WILSON Laboratories, Inc.

TFX-500

OPERATION MANUAL

REVISIONS	
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0.00 SCOPE OF MANUAL

This manual provides the information required to operate the TFX-500 Tape Formatter Exerciser.

1.00 CAPABILITY

The TFX-500 Tape Formatter Exerciser is designed to exercise and test formatter interfaced magnetic tape drives. The TFX-500 is directly compatible with dual 50-pin interface formatted drives such as:

Cipher F880 Microstreamer
Pertec Microformatted Transports

Cable end adapters provide compatibility with the 100-pin interface formatters such as:

Kennedy Model 9219
Cipher NRZ/PE/Dual Mode Embedded Formatter
Perkin Elmer Embedded Formatter (Model 701, 702, 703)
Pertec

2.00 FEATURES

2.01 INPUT

A set of fifteen test points and corresponding LEDS is provided for monitoring the control and status signals listed on the below:

LABEL	FUNCTION
ONL	ON LINE
RDY	READY
LDP	LOAD POINT
EOT	END OF TAPE
RWD	REWINDING
FBY	FORMATTER BUSY

LABEL	FUNCTION
DBY	DRIVE BUSY
FPT	FILE PROTECT
FMK	FILE MARK
IDENT	IDENTIFICATION OR CHECK CHARACTER
NRZI/PE	NRZI/PE
7TR/9TR	7 TRACK/9 TRACK
SPEED	HIGH TAPE SPEED
SGL	SINGLE GAP HEAD
GO	COMMAND INITIATE

2.02 DATA

A set of nine DATA test points provide access to read data from the formatter. Nine Data LEDS show data clocked by read or write data strobes according to the position of the READ/WRITE switch.

A set of nine DATA switches provide for the selection of any fixed write data character when the RAN/ALT 1/0/TRACK selector is set at TRACK. The ALT 1/0 position selects the write data from the nine DATA switches and alternately compliments this data in a continuous "checker board" pattern. The RANDOM position provides random pattern write data on channels 0-7 and odd parity on channel P. In systems where the parity is generated by the formatter, the parity track switch is not used during write operations but must be properly set for read track data comparisons.

2.03 DATA STROBES

Test points and LED indicators are provided for the READ DATA STROBE and the WRITE DATA STROBE.

2.04 ERROR SIGNALS

A set of three test points and four pairs of LEDS monitor error signals from the formatter. For each signal one LED blinks on each error pulse and another LED latches on the first error pulse. An additional pair of LEDS monitor compare errors between read data from the formatter and the track switches; no comparison is made for RANDOM or ALT 1/0 Data. Latched errors may be cleared at any time with the CLR switch without affecting the test in progress.

LABEL	FUNCTION
HER	HARD ERROR
CER	CORRECTED ERROR
H & C	COINCIDENT HER AND CER
TRK	TRACK SWITCH COMPARE ERROR (LED'S ONLY)

2.05 ADDRESS SELECTION

Three ADDRESS switches provide for the selection of one of eight linked drives. The switches directly control output lines to the formatter.

SWITCH	LINE	FUNCTION
1	ITADØ	DRIVE ADDRESS Ø
2	ITAD1	DRIVE ADDRESS 1
4	IFAD	FORMATTER ADDRESS

2.06 FORMATTER ENABLE

The ENABLE switch applies the Formatter Enable (IFEN) signal. That drive whose address matches the ADDRESS switch outputs will then respond with status outputs to the TFX-500.

2.07 CONTROLLED SIGNALS

Four push button switches provide for manually generated pulses on dedicated lines to cause the labeled action on those drives having the designated function.

LABEL	FUNCTION
LOAD ONLN	LOAD AND ON LINE
RWD UNLD	REWIND AND UNLOAD
OFFLN	OFFLINE
RWD	REWIND

2.08 CONFIGURATION SELECTORS

A set of four two-position switches control assigned output line levels.

HIGH SPEED/DENSITY

On the Cipher F880 and other streaming drives this switch sets the tape speed. On standard formatters this switch controls NRZI/PE recording density.

