

# Triple I

1901 North Walnut

P.O. Box 25308 • Oklahoma City, OK 73125 (405) 521-9000

## INTRODUCTION TO THE FIXED SPEED DECK

We at Triple I, feel that the Phi-Deck gives you more for your money than any other transport in the same price range. The Phi-Deck may permit additional savings in system cost by reducing power supply cost (due to smaller power requirements), making remote control of the deck easy, reducing susceptibility to tape damage, and by making downtimes fewer and farther between than that of other transports.

In addition to this, Triple I's staff can provide further help by reducing engineering and manufacturing cost of such items as motion control, digital read/write and other record/playback electronics.

If you have any questions about this or anything we may not have mentioned in the enclosed literature, please contact us. We are always interested in your feedback.

THE TRIPLE I STAFF

## FIXED SPEED DECK LITERATURE PACKAGE

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INSTRUCTIONS MANUAL  
FIXED SPEED DECK DEMONSTRATOR  
(FOR PHI-DECK MODEL #1)

### IMPORTANT

#### RUN INHIBIT

If you buy a second deck that has no cassette in place option on it, it will not work with the control board unless you make a jumper from a wire and the parts supplied in the accessory package. The jumper should be placed to short pins 7 and 9 of the options wiring jack.

#### BOT SWITCH POSITION

The decks in your evaluation package are not equipped with BOT sensors thus this position of the switch does not initiate any new functions. However, this position when used in conjunction with the auto play switch set to the ON position will inhibit the skip functions and may be used for such purposes if so desired. (The BOT sensor can be ordered and adapted to the decks and will cause a difference in the way the deck controls operate. See page 7.)

PREPARATION & FUNCTIONS CHECK OF YOUR  
FIXED SPEED DECK DEMONSTRATOR

To set up the demonstrator:

1. Connect the remote control box cable to D.I.P. socket (J7) at the front of the control board so that the cable leads away from the deck.
2. Set the controls to the following positions:
  - Auto play - OFF
  - Auto play - BOT
3. Plug in the AC adaptor to the jack at the right rear side of the control board. The stopped indicator should now be lit and the capstan motor should be turning.
4. Now run the tape back to its beginning by momentarily pushing the RWD button. When you have finished this the demonstrator is ready for an operations check.

## OPERATION:

### PLAY

A PLAY command will cause the headbar to engage and tape motion to start. The transport will continue to function in this mode until a stop command is given.

### STOP

A STOP command will cause tape motion to cease and the headbar to disengage. Other than from the STOP button, stop commands originate from the BOT\*sensor and tape motion sense circuit and will overrule any other commands.

### SKIP FUNCTIONS

A SKIP command will cause the tape to wind in the indicated direction so long as the command is given. Upon release of the skip button or termination of the command, a signal will be given to re-engage the headbar and start the deck into the play mode. If the deck is in the play mode when the skip button is depressed the headbar will be disengaged before winding.

(Note: The skip controls are made inoperative when the auto play switch is turned to ON.)

### FAST REWIND AND FORWARD

In order for the RWD and FWD switches to work the headbar must be disengaged.

These controls are self-latching and require only a momentary push of the button. To prevent separation of the leader from the hub, braking is applied as the tape approaches its' leader. A stop command is given to those tapes having a BOT/EOT marker or clear leader before the tape leader reaches its' end at the hub. For those tapes not stopped by this means, the tape motion sense circuit will give a stop command once the end of the tape leader has been reached and tape motion ceases. The operator may also stop at any portion of tape during fast forward or rewind by depressing the stop button.

### AUTO PLAY

The AUTO PLAY control must be switched to ON in order to observe the effects of CONT and BOT\*.

\* See Pages 3 and 7

CONT. (Continuous play)

This switch sets up a sequence of controls which commands a tape to play through until the end of tape motion is sensed, then to automatically disengage the head, rewind to the beginning and at that point to return to play.

### BOT/EOT MARKERS

Beginning of tape (BOT) and end of tape (EOT) markers are small holes in the magnetic tape. Each one is located about 18 inches from either end of the tape and are included in most data cassettes.

The demonstrator's circuits are designed to detect and initiate new commands when one of these markers or a clear leader is sensed.

The BOT/EOT marker and clear leaders are used in the demonstrator to initiate stop commands in the play and fast wind modes, as well as to initiate other sequences of commands when dictated to do so.

When set up appropriately the BOT/EOT marker can initialize such sequences as stop at EOT marker, rewind slightly past BOT, engage headbar and play to BOT, then stop and await next command.

The demonstrator can also be set up to play continuously on tapes that do not have the BOT marker. This can be done by sensing a clear leader or by sensing the end of tape motion. Detection of either can start the sequence of stop, rewind to beginning, engage headbar and start play.



## PHI-DECK MAINTENANCE

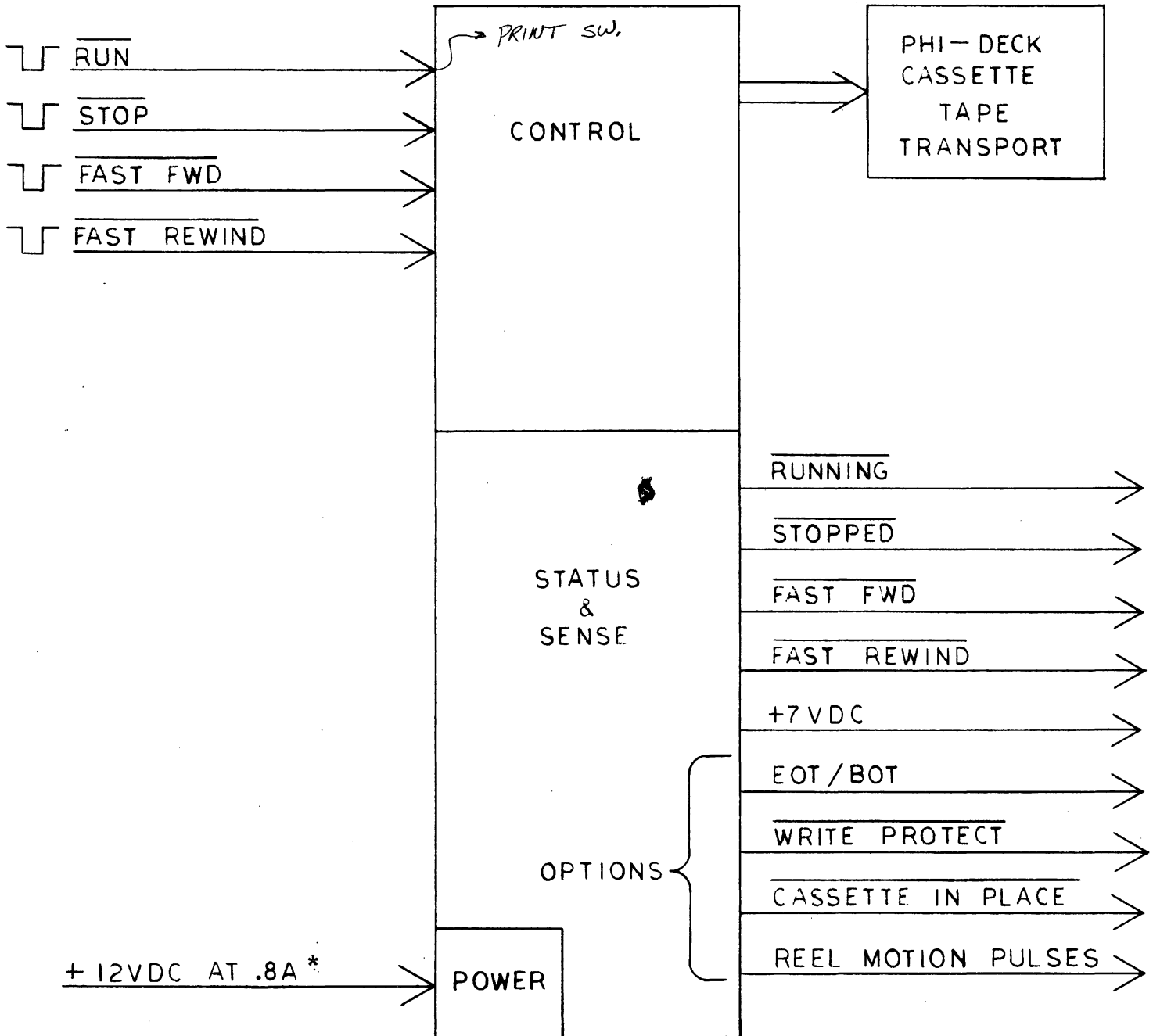
In order to obtain a longer more trouble-free life and to insure proper performance, a routine maintenance check should be made as outlined in the following schedule. The steps and time involved were derived from Triple I testing and from normal procedures involved in tape transport maintenance.

