Attachment 7
Test 001-11, 3/5/96

Materials contained in attachment 7

Test data tracking forms

Test engineer's notes

Test sequence

Time-history data plots for:

- Conditions B1.39.0928.801-.803
- Condition B1.39.0928.801.1
- Condition B1.39.0928.802.1
- Conditions B1.39.0928.805-.811

737 FLIGHT CONTROLS DATA TRACKING FORM

PRIORITY:

(WRITE IN BLACK INK OR PHOTOCOPY BEFORE TRANSMITTING)

DESCRIPTION 737-200 Rudder Ground Test SPS 20

TEST NO. 001-11 PILOT/AIRPLANE —— / PG3091 PARAM. SET # _____ WINDS _____

TEST DATE 3/5/96 AIRPORT/RUNWAY _____ PLOT FORMAT # _____ GW/CG/I _____

MANEUVER CODE _____ FC STAFF Ben Smith PHONE 294-7923 FLT TEST STAFF D. Nagel

DATA REQUEST NUMBER	EKS DATE	STAT. SOURCE	CONDITION NUMBER	SEQUENCE NUMBER	IRIG TIME START	IRIG TIME END	ALT MC	REMARKS
IAA2.9132			B1.39.0928.801		09:25:20	09:26:05		
			.802		09:27:45	09:29:15		
			.811		09:30:30	09:36:00		
			.801.1		09:37:10	09:38:00		
			.802.1		09:38:40	09:40:15		
			.803		09:41:00	09:42:15		
			.805		09:46:35	09:47:15		
			.806		09:48:15	09:49:45		
			.807		09:50:15	09:51:45		
			.808		09:53:10	09:54:10		
			.809		09:54:45	09:56:15		
			.810		09:56:35	09:58:10		

FILE RECEIVED _____ FAST _____ _____ TINKER/FILTER _____ DATABASE PACK _____

ADDATA _____ ADDKEY _____

FLIGHT TEST DATA SHEET

IMPORTANT: DO NOT USE BLUE INK AS IT WILL NOT REPRODUCE FROM THE ORIGINAL

					Note: Due Torque Tube measurements are very questionable.			
TAPE ON		09:18:00						
		09:22:35	Confirmed 125 kts on Feel Pitot;					
		09:23:27	Hyd. ON (A&B)					
		09:24:01	A, B, & Standby cycled					
		09:24:12	A & B Only					
BI.39.0928.801		09:25:35	Cycle Rudder Pedals					
		09:25:42	L Rudder					
		09:25:46	Neutral					
		09:25:48	Rudder					
		09:25:51	Neutral					
BI.39.0928.802		09:28:00	Dwell,	0.3Hz,	3° tR		40 lbs galling force	
		09:29:00	End					
BI.39.0928.811		09:30:45	Dwell,	1 Hz,	3° tR,	to gall up bearing wear		
		09:31:30	End					
BI.39.0928.811.1		09:34:40	Dwell,	1 Hz,	3° tR,	same purpose		
		09:35:40	End					
BI.39.0928.801.1		09:37:25	Cycle Rudder Pedal,			galling forces on the standby PCU input linkage were now ~60 lbs		
		09:37:29	L Rudder					
		09:37:32	Neutral					
		09:37:36	R Rudder					
		09:37:40	N					
BI.39.0928.802.1		09:38:56	Dwell,	0.3Hz,	3° tR			
		09:39:58	End					
BI.39.0928.803		09:40:10	Dwell,	0.3Hz,	1° tR			
		09:41:30	Manual Pedal Input					
		09:41:47	End Pedal					
		09:42:04	End Dwell					

SHEET 2 OF 2	TITLE 737-200 Rudder Ground Testing		MODEL
RECORDER D. Nagel			AIRPLANE
TEST NO. 001-11		BOEING	DOC. NO.
DATE 3/5/96			PAGE

X-21094 REV. 4/93

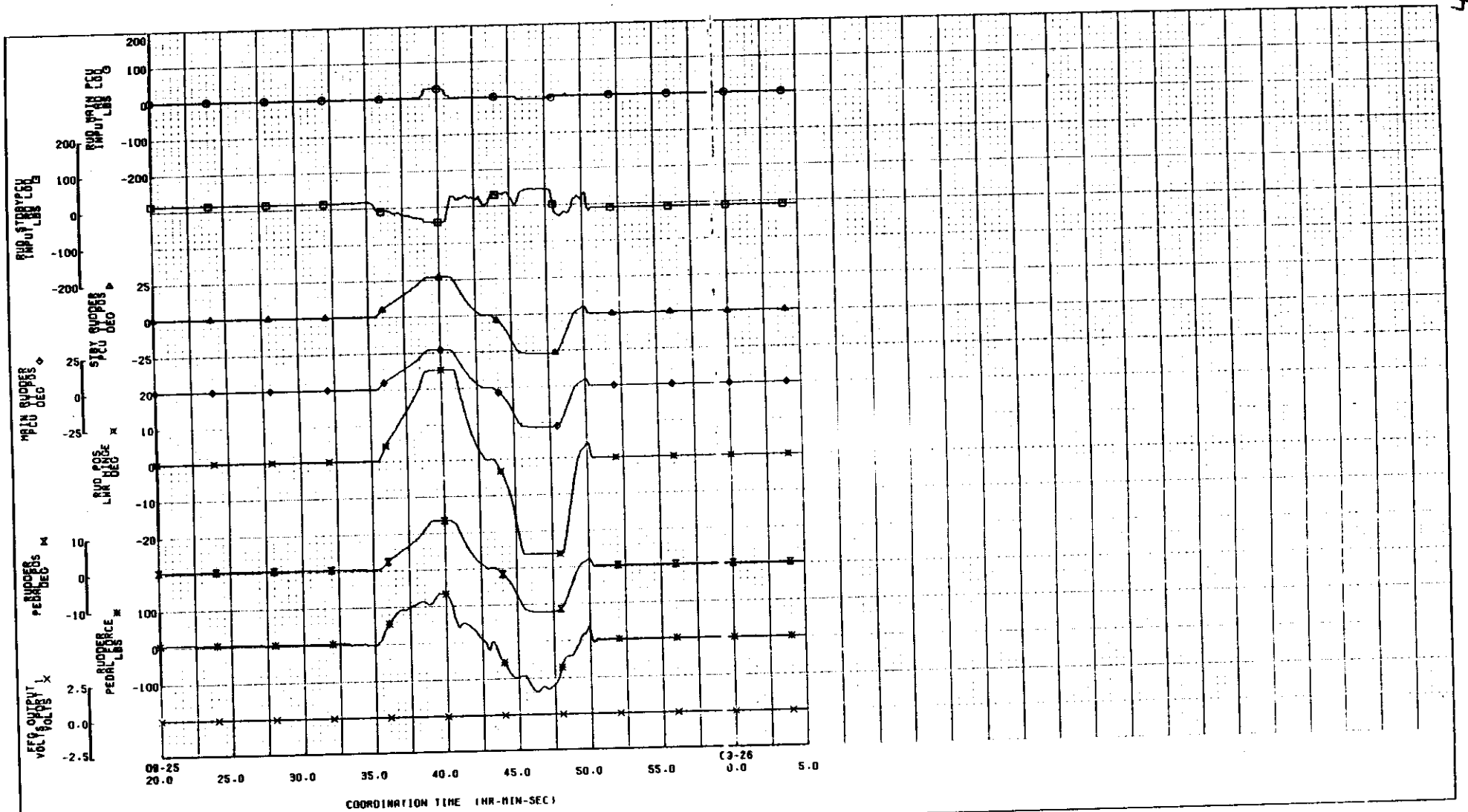
FLIGHT TEST DATA SHEET

IMPORTANT: DO NOT USE BLUE INK AS IT WILL NOT REPRODUCE FROM THE ORIGINAL

B1.39.0928.804	09:42:59	Bungees out on rudder & 125 KNOTS on rudder feel pitots	
B1.39.0928.805	09:44:25	B & Standby ON	
	:46:45	Begin Pedal Sweep	
	:46:50	L Pedal	
	:46:55	Neutral	
	:47:00	R Pedal	
	09:47:05	Neutral	
B1.39.0928.806	09:48:25	Dwell, ±3° for @ .3Hz	
	09:49:30	End Dwell	
B1.39.0928.807	09:50:30	Dwell, ±1° for, 0.3 Hz	
	:50:55	Begin Pedal Input	
	:51:15	End Pedal	
	09:51:34	End Dwell	
B1.39.0928.808	09:52:14	A & B & Standby	
	:53:30	Begin Pedal Input	
	:53:36	Full L	
	:53:40	Neutral	
	:53:44	Full R	
	09:53:50	Neutral	
B1.39.0928.809	09:54:55	Dwell, ±3° for, 0.3 Hz	
	09:56:00	End	
B1.39.0928.810	09:56:50	Dwell, ±1° for, 0.3 Hz	
	:57:10	Begin Pedal Input	
	:57:30	End Pedal	
	09:57:54	End Dwell	
	10:00:00	A & B OFF & Standby	
TAPE OFF	10:02:00		

SHEET 2 OF 2	TITLE 737-200 Rudder Ground Testing	MODEL	
RECORDER D. Nagel		AIRPLANE	
TEST NO. 001-Y	BOEING	DOC. NO.	
DATE 3/5/96		PAGE	

X-21094 REV. 4/93



03/05/96 1632			REQ 1AA2-9132		737-200 RUDDER GRND TEST TIME HISTORY PLOT	737-200 PG309
CALC			REVISED	DATE		
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APR					THE BOEING COMPANY	PAGE
APR						