PARITY

In some formatters this switch will decide whether ODD or EVEN parity is to be generated by the formatter. In other formatters the TFX-500 generated write parity signal will be used in place of the formatter generated parity.

THRESHOLD 1 & 2

These two switches set read threshold levels on those drives that have this feature.

2.09 COMMAND SELECT

Four two-position switches set four of the five command lines that are strobed by the GO pulse.

WRITE/READ

This switch controls the IWRT output line except when reverse motion is required motion is required by ALT, PROG, and EOT read reverse action.

EDIT/OFF

Controls the IEDIT output line for edit action.

ERASE/OFF

Controls the IERASE output line for erase action.

WFM/OFF

Controls the IWFM output line for file mark writing or reading.

2.10 ACTION

Action by the formatter begins when it receives a IGO pulse from the TFX-500. Formatter read action stops when the end of a record or a file mark is detected. Formatter write action stops after the TFX-500 sends the ILWD Last Word signal. Formatter write file mark action stops automatically after the file mark has been written.

An IGO pulse is emitted by the TFX-500 when RUN is started. 2.13
If RUN continues an additional IGO pulse is emitted each time the formatter signals that it has stopped by releasing the IFBY line, or on FLY block action is about to stop by releasing the IDBY line.

2.11 RUN/STOP

This push button provides for manually starting and stopping RUN. The RUN LED will show when TFX-500 is in RUN action. RUN will be blocked if the ONL On Line LED is not lighted. RUN will also be blocked if the ILL Illegal LED is lighted. ILL will light if an illegal control combination such as WRITE with REV or WRITE with FPT indication is selected.

2.12 STOP

This four-position switch selects the source of automatic RUN stopping.

CON	Run continues until manually stopped.
SINGLE	A Single IGO pulse is emitted on each START/STOP depression.
SOFM	Run stops when a file mark is detected.
SOE	Run stops when an error signal is received from the formatter, or a track switch compare error is detected in track mode.

2.13 MOTION

This switch selects one of four modes of tape motion.

FWD	Forward motion only except as modified by EOT ACTION.
REV	Reverse motion only.
ALT	Alternate forward and reverse motion. Requires selection of STEP CYCLE.
PROG	With EDIT OFF sequences five blocks forward and three blocks reverse and repeats, requires selection of STEP CYCLE.
	With EDIT ON sequences three blocks reverse and one block forward and repeats. Edit is commanded on the third reverse block and on the single forward block. PROG and WFM with EDIT ON may be combined with WRITE or with ERASE to provide two modes of testing the EDIT function.

2.14 CYCLE

Controls the location of ILWD when writing and the timing of the next IGO pulse. Three selections are provided: CONT, STEP, FLY.

CONT	The ILWD Last Word pulse is withheld until run is manually stopped or until EOT is encountered. The IGO timing is the same as for STEP.

STEP	Places the ILWD pulse at the end of the BLOCK SIZE selected. The next IGO occurs when IFBY is released.
FLY	Places the ILWD pulse at the end of the BLOCK SIZE selected. The next IGO occurs when IDBY is released. Legal only when FWD of REV MOTION is selected.

2.15 BLOCK SIZE

Selects one of four record lengths to be written on FLY or STEP CYCLE action: 16, 128, 1024, or 8196 bytes per block.

2.16 EOT ACTION

EOT action used with RWD or PROG MOTION selection provides for continuous repeat testing or the full length of the tape. Three actions are selectable: Stop, Rewind, and Read Reverse.

LABEL	FUNCTION
STOP	Run stops at EOT
RWD	Rewind occurs at EOT, run continues to excercise the system as the LDP is reached.
RR	Begins reverse read to EOT. Repeats selected action at LDP (Load Point).

2.17 DATA LEDS

The nine leds above the track switches display the read or write data and parity, and the READ/WRITE switch determines the selection. In the NRZI mode a mask is used to prevent the CRCC and LRCC characters from being displayed.

2.18 CONTINUOUS RECORDS

When reading a continuous record lacking file marks or end of record indications, the formatter cannot be stopped using the RUN/STOP switch. The operation in progress can be terminated by turning the ENABLE switch off.