Every 500 hours:

1. Clean the transport thoroughly. Remove any accumulated dust, metal oxide particles and lint with an air hose or brush.
2. Using a thin needle-type applicator, oil\* the starwheel shaft bearings, headbar pivot sleeve bearings, and the capstan bearing. Remove any excess oil on external surfaces.
3. Remove the two reel rest assemblies and post. Clean any oil or buildup from the insides of the assembly. This can be done by running a thin rag along the inside. Clean any oil or buildup from the reel post. Oil\* the post at the bearing surfaces and under the metal cap then reassemble to the deck. Remove any excess oil on the external surfaces.
4. Clean the head with G.C. magnetic head cleaner solvent or equivalent and wipe dry.
5. Clean the pinchroller with G. C. rubber drive cleaner solvent or equivalent and wipe dry.
6. De-magnetize the head.
7. Check and adjust as required the following functions:
  - a. Head depth (Set with an Information Terminals M-300 Gauge)
  - b. Pinchroller spring tension (pinchroller should be pulled from the capstan with a force of 250-275 grams at the outside edge of the pinchroller bracket).
  - c. Head height and azimuth.
  - d. Capstan drive motor speed plus Wow & Flutter.  
(Wow & Flutter problems are usually caused by the drive belts.)
8. For best performance replace all belts during the 500 hour routine maintenance.

\* Use a light weight oil such as 3 in 1 oil, or SAE 10W

TAPE MOTION CONTROL BOARD  
FIXED SPEED PHI-DECK



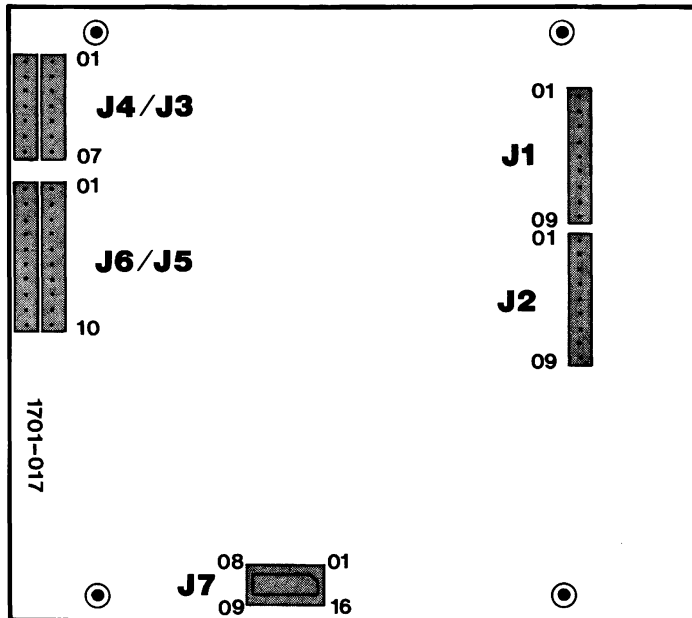
All non-optional input and output lines are DTL - TTL and CMOS compatible. Option lines are either DTL - TTL compatible logic signals or analogue signals. Discrete speeds available are 1-7/8, 2, 3-3/4, 4, 5, or 6 IPS.

\* 1.1A. for 150 ms. during headbar operation

The Phi-Deck tape motion control board is an electronics board that contains all the circuitry for proper control of the Phi-Deck tape transport. It accepts logic signals to initiate the different modes of operation and provides status output lines for reporting its current state of operation. The control board provides all the circuitry necessary for tape motion, tape tension, braking, motion sensing, etc. The Phi-Deck, when used with this board, will handle cassette tapes without spillage, excessive tension, slack or tape jerking. The following is a description of the signals for each interface line:

- RUN - Requires a logic low pulse for 1 msec. to initiate the RUN mode. This Function is inhibited when system is in Fast Forward or Rewind mode.
- STOP - Requires a logic low pulse for 1 msec. Responds to this line in any mode.
- FAST FORWARD - Requires a logic low pulse for 1 msec. This function is inhibited when in Run or Fast Rewind mode.
- REWIND - Requires a logic low pulse for 1 msec. This function is inhibited when in Run or Fast Forward.
- RUNNING - This line is low when system is in the Run mode.
- STOPPED - This line is low when system is in the Stopped mode.
- FAST FORWARD - This line is low when system is in Fast Forward mode.
- FAST REWIND - This line is low when system is in Fast Rewind mode.
- +7 VDC - Low impedance +7 VDC is available on this line when power is applied to board.
- EOT/BOT - Normally brought to the board at the options jack. Will supply a low when clear leader or trailer is sensed.
- WRITE PROTECT - This line is connected to a single pole single throw switch. The line is grounded when the Write Protect tab is sensed and is open when no tab is detected.
- CASSETTE IN PLACE - Normally brought to the board at the options jack. Line is switched low when cassette is in place.
- REEL MOTION PULSES - Logic level pulses are available on this line when take up reel is in motion. The pulse rate is proportional to the take up reel angular velocity.

# BOARD TERMINAL DIAGRAM FOR FIXED SPEED (1701-017)



## MAIN TERMINAL FUNCTIONS:

- J1-To Options
- J2-To Deck
- J3/J4-Power Connections (Wired in Parallel)
- J5/J6-Head and Amplifier Match-up  
(Wired in Parallel)
- J7-Remote Control Connections

J1-01  
 J1-02  
 J1-03 +5V Supply Line  
 J1-04 Emitter of Photodetector\*  
 J1-05 Anode of Photoemitter\*  
 J1-06 BOT/EOT Output  
 J1-07 Cassette in Place  
 J1-08 Write Protect (Tab Sense)  
 J1-09 Ground

J5/J6-01 Ground  
 J5/J6-02 Write Protect (Tab Sense)  
 J5/J6-03  
 J5/J6-04  
 J5/J6-05  
 J5/J6-06  
 J5/J6-07  
 J5/J6-08  
 J5/J6-09  
 J5/J6-10

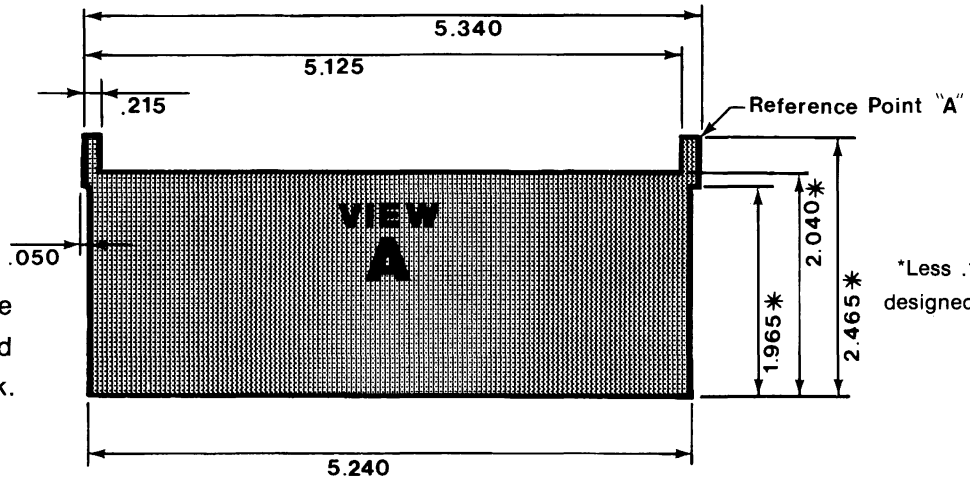
J2-01 Ground  
 J2-02 Capstan Motor (-)  
 J2-03 Reverse and Forward Motors (+)  
 J2-04 Reverse Motor (-)  
 J2-05 Capstan Motor (+)  
 J2-06 Head Engage Switch Common  
 J2-07 Forward Motor (-)  
 J2-08 Head Engage Switch (N.C.)  
 J2-09 Head Engage Switch (N.O.)