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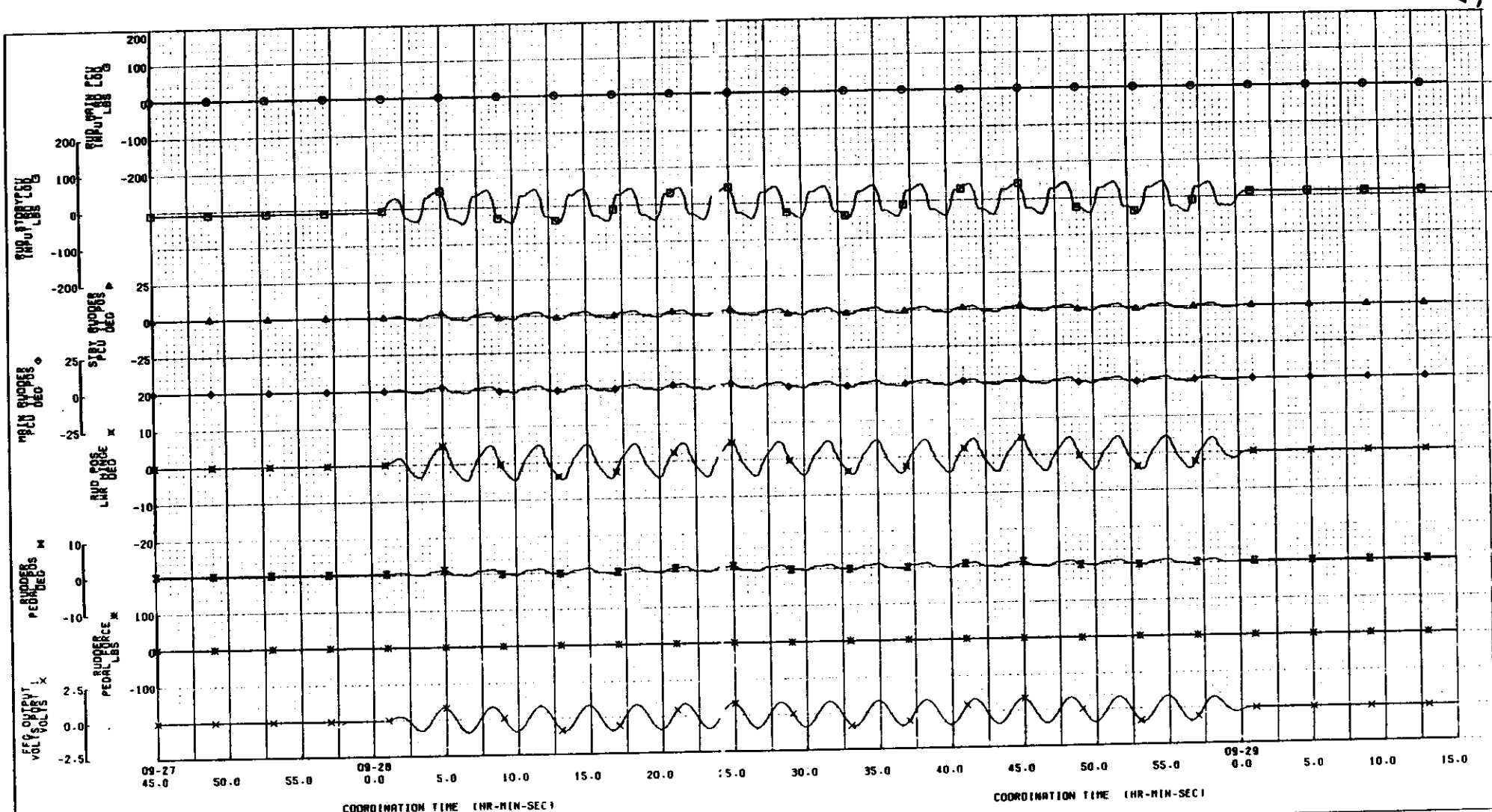
737-200, PG309, RUDDER SYSTEM GROUND TESTING



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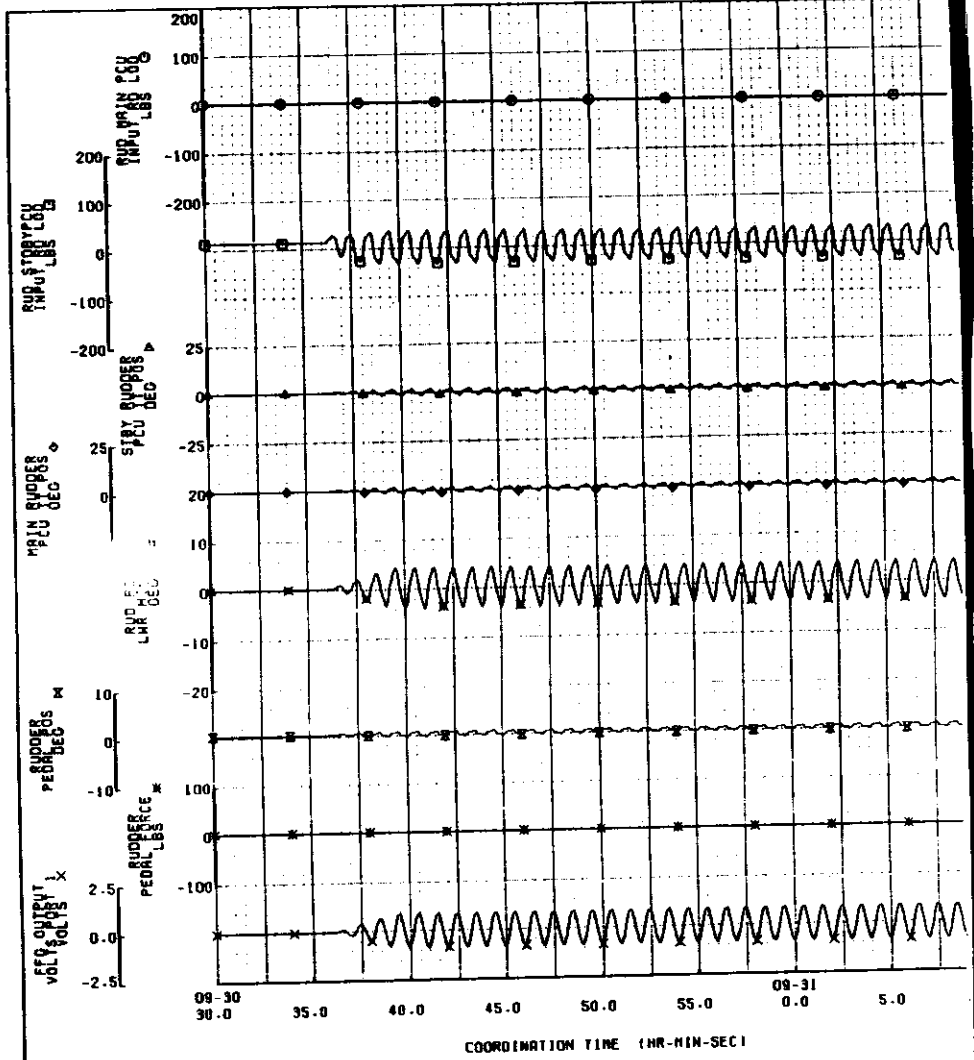

