENGER

Automobili De Tomaso
Modena / Italy

Mr. Geddes complained about the fact in general that we charge costs for a test bench. But as Mr. Theyler has asked us explicitly not to include the costs for a test bench in our cost calculation, so that we have to indicate them separately, it is unfortunately not possible to refrain completely from invoicing such costs. We have therefore made the following compromise:

We issue a Credit Note to the amount of DM 110,000.-- for the tooling cost charged. DM 55,000.-- will be apportioned among the unit prices of the transaxles, which have still to be supplied, and DM 55,000.-- are assumed by ZF.

The resulting price situation is the following:

Charges on the 1211 transaxles still to be supplied

DM 45.40 per piece.

We ask you to take note of the following new prices:

Order Nos. 10780 and 10782 for
a total of 491 transaxles

old unit price DM 2,500.--

new unit price

DM 2,545.40

Order No. 10781 for
720 transaxles

old unit price DM 2,470.--

new unit price

DM 2,515.40

Mr. Geddes complained furthermore that we charge a higher unit price for the transaxles, which are supplied in greater quantities, than for the Mangusta transaxles.

We wish to point out on this occasion that seen as a whole, the design of the new version is more expensive. In the meantime we have moreover had an increase in costs of about 15 %, which had not to be taken into account at the time when we made our quotation on the Mangusta version.

Subject: Accounts

Your account presently shows the following due invoices:

<u>Invoice No.</u>	<u>Date</u>	<u>Amount in DM</u>
3/500326	1/21/70	556.95
3/590169	2/17/70	114.92

ZAHNRADFABRIK FRIEDRICHSHAFEN
AKTIENGESELLSCHAFT
WERK SCHWÄBISCH GMÜND

TAG 7/21/70

BLATT 4

EMPFANGER

Automobili De Tomaso
Modena / Italy

<u>Invoice No.</u>	<u>Date</u>	<u>Amount in DM</u>
3/520132	4/2/70	407.23
3/310435	4/23/70	34,893.—
3/312310	5/14/70	49,140.—
3/312601	5/20/70	20,907.80
3/313571	6/1/70	9,311.80
3/315475	6/22/70	23,264.—
3/316116	6/29/70	18,590.20
3/316842	7/6/70	23,264.—
3/317365	7/9/70	23,264.—
plus tooling cost as per ZF letter dd. 5/25/70		249,455.—
cancellation cost inv. 3/370020 dd. 5/26/70		<u>65,554.28</u>
		518,723.18
less Credit Note on tooling cost charged for test bench		110,000.—
less Credit Note on cancellation cost charged for flanges		<u>5,502.56</u>
<u>Total balance</u>		<u>DM 403,220.62</u>

As mentioned above, we shall now use wide flanges made of Aluminium, which had been ready already; we issue a Credit Note on 56 right and 56 left flanges so that the amount of our invoice for cancellation cost is reduced by DM 5,502.56 to DM 60,051.72.

We ask you to provide for an immediate payment of the above balance and are sure that we shall receive the money before further deliveries to your company are effected. Mr. Geddes promised to contact you on this account and see to an early settlement of your account.

We wish to emphasize on principle that we have reserved for you at Schwäbisch Gmünd a production capacity of approx. 60 transaxles per month, also for the next 2 - 3 years. We ask you now to place your follow-up orders with us, taking into account that our delivery time is 12 months.

Very truly yours,

ZAHNRADFABRIK FRIEDRICHSHAFEN AG
WERK SCHWÄBISCH GMÜND

Encs.:

2 Credit Notes

מדינת ישראל
STATE OF ISRAEL

Ministry of Commerce and Industry

Jerusalem,

May 5, 1970

Ref. No. S/56

Mr. Frank L. Theyleg
31720 North Marklawn Drive
Farmington, Michigan 48024
U.S.A.

Dear Mr. Theyleg,

Please accept the enclosed copy of a letter, sent by the Minister of Commerce and Industry, to Mr. Henry Ford II.

I was very glad to hear and read of the smooth progress of the Ashot activity, and I do hope for the best in the deepening of the contacts with Ford.

I know that the advantages accrued from this to Israel are also your best reward.

With all best wishes, I am

Sincerely yours,

G. Lahav

G. Lahav
Director-General

Enc.

May 3, 1970

Mr. Henry Ford II
Chairman of the Board
Ford Motor Company
The American Road
Dearborn, Michigan 48121
U.S.A.

Dear Sir,

I was indeed very glad to learn about the successful conclusion of an agreement between an Israeli manufacturer - Ashot, Ltd. - and a German company for the supply of trans-axle parts for a joint deTomaso, Torino - Ford sports car.

I was informed by my Director-General that Mr. John Kerr and Mr. Frank Theyleg, who visited here in this connection, carried out their mission in a most efficient way, and that they expressed the opinion that there seems to be good prospects for the continuation and broadening of this first venture.

