

DIGITAL DATA SYSTEM

DS-1 SIGNAL ACCESS UNIT AND AUXILIARY CIRCUITS DESCRIPTION

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1. GENERAL

1.01 This section contains information concerning the physical and functional descriptions of the circuit packs (CPs) and DS-1 signal access unit (DSAU) shelf assembly that make up the DSAU and auxiliary circuits. A description of the interface leads between the DSAU and associated test equipment is also included.

1.02 When this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The DSAU provides full duplex access to a DS-1 signal (1.544 Mb/s) to facilitate centralized maintenance and testing of the digital data system (DDS). Each individual DSAU is dedicated to a single DS-1 line and provides the following features

when used in conjunction with a KS-21899 data test system or equivalent:

- Digital data can be monitored at the DS-1 signal level
- Bipolar violations can be detected in the DS-1 signal
- Test codes can be inserted into any one of the channels in the DS-1 multiplexed signal after frame synchronization with the signal has been attained.

For a description of the KS-21899 data test system, refer to Section 107-605-100.

1.04 The DSAU is located between the second stage multiplexer (T1DM or T1WB4) and the DS-1 cross-connect (DSX-1) in series with the DS-1 line (Fig. 1). Even though the DSAU is in series with the T1 line, it is transparent to all channels in the DS-1 signal. It provides regeneration of bipolar violations and equalization of the transmitted signal and is capable of extracting timing information.

1.05 DSAUs are housed in shelf assemblies, as shown in Fig. 2, which are capable of providing space for up to 22 CPs. Each bypass unit (BU) in the shelf provides for the independent protection bypass of up to four DS-1 lines through the BU in the event of a DSAU failure. The interface unit (IU) provides for the interchange of information between the DSAU shelf and the KS-21899 data test system allowing any one of the DSAUs in that shelf to be accessed during maintenance and testing. The F60513 power unit (PU) derives the appropriate voltages from the central office power and provides these voltages to all other units in the DSAU shelf. Also provided in a DSAU shelf are equalizers which are required at both outputs of each DSAU to provide proper waveshaping for the transmitted signal.

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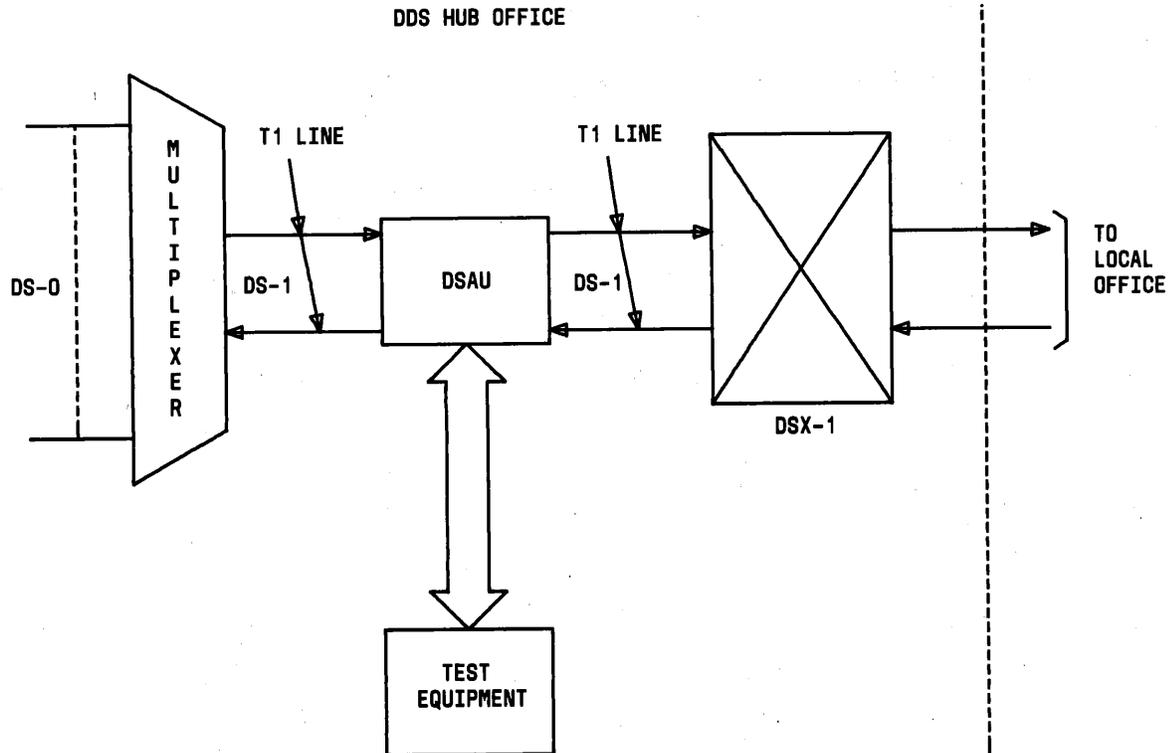


Fig. 1—Location of DSAU in DS-1 Channel

1.06 The exchange of data, clock signals, and alarm indications between the DSAU and test equipment takes place over a 25-pair interface cable.

2. PHYSICAL DESCRIPTION

2.01 This part describes the physical appearance of the units that comprise a DSAU shelf. A description of a DSAU bay and the interface cable between the DSAU shelf and test equipment is also included.

2.02 The DSAU shelf (Fig. 2) has external dimensions of 11 inches high, 23 inches wide and 11 inches deep, and weighs approximately 25 pounds when fully loaded. The DSAU shelf is designed for mounting in 23-inch frame racks and contains space to house up to 22 CPs plus 30 equalizers.

2.03 Each CP in the shelf measures 7-1/2 inches high, 10 inches long, and 7/8 inches wide except the IU and PU CPs which measure 1-3/4

inches wide. All of the CPs consist of a single circuit board, except the IU which contains two circuit boards, attached to a faceplate with lever located at the base of the faceplate for CP removal. A description of the CPs available for installation in a DSAU shelf is given below:

- DSAU CP HL196—One required for each DS-1 line to be accessed (maximum of 15) plus one required per shelf to be used for shelf-test and a spare. The faceplate of this CP contains a yellow light-emitting diode (LED) indicator and 12 test points (TPs).
- BU CP HL197—The faceplate of this CP contains 12 TPs with one CP required for every four DSAU CPs in each shelf (four maximum).
- IU CP HL198—One required per DSAU shelf. The faceplate of this CP contains a red LED indicator, a green LED indicator, a momentary pushbutton switch, and 24 TPs.