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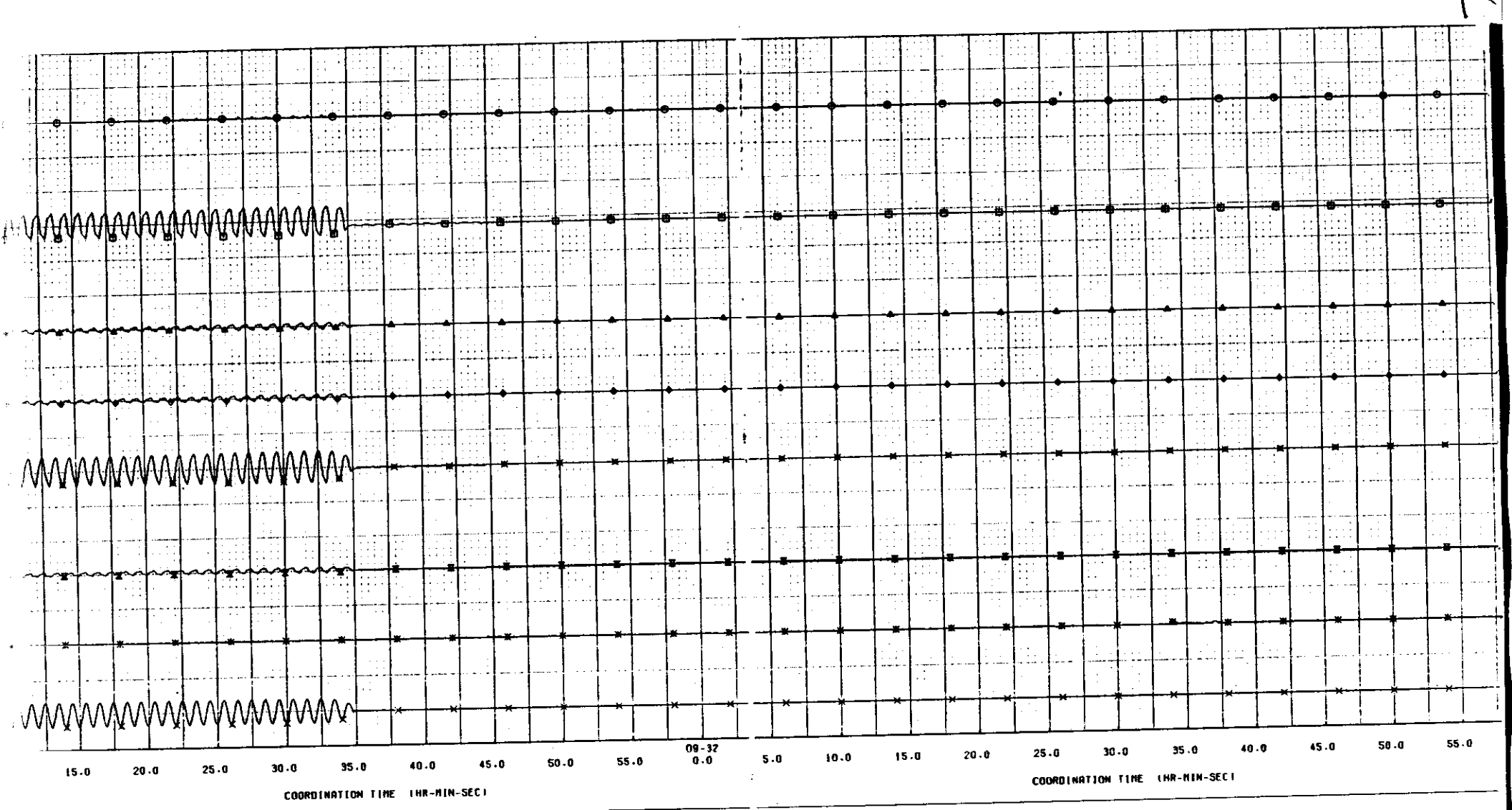
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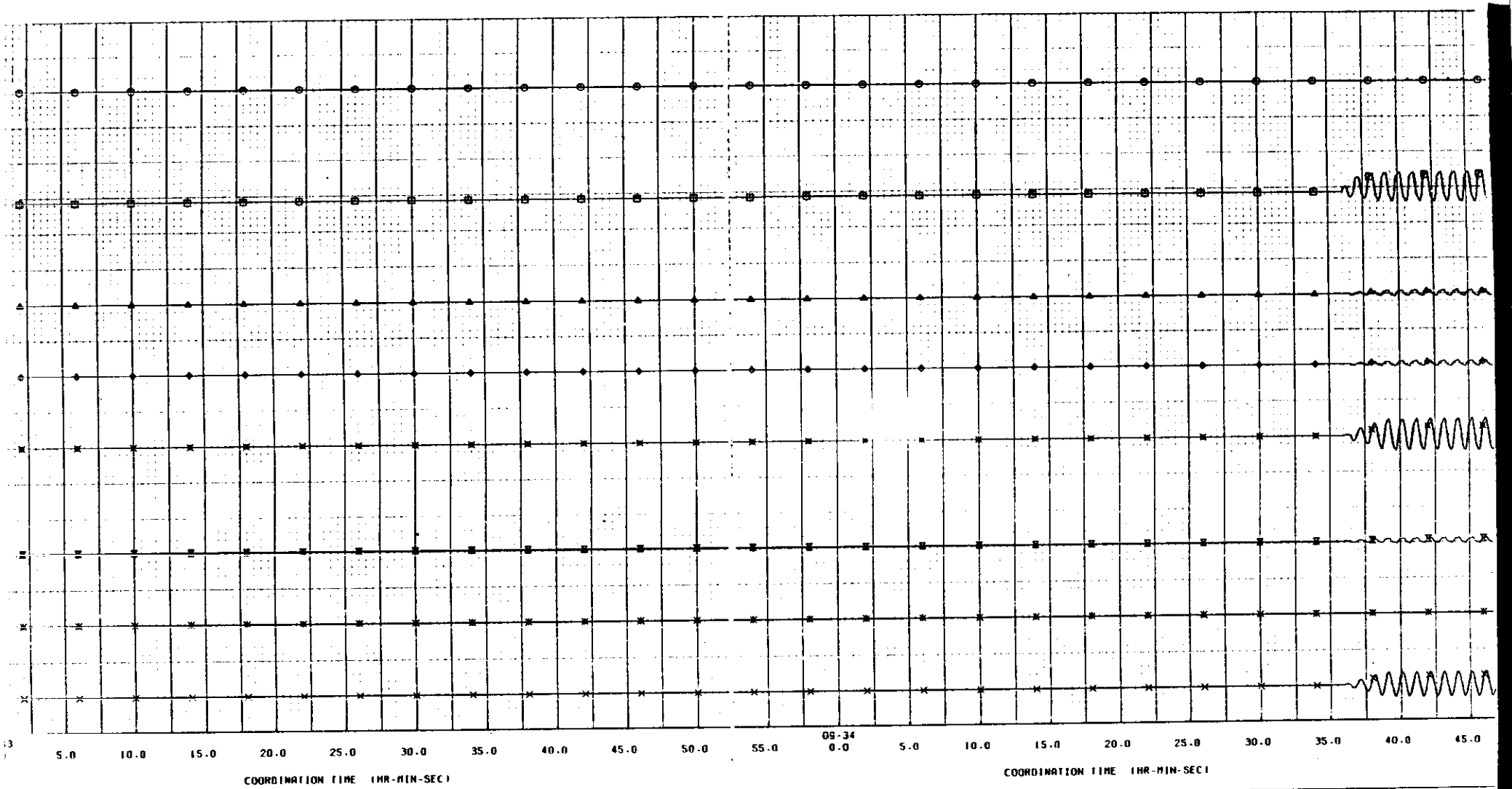
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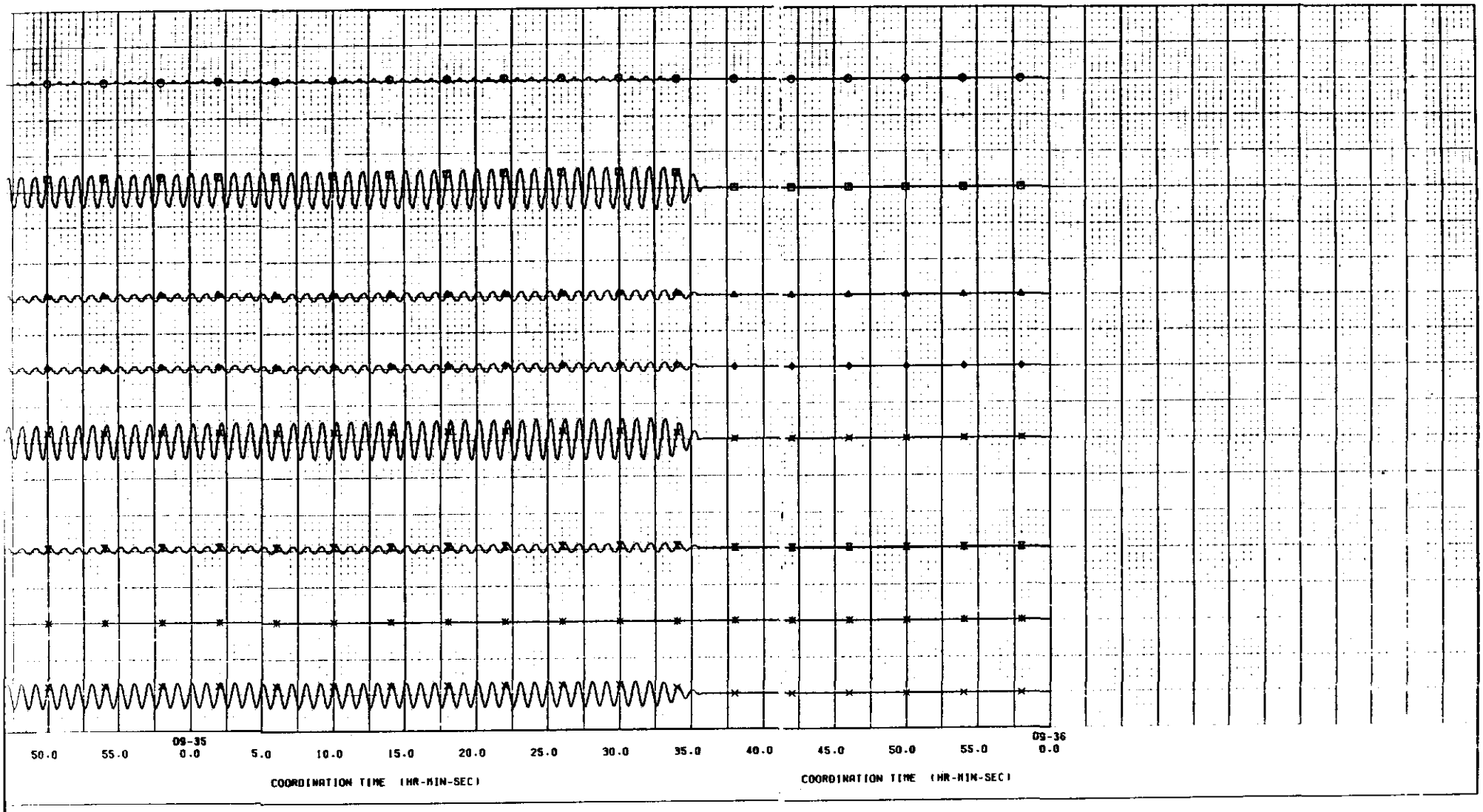
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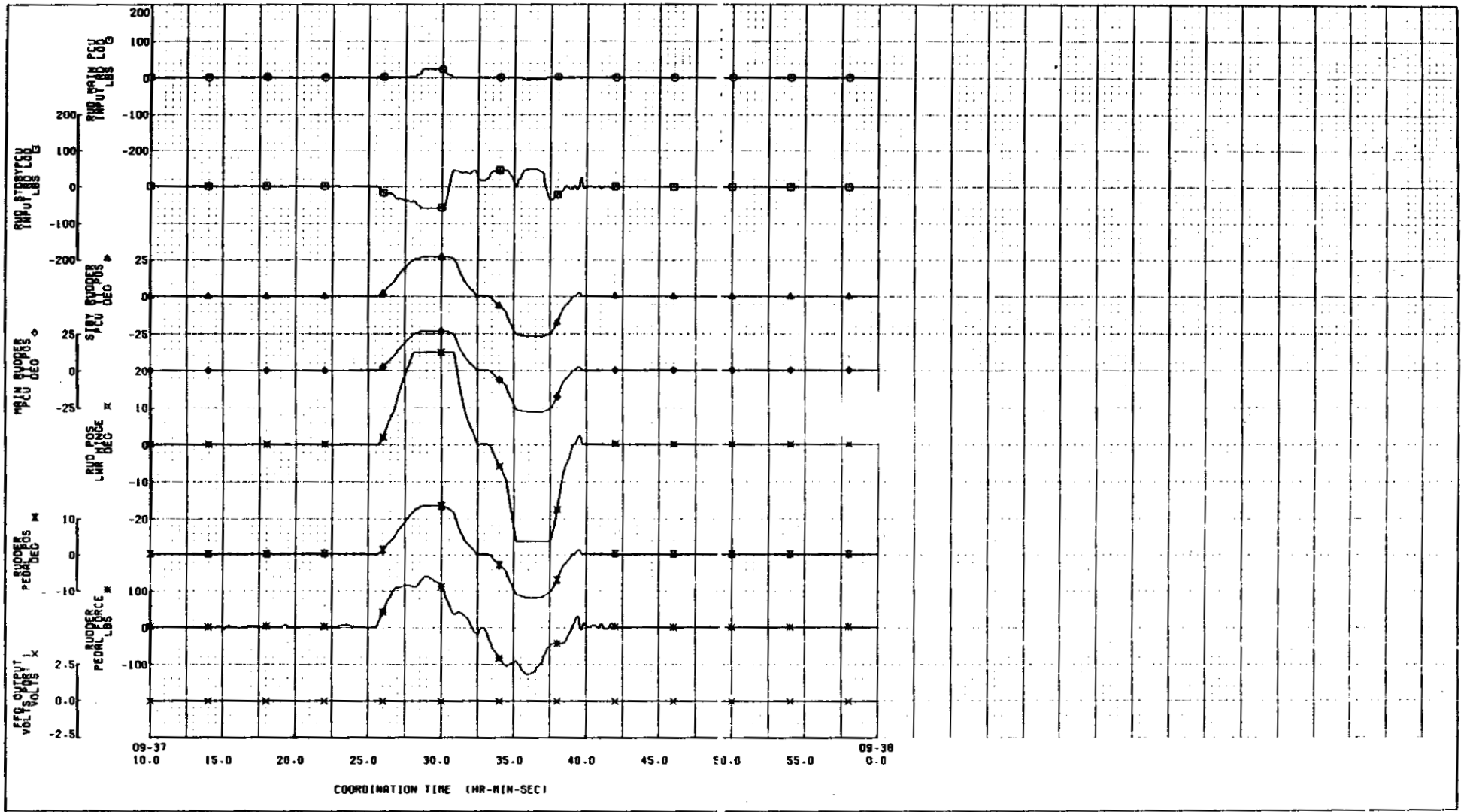

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APR					THE BOEING COMPANY	PAGE