J7-01  
 J7-02  
 J7-03 Run Direction Command  
 J7-04 Count Output  
 J7-05 Rewind Start  
 J7-06 Fast Forward Start  
 J7-07 Stop Command  
 J7-08 Run (Play) Command  
 J7-09 Ground  
 J7-10 +7V Supply Line  
 J7-11  
 J7-12 +7V Supply Line  
 J7-13 Fast Rewind Indicator  
 J7-14 Fast Forward Indicator  
 J7-15 Stopped Indicator  
 J7-16 Running Indicator

J3/J4-01  
 J3/J4-02  
 J3/J4-03 Ground  
 J3/J4-04 +11V  
 J3/J4-05 +7V  
 J3/J4-06  
 J3/J4-07 Ground

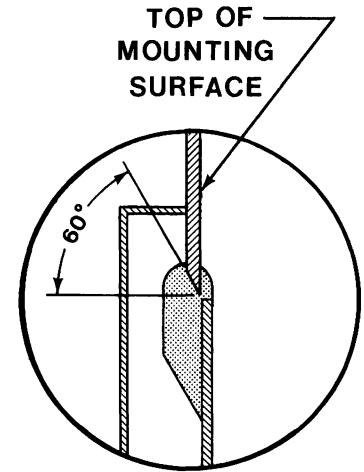
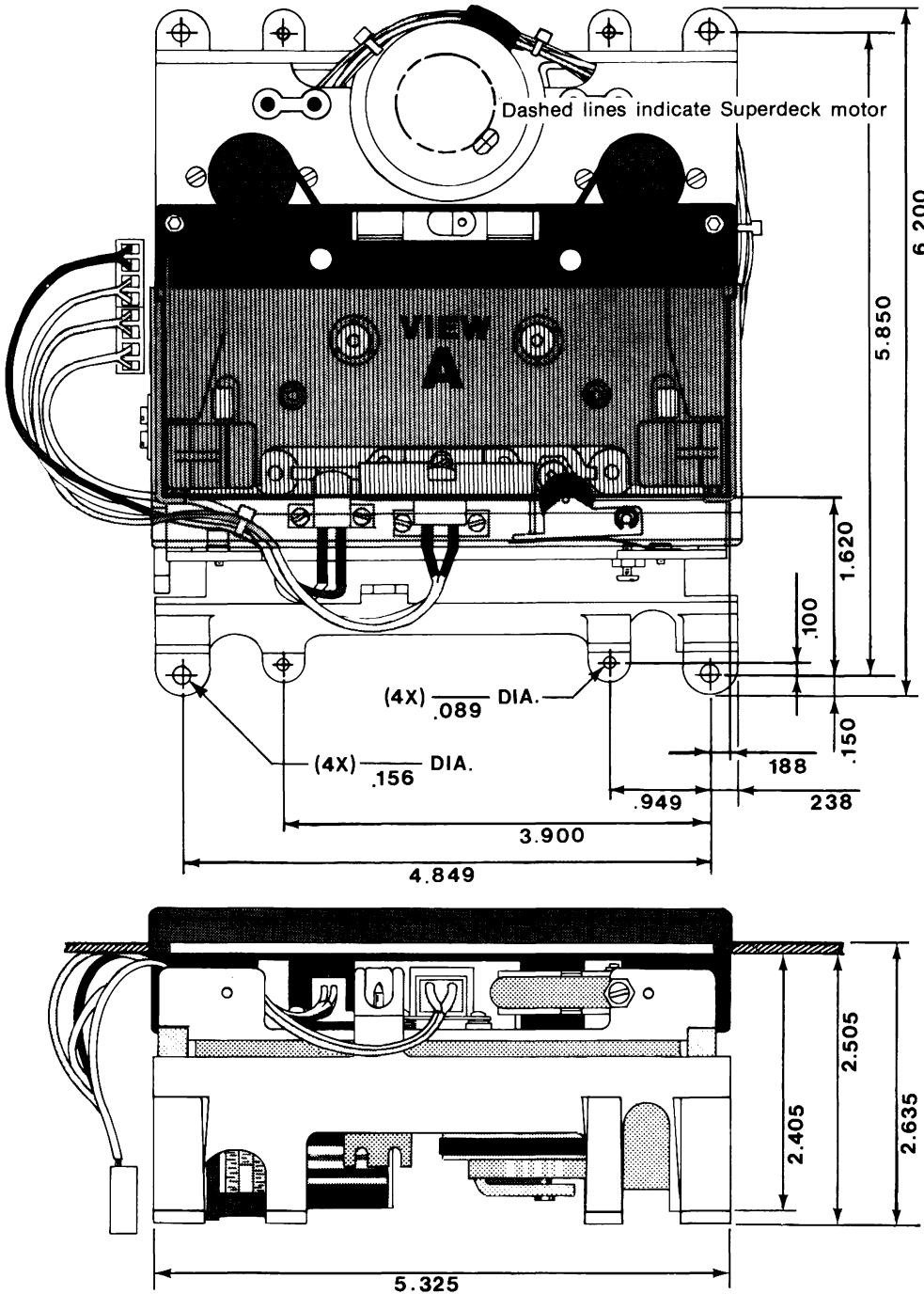
\*These connections are to the reel sensor for the counter signal generator.

# PHI-DECK® ASSEMBLY MOUNTING

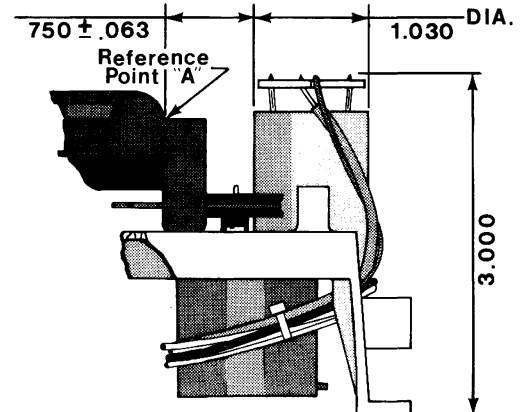


The area inside of solid line represents the opening needed to surface mount the Phi-Deck.

\*Less .125 inch for Well designed prior to revision



## SPECIFICATIONS FOR SUPER DECK MOTOR



## OPTIONS

The options described below are available for all three models of the Phi-Deck except as noted. Consult the individual price sheets for prices.

BOT/EOT SENSOR - The beginning-of-tape, end-of-tape (BOT/EOT) sensor option consists of a light source and light detector arranged to "look" through the tape. The option is designed to work with ANSI specified digital grade tapes. These tapes have a clear leader and trailer preceding and following the oxide portion of the tape. In addition, they have a .024" diameter punched hole located 18 inches from the beginning of tape oxide at both ends of the tape. The sensor will detect both the clear leader and the punched hole in digital grade tapes. The performance of this option with audio grade tapes is not specified since they usually have much more light transmittance than that specified for digital tapes. In addition audio grade tapes do not always have a clear leader or trailer.

When this option is used with the Phi-Deck control boards, tape motion will immediately be halted upon detection of either the BOT/EOT hole or clear leader. This applies to the Run, Rewind or Fast Forward mode.

TAPE POSITION PULSE GENERATOR - For use in locating to a given position on a cassette tape, the Phi-Deck has an optional pulse generating feature. This consists of a slotted disk attached directly to the take-up reel, a light source and a detector. For each revolution of the take-up reel a fixed number of pulses are generated. Since the amount of tape moved for one revolution of the take-up reel varies with the diameter of tape packed on the reel, the number of pulses is not linearly related to tape displacement. However, for a given cassette, the number of pulses can be counted and totalized for locating sections of the tape. The slotted disk is available with 2 pulses per revolution or 18 pulses per revolution. Using the 18 pulse disk allows tape to be positioned to within two inches of a known location.

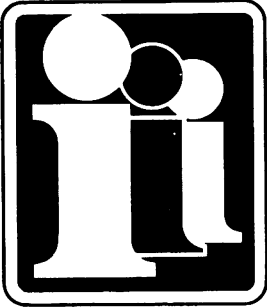
TAB SENSING - When it is desired to protect a recorded cassette from being erased or written over, there are tabs on the back of the cassette tape case that can be removed. There is one tab for each side of the tape. This option consists of a switch that detects the presence or absence of these tabs. These switches can be installed for either side of the cassette or both sides at once, if desired.

CASSETTE IN PLACE - This option consists of a switch mechanism that will detect when a cassette tape is present in a deck. The switch mechanism is located such that the cassette must be properly seated on the deck to activate the switch. When used with the Phi-Deck control boards, the system will be inhibited from entering the Run, Rewind or Fast Forward modes unless a tape is properly installed and seated on the deck.

CAPSTAN MOTOR PULLEY - The fixed speed Phi-Deck is available with any one of six discrete speeds as listed in the specification sheet. For any speed other than the standard 1-7/8 speed, an optional pulley must be installed in accordance with the speed selected.

The variable speed deck is available in four different speed ranges. A pulley is installed in accordance with the speed range selected.

The Super Deck covers its entire speed range with only one pulley. Therefore, no optional pulleys are required.



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### OPTIONS

#### SOLENOID OPERATED PRESSURE-ROLLER (Preliminary Information)

Triple I's Superdeck system was designed to make addition of this option a simple matter of adding the proper components to the areas provided for this option on the Superdeck control board and remote box.

Addition of this option to Triple I's other deck systems requires on the customer's part, an addition of a + and -18 volts power supply, and the design and construction of circuitry to operate the solenoid.

This option enables the Superdeck to have a bi-directional search capability with head engaged at unregulated speeds of up to 120 IPS.

#### Specifications

Start time to stable tape motion:  
Typical 30 milliseconds at any speed.

Typical stop times of actual tape movements:			
@20 IPS:	80 ms.	Tape Coast:	1.1" max. .8" typ.
@10 IPS:	60 ms.	Tape Coast:	.4" max. .25" typ.
@ 5 IPS:	40 ms.	Tape Coast:	.1" max. .08" typ.
@ 1 IPS:	25 ms.	Tape Coast:	.05" max. .03" typ.

Solenoid Engage Time - 15 ms.  
Solenoid Disengage Time - 25 ms.