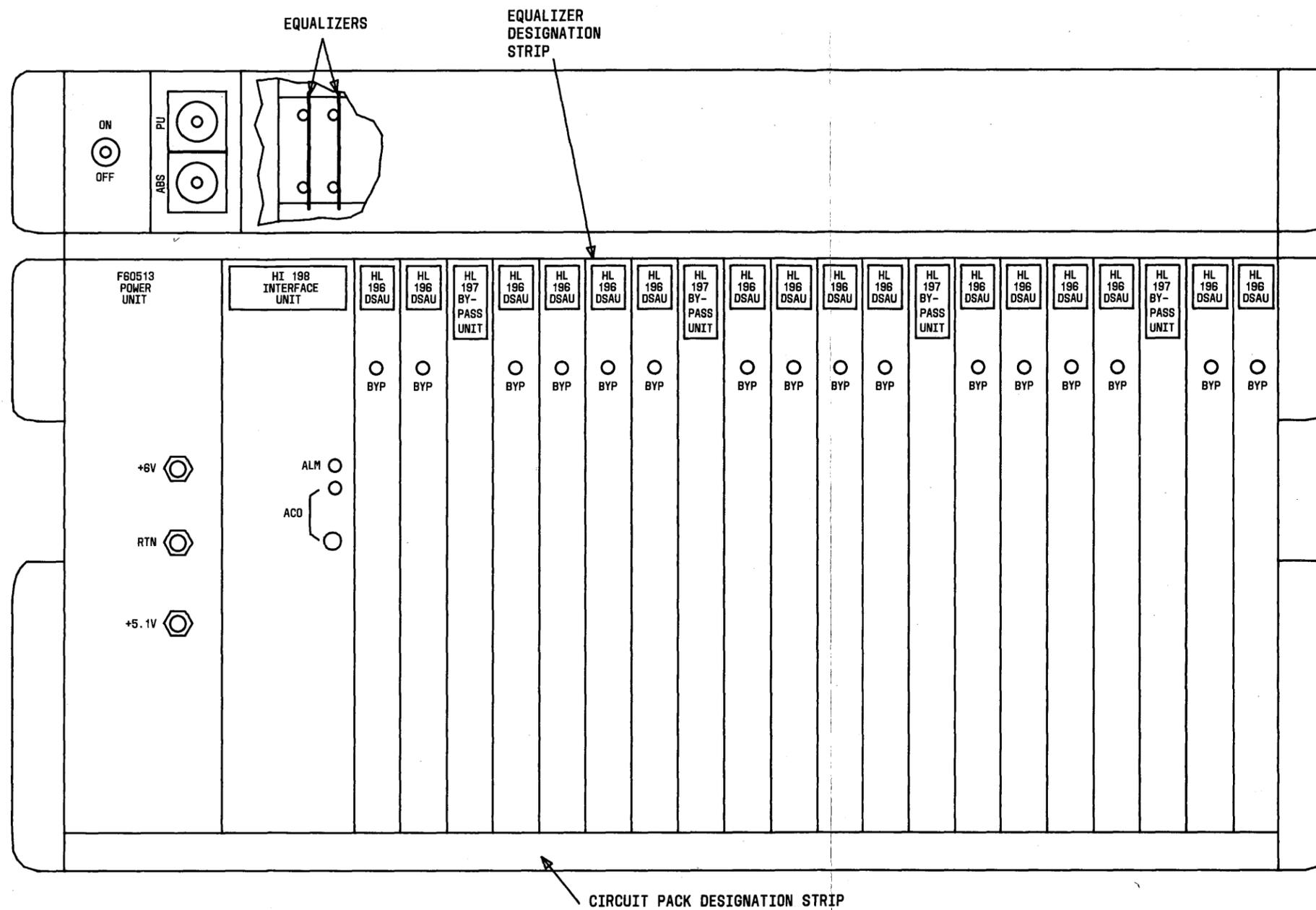


Fig. 2—Front View of a DSAU Shelf Assembly

- F60513 PU—The faceplate of the PU contains 4 TPs with one PU required per DSAU shelf.

2.04 The equalizers are located directly above the CPs in the shelf with two equalizers required per active DSAU CP (30 maximum). Each equalizer measures 1-3/4 inches high, 2-1/4 inches long, and 5/16 inches wide. Two equalizers are installed in each numbered shelf position. The numbers on the equalizer shelf positions correspond to the numbers on the DSAU shelf positions so that equalizers and DSAUs with identical shelf position numbers are used in conjunction with each other.

2.05 Located in the upper left-hand corner of the DSAU shelf are two fuses (FA1 and FA2) for the PU, the alarm battery supply (ABS), and a toggle switch. The PU fuse is a 70B fuse which provides protection for the circuitry on the PU CP. The ABS fuse is a 70H-type fuse which provides protection for all of the alarm circuitry in the DSAU shelf, including the bypass relays on the BU CP. The toggle switch (KS-20079-L2) is a single-pole single-throw switch which is used to control the central office battery supply to the PU CP.

2.06 The rear of the DSAU shelf (Fig. 3) contains the following items:

- 3 terminal strips—TSA and TSB are wire-wrapped terminal strips with 120 terminals per terminal strip which provide connections for the DS-1 lines that are to be accessed by the DSAU. TSC is a screw-down terminal strip with ten terminals which provide power and alarm connections.
- Interface cable—This 842127938 cable assembly is approximately 4 feet long, contains 50 leads and is equipped with a 50-pin KS-16689-L14 plug on one end and terminated in the shelf at the other end.
- 23 CP connectors—The CP connectors consist of nineteen 940A connectors and four KS-21244-L6 connectors. The 940A connectors are 50-pin connectors and accept all CPs in the shelf except the CPs in shelf locations 19, 34, 48, and 62; the CPs in these four positions are inserted into the 56 terminal KS-21244-L6 connectors.

2.07 DSAU shelves can be mounted in bays 7 feet tall or greater with 6 shelves per bay and access to a maximum of 90 DS-1 lines.

3. FUNCTIONAL DESCRIPTION

3.01 This part contains a description of the circuitry contained on each CP that comprises a DSAU shelf. The functions of the interface leads between the DSAU and the KS-21899 data test system are also included in this part.

DSAU CP

3.02 A functional block diagram of the circuitry contained on a DSAU CP is given in Fig. 4. The circuitry on the DSAU CP can be divided into three sections; near-to-far circuitry, far-to-near circuitry, and common circuitry. The common circuitry is composed of the insert alarm circuit, the bypass alarm circuit, the enable verify circuit, the power-on reset circuit, and the bus interface circuit. The near-to-far circuit and the far-to-near circuit are identical and any mention of the near-to-far circuit in this description also applies to the far-to-near circuit.