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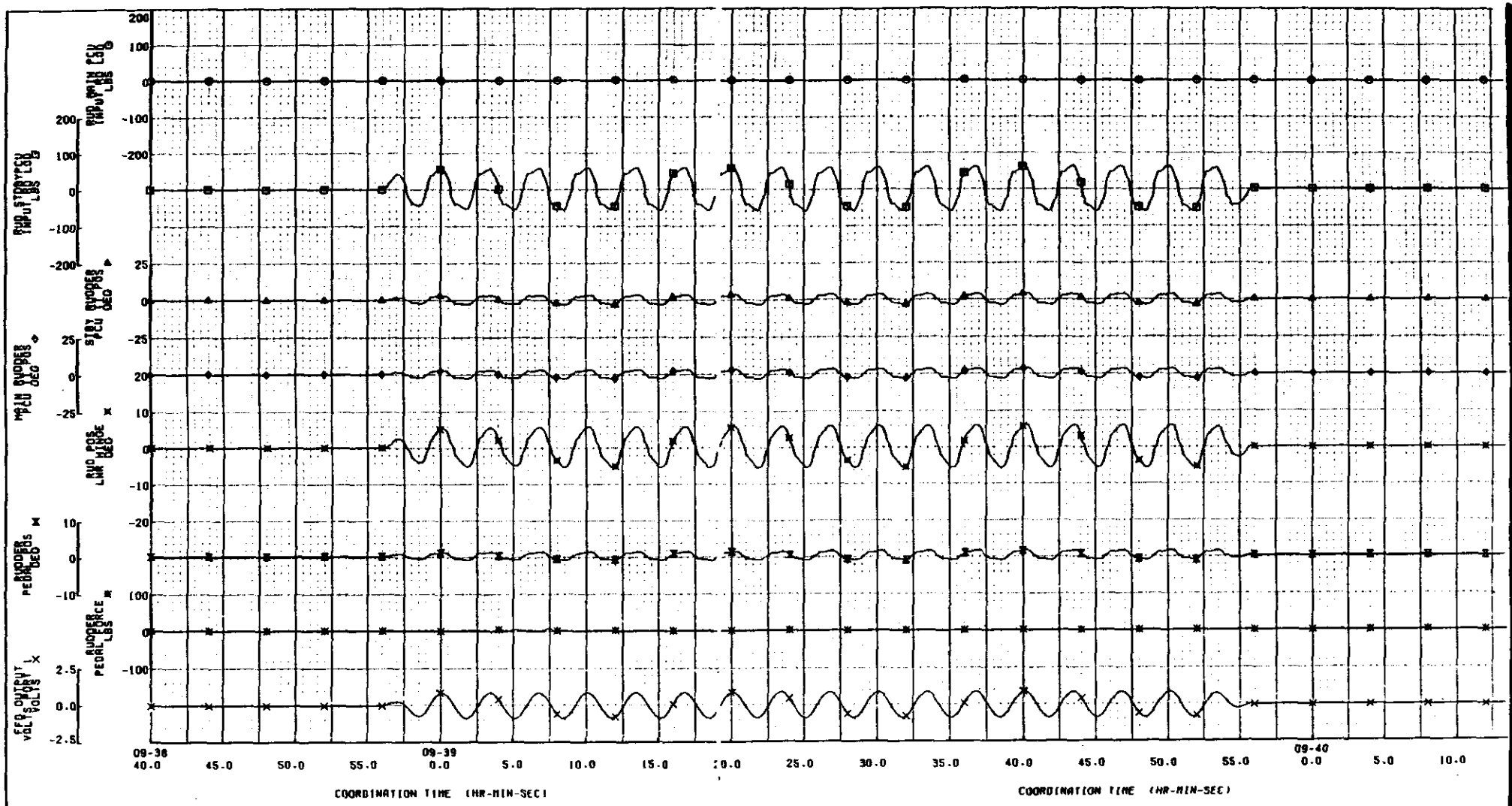

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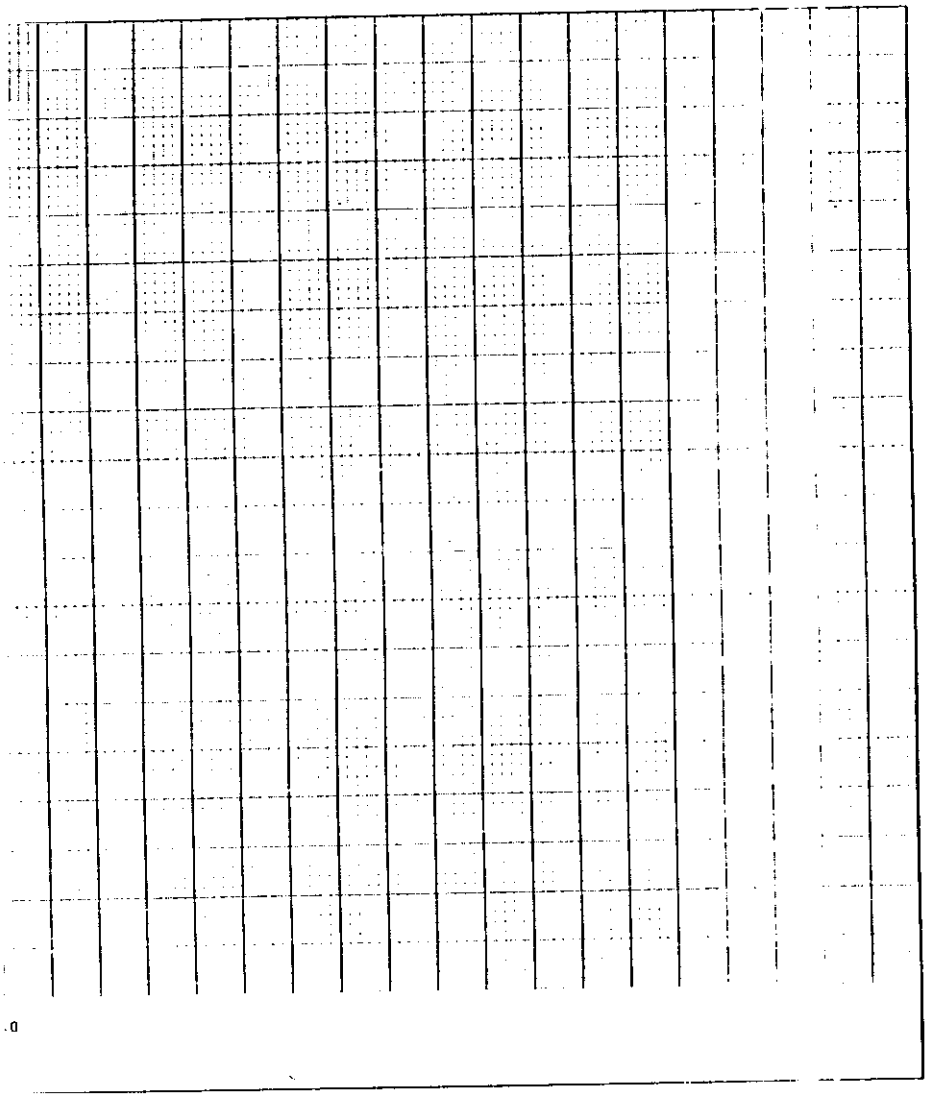