#### PRICING INFORMATION

<u>Quantity</u>	<u>Solenoid Controlled Tape Engage</u>
1-9	\$32.50
10-49	32.50
50-99	30.05
100-249	27.75
250-499	25.70
500-999	23.75
1000-2499	22.00
2500-4999	20.35

## READ/WRITE BOARD INTRODUCTION

The read/write amplifier is a wide range electronics board designed for use with the Phi-Deck Tape Transport when used in digital systems. This board enables the user to write from TTL level data signals onto cassette tape when using any one of a number of saturated digital recording techniques, such as PE, NRZI, or NRZ. Using this board and any one of these encoding schemes can result in greater tape data capacity, as well as a higher baud rate than that of audio encoding schemes where modems or Frequency Shift Keying is required.

This board comes in six versions and can be ordered under the associated part numbers found in the ordering instructions in this booklet.

### FEATURES

- \* It is applicable to almost every type of saturated recording scheme including PE, NRZI, NRZ, and Delay Modulation.
- \* Plug in I.C.'s
- \* On board +5 V regulator
- \* Adjustable data threshold detection levels
- \* TTL buffered data lines

### SPECIFICATIONS

- A) ENCODING METHODS (user provided): RB, CRB, NRZI, NRZ, PM, Delay Modulation, or most any other method using a saturated recording technique.
- B) HEAD REQUIREMENTS: Nortronics DCA21P007N-A, Vikron 800-809 (P-3D7J3), or equivalent 10 mhy digital head.
- C) CASSETTE TYPE: Certified Data Cassette
- D) RECORDING DENSITY: 0 to 1600 FRPI (Flux Reversals Per Inch)
- E) CASSETTE CAPACITY (at 1600 FRPI): 5.76 M Flux Reversals Per Track per 300 ft. cassette.
- F) POWER REQUIREMENTS: +15 volts regulated, 150 ma  
-15 volts regulated, 30 ma
- G) INTERFACE LOGIC: TTL
- H) DIMENSIONS: 7/8" x 6-3/16" x 6-5/16"
- I) WEIGHT: 6 oz.



## ORDERING INFORMATION

### DECKS:

When ordering decks keep in mind that decks are shipped as "bare" units unless otherwise specified. These "bare" units contain all parts necessary for tape location and movement as well as the cassette well and eject lever.

### HEADS:

Effective September 1, 1976 - Unless specifically ordered, heads and cost are not included on any Phi-Deck models.

When ordering heads for decks the head must be specified by either a Triple I part number or by the name of the head manufacturer and their associated part number.

If you will be using heads other than those normally stocked by Triple I, please refer to our Standard Letter of Intent.

### OPTIONS:

Options may be ordered by using the appropriate order number shown on the price sheet.

Consideration should be given to what deck options are necessary when used with your own electronics or with Triple I's control boards. (i.e. When using Triple I's controls with a BOT sense option it is also necessary to order a cassette in place option.) For further details see the interfacing information.

### CIRCUIT BOARDS:

Complete control circuit boards and remote control boxes may be ordered by using the appropriate order number shown on the price sheet.

These boards were designed so that all of Triple I's standard evaluation circuits can be connected to them and unless, ordered otherwise, will be shipped this way.

The design of these boards allows for removal of several circuits that are not necessary in all applications. This allows a cost reduction to the quantity purchases of Triple I control electronics. For more details contact Triple I.

### NEW PRODUCTS:

New electronics are being developed to complement the Phi-Deck transports. A digital read/write amplifier is being released as the first of several. For more details contact Triple I or their representative.

# FIXED SPEED PHI-DECK®

Mechanical Speed Ranges from less than 1 to 6 ips  
 Standard Speed 1 7/8 ips  
 (Prices effective October 1, 1976)

## PRICE LIST

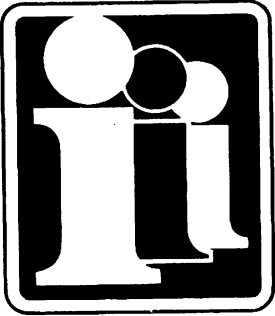
Description	Order No.	1-9	10-49	50-99	100-249	250-499	500-999	1,000-2,499	2,500-4,999
Fixed Speed Phi-Deck	7607	\$124.00	\$99.50	\$91.55	\$86.40	\$72.00	\$67.00	\$60.50	\$54.50
<b>Special Heads:</b> Mounting of Customer Supplied Standard Head	8050-004	N/C							
Analog Erase Head 1 Channel, 2 Track (wired)	8050-005	4.30	4.30	4.05	3.80	3.55	3.35	3.15	3.00
Analog Play/Record Head 2 Channel, 4 Track (wired)	7803-001	10.95	9.35	8.00	6.85	5.85	5.00	4.25	3.65
Mounting Non-conventional Heads	8050-006	To be negotiated							
<b>Sensors:</b> Tape Position Signal Generator	8050-007	7.95	7.95	7.35	6.80	6.25	5.80	5.35	5.00
BOT/EOT	8050-008	9.50	9.50	8.80	8.10	7.50	6.95	6.40	5.95
Side A Sense	8050-022	1.25	1.25	1.15	1.05	1.00	.90	.85	.80
<b>Cassette Sensing Switch:</b> Record Lockout/ R.H. Tab Sense L.H.	8050-018 8050-009	3.50	3.50	3.25	3.00	2.75	2.55	2.35	2.20
Cassette In Place	8050-010	3.50	3.50	3.25	3.00	2.75	2.55	2.35	2.20
Up-Down Counter	8050-025	42.00	42.00	38.85	35.90	33.20	30.70	28.40	26.30
AC Adaptor	6600-002	7.50	6.95	6.50	5.25	4.65	4.45	4.15	3.75
Remote Control Box	7605-004	89.00	89.00	82.45	76.35	70.70	65.50	60.65	56.15
Fixed Speed Motion Control Board	1701-017	99.50	99.50	94.75	89.95	85.95	82.50	77.75	74.95
<b>CUSTOMER TOTALS</b>									

For prices of quantities above 5,000, or for more information, write or call:

### TRIPLE I

A Division of The Economy Company  
 P.O. Box 25308  
 Oklahoma City, Oklahoma 73125  
 (405) 521-9000

Prices subject to change without notice.



# Triple I

1901 N. Walnut  
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STANDARD LETTER OF INTENT CONDITIONS

1. We require shipping schedules based on your requirements for the next 12-month period. (Please indicate schedule below.)
2. Shipments would be released based on your purchase order authorizations, not on Letter of Intent. We must have your purchase order eight weeks prior to your shipment date. Should the order change after entering we will need sixty days notice before the change will be incorporated.
3. Heads are a critical item:  
If you are to provide heads, we would need to have them in house thirty days prior to shipment date. Engineering drawing specifications on mounting, etc., must accompany the heads.

If we supply heads, the heads engineering drawing mounting information must accompany, and order for heads must be included in the deck and/or electronics order and is governed by the same lead times.

4. Any custom modifications to the decks, wiring, electronics, must be detailed by specifications and engineering drawings. These must accompany or precede the purchase order eight weeks in advance of shipment date. Any modifications to existing purchase orders will be governed by similar lead times.
5. We would bill you at the quantity price of your Letter of Intent. If you failed to take delivery of all units, we would rebill you at the quantity price for the units accepted.
6. If Triple I, Division of The Economy Company, purchases nonstandard parts, heads, etc., for an order and you fail to take delivery, all nonstandard parts that are not returnable will be rebilled to you. We require written acceptance of these terms before Triple I can procure nonstandard parts. If Triple I is required to purchase nonstandard parts, heads, etc., we will not be accountable for delivery delays caused by conflicting delivery schedules. We will make every effort to coordinate these schedules to comply with your requirements.

