POINT I

kHz H
SIG REF C

5 kHz from
S-TEC autopilot

customer unit
supplies excitation
400 Hz or other

BOOTSTRAP #1
B2
Z Y X
H
C

BOOTSTRAP #2
B8
X Y Z
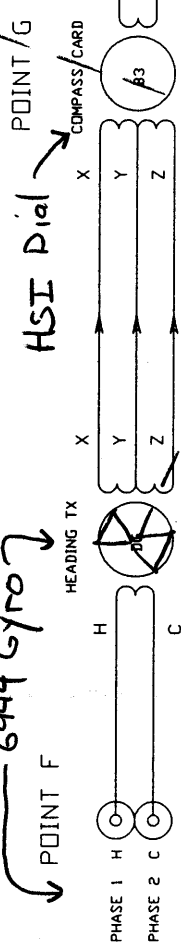H
C

HEADING
B5
Z X Y
H C

COURSE
B6
Z Y X
H C

BY VOR

HDG H HDG CT
HDG OUT

CRS H CRS CT
CRS OUT
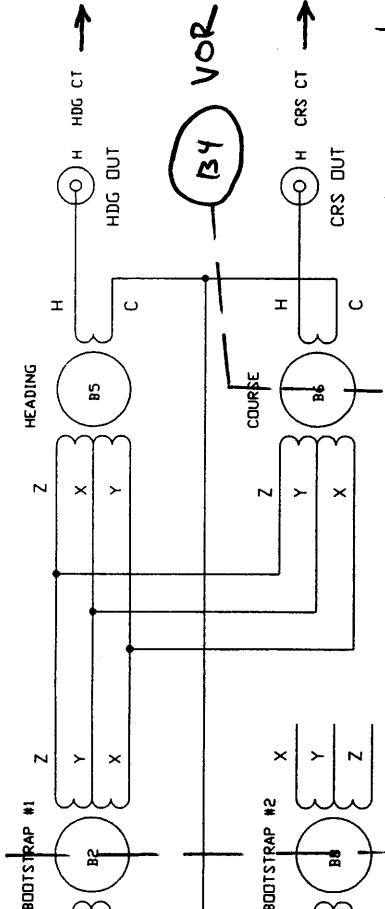
To autopilot heading bug →