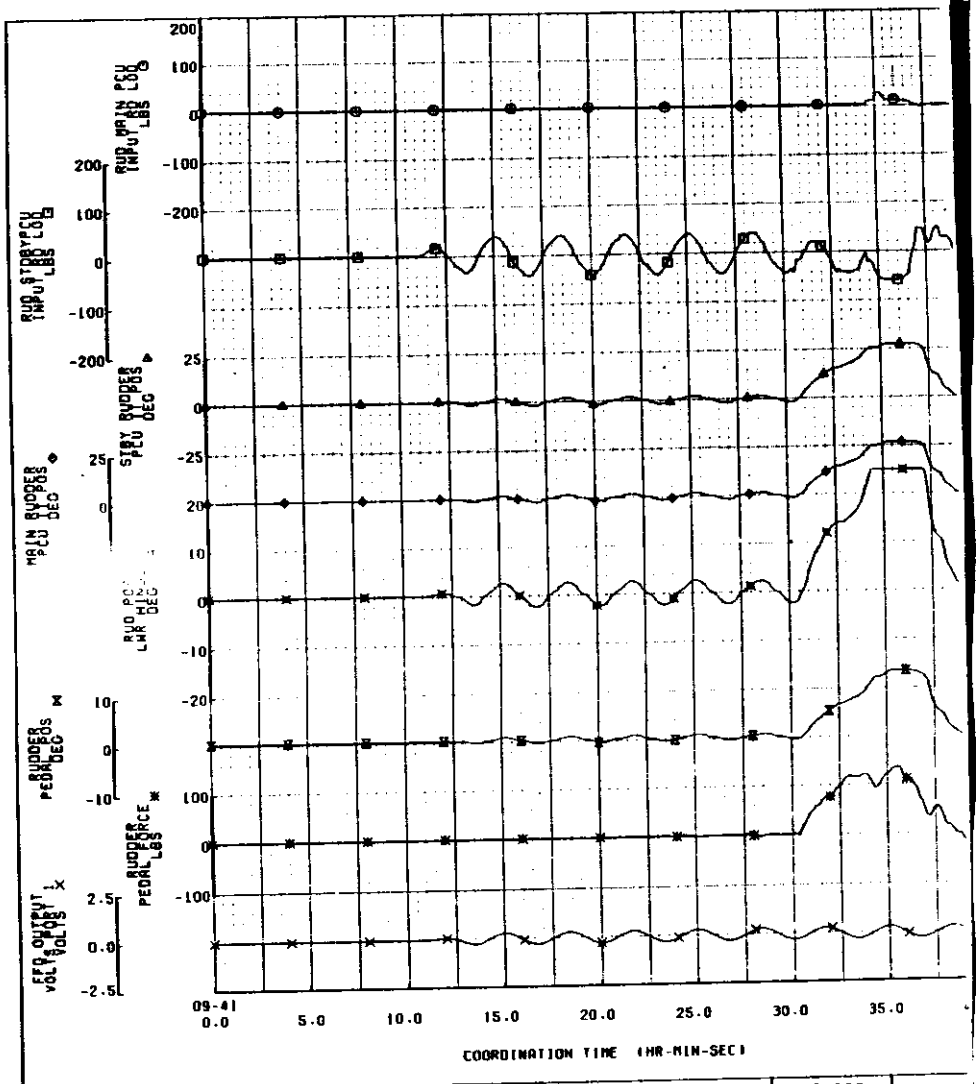

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737-200
PG309
B1.39-0928
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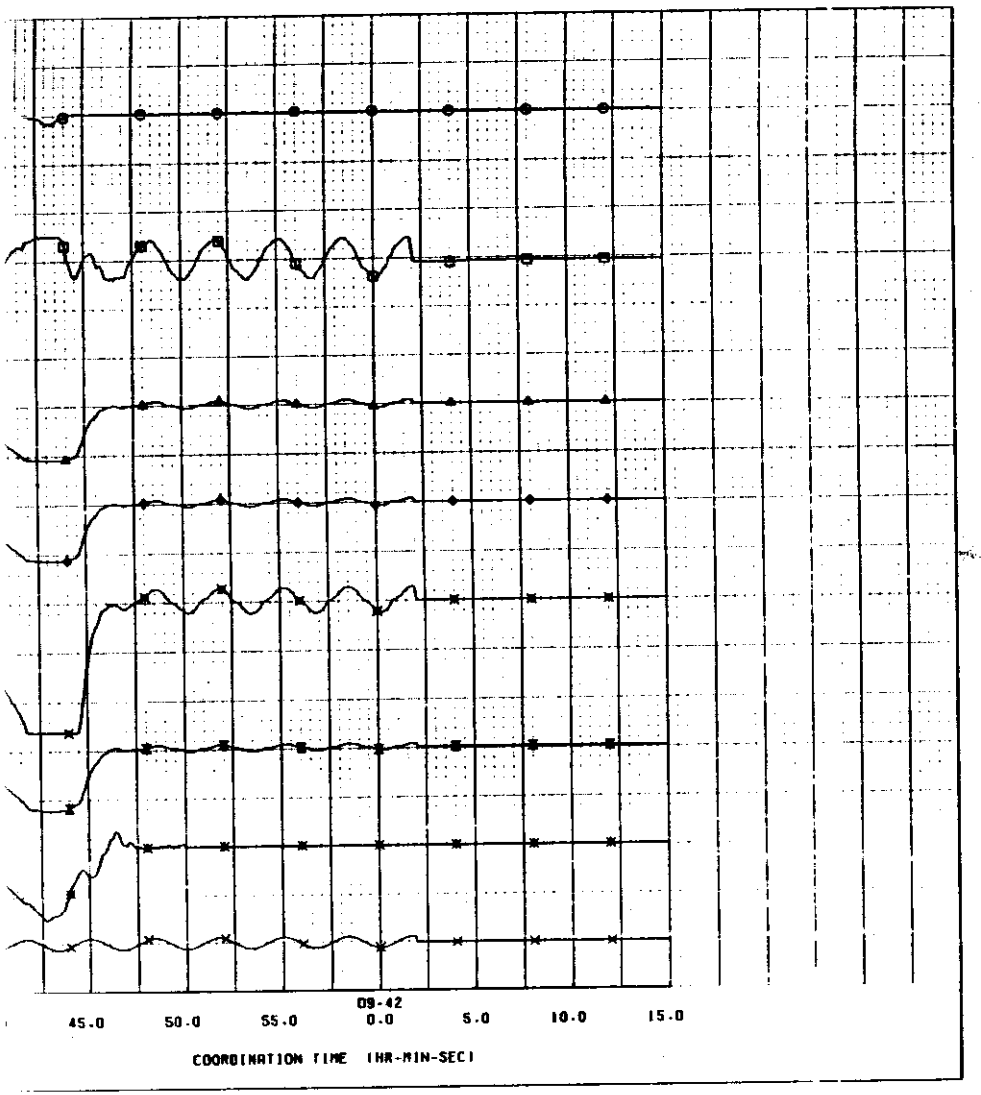

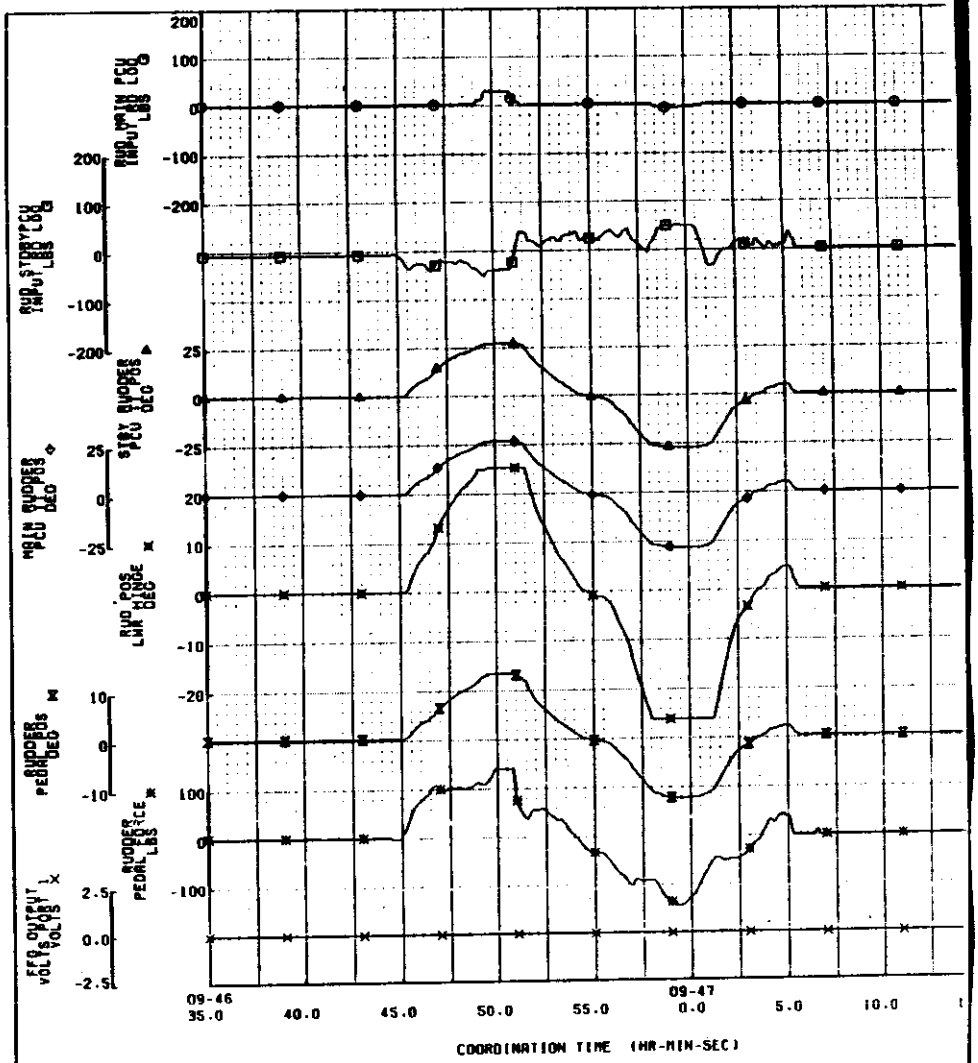

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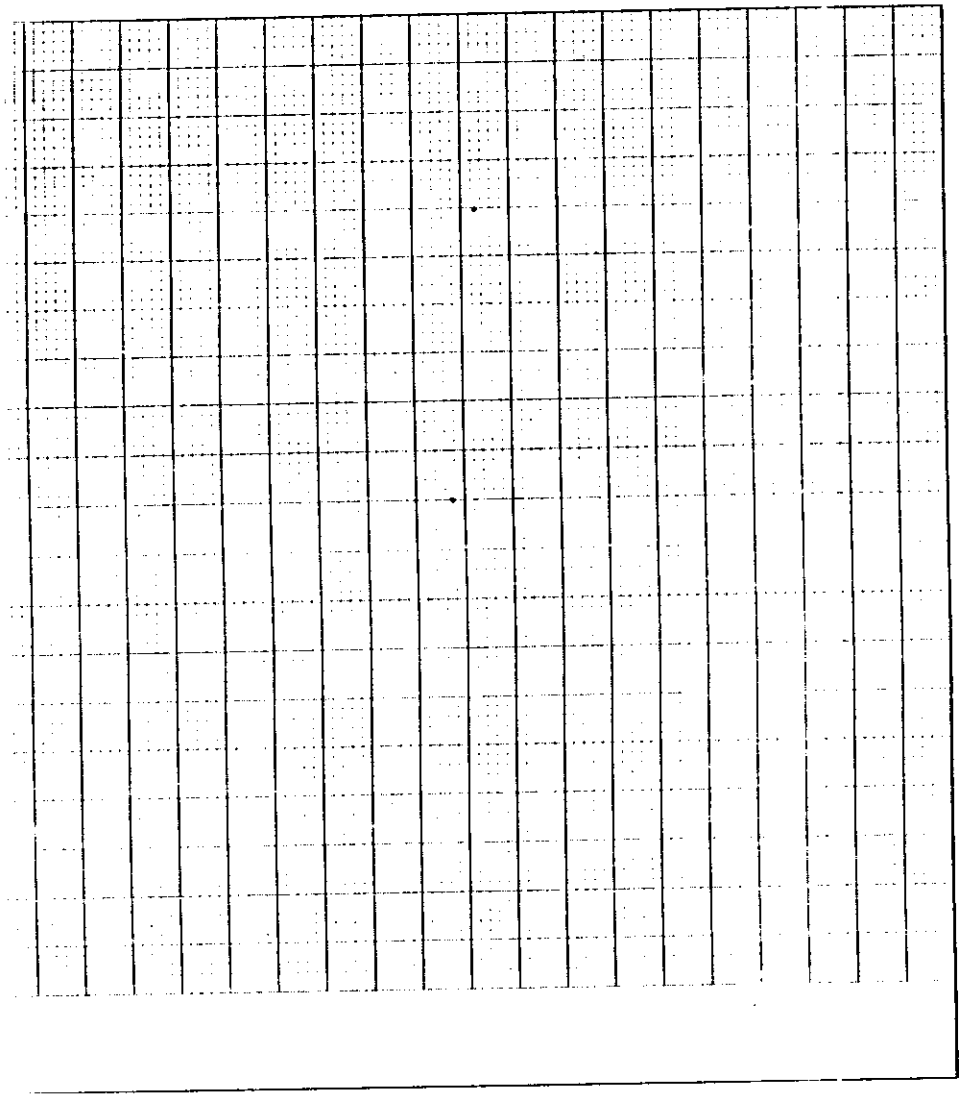