Total Number of Units Required for next 12-month period: \_\_\_\_\_  
Ship Schedule: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signed: \_\_\_\_\_  
Name and Title

\_\_\_\_\_

\_\_\_\_\_

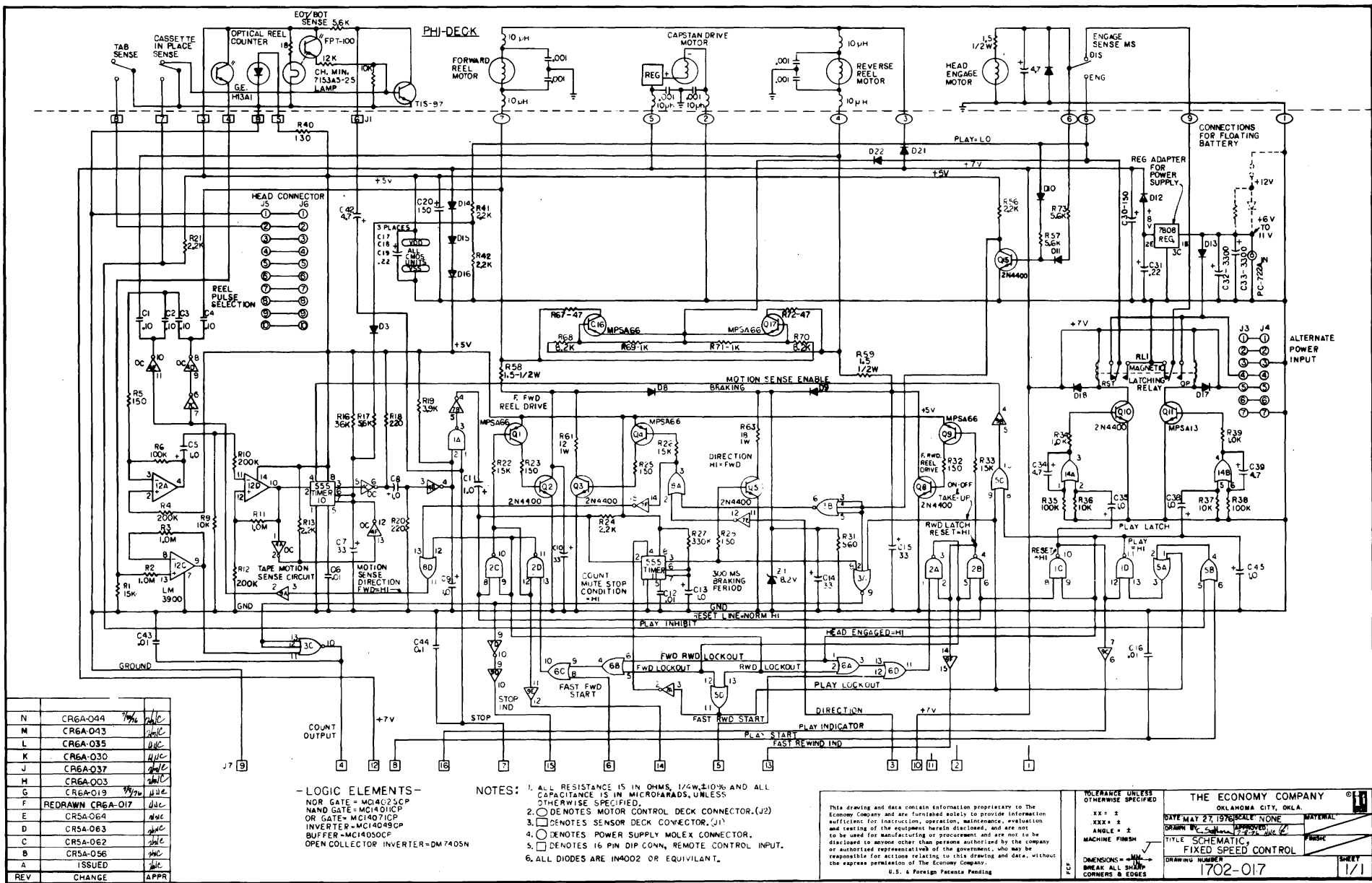
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Address

\_\_\_\_\_

Date

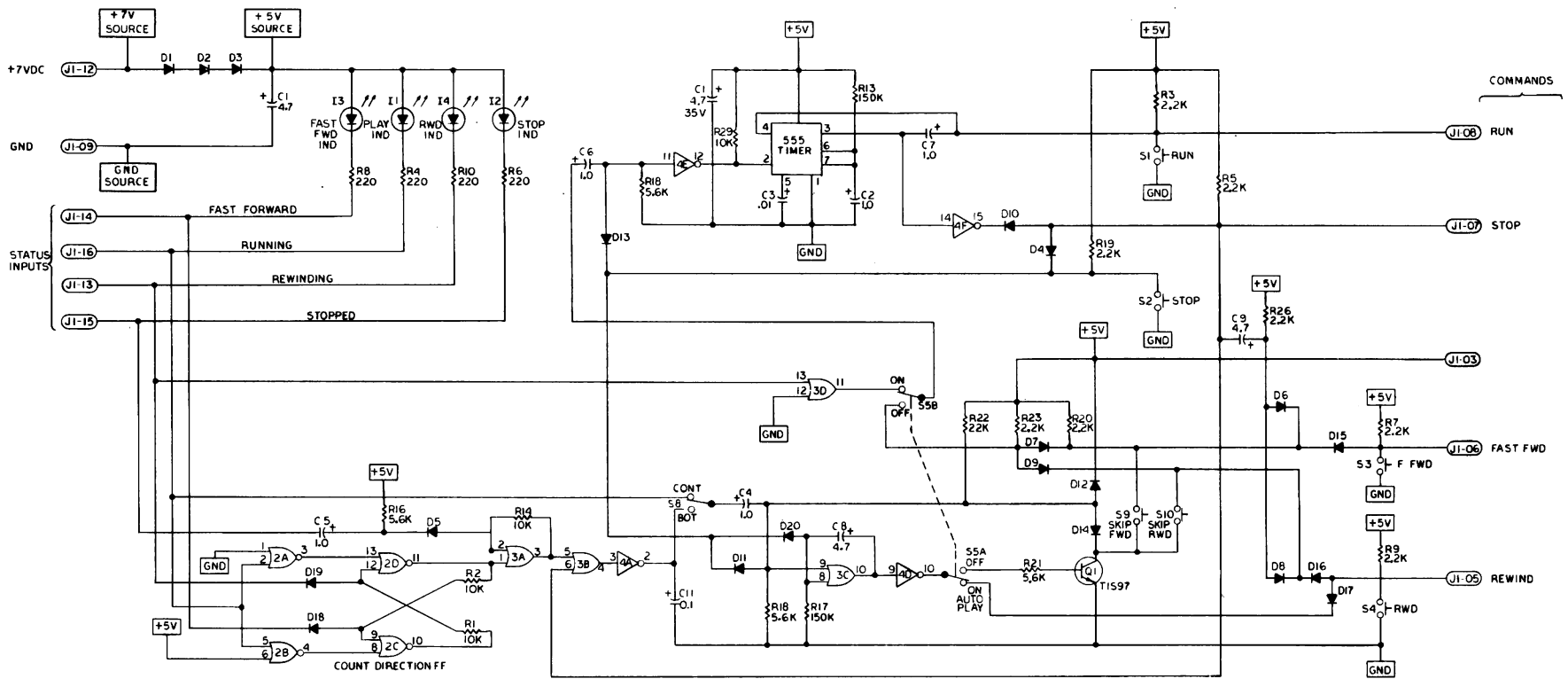


N	CR6A-044	HL
M	CR6A-043	HL
L	CR6A-035	HL
K	CR6A-030	HL
J	CR6A-037	HL
H	CR6A-003	HL
G	CR6A-019	HL
F	REDRAWN CR6A-017	HL
E	CR5A-064	HL
D	CR5A-083	HL
C	CR5A-062	HL
B	CR5A-056	HL
A	ISSUED	HL
REV	CHANGE	APPR

— LOGIC ELEMENTS —  
 NOR GATE = MC14025CP  
 NAND GATE = MC14011CP  
 OR GATE = MC14071CP  
 INVERTER = MC14049CP  
 BUFFER = MC14050CP  
 OPEN COLLECTOR INVERTER = DM7405N

- NOTES: 1. ALL RESISTANCE IS IN OHMS, 1/4W, ±10% AND ALL CAPACITANCE IS IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.  
 2. ○ DENOTES MOTOR CONTROL DECK CONNECTOR (J2)  
 3. □ DENOTES SENSOR DECK CONNECTOR (J1)  
 4. ○ DENOTES POWER SUPPLY MOLEX CONNECTOR.  
 5. □ DENOTES 16 PIN DIP CONN, REMOTE CONTROL INPUT.  
 6. ALL DIODES ARE IN4002 OR EQUIVARIANT.