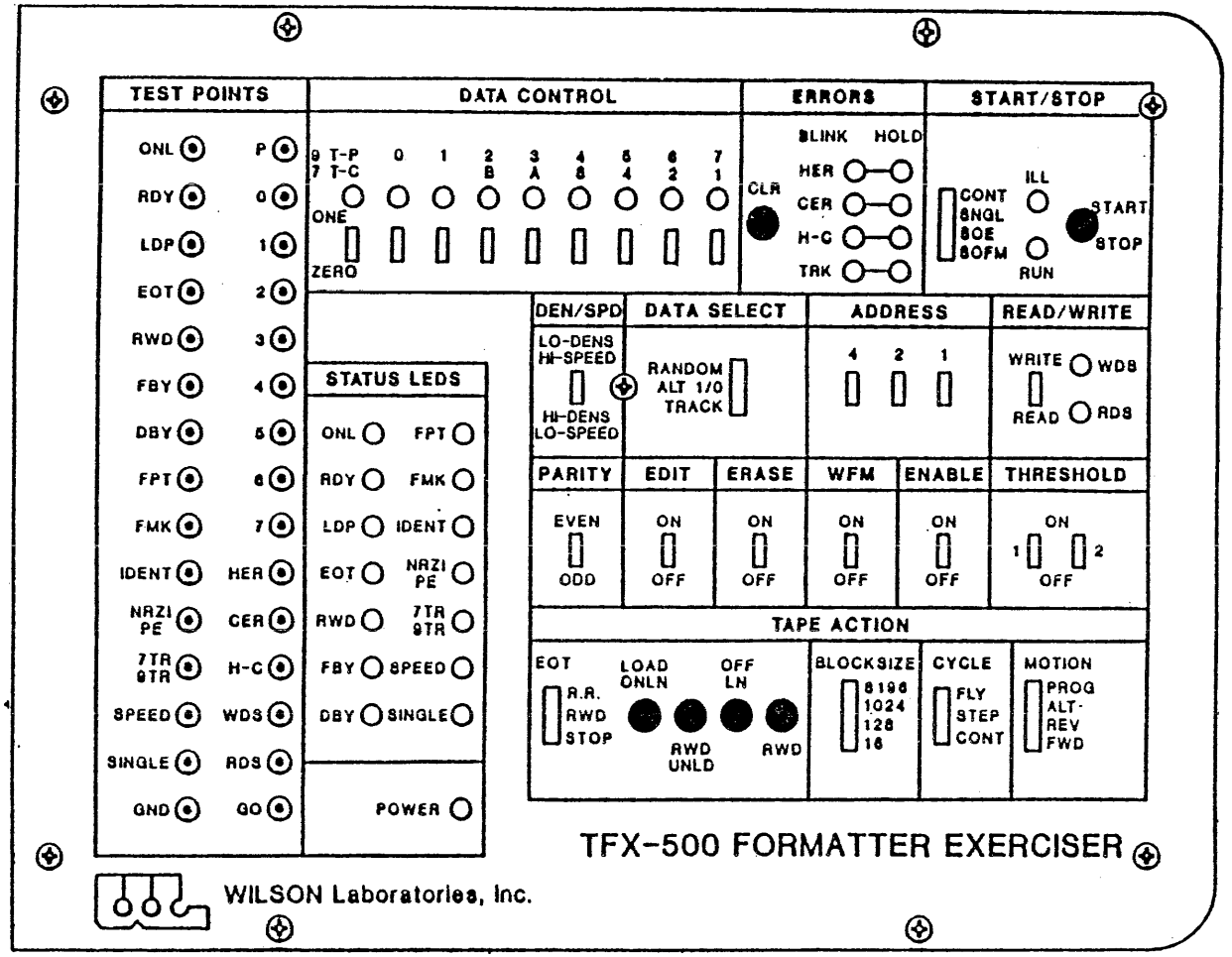
3.00 CONSTRUCTION

For portability the TFX-500 is housed in a small plastic carrying case. The size is 17" X 10" X 4½". The unit weighs six pounds.