3.03 When the DS-1 signal from the near end enters the DSAU, it goes to the regenerator in the near-to-far circuit first (Fig. 5). The regenerator performs the following functions:

- Equalizes the incoming signal including amplification and automatic line build out which compensates for the variations in cable length between the DSAU and the DS-1 signal source.
- Extracts timing from the incoming signal and provides the generated clock signal to the clock level shifter to assure proper timing and signal regeneration.
- Regenerates the incoming signal so that the DS-1 signal leaving the DSAU will resemble as close as possible the DS-1 signal as it left the originating source.

3.04 The output pulses of the regenerator circuit are delayed by the output delay circuit to ensure accurate sampling of the output pulses by the sampling circuit and to ensure proper operation of the bipolar violation detector.

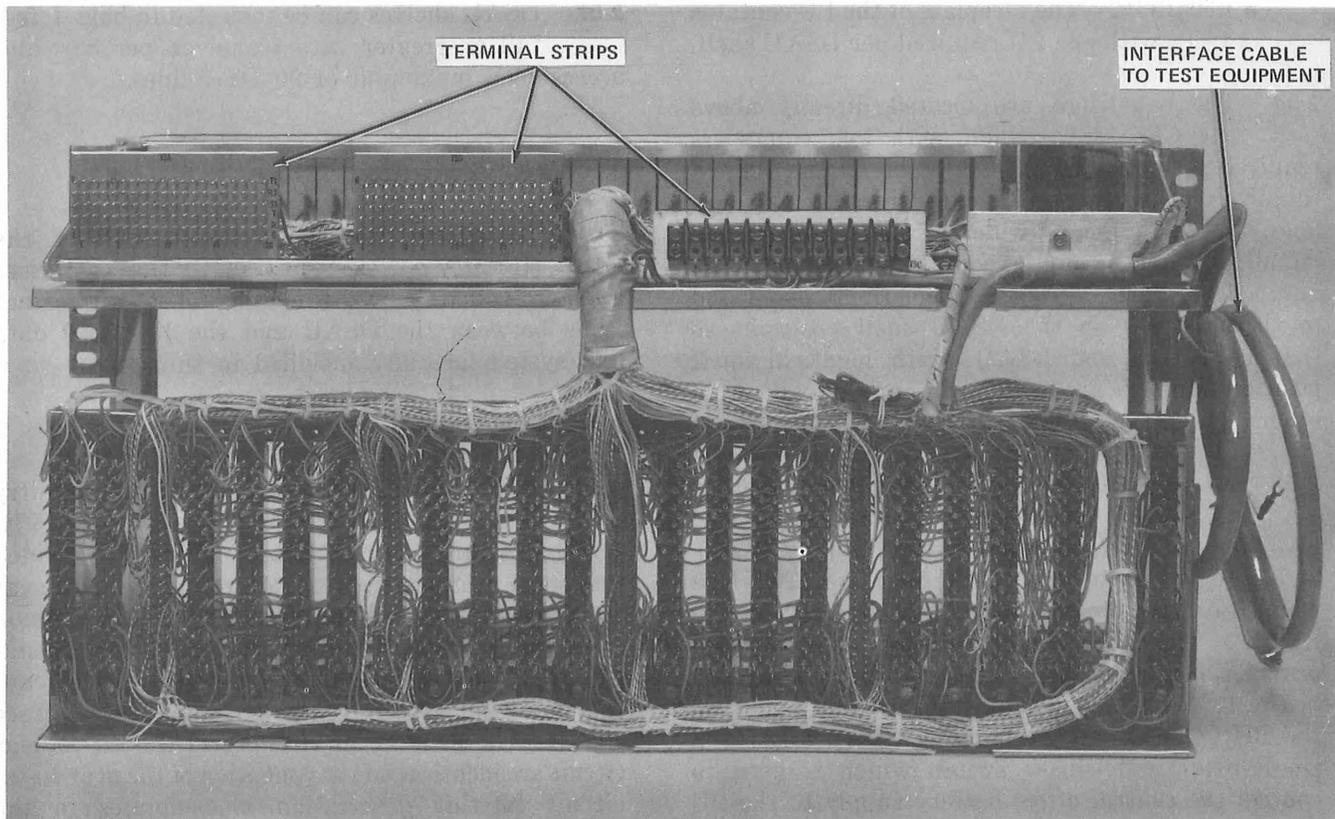


Fig. 3—Rear View of a DSAU Shelf Assembly

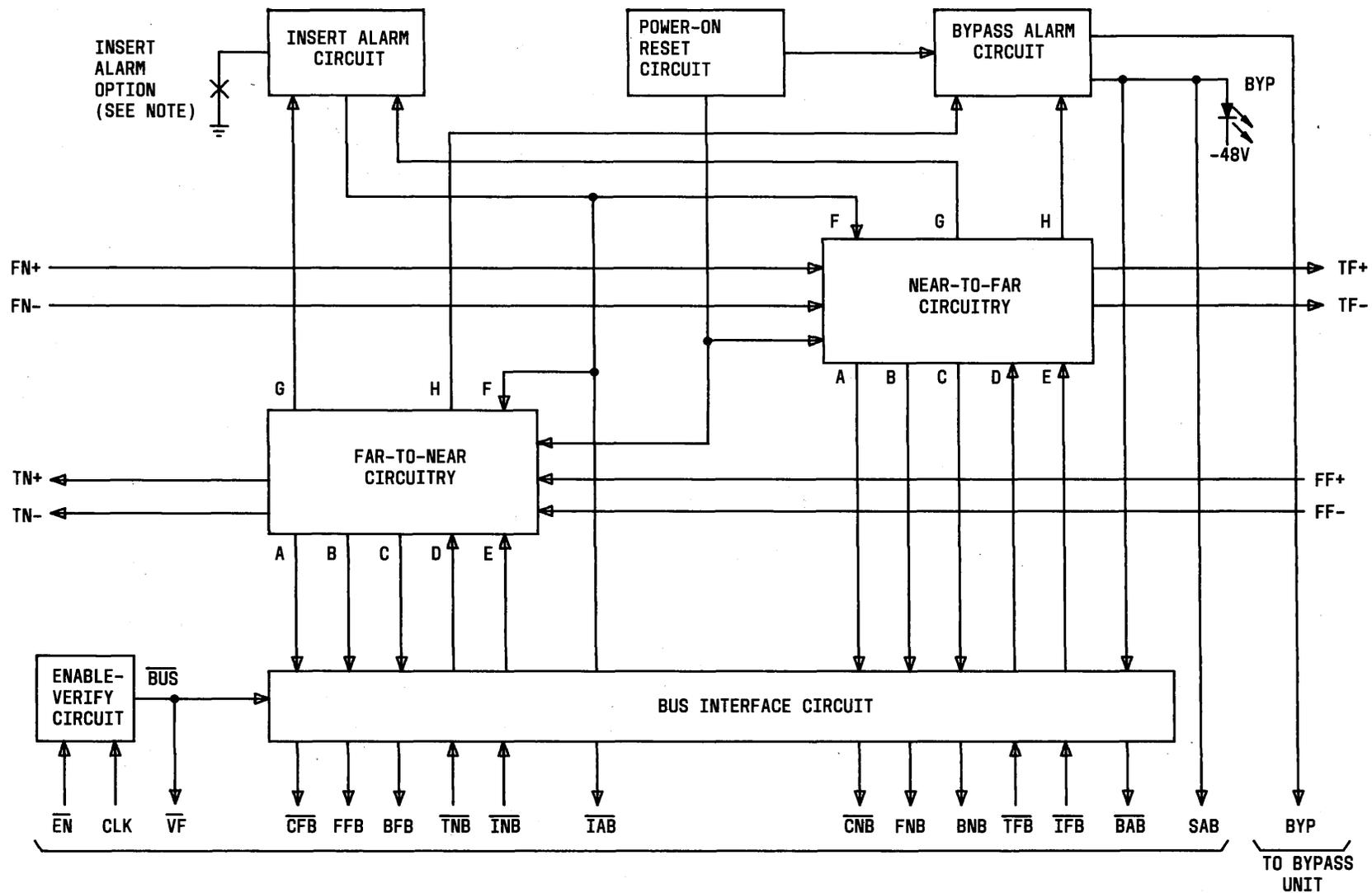
3.05 The clock level shifter accepts the generated clock signal from the regenerator circuit and derives a transistor-transistor level (TTL) clock signal which provides timing for the additional DSAU circuits.