This drawing and data contain information proprietary to The Economy Company and are furnished solely to provide information sufficient for instruction, operation, maintenance, evaluation and testing of the equipment herein disclosed, and are not to be used for manufacturing or procurement and are not to be disclosed to anyone other than persons authorized by the company or authorized representatives of the government, who may be responsible for action relating to this drawing and data, without the express permission of The Economy Company. U.S. & Foreign Patents Pending	TOLERANCE UNLESS OTHERWISE SPECIFIED XX ± .5 XXX ± .2 ANGLE ± .5 MACHINE FINISH	THE ECONOMY COMPANY OKLAHOMA CITY, OKLA. DATE MAY 27, 1976 DRAWN BY G.M. CHECKED BY J.C. TITLE SCHEMATIC FIXED SPEED CONTROL DRAWING NUMBER 1702-017	MATERIAL FINISH SHEET 1/1	
	DIMENSIONS ARE IN INCHES BREAK ALL SHARP CORNERS & EDGES			



NOTES:

1. ALL RESISTANCE IS IN OHMS, 1/4W, 10%, AND ALL CAPACITANCE IS IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
2. DENOTES 16 PIN DIP 1/0 CONNECTOR & PIN NO.
3. DENOTES BUS FUNCTION.
4. DENOTES SOURCE.
5. ALL DIODES ARE IN4002.
6. IC2-4001 CMOS  
IC3-4071 \*\*  
IC4-4049 \*\*  
IC5-NE555 \*\*

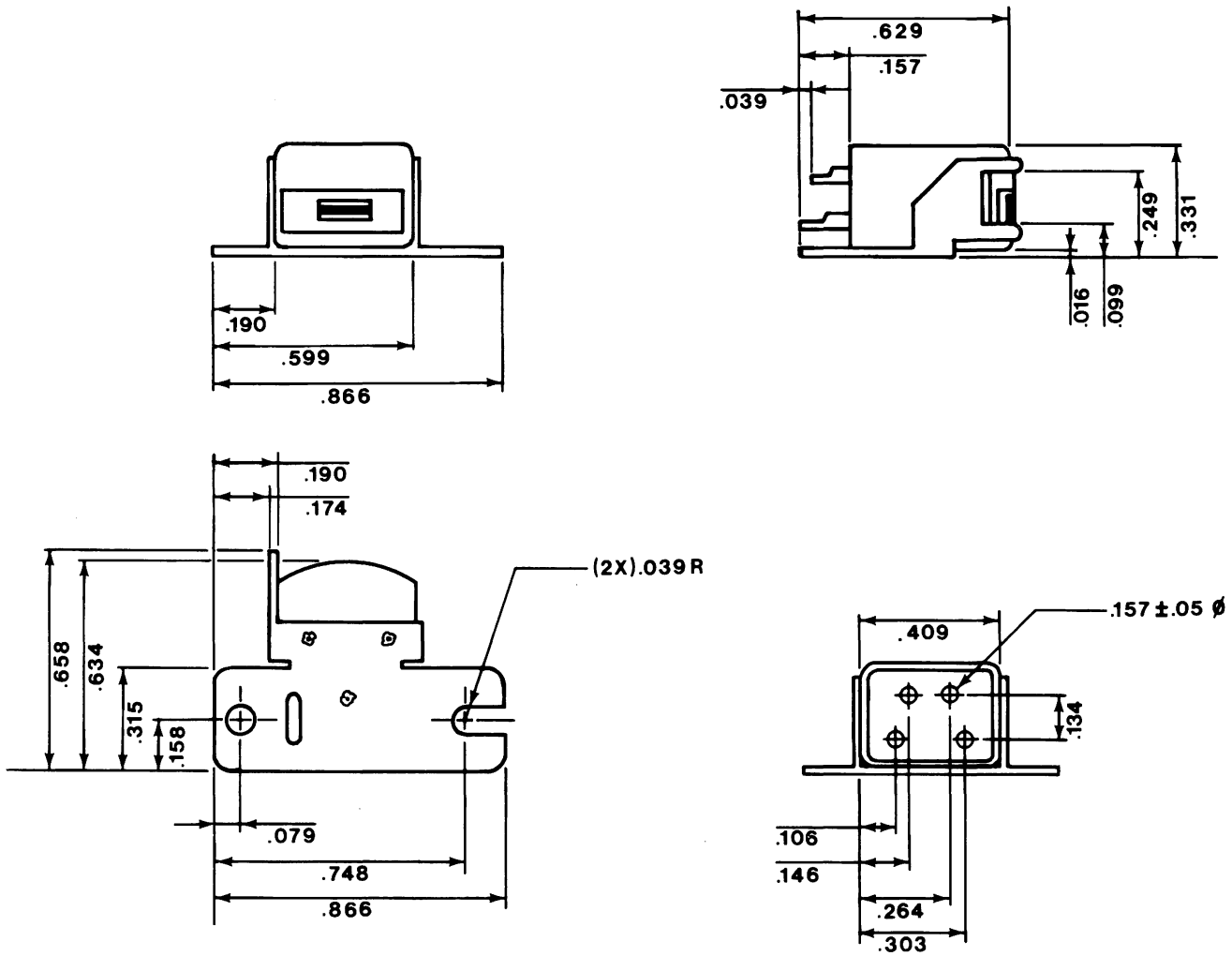
F REDRAWN C86-034 3/84 JLD  
REV CHANGE APPR

This drawing and data contain information proprietary to The Economy Company and are furnished solely to provide information sufficient for instruction, operation, maintenance, evaluation and testing of the equipment herein disclosed, and are not to be used for manufacturing or procurement and are not to be disclosed to anyone other than persons authorized by the company or authorized representatives of the government, who may be responsible for actions relating to this drawing and data, without the express permission of The Economy Company.  
U.S. & Foreign Patents Pending

TOLERANCE UNLESS OTHERWISE SPECIFIED  
.XX ± %  
XXX ± %  
ANGLE ± °  
MACHINE FINISH  
DIMENSIONS - UNLESS OTHERWISE SPECIFIED  
BREAK ALL SHARP CORNERS & EDGES

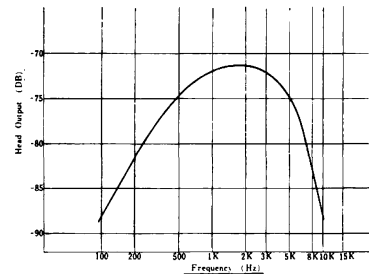
THE ECONOMY COMPANY  
OKLAHOMA CITY, OKLA.  
DATE 7/21/76 SCALE NONE MATERIAL:  
DRAWN BY: SCHEMATIC APPROVED BY: JLD  
ANGLE ± °  
TITLE: SCHEMATIC REMOTE FIXED SPEED  
DRAWING NUMBER 1702-022 SHEET 1/1

# 2 CHANNEL, 4 TRACK, AUDIO RECORD/PLAYBACK HEAD

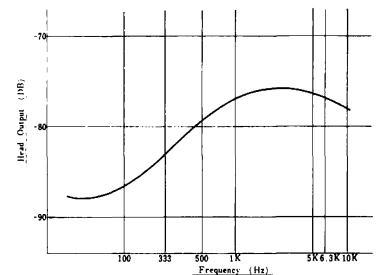


## SPECIFICATIONS

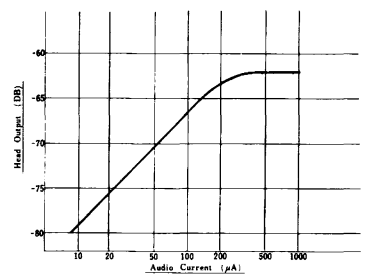
Test Tape	: BASF QP 12 LH
Tape Speed	: 4.75 cm/sec.
Playback Test Tape	: TEAC MTT 116L
1. Impedance (1 KHz)	: 750 OHMS ± 30%
2. Impedance (50 KHz)	: 20K OHMS ± 30%
3. Bias Current (50 KHz)	: 350 Micro Amps, ± 30%
4. Audio Current (1 KHz)	: 35 Micro Amps, ± 25%
5. Sensitivity (1 KHz)	: -72 DB ± 3 DB
6. Frequency Response (8 KHz)	: - 11 DB ± 4 DB (0 DB-1 KHz)
7. Separation between channels	: Less than -30 DB (1 KHz)
8. Insulate Resistance	: Better than 50 MEG OHMS (250V D.C.)
9. Playback Sensitivity (333 Hz) (10 DB down from saturation level.)	: -82 DB ± 3 DB
10. Playback Frequency Response (8 KHz)	: +8 ± 4 DB (333 Hz-0 DB)
11. Output Difference	: 3 DB max at 333 Hz 4 DB max at 8 KHz