The case cover is quick detach removable. The bottom half of the case presents the console and provides a well for storage of I/O cables and adapters.

The +5 volt 1.2 AMP power supply is mounted on the inside side panel of the console and can be operated from 100, 115, 210, or 230/240 VAC (as determined by factory wiring).

The TFX-500 console may be alternately housed in the cover of the TX-500 Exerciser. With this combination a single unit provides for exercising both formatters and tape drives.


TEST POINTS
ONL P
RDY 0
LDP 1
EOT 2
RWD 3
FBY 4
DBY 5
FPT 6
FMK 7
IDENT HER
NRZI PE CER
7TR 9TR H-C
SPEED WDS
SINGLE RDS
GND GO
DATA CONTROL
9 T-P 7 T-C
ONE
ZERO
CLR
STATUS LEDS
ONL FPT
RDY FMK
LDP IDENT
EOT NRZI PE
RWD 7TR 9TR
FBY SPEED
DBY SINGLE
POWER
ERRORS
BLINK HOLD
HER
CER
H-C
TRK
START/STOP
CONT
SNGL
SOE
SOFM
ILL
RUN
START
STOP
DEN/SPD
LO-DENS HI-SPEED
HI-DENS LO-SPEED
DATA SELECT
RANDOM ALT 1/0 TRACK
ADDRESS
READ/WRITE
WRITE WDS
READ RDS
PARITY
EVEN ODD
EDIT
ON OFF
ERASE
ON OFF
WFM
ON OFF
ENABLE
ON OFF
THRESHOLD
ON OFF
TAPE ACTION
EOT
R.R. RWD STOP
LOAD ONLN
RWD UNLD
OFF LN
RWD
BLOCKSIZE
8196 1024 128 16
CYCLE
FLY STEP CONT
MOTION
PROG ALT-REV FWD
TFX-500 FORMATTER EXERCISER
WILSON Laboratories, Inc.

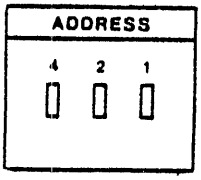
5.00 TFX-500 CONNECTOR SIGNALS

J1-2	IFBY	J2-1	IRP
-4	ILWD	-2	IRØ
-6	IW4	-3	IRI
-8	IGO	-4	ILDP
-10	IWØ	-6	IR4
-12	IW1	-8	IR7
-13	7TK/9TK	-10	IR6
-14	ISGL	-12	IHER
-15	PAR	-14	IFMK
-16	ILOL	-16	IDENT
-18	IREV	-18	IFEN
-20	IREW	-20	IR5
-22	IWP	-22	IEOT
-24	IW7	-24	IOFL
-26	IW3	-26	INRZ
-28	IW6	-28	IRDY
-30	IW2	-30	IRWD
-32	IW5	-32	IFPT
-34	IWRT	-34	IRSTR
-36	RTH2	-36	IWSTR
-38	IEDIT	-38	IDBY
-40	IERASE	-40	ISPEED
-42	IWFM	-42	ICER
-43	RW/UNLD	-44	IONL
-44	RTH1	-46	ITAD1
-46	ITADØ	-48	IFAD
-48	IR2	-50	IHISP
-50	IR3		

Note: All other pins grounded.

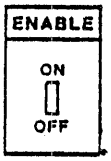
6.00 CONTROLS AND INDICATORS

6.01 FORMATTER AND DRIVE ADDRESS



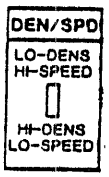
The Formatter and Drive Address must be selected before any motion or READ/WRITE commands are accepted by the Formatter/Drive under test. Bit "1" and "2" of the ADDRESS selector switch select one of the four transports which may be daisy-chained to the Formatter. Bit "4" of the ADDRESS selector switch selects either of two possible Formatter Addresses. These switches directly control the one Formatter and two DRIVE ADDRESS lines to the Formatter/Drive.