3.06 The output of the output delay circuit is sent to the sampling circuit and to the bipolar violation detector. The sampling circuit takes the half-duty cycle pulses at its input and converts the pulses to a full-duty cycle logical representation of the bipolar pulses present on the input DS-1 signal. The bipolar violation detector checks the pulses from the output delay circuit to see if any two consecutive pulses are of the same polarity (positive or negative) causing a bipolar violation. The bipolar violation detector sends a logic zero to the digital to analog (D/A) converter when a violation is detected.

3.07 The function of the selector circuit is to select either the DS-1 signal input data from the sampling circuit or the test data input

transmitted by the KS-21899 data test system. The selection of either signal is controlled by the test equipment via the insert signal on the IF lead. The insert signal must first pass through the insert monitor before it reaches the selector circuit. The insert monitor checks the incoming insert signal to see if it is faulty in order to prevent the erroneous insertion of test data into the DS-1 signal due to a faulty insert signal.

3.08 The D/A converter takes the output of the selector circuit and converts it to a bipolar signal (half-duty cycle) for transmission over the DS-1 facility to the terminal equipment. For each logical one received from the selector circuit, the D/A converter transmits a bipolar pulse with every other pulse alternating in polarity, except in the case where the D/A converter receives a logical zero from the bipolar violation detector. The logical zero signifies that a bipolar violation was present in the DS-1 input signal and that the D/A converter should transmit a bipolar pulse, identical in polarity



NOTE: THE INSERT ALARM OPTION MUST BE DISABLED BEFORE A DSAU CP CAN BE USED AS A SELF TEST UNIT.

Fig. 4—Functional Block Diagram of a DSAU CP

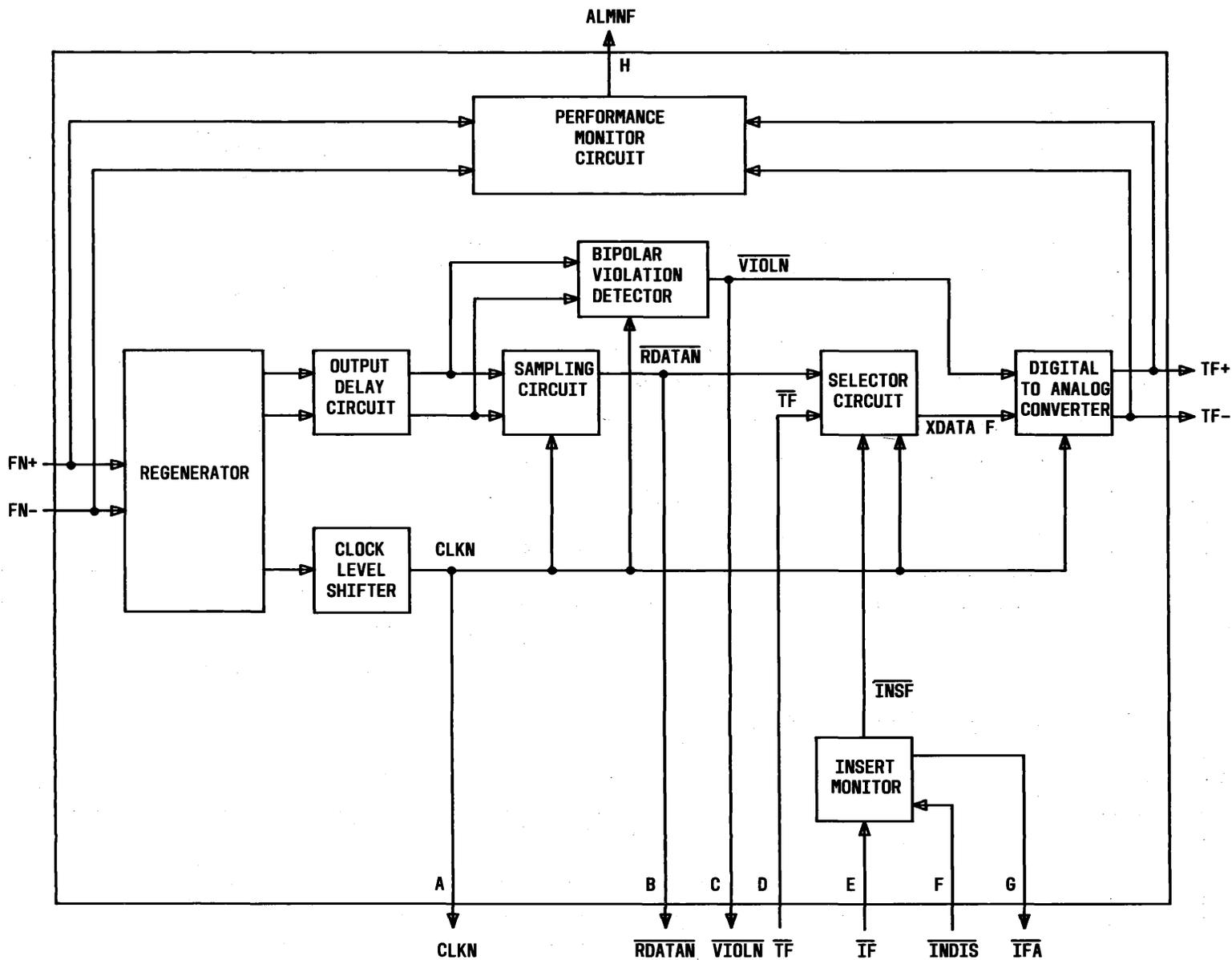


Fig. 5—DSAU Near-to-Far Circuitry

to the previously transmitted pulse in order to restore the bipolar violation.