In the light of the fast development of the metal and automotive industry in Israel during the recent years, in volume as well as in quality, I do feel that a thorough analysis of the potential of sub-contracting from Israel of specific automotive parts or sub-assemblies to the various Ford plants, could be to the mutual benefit of both parties.

Our policy in this respect was reflected in the agreements with local automobile assemblers, a.o., with your distributors in Israel, according to which the value of exports of Israeli-made parts to their mother companies will be deducted from the assembler's obligation for local content, for the purpose of taxation.

I would, therefore, like to suggest that a Ford survey team should spend some time in Israel, with the object of obtaining the closest possible knowledge of our industrial capacity and the identification of those categories of parts or components which could - by criteria of competitiveness in price and quality - be supplied from Israel.

Such a team would, of course, receive all the necessary assistance from the Government, and the local experts shall be available for data submission and consultation.

I shall appreciate very much your views on the above suggestions, and remain,

Sincerely yours,

(-750011) J.S.M.R

Joseph Saphir



**Government of Israel
Investment and Export Authority**

North American Office

May 1, 1970

Mr. Frank L. Theyleg
Ford Motor Company
P. O. B. 2053
Dearborn, Michigan 48121

Dear Frank,

I was delighted to read your report about your visit and Mr. Kerr's to Israel. It was especially encouraging to note that you were able to accomplish the initial stages of a very important export production deal between Ashot and Z.F. in Germany.

As requested by you, I have enquired through my colleagues in Israel and they confirmed to me that an export production which was initiated by the Ford Company will be regarded by the Government of Israel as a relevant percentage in the local production of the Ford's plant in Israel.

I hope that all parties concerned will now move ahead with the implementation of this contract.

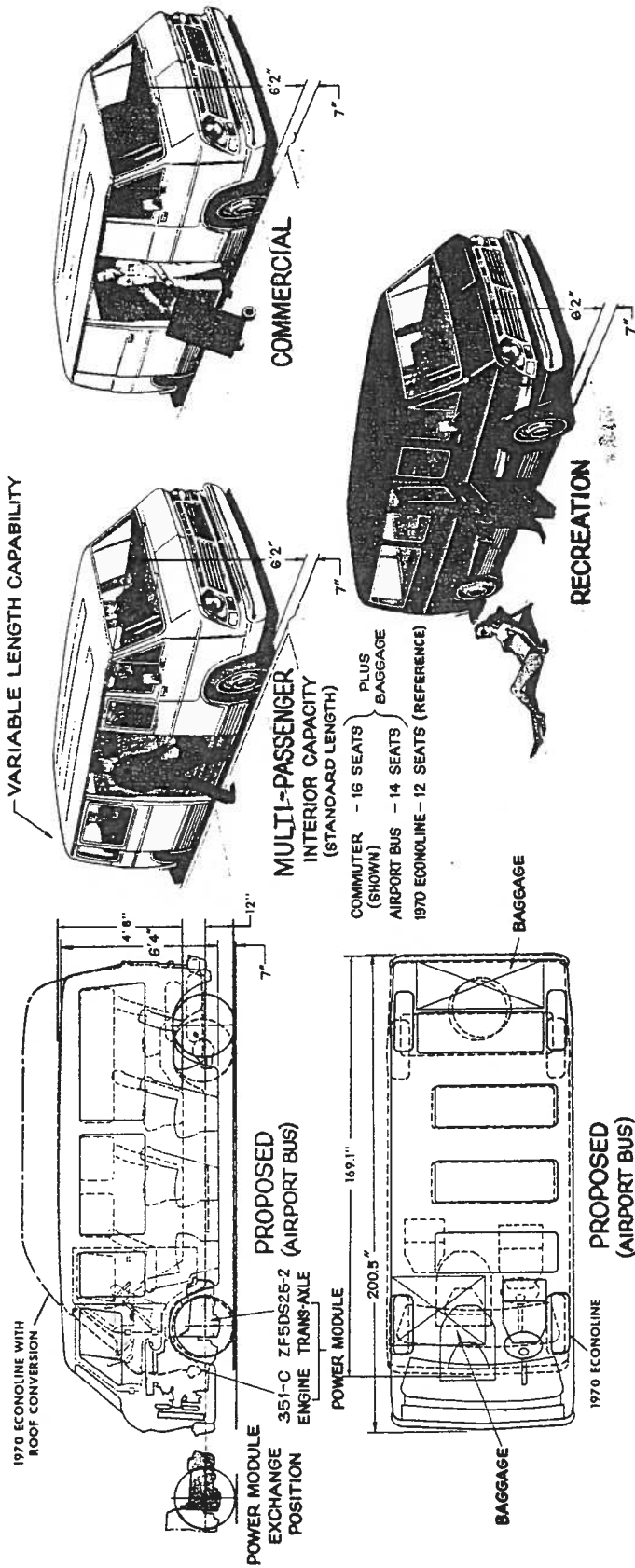
Sincerely yours,

Baruch Barak, Director
North American Office

PROPOSED DRIVE-SHAFTLESS LOW FLOOR LEVEL VEHICLE

WITH MAXIMUM USE OF 1970 ECONOLINE COMPONENTS

(OVERLAY - PRODUCTION 1970 ECONOLINE)