6.02 ENABLE



The Formatter must be enabled before any motion or READ/WRITE commands are accepted by the Formatter. The "ON" position of the ENABLE switch enables the Formatter while the "OFF" position disables/resets the Formatter.

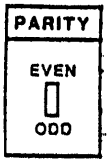
6.03 DENSITY/SPEED



DEPENDING on the particular Formatter, the DEN/SPD switch has typically three possible functions. For 7 track NRZI operation the switch will select one of two possible data packing densities.

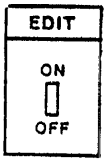
For Formatters with both PE/NRZI capabilities used in conjunction with transports equipped with PE/NRZI format selection, the switch will select either NRZI (800 CPI) or PE (1600 CIP) operation. For Formatters coupled with DUAL SPEED DRIVES, the switch will select one of two tape speeds.

6.04 PARITY



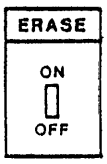
THE PARITY switch will select the type of parity bit generated by the Formatter, for Formatters having this option. For Formatters set up for external parity bit generation this switch is not used.

6.05 EDIT



THE EDIT switch controls the EDIT line to the Formatter when the motion selection is FORWARD, REVERSE, and ALTERNATE, when PROGRAMMED motion is selected, the EDIT line is sequenced by the tester if the EDIT switch is on.

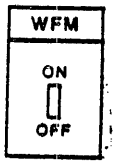
6.06 ERASE



THE ERASE switch controls the ERASE line to the Formatter and

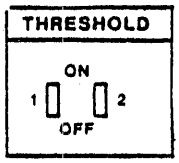
is inhibited by any REVERSE motion command by the tester.

6.07 WRITE FILE MARK



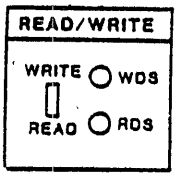
THE WRITE FILE MARK switch controls the WRITE FILE MARK line to the Formatter, and is inhibited by REVERSE motion commands by the tester in the ALTERNATE, REVERSE and PROGRAMMED motion modes.

6.08 THRESHOLD



THE THRESHOLD switches directly control the two THRESHOLD lines to the Formatter.

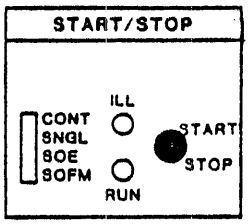
6.09 READ AND WRITE



THE READ/WRITE switch controls the WRITE command line to the Formatter, and is inhibited by REVERSE motion commands by the tester. The default on not writing is interpreted as a read.

The WRITE DATA STROBE indicator is buffered then driven by the WRITE DATA STROBE line from the Formatter. The READ DATA STROBE indicator is buffered and then driven by the READ DATA STROBE line from the Formatter.

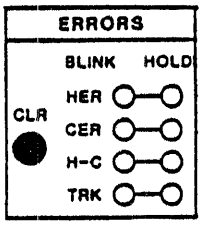
6.10 START AND STOP



The START/STOP switch initiates and terminates all commands from from the tester to the Formatter. Typically after the tester asserts a command line to the Formatter, the START/STOP switch strobes the GO command line to the Formatter. With the four position selector switch in the CONTINUOUS position when the START/STOP switch is depressed the tester sends out a GO command and proceeds to send additional GO commands to the Formatter after each command is properly completed resulting in continuous operation until the START/STOP switch is again depressed stopping all action. With the selector switch in the SINGLE position the tester sends out a single GO command to the Formatter for each depression of the START/STOP switch. With the selector switch in the STOP ON ERROR position the action is the same as for CONTINUOUS mode except that the function is terminated on detecting an error or by depressing the START/STOP switch. With the selector switch in the STOP ON FILE MARK position the action is the same as for CONTINUOUS mode except that the function is terminated on detecting a file mark or by depressing the START/STOP switch. The ILLEGAL indicator will flash when an improper switch combination such as REVERSE-WRITE is set up on

the tester, the GO command strobe line to the Formatter will be inhibited when this indicator is active and the RUN mode may not be entered. The RUN indicator will be active when the tester is in the RUN mode.