3.09 The performance monitor circuit continuously checks for internal failure in the DSAU circuit. The performance monitor checks the DS-1 signal entering the regenerator and leaving the D/A converter for bipolar pulses. If bipolar pulses are present at the regenerator input but are not present at the D/A converter output after specified period of time, a circuit failure is detected and an alarm signal is sent to the bypass alarm circuit for bypassing the DS-1 signal around the failed DSAU.

3.10 As part of the common circuits (Fig. 4), the enable-verify circuit, which is driven by the EN signal from the IU addressing circuitry, connects the internal DSAU signals to the shelf bus through the bus interface circuit (via the BUS lead). The enable-verify circuit also indicates to the test equipment that the DSAU has been addressed (via the VF lead). To ensure that transient signals on the EN lead do not activate the BUS lead, a shift register in the enable-verify circuit allows the BUS lead to be active only if the signal input on the EN lead is active for a specified period of time.

3.11 To prevent erroneous insertion of test data into the DS-1 channels, the insert alarm circuit disables the insert signal from the test equipment to the directional circuits (far-to-near and near-to-far circuitry) when the signal exceeds duration cycle limits. The insert alarm circuit is activated by an alarm signal from the insert monitor in either directional circuit and, when activated, it returns a disable signal to both insert monitors to disable the insert signal. When activated, the insert alarm circuit also notifies the test equipment of the alarm condition via the bus interface circuit when the particular DSAU is addressed. An option switch located on each DSAU CP is used to disable the insert alarm circuit when the unit is being used as a self-test DSAU.

3.12 When the performance monitor in either of the directional circuits detects a trouble condition, it sends a signal to activate the bypass alarm circuit. Once activated, the bypass alarm circuit causes the following actions:

- A signal is sent to the BU which causes the DS-1 signal to be transferred around the DSAU experiencing trouble.

- The LED on the faceplate of the DSAU CP is lighted to indicate the bypass condition.

- The test equipment is notified, via the SAB lead, that one of the DSAUs in the shelf has entered the bypass mode plus a visual and audible central office alarm is activated.

- The test equipment is notified, via the BAB lead, when the particular DSAU which is in the bypass mode is addressed.

3.13 The bypass alarm circuit is protected against any power failure originating from the PU by obtaining power from the -48 volt ABS. This ensures that if there is a power failure within the DSAU circuits, the alarm indications and bypass switching occurs in the normal manner.

3.14 When the alarm indications are activated by a trouble condition detected by the performance monitor, the alarm indications remain activated even though the trouble has been located, repaired, or has disappeared. To clear the alarm indications, the defective DSAU CP must be replaced by a good DSAU CP. If the alarm indications are activated by a power failure, the restoral of power will clear the bypass alarm circuit and transfer the circuit from the bypass mode to the normal mode.

3.15 The power-on reset circuit prevents the bypass alarm circuit from latching in the wrong state and causing a false alarm indication when the DSAU CP is initially installed in a shelf slot. The power on reset circuit also clears the performance monitor circuit in each directional circuit to prevent erroneous alarm indications.

Interface Unit CP

3.16 The IU circuitry is divided between the two circuit boards of the CP. One of the circuit boards contains the interface drivers, terminators, and the alarm circuits. The addressing and verification, and the self-test circuitry are contained on the second circuit board.

3.17 The interface drivers and terminators provide the proper signal termination and level during the interchange of information between the test equipment and the DSAU shelf over the shelf bus and the addressing and verification circuitry. The interchange circuits between the test equipment

and the DSAU shelf consists of balanced and unbalanced circuits. The balanced circuits are needed for the high-speed data, clock and control signals, while the unbalanced circuits are used for the low-speed alarm, address and verification signal.

3.18 The alarm circuits on the IU CP activates minor audible and visual CO alarms following one or more DSAU failures. A red LED located on the faceplate of the IU CP also lights when a DSAU failure occurs. The alarm cut-off (ACO) switch on the IU CP is used to turn off the CO alarms with the green LED on the IU CP faceplate lighting to indicate the action. Once the trouble is located and cleared, the red and green LEDs on the IU CP faceplate will go off, and the CO alarms will be silenced if the ACO switch was not depressed previously.

3.19 The addressing and verification circuitry (Fig. 6) permits communication between the test equipment and any selected DSAU. The addressing circuitry (demultiplexer) decodes a 5-bit enable address from the test equipment, activates the appropriate enable signal, and connects the selected DSAU to the shelf bus. The verification circuitry (integrity check encoding circuit) indicates to the test equipment which DSAU is connected to the bus by transmitting to the test equipment an encoded 5-bit address. The verification circuitry also detects the faulty condition where two or more DSAUs are connected to the shelf bus at the same time, and sets each bit of the 5-bit address to a binary one state which identifies this condition.

3.20 The self-test circuitry on the IU CP provides the looping arrangement for the self-test operation between the test equipment and the self-test DSAU. Refer to 3.25 for a description of the self-test operation.

Bypass Unit CP

3.21 One BU CP is required per four DSAU CPs with each BU CP containing four independent switching circuits providing the protection bypass paths for the four associated DSAU CPs. The BU CP provides for the bypass of a DSAU CP when one of the following occurs.

- Internal DSAU failure detected by either of the performance monitor circuits

Note: In the event that only one of the directional circuits (near-to-far or far-to-near) develops trouble, both circuits will be switched to the bypass mode.

- Power failure
- DSAU CP removed from the DSAU shelf.

3.22 The switching of the DS-1 lines around a DSAU is accomplished by relay contacts with the relay being controlled by a signal from the DSAU to be bypassed. The relay is in the activated state during normal operation with the DS-1 signal path through the DSAU circuitry. In the bypass mode the signal from the DSAU causes the relay to be deactivated, and the DS-1 signal path is routed through the BU CP. A warning label is attached to each BU CP to help prevent the erroneous removal of the protection bypass path.

F60513 Power Unit

3.23 The PU is a DC-to-DC converter which converts -48 volts dc CO power to +6 and +5.1 volts dc for use by the CPs in the associated shelf. The +6 volt output has a voltage range of +5.8 to +6.2 volts at a maximum of 1 amp and the +5.1 volt output has a voltage range of +4.85 to +5.35 volts at a maximum of 7 amps.

