INSTRUCTION MANUAL FOR

TM-2 TAPE TRANSPORT

TABLE OF CONTENTS

Section				Page
I	DESC	RIPTION/SPECIFICATIONS		1-1
	1-1	General Description		
	1-3	Tape Transport		1 – 1
	1-12	Head Assembly		
	1-14	Photosense		
	1-16	Transport Electronics Assembly		1-3
	1-18	Manual Control Panel		1-4
	1-20	Voltage Regulator		
	1-22	Cooling Fan		
	1-24	Functional Description		
	1-33	Specifications		
		Operating Characteristics		
		Programming		1-13
		Outputs		
		Controls		
		Input Power Requirements		
		Environmental	•	1-17
II	INSTA	ALLATION		2-1
	2-1	Selection of Location		2-1
	2-7	Uncrating		2-2
	2-13	Mounting (Custom Installations)		2-4
	2-15	Cabling		2-11
	2-17	Head Cable Connections		2-13
III	OPER	ATION		3-1
	3-1	General	-	3-1
•	3-3	Operating Controls	•	3-1
	3-5	Threading Tape Leader		3-1
	3-9	Installing File (Supply) Reel		3-5
	3-11	Manual Operation		3-7
	3-16	Automatic Operation		3-7
	3-19	Removing File Reel	•	
,	3-21	Interlocks		
	3-24	Preparing Tape Indicators		

TABLE OF CONTENTS

Section			Page
IV	CHEC	KOUT AND ADJUSTMENT	. 4-1
	4-1	General	. 4-1
	4-4	Preliminary Operations	. 4-1
	4-7	Preliminary Operations	. 4-5
	4-10	Checking Start/Stop Distance	
	4-12	Adjusting Capstan Roller Gap and Tape Brake Gap.	
	4-14	Checking Tape Tracking	
v	MECH	HANICAL DESCRIPTION	. 5-1
	5-1	General	. 5-1
	5-4	Tape Transport	
	5-27	Transport Electronics Assembly	
	5-40	Manual Control Panel	
	5-42	Photosense Unit	
VI	ELEC	TRICAL OPERATION	. 6-1
	6-1	Basis of Discussion	. 6-1
	6-4	Actuator Control	
	6-37	Servo System	
	6-64	Manual Control Panel	
	6-88	Photosense Unit	
VII	MAIN	TENANCE	. 7-1
	7-1	General	. 7-1
	7-4	Preventive Maintenance Schedule	. 7-1
	7-6	Maintenance Operations	
	7-7	Checking Servo Amplifier Bias	
	7-8	Cleaning the Tape Transport	. 7-6
	7-9	Checking Capstan Roller Adjustment	. 7-7
	7-10	Checking Tape Tracking	. 7-7
	7-11	Checking Pack Follower Alignment	
	7-12	Capstan Roller Adjustment	. 7-8
	7-13	Degaussing Tape Path	. 7-11
	7-14	Cleaning Rack	. 7-12
	7-15	Replacing Air Filters	. 7-13
	7-16	Checking and Adjusting Vacuum	. 7-13
	7-17	Aligning Chamber Guides	. 7-14
	7-18	Checking and Adjusting Reel Servos	. 7-15
	7-19	Checking Holddown Operation and Torque	. 7-20

Section		P	age
	7-20	Checking Actuator Firing Circuitry	-20
	7-21	_	-20
	7-22	Replacing Thyratrons	-23
	7-23		-23
	7-24		-23
	7-25		-24
	7-26		-26
	7-27		-26
	7-28		-27
	7-28		-27
	7-29	Replacing Capstan Roller Assemblies,	
			-27
	7-30	Replacing Capstan Drive Belt 7	-28
	7-31		-29
	7-32		-29
	7-33		-30
	7-34	Replacing Positive Pressure Blower 7	-30
	7-35	Replacing Pack Follower Assemblies 7	-31
	7-36		-31
	7-37		-32
	7-38		-33
	7-39	•	- 34
	7-40		-39
VIII	SCHE	MATIC DIAGRAMS	8 - 1
ΙΧ	HILLIS	STRATED PARTS BREAKDOWN	9-1



LIST OF ILLUSTRATIONS

Figure	Title	Page
	SECTION I DESCRIPTION/SPECIFICATIONS	
1 - 1	Tape Transport	1-1
1-2	Head Assembly	1-3
1-3	Transport Electronics Assembly	1-3
1-4	Manual Control Panel	1-4
1-5	Voltage Regulator	1-5
1-6	Instantaneous Speed Variation	1-12
1-7	Stop Delay Requirements	1-14
	SECTION II INSTALLATION	
2-1	Dimensions and Clearances, Ampex Cabinet Rack	2-3
2-2	Tape Transport Mounting	2-5
2-3	Transport Electronics Assembly Mounting	2-7
2-4	Manual Control Panel Mounting	2-8
2-5	Voltage Regulator Mounting	
2-6	Cabling Diagram	2-10
2-7	Typical Control Circuitry	2-12
2-8	Head Cable Connections	2-14
	SECTION III OPERATION	
3-1	Operating Controls, Manual Control Panel	3-2
3-2	Tape Threading Path	3-3
3-3	Mounting a File Reel	3-4
3-4	Connecting Leaders	3-6
3-5	Placement of Photosense Tabs on Tape	3-10
	SECTION IV CHECKOUT AND ADJUSTMENT	
4-1	Servo Amplifier Adjustment Points	4-3
4-2	Adjusting Servo Transducer	4-3
4-3	Adjusting Servo Gain	4-5
4-4	Test Set-up, Start/Stop Time Measurement	4-6
4-5	Typical Waveforms, Start/Stop Time	4-7
4-6	Test Set-up, Start/Stop Distance Measurement	4-9
4-7	Capstan Roller Adjustment Points	4-10
4-8	Tape Guide Adjustment Points	1 4-14