6.11 ERRORS

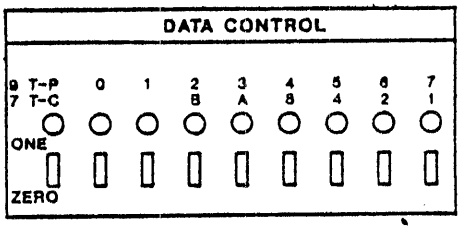


THE ERRORS INDICATORS when active display errors detected by the Formatter or the tester.

The BLINK column of indicators display errors by flashing on errors, CONTINUOUS errors will display as a steady indication. The HOLD column of indicators latch on the first error, and may be cleared with the CLEAR switch.

HARD ERROR and CORRECTABLE ERROR are lines from the Formatter buffered to the appropriate displays. The combined HARD ERROR with CORRECTABLE ERROR indication is generated by the tester. The TRACK ERROR indication is internally generated in the tester when data read does not agree with data written.

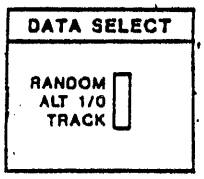
6.12 DATA CONTROL



THE DATA CONTROL switches select the data pattern to be written when the DATA SELECT switch is in the TRACK or ALT 1/0 mode.

During a read with the DATA SELECT switch in the TRACK mode, READ data is compared to the DATA CONTROL switches. The DATA CONTROL indicators display READ data during a read and WRITE data during write operations.

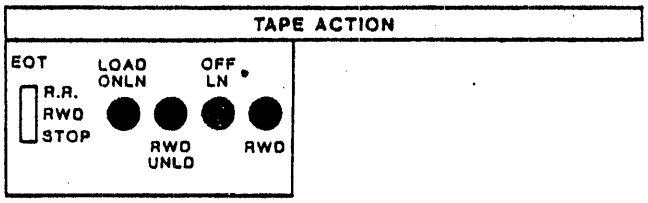
6.13 DATA SELECT



THE DATA SELECT switch determines the source of WRITE data, in the READ mode the switch will determine error checking modes within the tester. The TRACK position selects the DATA CONTROL switches as the source of WRITE data and compare data for reading. The ALTERNATE I's and 0's mode selects the DATA CONTROL switches as the source of WRITE data, which is complimented every write strobe for an alternating pattern. During a read in the ALTERNATE I's and 0's mode track error checking in the tester is inhibited.

The RANDOM mode selects an internal random data source within the tester for WRITE data, during a read in the RANDOM mode track error checking in the tester is inhibited.

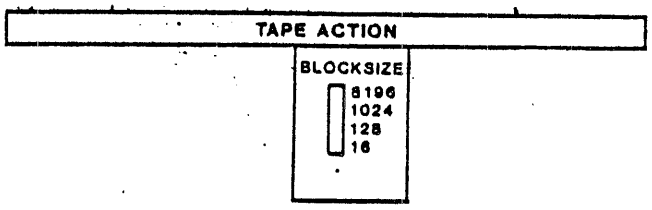
6.14 TAPE ACTION



THE END OF TAPE switch selects the response to detecting end of tape. With the switch in the REVERSE READ position the tester will enter the REVERSE READ mode until beginning of tape is detected.

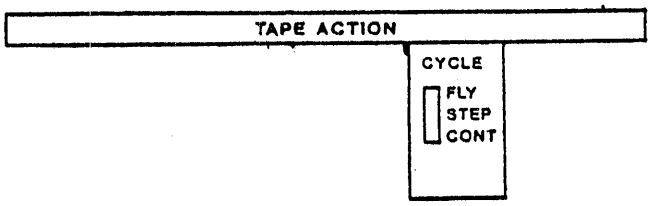
With the switch in the REWIND position the tester will perform a REWIND command. With the switch in the STOP position all action will terminate on detecting end of tape.
The four switches LOAD/ONLINE, REWIND/UNLOAD, OFFLINE, and REWIND are direct lines to the Formatter, all four functions are not supported by all systems.