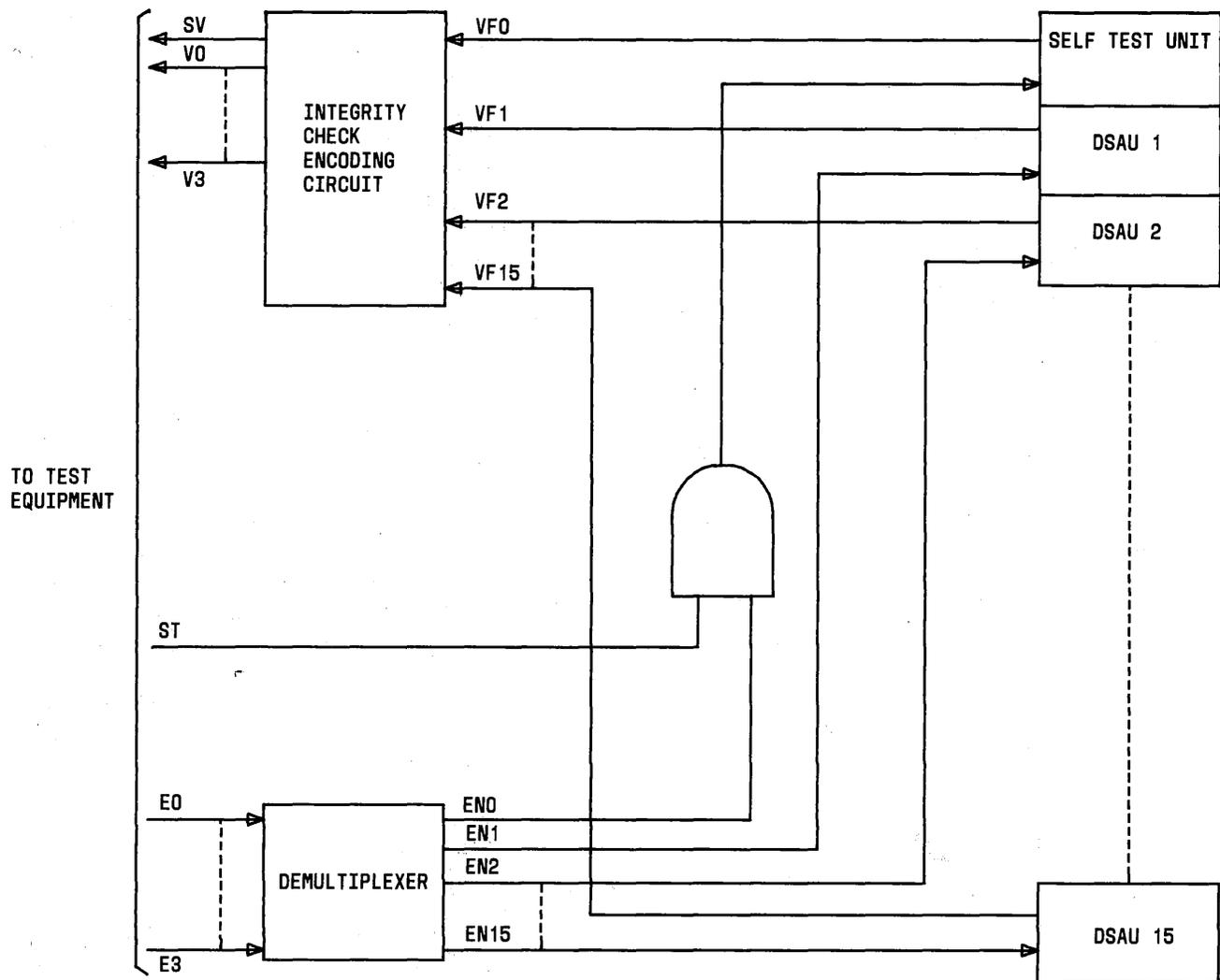


Fig. 6—Address and Verification Circuitry

Equalizers

3.24 Associated with each DSAU CP are two equalizers; one for the near-to-far circuitry, and one for the far-to-near circuitry. The equalizers are required at both outputs to provide the proper waveshaping for the transmitted signal. There are three different codes of equalizers available which can be installed in a DSAU shelf. The code of equalizer that is required for a particular DSAU depends upon the distance in cable length between the DSAU outputs and the DSX-1 cross-connect. The three equalizer codes and cable lengths for each equalizer are given below. Always use a GRP 1 equalizer, regardless of cable length, between a DSAU and the terminating equipment.

EQUALIZER CODE	CABLE LENGTH (FT)
ED 3C585-30 GRP 1	0 — 220
ED 3C585-30 GRP 2	220 — 440
ED 3C585-30 GRP 3	440 — 655

Self-Test Unit

3.25 Each DSAU shelf is equipped with a self-test unit which provides for testing of the interface between the DSAU shelf and the test equipment by simulating the normal operation of a

DSAU without accessing a DS-1 line. The self-test unit also allows the test equipment to exercise the control and monitoring functions required for normal communication over the interface and provides clock pulses to the test equipment for synchronization.

3.26 The DSAU CP that is used as the self-test unit in a DSAU shelf can also be used as a spare DSAU for any of the active DSAU CPs since all of the DSAU CPs are identical. When used in the self-test mode (Fig. 7), the DSAU is arranged so that the output and input pairs of the near-to-far circuits are connected to the input and output pairs of the far-to-near circuits, respectively. During the absence of a self-test operation, the connection from the near-to-far circuit to the far-to-near circuit is broken and a 1.544 Mb/s signal is connected to the inputs of the far-to-near circuitry to maintain clock on both circuit sections.



The insert alarm circuit option on the DSAU CP (Fig. 8) that is used as a self-test unit must be disabled before the CP is installed in the self-test slot in the DSAU shelf (close S1 for option Z).

3.27 Whenever the failure of the internal circuitry in a self-test DSAU occurs, CO alarms will be activated in the same manner as with an active DSAU failure, but a bypass transfer switch will not occur.

4. DSAU—TEST EQUIPMENT INTERFACE

4.01 The DSAU interface provides for the serial binary interchange of data between the DSAU and the test equipment. The interchange circuits in the DSAU can be divided into four categories: common return, timing circuits, data circuits, and control and alarm circuits. The interchange circuits are listed in Table A and described below:

- Signal Ground (GND)—This lead connects to the DSAU shelf signal ground and provides a reference for timing, data, and control interface signals to the test equipment.
- Clock Near (CN) and Clock Far (CF)—These circuit signals provide signal element timing information from both near- and far-end directions to the test equipment as the timing is recovered from the incoming DS-1 signal by the DSAU circuitry.