To autopilot course error →

Mechanically Tied in HSI 6443

6444 Gyro

POINT F

PHASE 1 H
PHASE 2 C

HEADING TX
D5

HSI Dial

POINT G
COMPASS/CARD
B3
X Y Z
X C

POINT H
AEM PATH

HSI

ERROR BRD 2
HSI BRD 2
14V

A

TORQUER MOTOR
B7

slaving coil moves vane

Magnetic Field

POINT A
X Y Z

FLUX GATE
PHASE 1 H
PHASE 2 C

JJJJ
from Gyro

E-W-N-S
POINT B
COMPENSATION
FLUX GATE HSI BD
X Y Z

HSI CIRCUIT BOARD

slaving panel E-W-S in

POINT C
HSI SYNCRO CONTROL
XFMR B1
X Y Z
H C

AEM mode

Gyro 6444

DG
AEM
FLUX GATE H
H
C
FLUX GATE C
PWR

POINT D

ERROR

SLAVING/ERECTION POWER

Gyro

SLAVING
COIL

slaving panel cw/ccw in

6444 Gyro

LIQUID LEVEL SWITCH

PHASE 1
PHASE 2

ERECTION
COIL

DG LEVEL CIRCUIT
H IN
C

POINT E

6444 Gyro

DG ROTOR
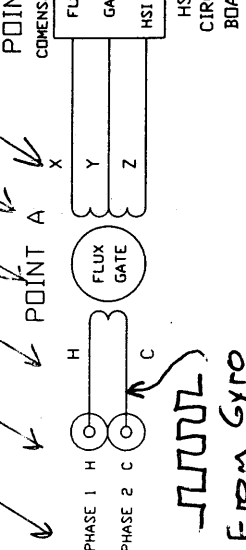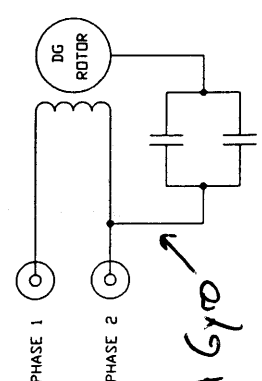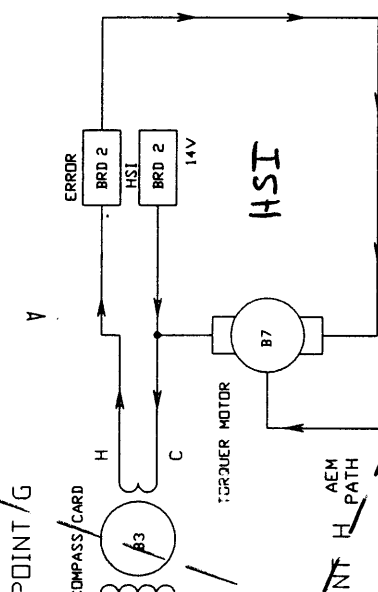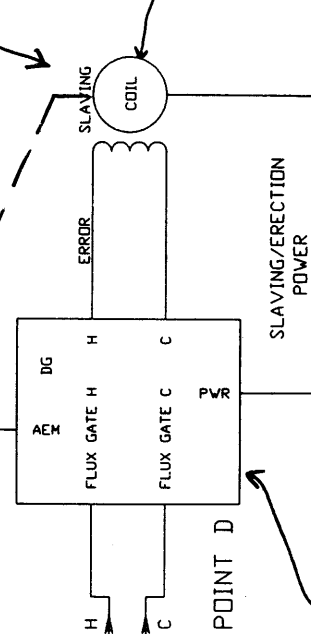
PHASE 1
PHASE 2

6444 Gyro

For a basic theory of operation, refer to the Pilot's Operating Handbook (Pt.# 8726).

At point A: The Flux Gate is excited by phase 1 & 2 of the D.G. with amplitude of approximately 24Vrms. As the flux gate senses the earth's magnet field, the output varies from approximately 70 to 180 mVrms as measured across any two of X Y or Z leads.

Point B: This output is then fed into the Flux Compensation circuit of the H.S.I. where the E-W/N-S potentiometers of the Slaving Panel are used to calibrate the compass system to the aircraft's magnetic field.

Point C: The signal then is applied to B1 (synchro control transformer) of the H.S.I. where an error is produced and fed to the D.G. The error will be approximately 35 mVrms at null and about 190mVrms at max, which occurs with an error of 90 degrees from heading.

Point D: This error enters the Heading Error Amp of the DG where it takes two paths. One path is for the A.E.M. (which will be discussed at Point H) and the other is to the slaving coil. If the H.S.I. is not in the AEM mode, the slaving coil will magnetically slave the gyro until no error exists at the inputs of the Heading Error Amp.

Point E: In response to slaving signals, the gyro has an electrically operated erection system. This system is activated by the Leveling Sensor, which is mounted on the gymbal. As it senses an unleveled gyro, power is applied to a torquer, which attempts to erect the gyro to a level position.

Point F: As the gyro is being slaved by the slaving coil (refer to point D), the gyro is coupled mechanically to the Heading Transmitter which is being excited by phase 1 & 2 of the DG, and X, Y, Z information is produced that is relative to the position of the gyro. This information is sent back to the H.S.I., directly to B3.

Point G: The gyro X, Y, Z information into B3 is converted to Card Error which drives B7, the Torquer Motor. B1 and B3 are mechanically coupled to the torquer motor, which will continue to drive until there is no Card error from B3. If at this point B1 is satisfied, slaving will cease and the system is at a nulled or satisfied state. Upon initial power up, the system will be in fast slave mode, which is 50-80 degrees per minute. When the slaving error is reduced to zero the Heading Flag will pull and the system will convert to slow slave which is 3 degrees per minute. The slow slave will keep the system aligned with the earth's magnetic field.

Point H: If the gyro and the compass card are out of synchronization and the reset button on the H.S.I. is pushed, the system will go into fast slave. If after approximately 3 minutes the system is not synchronized, the system will enter Automatic Emergency Mode (AEM). At this point the system is controlled by the Flux Gate information only and is not looking at the information from the Heading Transmitter in the DG or the information from B3 of the H.S.I. In AEM the system will function as a vertical card magnetic compass.

Point I: B2 (bootstrap 1) and B8 (bootstrap 2) are also mechanically coupled to the Torquer Motor. These synchro transmitters provide output to other aircraft systems. For example, if the system is connected to an S-Tec autopilot,B2 would be excited by the 5Khz and signal reference from the A/P. The external harness of CN1 of the H.S.I. would be configured per Point I, thus connecting Bootstrap 1 to B5 (heading transformer) and B6 (course transformer). B5 is mechanically coupled to the Heading Bug and B6 and B4 (OBS Resolver) are coupled to the Course Pointer. B5 supplies heading information and B6 supplies course information to the A/P. B4 supplies information to the Vor/Loc Converter.