6.15 TAPE ACTION, BLOCKSIZE



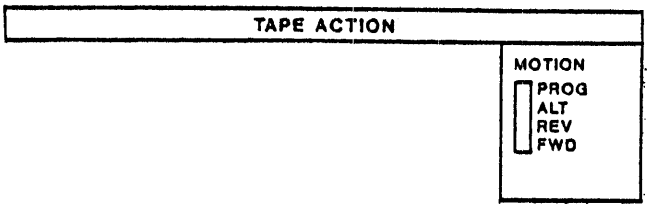
THE BLOCKSIZE switch selects the number of bytes of data per data block when in the WRITE mode.

6.16 TAPE ACTION, CYCLE



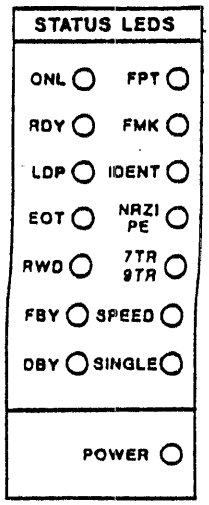
THE CYCLE switch selects either BLOCKED type of data records or CONTINUOUS records when writing. The FLY selection of the CYCLE switch selects the BLOCKED type of data record with the GO command being output from the tester when the DRIVE goes not busy. The STEP selection of the CYCLE switch selects the BLOCKED type of data record with the GO command being output from the tester when the FORMATTER goes not busy. The CONTINUOUS selection of the CYCLE switch selects a CONTINUOUS record type of data record running to end of tape.

6.17 TAPE ACTION, MOTION



THE MOTION selector switch determines the direction and type of tape motion by the Formatter. With PROGRAMMED motion selected a predetermined pattern of tape movement in the FORWARD and REVERSE direction is performed. The pattern consists of five forward commands following by 3 reverse commands, the pattern is modified by the action of the EDIT switch. The ALTERNATE motion selection moves the tape back and forth. The REVERSE motion selection moves the tape in reverse. The FORWARD motion selection moves the type in the forward direction.

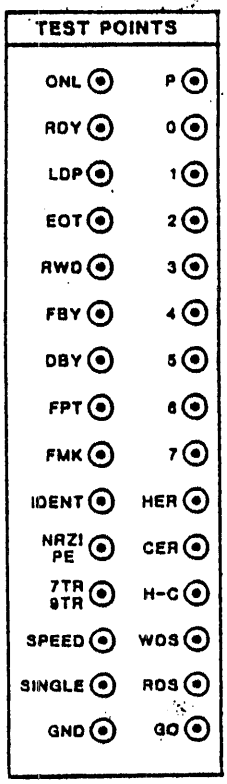
6.18 STATUS LEDS



THE ONLINE status indicator will be active once the Formatter/ Drive combination has been selected with the proper address. All the status indicators are buffered lines from the Formatter. THE POWER indicator will be active when the AC power is turned on and the tester has DC power.

ONL:	SELECTED TRANSPORT IS ON LINE
RDY:	TRANSPORT NOT REWINDING, LOAD POINT SEQUENCE COMPLETED, NOT REWINDING, AND ON LINE
LDP:	TAPE AT LOAD POINT
EOT:	END OF TAPE
RWD:	TRANSPORT REWINDING
FBY:	FORMATTER BUSY
DBY:	DRIVE BUSY
FPT:	FILE PROTECT
FMK:	FILE MARK
IDENT:	IDENTIFICATION STATUS
NRZI/PE:	NRZI OR PE
7 TR/9 TR:	7 OR 9 TRACK
SPEED:	TAPE SPEED
SINGLE:	SINGLE GAP HEAD

6.19 TEST POINTS



SELECTED FORMATTER and TESTER signal lines are made available at 30 testpoints for use with external test equipment.

ONL: SELECTED TRANSPORT IS ON LINE

RDY: TRANSPORT NOT REWINDING, LOAD POINT SEQUENCE COMPLETED, NOT REWINDING, AND ON LINE.

