





# T Utility Truck Customer Measurement Program

Introduction

Components

Status



# Program Intent

Introduction

Components

Status

- PUMA based
- Extend database to commercial customers
- Correlate data from PUMA
- Understand usage characteristics of commercial customers



# Program Overview

Introduction

Components

Status

- 5 T Utility Trucks:
  - TU5188 (Maricopa County, Parks Division)
  - TU6039 (B78 East Lot)
  - TU6040 (B78 Garage)
  - TU6041 (B78 East Lot)
  - TU6043 (B78 East Lot)
- Kerry Conroy
- Shakeeb Rahman





# Data Acquisition (Loggers)

Introduction

Components

Status

- *ProDAS*
- 12 Channel Occurrence / Duration
- Signal Conditioning Box



# *ProDAS* Inputs (Analog)

Introduction

Components

Status

- Balljoint (vertical, lateral, fore/aft)
- Rear ballast
- Rear axle torque
- Chassis twist





# *ProDAS* Inputs (Digital)

Introduction

Components

Status

- Front axle engagement
- TCC application
- Transfer case position
- Transmission gear position
- Engine speed
- Vehicle speed
- Brake application
- ABS operation
- Engine run
- Ignition on



# *ProDAS* Enclosure

Introduction

Components

Status



- Bracket mounted on right rear quarter panel
- Enclosed behind carpeted sheet metal casing





# 12 Channel Inputs

Introduction

Components

Status

- Distance traveled (via speed buffer)
- All door openings (also tailgate, endglass)
- Trailering connection
- Wiper operation
- Engine run
- Battery connection



# 12 Channel Enclosure

Introduction

Components

Status



- Located under luggage cover beside jack

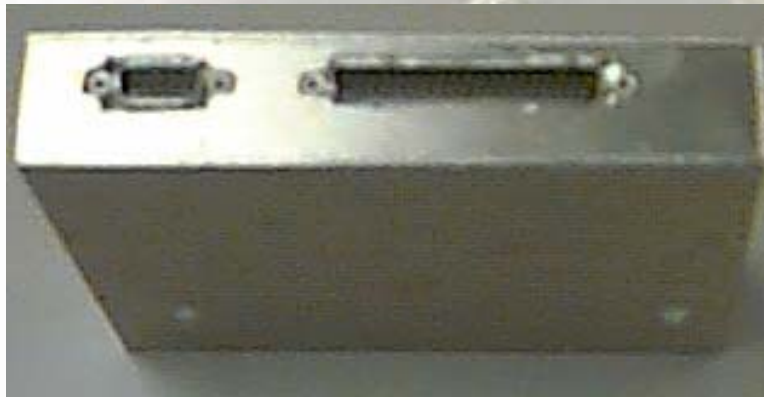


# Signal Conditioning Box

Introduction

Components

Status



- Enclosed, custom printed circuit boards
- Conditioned signals for *ProDAS* digital:
  - Transfer case position
  - Gear selection
  - Trailing connection
  - Engine run
  - Ignition on
- Velcroed onto *ProDAS*



# Hall Effect Sensors

Introduction

Components

Status



- Current detectors using electromagnetic principles
- 2 HES per vehicle:
  - Between brake modulator and VCM for ABS
  - Inline with trailering connector for trailering
- Checked for switch closure when current exceeds 500mA





# Tachometer Pass-Thru

Introduction

Components

Status



- Connected to crank sensor via Metri-Pack 150 connector
- Allows engine speed readout



# Transmission Pass-Thru

Introduction

Components

Status



- Based on Micro-Pack 100W connector, adding additional leads
- Allows gear selection and TCC application readouts