- From Near (FN) and From Far (FF)—These circuits provide the test equipment with the information present on the selected channel of the DS-1 signal from both near- and far-end directions. The test equipment uses the signals from these circuits to achieve frame synchronization with the DS-1 signal and to monitor information on the selected channel.
- Bipolar Violation Near (BN) and Bipolar Violation Far (BF)—These circuits provide to the test equipment each bipolar violation occurrence on the selected channel of the DS-1 signal from both the near- and far-end directions.
- To Near (TN) and To Far (TF)—Signals on these circuits are generated by the test equipment for insertion into the selected channel of the DS-1 signal in place of existing data under control of the insert near and insert far circuits described below. Signals on the TN circuit will be sent to the near-end and signals on the TF circuit will be sent to the far-end.
- Insert Near (IN) and Insert Far (IF)—The signals on these circuits select the appropriate bit or bits of data in the selected channel of the DS-1 signal that are to be replaced by the insert data from the test equipment. The IN and IF signals also enable the test equipment to insert the data which is provided via the TN and TF circuits, respectively.
- Bypass Alarm (BA)—This circuit, when in the **on** condition, provides an indication to the test equipment that the DSAU which has been addressed is in a trouble condition and has switched to the bypass mode. If the DSAU trouble condition involves internal circuit failure, the DSAU circuits will be latched to the bypass mode. If the trouble condition involves a power failure, the DSAU will automatically switch back to the normal state when power is restored. Circuit BA going to the **on** state because of a power failure occurs only when an entire DSAU shelf has lost power. If an individual DSAU loses power, the test equipment will not be able to communicate with that unit and an **on** condition on circuit BA will not occur.

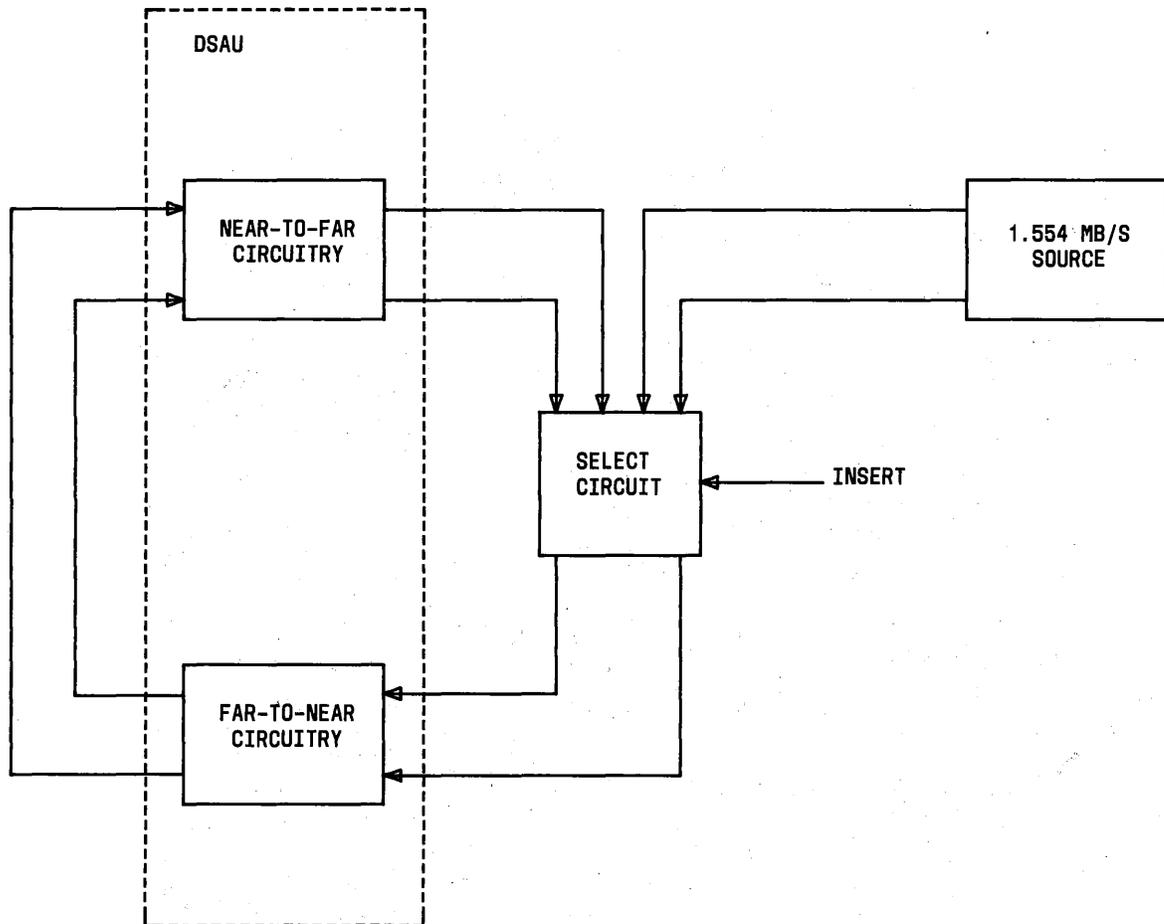


Fig. 7—Self-Test Unit Looping Arrangement

- Shelf Alarm (SA)—An *on* condition on this circuit notifies the test equipment and activates the DSAU shelf office alarm circuits when one or more of the 15 active DSAUs or the self-test DSAU in a DSAU shelf has switched to the bypass mode due to a trouble condition. The trouble condition can be located by using the test equipment to address each DSAU in the shelf and checking circuit BA. In the event that a DSAU CP is not plugged into one of the shelf slots being addressed by the test equipment, the SA circuit will not indicate a trouble condition. If an active DSAU or self-test DSAU in the bypass mode is removed from the DSAU shelf, the SA circuit will go to the *off* condition.
- Insert Alarm (IA)—An *on* condition on this circuit indicates to the test equipment that the addressed DSAU has detected a trouble condition in either or both of the insert control signals to that DSAU and has disabled both signals. When the insert monitor and alarm circuit option switch on the DSAU CP is in the *off* position, the IA circuit will be in the *off* state.
- Enable Signals (E0, E1, E2, E3)—The signals on these leads allow the test equipment to address any one of the 15 DSAUs or the self-test unit in a DSAU shelf. The test equipment addresses a particular DSAU by sending a 4-bit binary-coded address that is peculiar to that DSAU (see Table B). When the self-test unit is being addressed, the test equipment must send the 4-bit binary-coded address. In addition, the ST interchange circuit must be set to a binary one.
- Verify Signals (V0, V1, V2, V3)—These signals are used to indicate to the test