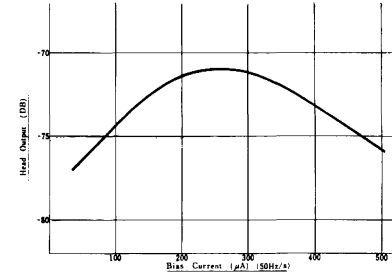
RECORD/PLAYBACK FREQUENCY RESPONSE



PLAYBACK FREQUENCY RESPONSE

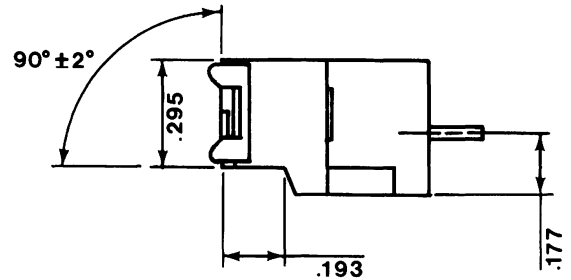
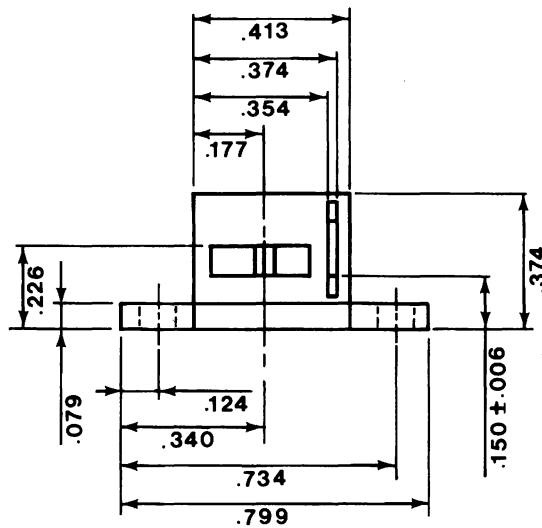
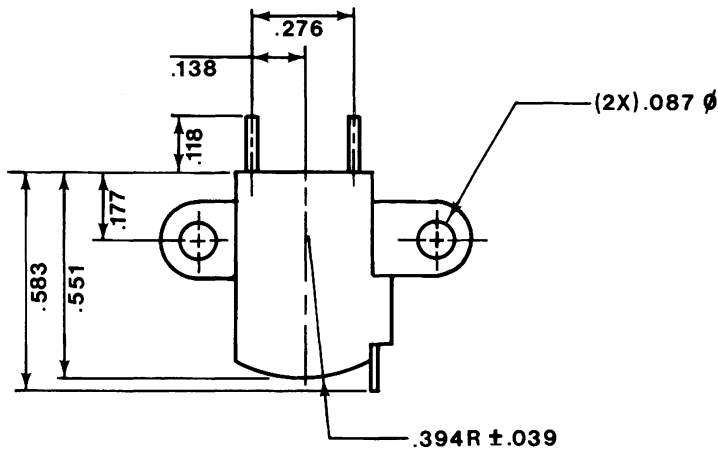


AUDIO CURRENT RESPONSE



BIAS CURRENT RESPONSE

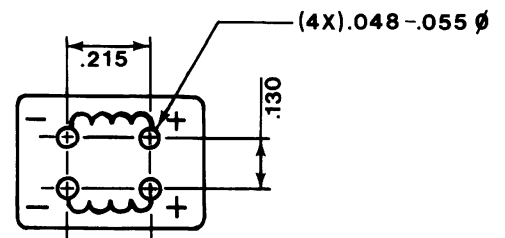
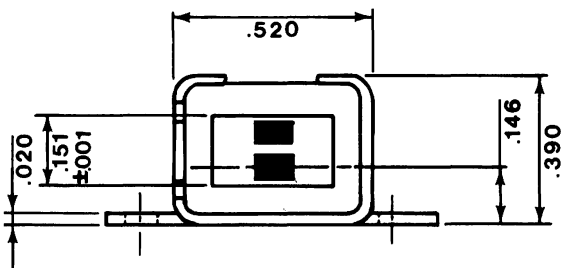
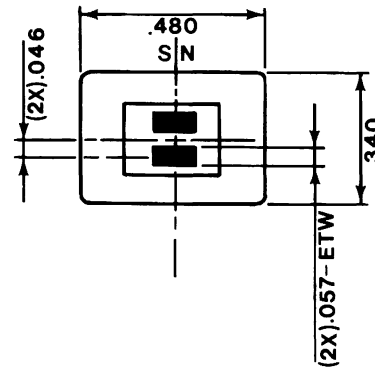
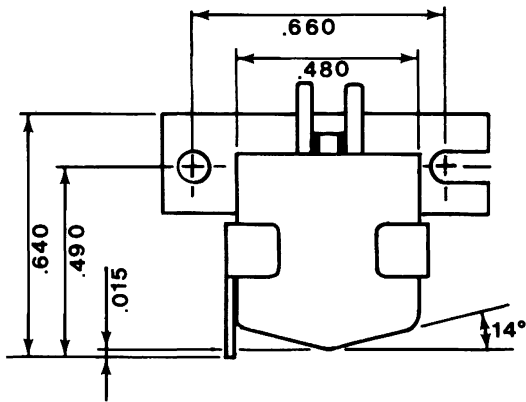
# 1 CHANNEL, 2 TRACK, AUDIO ERASE HEAD



## SPECIFICATIONS

- |                             |                      |
|-----------------------------|----------------------|
| 1. Inductance (10 MV, 1Khz) | : 0.3 mhy, REF.      |
| 2. D.C. Resistance          | : 20 OHMS, REF.      |
| 3. 100 KHz Impedance        | : 200 OHMS, REF.     |
| 4. Erase voltage (100 KHz)  | : 15 volts RMS, REF. |
| 5. Erase current (100 KHz)  | : 75 ma, REF.        |
| 6. 60 KHz Impedance         | : 110 OHMS $\pm$ 25% |
| 7. Erase current (60 KHz)   | : 100 ma             |
| 8. Erasure                  | : 60 DB min.         |

## 2 CHANNEL, 2 TRACK, DIGITAL READ/WRITE HEAD



### SPECIFICATIONS

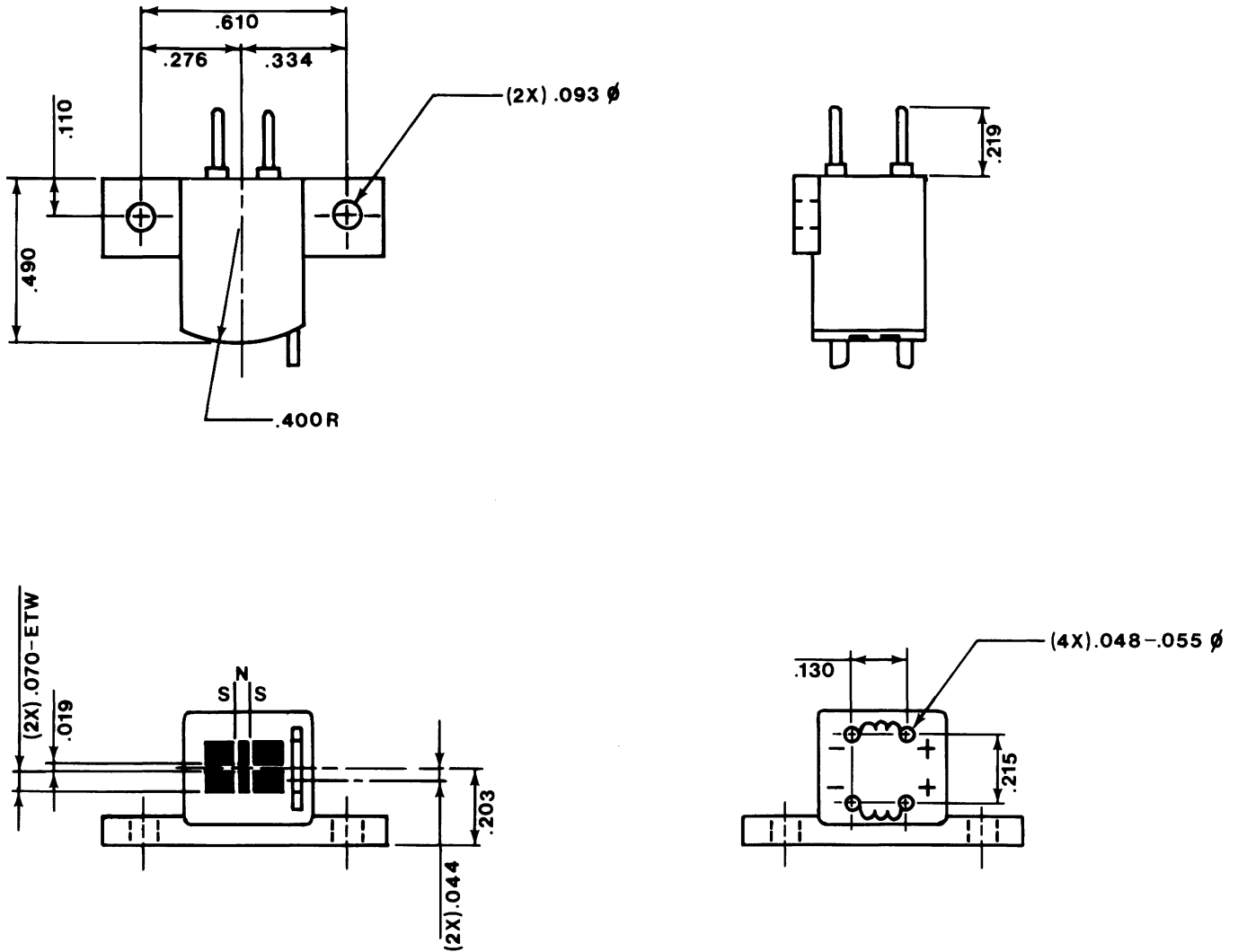
Test Tape - 3M - 277

Tape Speed - 15 IPS

1. Write Density : 1600 FRPI (Set)
2. Saturation current ( $I_{sat.}$ ) (95% peak to peak output ( $E_o$ ), at 1600 FRPI.) : 4.1 ma, P-P,  $\pm 20\%$
3. Write Current ( $I_w$ ) for typical operation. ( $I_w = 150\% \times I_{sat.}$ ) : 6.15 ma, P-P,  $\pm 20\%$
4. Read Output ( $E_o$ ) (for  $I_w$  at 1600 FRPI) : 17 mv, P-P,  $\pm 20\%$
5. Crosstalk (read to read) percentage of  $E_o$  : 1% Max.
6. Resolution,  $\frac{E_o @ 1600}{E_o @ 800} \times 100 = \text{Percent}$  : 85 Min.
7. Inductance (1 KHz, 100 mv); Read/Write : 10 mhy,  $\pm 20\%$
8. D.C. Resistance; Read/Write : 40 OHMS,  $\pm 20\%$
9. Effective Track Width; Read/Write : 0.057 Inches,  $\pm .002$
10. Track Location, center to center : 0.092 Inches,  $\pm .002$