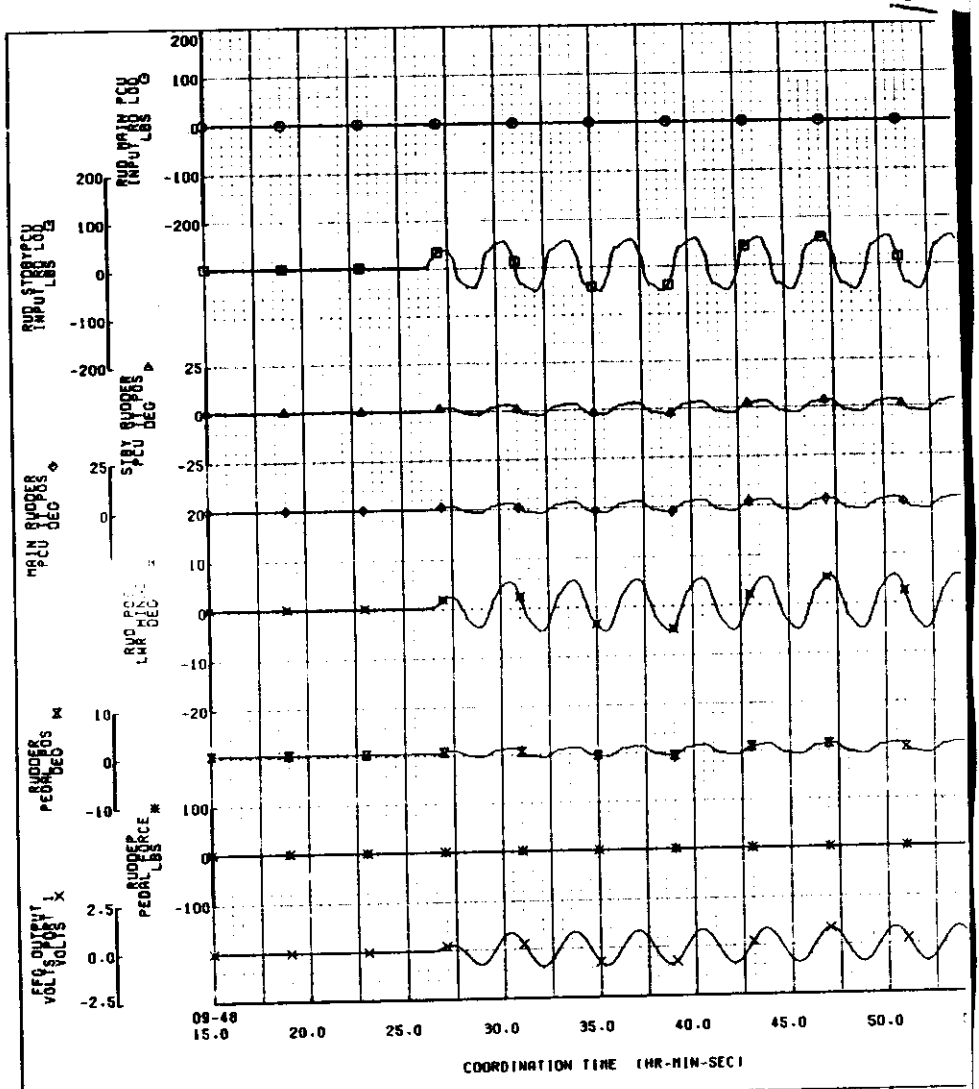

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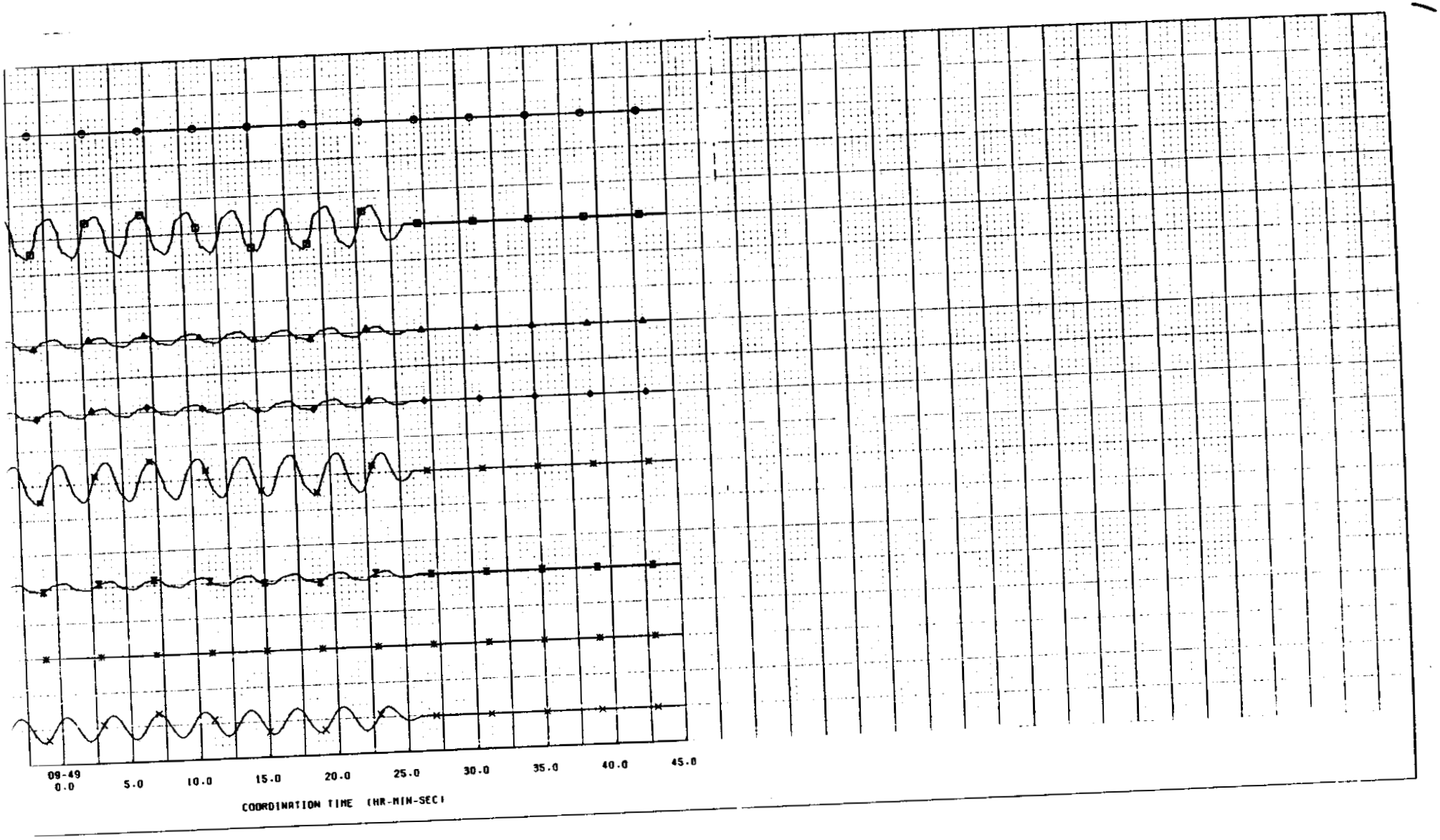
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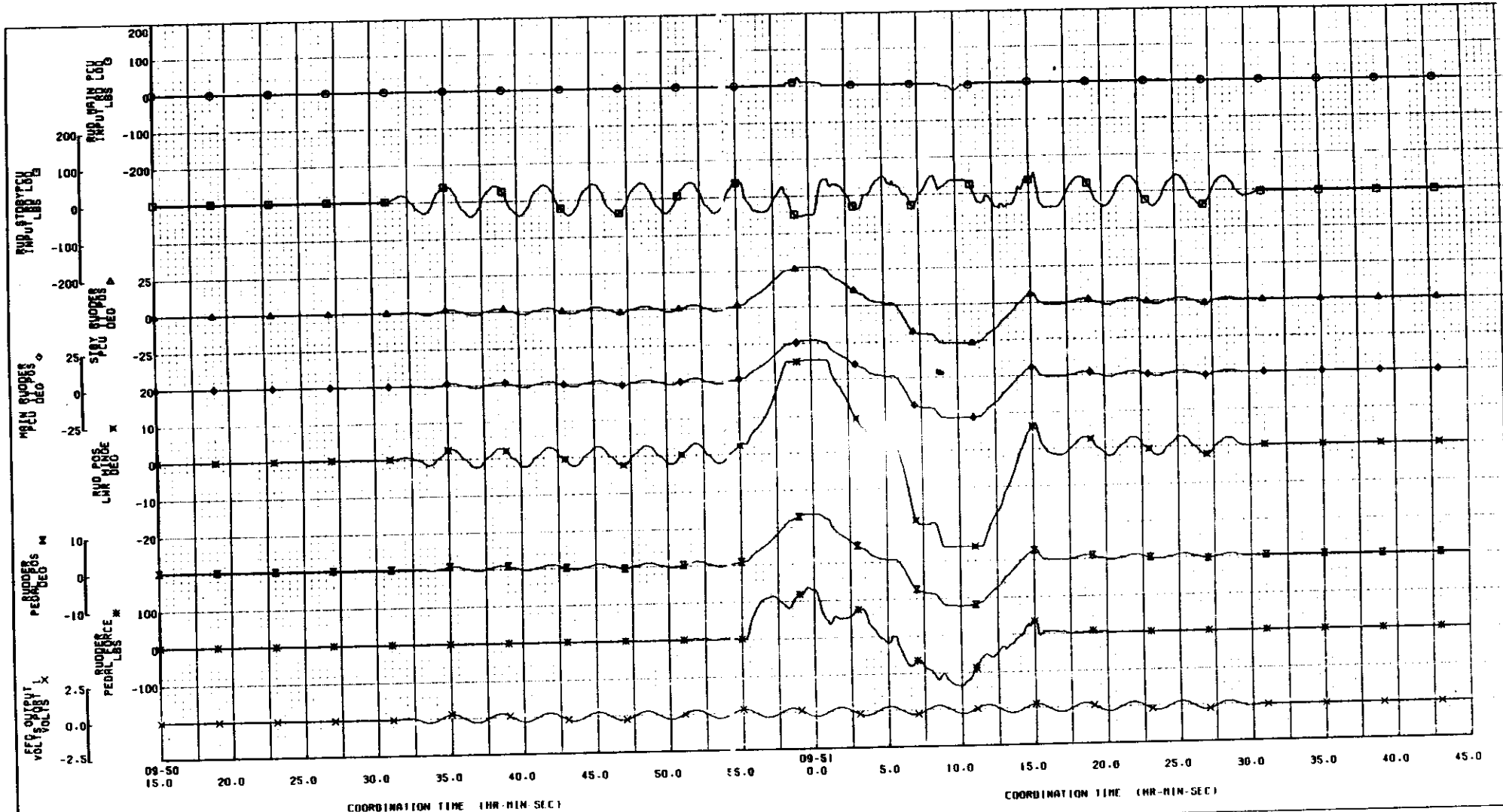

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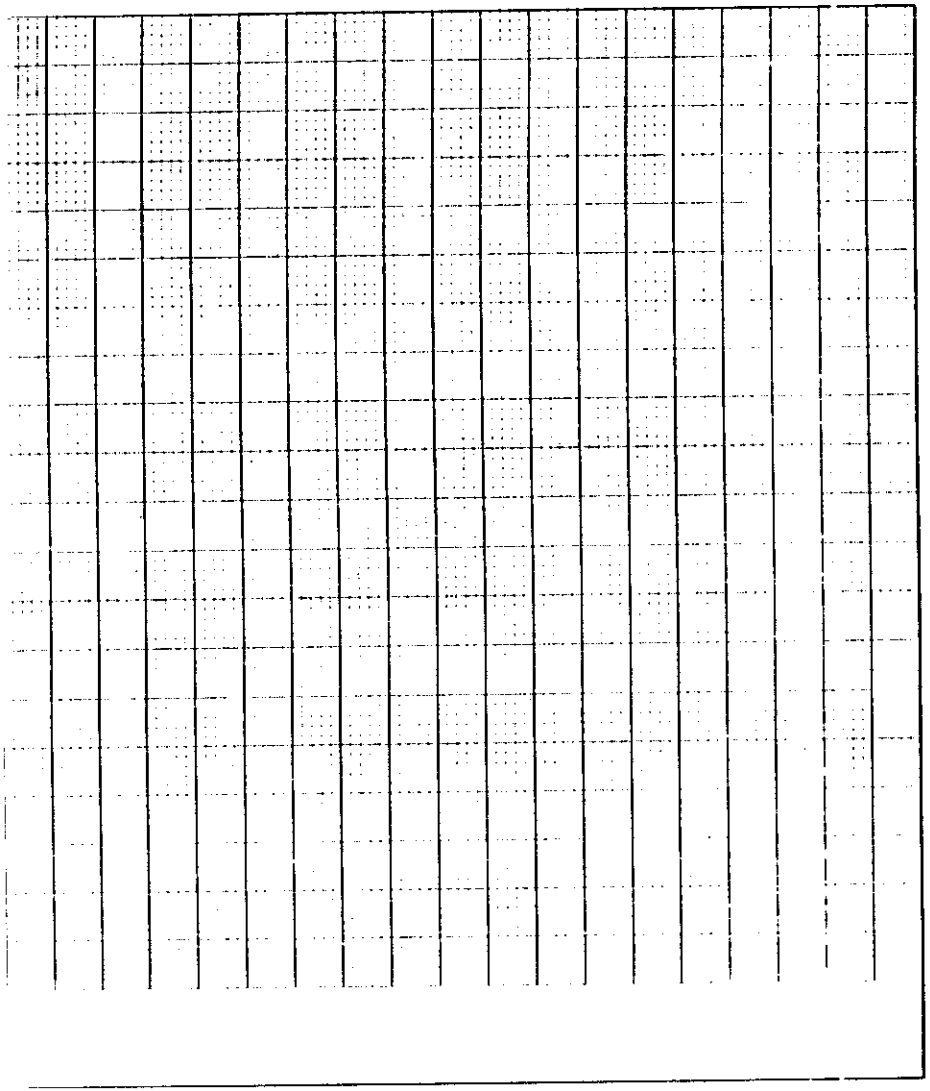