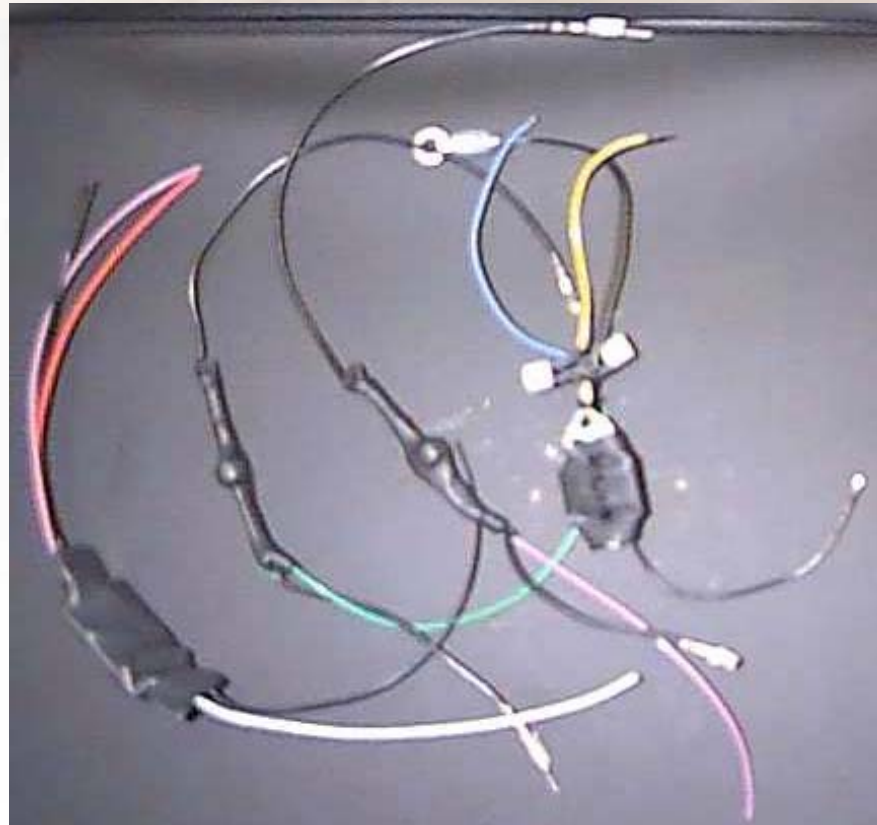


# Buffer and Diode Packs

Introduction

Components

Status



- Wiper buffer
- Endglass insert
- Door diode
- Tachometer buffer



# Chassis Twist Bar

Introduction

Components

Status



- Installed onto rear undercarriage
- Weather protected transducer
- Temperature compensation lead wire



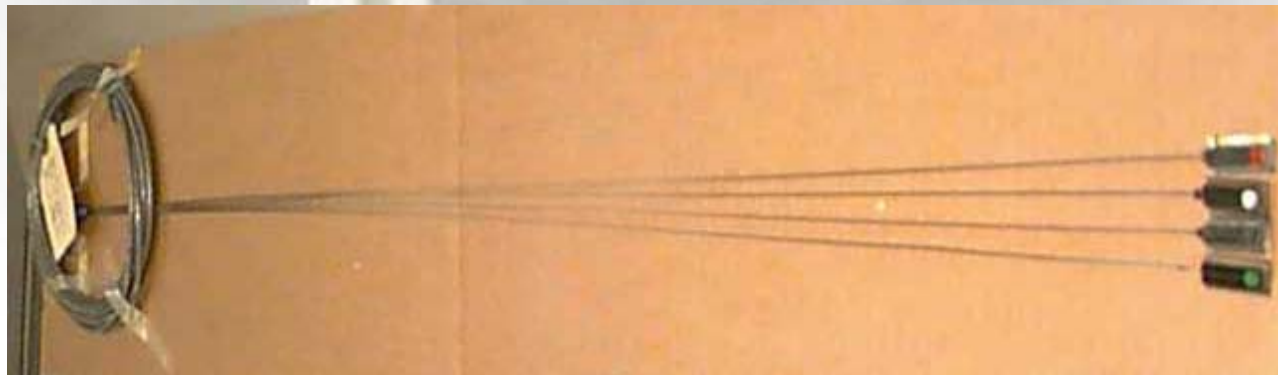
# Rear Ballast Gage

Introduction

Components

Status

- Weldable ballast gages
- Welded areas protected by metal plates







# Rear Axle Torque

Introduction

Components

Status

- Spotwelded onto rear axle
- Calibrated from propeller shaft





# Door Openings

Introduction

Components

Status

- Jamb switch inserts for doors and endglass
- Reed switch for tailgate





# Wiring & Harnesses

Introduction

Components

Status

- Harness construction by Michigan Scientific







# Inputs Under Consideration

Introduction

Components

Status

- Pitman arm
- Tie rod
- Extra logger for new, non-PUMA inputs



# Non-Data Related

Introduction

Components

Status



- Carpets, luggage carrier, interior trim pieces, lighting, fluids



# Other Project Related Items

Introduction

Components

Status

- Created new binder of schematics, instructions, purchase receipts, schedules
- Created 2 documents on project status:
  - MS Excel worksheet on component installation
  - MS Word document on parts inventory
- Created *ProDAS* download instructions for program customers