ADVANTAGES

- **LOW FLOOR LEVEL:**
 - LOADING/STEP-IN FLOOR LEVEL AT CURB HEIGHT
 - 6'-0" WALK-AROUND HEADROOM WITHOUT ROOF RISER
 - 1970 ECONOLINE OVERALL HEIGHT
- **LARGER INTERIOR:**
 - INCREASED CARGO CAPACITY
 - INCREASED SEATING CAPACITY PLUS ADDED INSIDE BAGGAGE SPACE
 - IMPROVED SEATING ARRANGEMENT

- **IMPROVED RIDE AND HANDLING:**
 - BETTER DIRECTIONAL STABILITY
 - REDUCED SIDE WIND WANDER
 - BETTER TRACTION ON SNOW, WET ROADS OR SAND
 - LONGER WHEEL BASE
 - ALLOWS INDEPENDENT FRONT AND REAR SUSPENSION
 - REDUCES UNSPRUNG WEIGHT BY ELIMINATION OF REAR AXLE DIFFERENTIAL AND DRIVE SHAFT

- **QUICK POWER TRAIN SERVICE**
 - POWER MODULE REMOVABLE AS UNIT FOR EXCHANGE OR MAJOR REPAIR
- **GREATER MODEL FLEXIBILITY:**
 - ALLOWS MODULAR BODY SHELL FOR VARIABLE OVERALL LENGTH OF BODY AND/OR WHEELBASE
 - ALLOWS INCREASE OF GVW