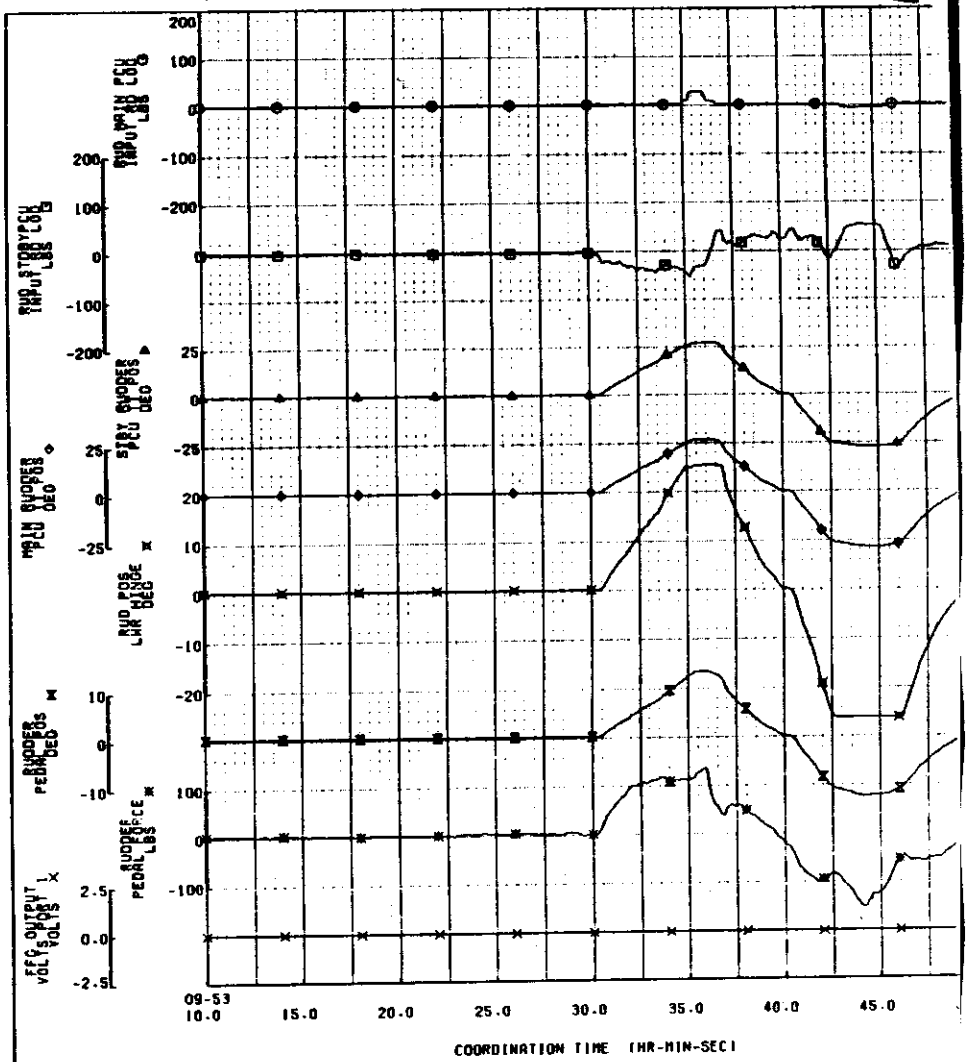

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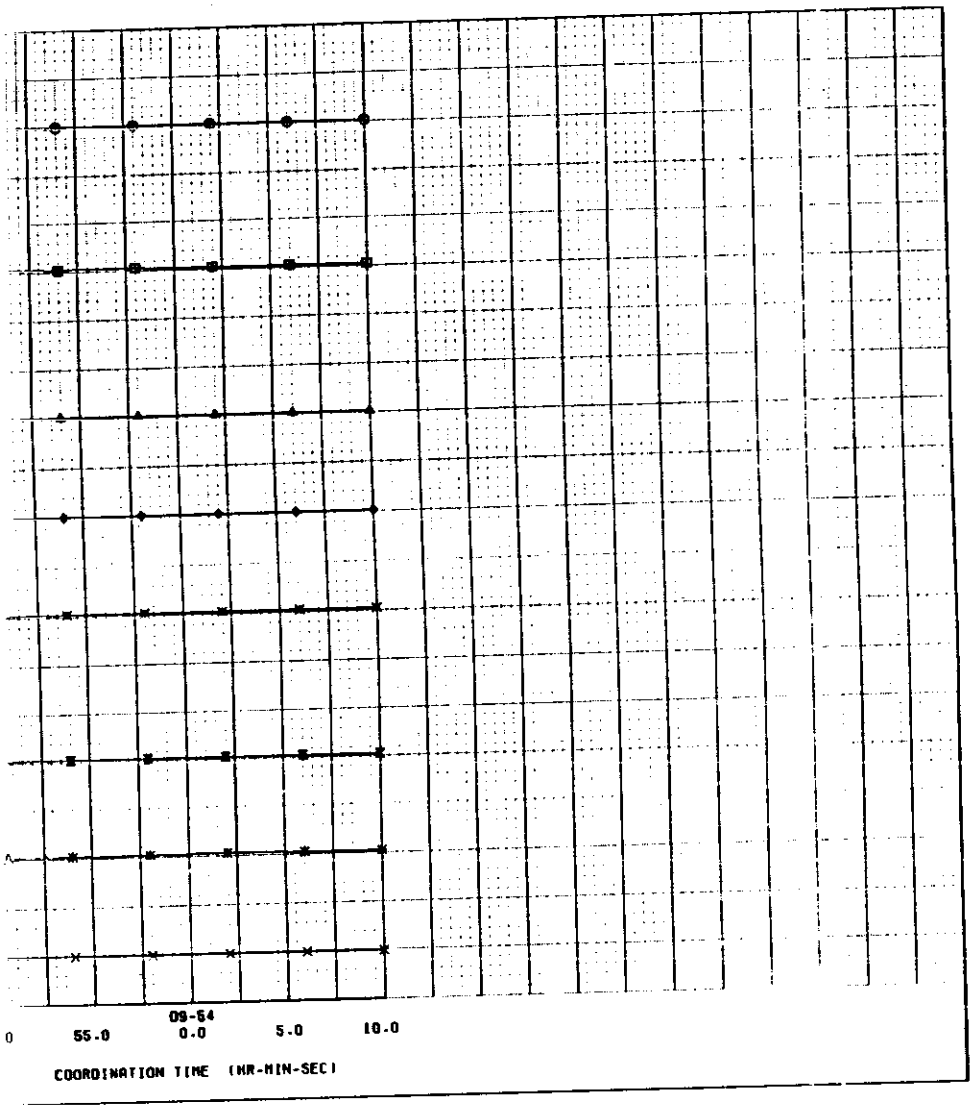