LIST OF ILLUSTRATIONS

Figure	Title	Page
	SECTION V MECHANICAL DESCRIPTION	
5-1	Interconnection of Units	5-2
5-2	Tape Transport: Front View	5-3
5 - 3	Tape Transport: Rear View	5-4
5-4	Head Assembly	5-7
5-5	Transport Electronics Assembly.	5-9
5-6	Manual Control Panel	5-12
	SECTION VI ELECTRICAL OPERATION	
6-1	Block Diagram, Actuator Control AC-400	6-2
6-2	Waveshape, Anode of V404	6-3
6-3	Waveshapes, C107/Anode V404	6-4
6-4	Waveshape, Discharge Current C107	6-4
6-5	Waveshapes, Cathode/Grid V104	6-5
6-6	Waveshapes, Typical AC-400 Input/Resulting Pulse	6-7
6-7	Partial Schematic, AC-400 (Forward Control)	6-9
6-8	Partial Schematic, AC-400 (Forward Interlock)	
6-9	Block Diagram, Reel Servo System	6-13
6-10	Block Diagram, Servo Oscillator OSC-700	6-15
6-11	Waveshape, Typical Oscillator Output	6-15
6-12	Partial Schematic, SA-500 (Demodulator)	6-17
6-13	Partial Schematic, SA-500 (First Stage)	6-18
6-14	Partial Schematic, SA-500 (Second Stage)	6-19
6-15	Partial Schematic, SA-500 (Final Stage)	6-20
6-16	Waveshapes, Relationship Grid/Anode Voltages	6-21
6-17	Block Diagram, Photosense Electronics	
	SECTION VII MAINTENANCE	
7-1	Cleaning Head Assembly	7-6
7-2	Cleaning Sensing Slots.	7-7
7-3	Capstan Roller Adjustment Points	7-9
7-4	Head Demagnetization	7-12
7-5	Vacuum Level Adjustment Point	7-14
7-6	Vacuum Test Assembly	7-14
77	Tape Guide Adjustment Points	7-15
7-8	Servo Amplifier Adjustment Points	716

Figure	Title	Page
7-9	Adjusting Servo Transducer	7-17
7-10	Adjusting Servo Gain	7-19
7-11	Measuring Tape Packer Arm Tension	7-21
7-12	Cutaway View, Tape Packer Assembly	7-21
7-13	Location of Pack Follower Switch	7-22
7-14	Checking Head Wear	7-24
7-15	Adjusting Loop Warning Switch	7-25
7-16	Capstan Drive Belt Path	7-28
7-17	Measuring Capstan Drive Belt Tension	7-29
7-18	Adjusting Capstan Drive Belt Tension	7-29
7-19	Reel Brake Adjustment Points	7-33
	SECTION VIII SCHEMATIC DIAGRAMS	
8-1	Schematic Diagram, Tape Transport	8_1
8-2	Schematic Diagram, Composite Control System	
8-3	Schematic Diagram, Composite Actuator Control	
8-4	Schematic Diagram, Actuator Control Unit AC-400.	
8-5	Schematic Diagram, Composite Servo System.	
8-6	Schematic Diagram, Servo Oscillator OSC-700	
8-7	Schematic Diagram, Servo Amplifier SA-500	8-13
8-8	Schematic Diagram, Electronics Power Supply PS-100	
8-9	Schematic Diagram, Servo Motor Power Supply PS-200	
8-10	Schematic Diagram, Connector Chassis CC-300	
8-11	Schematic Diagram, Manual Control Panel CU-800	
8-12	Schematic Diagram, Photosense Base Card.	
8-13	Schematic Diagram, Photosense Base Card	8-25
8-14	Schematic Diagram, Photosense Base Card	
8-15	Schematic Diagram, Photosense Power Supply	
8-16	Schematic Diagram, Photosense Chassis Wiring	
8-17	Schematic Diagram, Photosense Chassis Wiring	8-33
8-18	Schematic Diagram, Photosense Chassis Wiring	
	SECTION IX ILLUSTRATED PARTS BREAKDOWN	
9-1	TM-2 Tape Transport	9-3
9-2	TM-2 Tape Transport Final Assembly.	9-8
9-3	Read/Write Head Assemblies	9-12
9-4	Head Cable and Box.	9-14
		. –

LIST OF ILLUSTRATIONS

Title	Page
Photosense System	9-18
Positive Pressure Filter Assembly	9-30
Vacuum Blower and Elapsed Time Meter	9-32
Supply Reel, Take-Up Reel, and Reel Motors	9-36
Capstan Drive Motor Assembly	9-40
Positive Pressure Blower	9-44
Upper Servo Control	9-48
	9-52
	9-56
	9-60
	9-64
	- / ^
Transport Access Door	9-82
Transport Electronics Assembly	9-86
Electronics Power Supply PS-100	9-90
Servo Motor Power Supply PS-200	9-98
Connector Chassis CC-300	9-102
Actuator Control Unit AC-400	9-106
	9-110
	9-114
Cabinet and Dolly Assemblies	9-120
	Photosense System Positive Pressure Filter Assembly Vacuum Blower and Elapsed Time Meter Supply Reel, Take-Up Reel, and Reel Motors Capstan Drive Motor Assembly Positive Pressure Blower Upper Servo Control Lower Servo Control Oscillator and Housing Reel Brakes. Vacuum Chambers Precision Plate Cable, Switches, Vacuum Tubing, and Main Frame. Transport Access Door Transport Electronics Assembly Electronics Power Supply PS-100 Servo Motor Power Supply PS-200 Connector Chassis CC-300 Actuator Control Unit AC-400 Servo Amplifier SA-500