## 2 CHANNEL, 2 TRACK, DIGITAL ERASE HEAD



### SPECIFICATIONS

1. Recording Density	: Up to 3200 FRPI
2. Tape Speed	: Up to 50 IPS
3. D.C. current for 99% erasure	: 30 ma
4. Inductance (1KHz & 100 MV ± 20%)	: 2 mhy
5. D.C. Resistance	: 12 OHMS ± 20%
6. Effective Track Width	: .070 Inches
7. Track Location, center to center	: .088 Inches



**NORTRONICS  
COMPANY, INC.**

## **WARRANTY**

### **TERMS OF WARRANTY ON HEADS SUPPLIED TO O.E.M. CUSTOMERS**

All NORTRONICS heads carry an unconditional warranty to perform as called for by the specification in existence at the time of shipping. These heads will remain on this warranty for a one year period while they remain in your possession. During this time, if the heads are maltreated either in inspection, testing or assembly on your machines, and thereby become defective, we cannot be held responsible. Further, if any heads are modified by you, our warranty ceases.

We are constantly improving the quality of our heads and at the same time making them more rugged so as to withstand abuse. However, if a head is mistreated, such as dropping on the floor, soldering leads on pins, scratching or impairing the finish on the face, we cannot assume responsibility for any damage incurred.

When the heads get out in the field on your machines, our warranty extends for ninety days from the date of purchase by the final customer. At this point, the main consideration is head wear. However, if the head goes bad due to tampering, neglect or maltreatment by the customer, we again cannot be held responsible.

### **PROCEDURE FOR RETURNING WARRANTY CLAIMS**

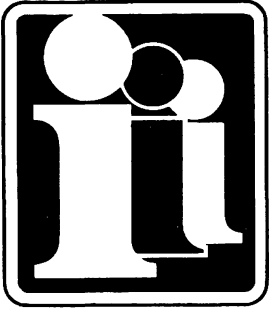
If for some reason your Nortronics heads do not conform to the above warranty, these procedures should be followed:

- A. The customer should contact the Nortronics Marketing Department and request permission to return the merchandise. This request should give a brief summary of the problems encountered.
- B. Upon receipt of the request by the Nortronics Marketing Department, authorization will be granted to the customer for the return of the merchandise along with shipping and packaging requirements.
- C. Upon receiving the return authorization, the customer will forward the merchandise to the Nortronics Company.
- D. The Nortronics Company will inspect the returned merchandise to determine if a warranty adjustment is justified using the following criteria:
  1. Did the heads meet factory specifications applicable to the head in question.
  2. Are the heads within the warranty dates as specified in the warranty policy.
  3. Has the customer exercised proper caution in the handling of the heads to protect them from improper handling damage.

For heads that are justified warranty claims, immediate credit will be issued to the customer's account and a replacement order entered.

For heads that are not within the warranty provisions as stated above, the customer will be contacted and asked for a proper disposition.

Nortronics Company, Inc.  
8101 Tenth Avenue North  
Minneapolis, Minnesota 55427



# Triple i

1901 North Walnut  
 P.O. Box 25308 • Oklahoma City, OK 73125 (405) 521-9000

PRODUCT SURVEY

Name \_\_\_\_\_

Title \_\_\_\_\_

Telephone \_\_\_\_\_  
                   Area Code                    Number                    Ext.

Company \_\_\_\_\_

Division \_\_\_\_\_

Street \_\_\_\_\_

City & State \_\_\_\_\_ Zip \_\_\_\_\_

Did your shipment arrive OK? \_\_\_\_\_

Did the equipment operate properly? \_\_\_\_\_

Was the literature adequate? \_\_\_\_\_

Were the instructions adequate? \_\_\_\_\_

Comments or questions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Add to mailing list \_\_\_\_\_

LITERATURE REQUEST

	Fixed Speed	Variable Speed	Super Deck
--	-------------	----------------	------------

Deck	_____	_____	_____
------	-------	-------	-------

Control Electronics	_____	_____	_____
---------------------	-------	-------	-------

Capstan Motor Specs	_____	_____	_____
---------------------	-------	-------	-------

MTBF Data _____	Reel Motor Specs _____
-----------------	------------------------

Rec/PB Circuitry _____	Read/Write Circuitry _____
------------------------	----------------------------

Magnetic Heads _____	Option Schematics _____
----------------------	-------------------------



**Triple i**  
A DIVISION OF THE ECONOMY COMPANY

1901 N. Walnut  
P.O. Box 25308 • Oklahoma City, OK 73125  
(405) 521-9000

**YOUR TAPE TRANSPORT FUNCTIONS LIST**

(To be used by our Applications Engineering Department  
to help you get the proper deck for your application)

GENERAL INFORMATION

Model #1 - The Fixed Speed Phi-Deck 7607 will move tape at tape speeds between 1-7/8 ips and 6 ips with mechanical pulley changes. Normal standard tape speed is 1-7/8. Option speeds are 2, 3-3/4, 5 and 6 ips.

Model #2 - The electronically Variable Speed Phi-Deck 7608 will move tape bidirectionally at speeds between .4 ips and 10 ips.

Model #3 - The Super Deck 7609 will move tape bidirectionally at speeds between .4 ips and 20 ips.

\* All decks have a fast forward or rewind speed up to 150 ips maximum.

What model of Phi-Deck do you think you need? # \_\_\_\_\_

Is this a digital, digital/analog or analog application? \_\_\_\_\_

YOUR TAPE SPEED REQUIREMENTS

Do you need to write/record? \_\_\_\_\_ What speed? \_\_\_\_\_

Do you need to read/playback? \_\_\_\_\_ What speed? \_\_\_\_\_

Do you need to search, head engaged? \_\_\_\_\_ What speed? \_\_\_\_\_

Do you need to position tape, head disengaged? \_\_\_\_\_ What speed? \_\_\_\_\_

Do you need a control board for the deck? \_\_\_\_\_

Do you need fast rewind? \_\_\_\_\_ What speed? \_\_\_\_\_

Do you want to use our deck control circuitry for your build? \_\_\_\_\_

Other Comments \_\_\_\_\_

TAPE AND HEAD CONTROL REQUIREMENTS

Forward, head disengaged \_\_\_\_\_ Forward, head engaged \_\_\_\_\_

Reverse, head disengaged \_\_\_\_\_ Reverse, head engaged \_\_\_\_\_

Fast forward, head engaged \_\_\_\_\_ Fast forward, head disengaged \_\_\_\_\_

Fast reverse, head engaged \_\_\_\_\_ Fast reverse, head disengaged \_\_\_\_\_

Variable Speed \_\_\_\_\_ For what functions? \_\_\_\_\_

Automatic rewind \_\_\_\_\_

SENSING FUNCTIONS

Beginning of tape/end of tape - BOT/EOT \_\_\_\_\_ 8050-008

Tape in motion \_\_\_\_\_

Tape position signal generator \_\_\_\_\_ 8050-007

Cassette in place \_\_\_\_\_ 8050-010

Record Lockout/write protect \_\_\_\_\_ 8050-009

Side A \_\_\_\_\_ 8050-002 Stall Sensing \_\_\_\_\_

Other \_\_\_\_\_

MOUNTING

READ/WRITE (PLAY/RECORD)  
DIRECTIONS

TAPE START/STOP TIME

Horizontal \_\_\_\_\_ One direction \_\_\_\_\_ Start Time \_\_\_\_\_

Vertical \_\_\_\_\_ Dual direction \_\_\_\_\_ Stop Time \_\_\_\_\_

Upside down \_\_\_\_\_

Angle \_\_\_\_\_

OPERATING CONDITIONS

TYPE OF HEAD REQUIREMENTS

Operating temperature \_\_\_\_\_ Analog \_\_\_\_\_ Erase Head \_\_\_\_\_

Operating humidity \_\_\_\_\_ Digital \_\_\_\_\_ Nonstandard Head \_\_\_\_\_

Do you need Read/Write Electronics \_\_\_\_\_

Do you need Record/Play Electronics \_\_\_\_\_

General type of application \_\_\_\_\_

Date application is to start \_\_\_\_\_

Number of decks required \_\_\_\_\_ Over what period of time \_\_\_\_\_

Other comments \_\_\_\_\_

Your Name \_\_\_\_\_ Title \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

Phone Number \_\_\_\_\_