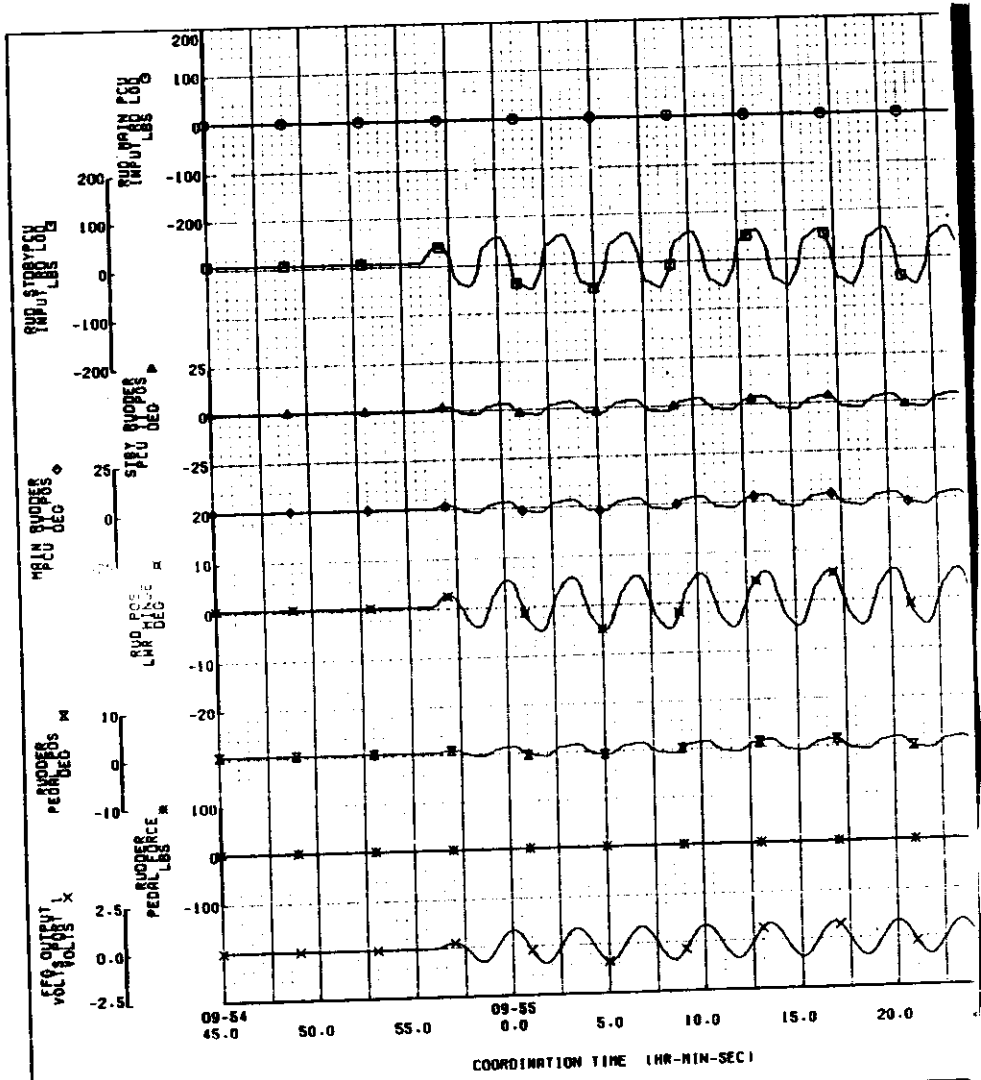

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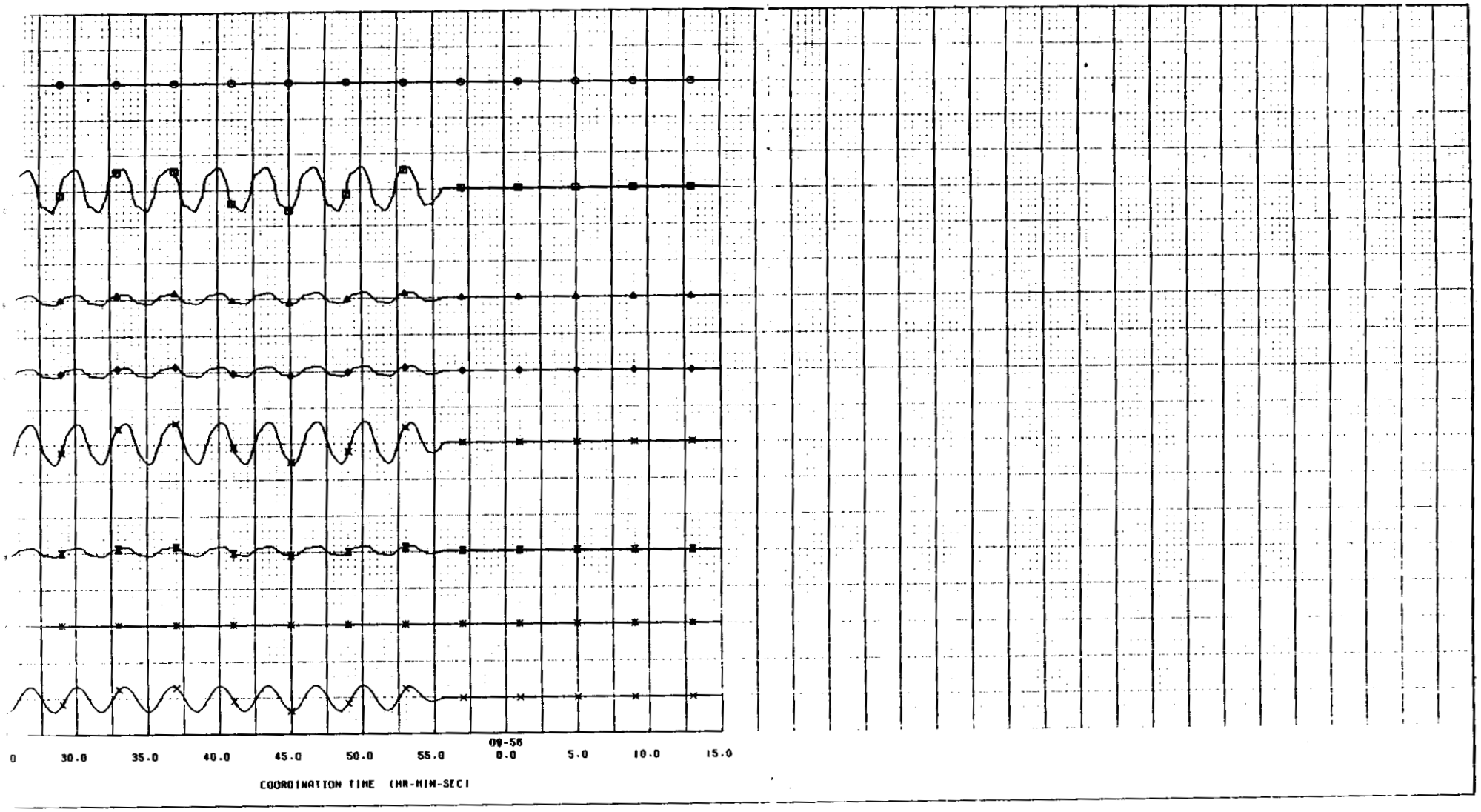
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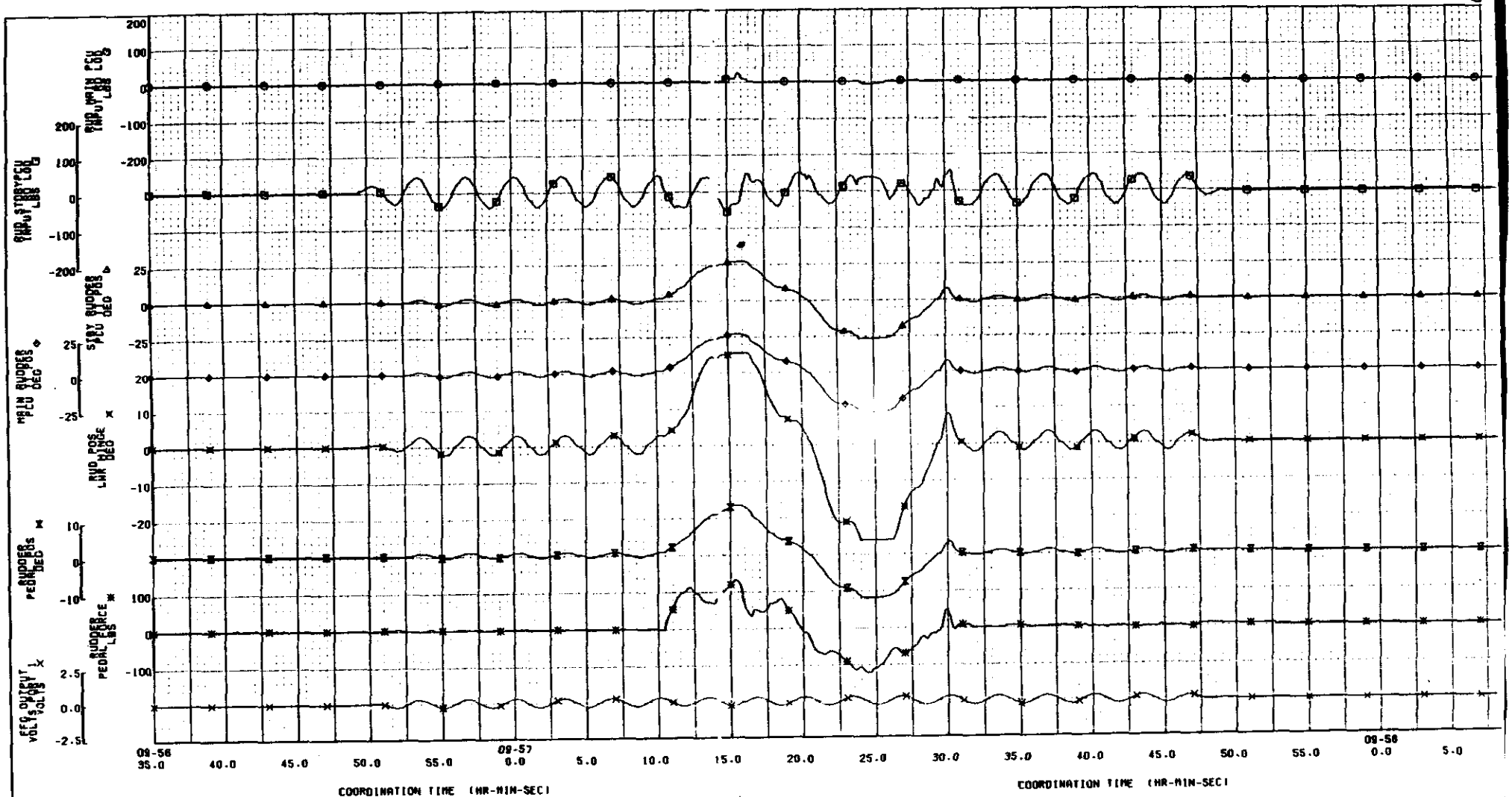

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APR					THE BOEING COMPANY	PAGE
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FORMAT 1
737-200, PG309, RUDDER SYSTEM GROUND TESTING

SCHEDULED TESTING

T.I. #	Test Item Title
B1.39.0928	737-200 STANDBY RUDDER ACTUATOR FAILURE GROUND TEST - B

PURPOSE OF TEST

Jams of the standby rudder PCU control valve lever will be introduced on the ground. The resulting rudder control system operational characteristics will be investigated with various initial conditions and subsequent yaw damper, rudder pedal, and rudder trim inputs. The intent is to allow evaluation of these characteristics with an actual airplane's flight control system compliance, backlash, control valve flow, and pressure gains.

TEST PARAMETERS

☐Hydraulic Power - Supplied to the A & B systems.

☐Electrical Power - ON

☐Nosewheel Steering - Disabled (either install nose gear steering lockout pin in nose gear steering depressurization valve per maintenance manual 32-00-01, or pull the nose gear air/ground circuit breaker on the P-6 panel).

TEST CONDITIONS

System Effects with a Galled Standby Rudder PCU Bearing

- *A Standby PCU with a galled input linkage bearing will be installed. The bearing will be galled to about 60 pounds of input lever force.*
- *Set the Hydraulic System as noted.*
- *Minimize rudder pedal application with the galled bearing. Additional pedal cycles may increase the galling force and jeopardize the test results.*

Condition No.	Hyd Pressure	Operation
☑B1.39.0928.801	A & B	Cycle the rudder pedals through full deflection and note the system response.
☑.802	A & B	Input a ±3.0 degree yaw damper command at 0.3 Hz. Record the system response.
☑.803	A & B	Input a ±1.0 degree Yaw Damper Command at 0.3 Hz. Cycle the rudder pedals through full displacement during the frequency input. Record system response.
☑.804	- - - -	Confirm a simulated airload has been applied to the rudder trailing edge.
☑.805	B & Stby	Cycle the rudder pedals through full deflection and note the system response.

Condition No.	Hyd Pressure	Operation
☑.806	B & Stby	Input a ±3.0 degree yaw damper command at 0.3 Hz. Record the system response.
☑.807	B & Stby	Input a ±1.0 degree Yaw Damper Command at 0.3 Hz. Cycle the rudder pedals through full displacement during the frequency input. Record system response.
☑.808	A,B & Stby	Cycle the rudder pedals through full deflection and note the system response.
☑.809	A,B & Stby	Input a ±3.0 degree yaw damper command at 0.3 Hz. Record the system response.
☑.810	A,B & Stby	Input a ±1.0 degree Yaw Damper Command at 0.3 Hz. Cycle the rudder pedals through full displacement during the frequency input. Record system response.

ADDED
ADDITIONAL CONDITIONS

.801.1	A&B	CYCLE THE RUDDER PEDALS NOTE SYSTEM RESPONSE.
.802.1	A&B	INPUT A ±3.0 degree YAW damper Command @ 0.3 HZ

G. PHILLIPS
4/26/96