# Status Documents

Introduction

Components

Status

	TU6039 Jimmy	TU6040 Jimmy	TU6041 Blazer	TU6043 Blazer
<u>General</u>				
Status/Location	B78 East Lot	B78 Garage	B78 East Lot	B78 East Lot (contact Frank Whiton prior to use)
Inspector	C.J. Boggs	C.J. Boggs	C.J. Boggs	Unscheduled
<u>Stock parts</u>				
Tires				?
Brakes				?
Shock absorbers				?
Wiper blades				
Wiper motor(s)				
Windshield				
Driver's seat bottom				
Luggage carrier				
Rear carpet			In storage	
Coolant, brake, washer fluids				?
Front carpet				?
Rear carpet				?
Interior	Intact	Stripped (in KS7606)	Stripped (in TU6041)	Intact
<u>Special Instrumentation &amp; Installation</u>				
ProDas				
ProDas covers				
12 Channel Occurrence/Duration				
Signal Conditioner				
Tach pass-thru harness				
Transmission pass-thru harness				
Engine run signal				
Door and endglass jamb switches				
Tailgate reed switch				
ABS tap (hall effect sensor)				
Trailer tap (hall effect sensor)				
Wiper tap				
Harness routing			Partial	
Weldable ballast transducer				
Ball joints with transducers	Awaiting parts		Awaiting parts	Awaiting parts
Chassis twist transducers				
Rear axle torque transducer				
Pitman arm transducer	Awaiting decision	Awaiting decision	Awaiting decision	Awaiting decision
Tie rod transducer	Awaiting decision	Awaiting decision	Awaiting decision	Awaiting decision

<u>Legend</u>	
	Incomplete
	Completed
	Unnecessary
?	Necessity unknown

## T Utility Customer Measurement Project

General Parts Information (August 19, 1998)  
Harris Yong

### End-of-Summer Goals for T-Utility Customer Measurement Project

1. Complete all installations in TU6040 (per Excel checklist) and prepare for footprint schedule.
2. Confirm availability of all parts and tools (per list below) T Utilities in project.
3. Update personnel involved regarding project status.

### Parts Update (See Excel sheet for installation status)

Tach pass-thru harnesses	6 fully prepared per PUMA specifications with heat shrinks (including 1 installed in TU6040)
Transmission pass-thru harnesses	4 fully prepared per PUMA specifications with heat shrinks (including 1 installed in TU6040)
Signal conditioners	1 fully prepared 3 more printed circuit boards to be enclosed this week
ProDas enclosures	1 fully prepared 4 more to be carpeted and finished on a vehicle specific basis unfinished covers in KS7606 see below for carpet detail
Carpet	1 cut TU rear gray carpet in TU6040 (for ProDas enclosures) 1 new Suburban rear gray carpet in KS7606 (for ProDas enclosures) 1 new TU front gray carpet in KS7606 (for TU6041) 1 new TU rear gray carpet in TU6041 (for TU6041) need to order charcoal carpet for TU6043's ProDas enclosure
Ballast measuring shear gages	4 ready for installation
Hall effect sensors	10 fully prepared per PUMA specifications (including 2 installed in TU6040) 3 of the 10 remain to be tested
Signal conditioning boxes	1 fully prepared for TU6040 3 more to be enclosed by John Deering components for 1 more conditioner available (requires assembly by Hughes Electronics)
Ball joints	being completed by Jeff Vogt ETA: 98/08/17
Tie rod, Pitman arms	to be strain gaged, waiting for Kerry Conroy's advice
Reed switches	2 sets installed (TU6040 and TU6041) 4 sets ready (stored in TU6040)
12 Channel Occurrence/Duration	1 installed in TU6040 3 ready with Shakeeb Rahman
ProDas	1 installed in TU6040 3 ready with Shakeeb Rahman
Chassis twist transducers	1 installed in TU6040 4 ready in Strain Gage room

### Personnel Involved

Kerry Conroy	Program direction
Shakeeb Rahman	Engineering
Quinn Lucas	Garage supervision
Jim McCartney	Principal technician
Richard Janke	Data acquisition
Jon Schuster	Fabrication (ProDas covers)
John Deering	Instrumentation



# *ProDAS* Download Manual

Introduction

Components

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*ProDAS* Download Instructions  
for Customers of the T Utility Truck  
Customer Measurement Program

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GM Truck Group  
Field Test  
Harris Yong  
Updated August 21, 1998

- Thanks to Richard Janke for screen captures





# Remaining Tasks

Introduction

Components

Status

- TU6040:
  - Ball joint (Jeff Vogt)
  - Tie rod, Pitman arm (Kerry Conroy)
  - Reassembling interior
- Parts for remaining 3 vehicles ready except:
  - Balljoints, tie rods, Pitman arms, signal conditioner enclosures, ProDAS enclosures (vehicle specific), charcoal carpet for TU6043





# Questions & Answers

Introduction

Components

Summary