LDP: TAPE AT LOAD POINT

EOT: END OF TAPE

RWD: TRANSPORT REWINDING

FBY: FORMATTER BUSY

DBY: DRIVE BUSY

FPT: FILE PROTECT

FMK: FILE MARK

IDENT:	IDENTIFICATION STATUS
NRZI/PE:	NRZI OR PE
7TR/9TR:	7 OR 9 TRACK
SPEED:	TAPE SPEED
SINGLE:	SINGLE GAP HEAD
P, 0 TO 7:	READ DATA
HER:	HARD ERROR
CER:	CORRECTED ERROR
H - C:	HARD AND CORRECTION ERROR
WDS:	WRITE DATA STROBE
RDS:	READ DATA STROBE
GO:	IGO COMMAND STROBE

7.0 OPERATING PROCEDURES

7.01 ON LINE PREPARATION

The following procedure describes the initial preparation of the TFX-500 for on line operation.

1. Connect the two 50 PIN I/O cables to the Formatter under test. Use an adapter card if specified.

2. Provide AC power to the Formatter/Drive combination and the TFX-500 tester. Turn on the AC power to all pieces of equipment. The power ON indicator on the TFX-500 should be active.

3. Set the address switches on the TFX-500 to the proper transport and Formatter address.

4. Place the transport on line. Observe that the ONL and RDY indications are active on the TFX-500.

5. Select the ON position of the ENABLE switch on the TFX-500.

7.02 BASIC READ CONFIGURATION

Place the following switches in the OFF position: EDIT, ERASE, WFM, and THRESHOLDS.

Select the following switch positions to enable reading in the forward direction:

START/STOP ..... "CONT"
DATA SELECT ..... "TRACK"
READ/WRITE ..... "READ"
CYCLE ..... "FLY"
MOTION ..... "FWD"

NOTE: The TFX-500 normally assumes a 9 TRACK mode of operation. 7 TRACK operation is selected by grounding the 7/9 TRACK test point on the front panel.

Depress the START/STOP switch, the transport will start reading continuously in the forward direction. The read data is compared to the data control switch pattern and compare errors are logged on the TRK error indicators.

7.03 BASIC WRITE CONFIGURATION

Select the following switch positions to enable writing in the forward direction.

DATA SELECT ....."TRACK"

START/STOP....."CONT"

DATA CONTROL SWITCHES....DATA PATTERN

READ/WRITE....."WRITE"

BLOCK SIZE....."1024"

CYCLE....."FLY"

MOTION....."FWD"

EDIT, ERASE, WFM, THRESHOLD..."OFF"

Depress the START/STOP switch, the transport will start writing 1024 byte blocks of data continuously in the forward direction. The data pattern is being selected by the data control switches.

7.04 PROGRAMMED READ/WRITE

Select the following switch positions to enable sequential reading and writing.

DATA SELECT....."TRACK"

START/STOP....."CONT"

DATA CONTROL SWITCHES.....DATA PATTERN

READ/WRITE....."WRITE"

BLOCKSIZE....."1024"

CYCLE....."STEP"

MOTION....."PROG"

EDIT, ERASE, WFM, THRESHOLDS.."OFF"

Depress the START/STOP switch, the transport will write 5 blocks (1024 bytes) of data forward and read 3 blocks of data in the reverse direction, the cycle will repeat in a continuous manner. Read data is compared to write data and errors are logged on the track error indicators. The data pattern is selected by the data control switches.

7.05 ALTERNATE READ/WRITE

Select the following switch positions to enable sequential reading and writing.

DATA SELECT....."TRACK"
START/STOP....."CONT"
DATA CONTROL SWITCHES.....DATA PATTERN
READ/WRITE....."WRITE"
BLOCK SIZE....."1024"
CYCLE....."STEP"
MOTION....."ALT"
EDIT, ERASE, WFM, THRESHOLDS."OFF"

Depress the START/STOP switch, the transport will write 1 block (1024 bytes) of data forward and read 1 block of data in the reverse direction, the cycle will repeat in a continuous manner with the transport "jogging" in place. Read data is compared to write data and errors are logged on the track error indicators. The data pattern is selected by the data control switches.