DISADVANTAGES

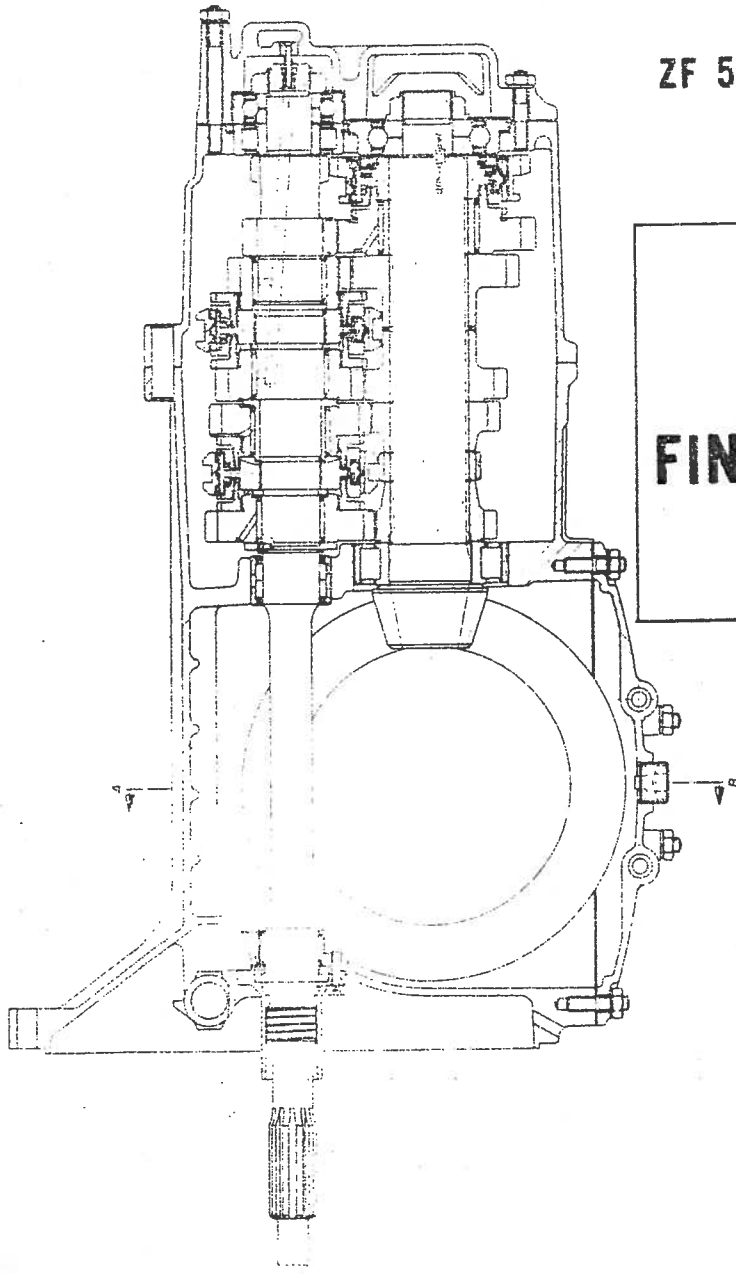
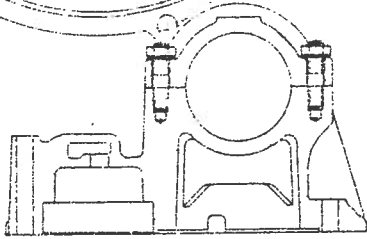
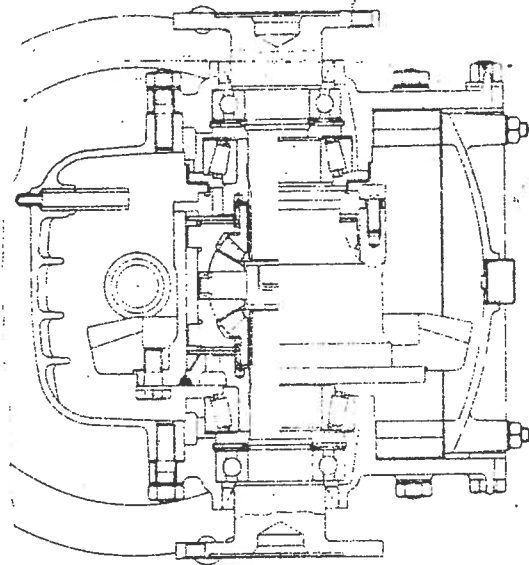
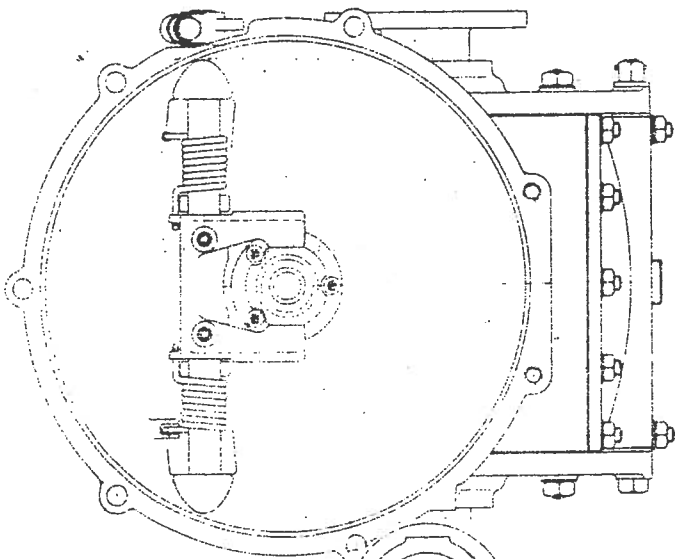
- **POSSIBLY ADDED COST:**
 - INITIAL LOW VOLUME PRODUCTION OF ZF TRANSAXLE (400/MONTH AVAILABILITY)
- **GREATER STEERING EFFORT:**
 - MAY REQUIRE POWER STEERING

ADVANTAGES/DISADVANTAGES

OBTAINABLE WITH

ZF 5DS25/2 MODULAR TRANSAXLE

MODULAR ALTERNATIVES	GEAR SPEEDS					ADVANTAGES	DISADVANTAGES
	1	2	3	4	5		
3 SPEED			1:1 (or as req'd)	—	—	NORMAL	NORMAL
4 SPEED				1:1 (or as req'd)	—	<ul style="list-style-type: none"> Improved acceleration Better transmission and differential gear ratio selection Improved grade, traffic and passing performance Allows reduction of engine displacement or rpm Allows increased GVW 	<ul style="list-style-type: none"> Added cost Added shifting
5 SPEED					1:1 (or as req'd)	<ul style="list-style-type: none"> Further improved acceleration Further improved grade, traffic and passing performance Better transmission and differential gear ratio selection Improved cruising and fuel economy by over-driven 5th gear Allows reduction of engine displacement or rpm Allows increased GVW 	<ul style="list-style-type: none"> Further cost addition Added shifting Manual downshifting required for highway passing
					0.7:1 (or as req'd)		



FORD - PANTERA

**ZF 5DS25/1 OR /2 TRANSAXLE
REQUIREMENTS**

**REPORT
ON
FINALIZED PROGRAM
DETAILS**

**STATUS DATE:
OCTOBER 1, 1970**

Schiff A.B.

5 (cong. Centre) 1971 352 700 10

COVER: PANTERA 5DS25/2 TRANSAXLE, CROSS-SECTION OF FINAL PRODUCTION VERSION "P".