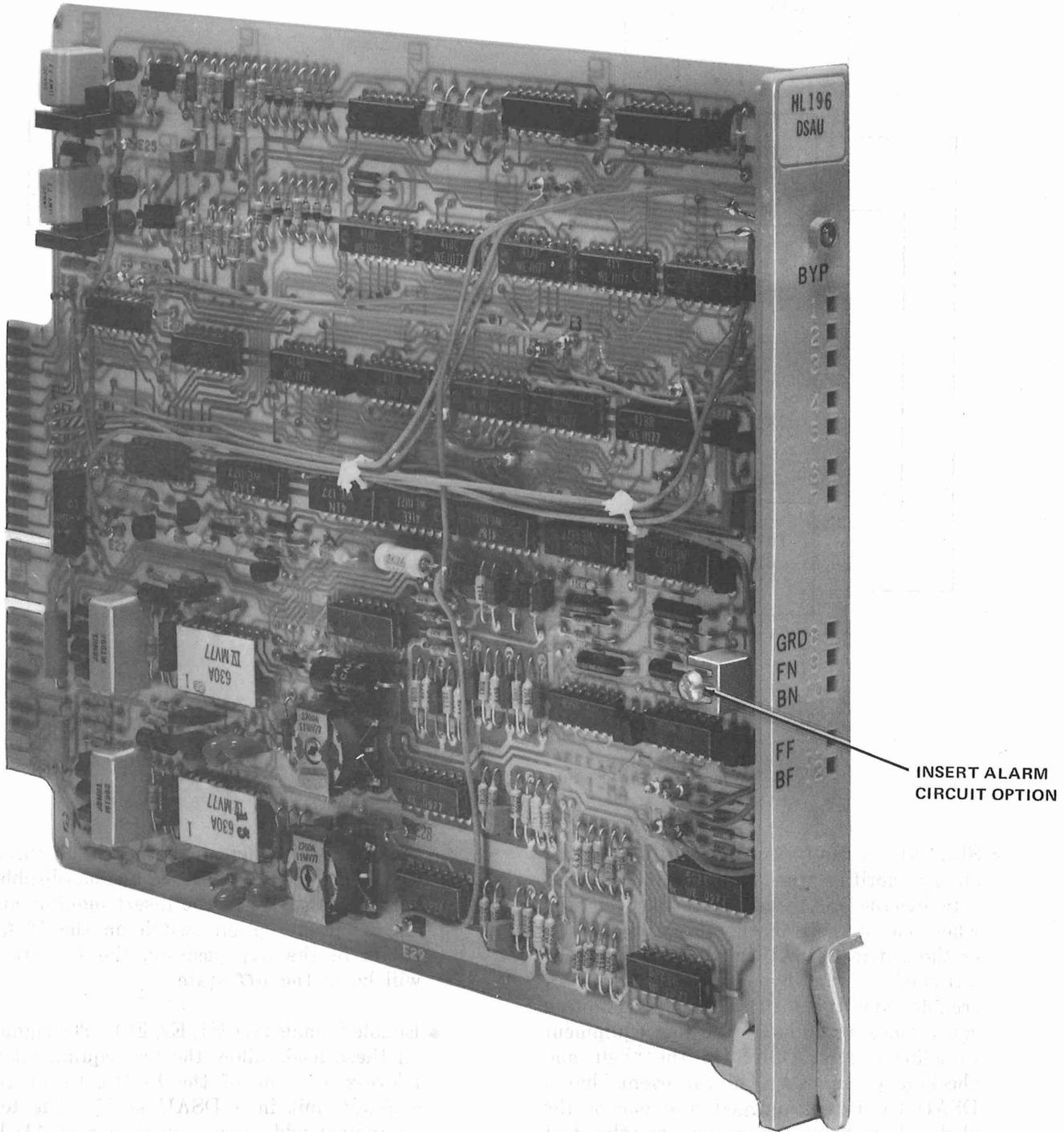


Fig. 8—DSAU Circuit Pack

TABLE A

INTERCHANGE CIRCUITS BETWEEN
 DSAU AND TEST EQUIPMENT

CIRCUIT	DESCRIPTION	COMMON	TIMING	DATA		CONTROL AND ALARM	
		RETURN	FROM DSAU	FROM DSAU	TO DSAU	FROM DSAU	TO DSAU
GND	Signal Ground	X					
CN	Clock Near		X				
CF	Clock Far		X				
FN	From Near			X			
FF	From Far			X			
BN	Bipolar Violation Near			X			
BF	Bipolar Violation Far			X			
TN	To Near End				X		
TF	To Far End				X		
IN	Insert Near						X
IF	Insert Far						X
BA	Bypass Alarm					X	
SA	Shelf Alarm					X	
IA	Insert Alarm					X	
E0	Enable Signal						X
E1	Enable Signal						X
E2	Enable Signal						X
E3	Enable Signal						X
V0	Verify Signal					X	
V1	Verify Signal					X	
V2	Verify Signal					X	
V3	Verify Signal					X	
ST	Self-Test						X
SV	Self-Test Verify					X	

equipment which DSAU was addressed by the test equipment over the enable leads. Under normal conditions, the address set by the enable signals should equal the address indicated on the verify signals as an indication that the DSAU chosen by the test equipment was actually the one that was addressed. With no DSAU connected to the bus, the verify signals will all be set to the binary zero state. When the self-test unit is addressed, the verify signals will remain in the zero state, but the SV interchange circuit will be a binary one. The verify signals and SV circuit will be set to the binary one state when a trouble condition occurs where more than one DSAU in the shelf is connected to the bus.

- Self-Test (ST)—This circuit, when in the binary one state, activates the self-test unit during a self-test operation. All of the enable signals must be set to the binary zero state by the test equipment before the self-test can be performed.
- Self-Test Verify (SV)—This circuit provides an indication that a self-test is being performed. The SV interchange circuit is set to a binary one state, and the enable signals are set to a binary zero state during a self-test, while the ST interchange circuit, which activates the self-test unit, is in the binary one state and the verify signals are in the binary zero state. If a DSAU that is not a self-test unit is addressed when

TABLE B
DSAU ADDRESS CODES

INTERCHANGE CIRCUIT					DSAU ADDRESSED
E3	E2	E1	E0	ST	
0	0	0	0	0	NONE
0	0	0	0	1	SELF TEST
0	0	0	1	DC	1
0	0	1	0	DC	2
0	0	1	1	DC	3
0	1	0	0	DC	4
0	1	0	1	DC	5
0	1	1	0	DC	6
0	1	1	1	DC	7
1	0	0	0	DC	8
1	0	0	1	DC	9
1	0	1	0	DC	10
1	0	1	1	DC	11
1	1	0	0	DC	12
1	1	0	1	DC	13
1	1	1	0	DC	14
1	1	1	1	DC	15

DC = Don't Care (either 1 or 0)

the ST lead is set to the binary one state, then the SV circuit will be set to a binary zero state. When the SV circuit and the verify signals are all in the binary one state, this is an indication that more than one DSAU in a shelf is connected to the bus indicating an internal trouble condition.

5. REFERENCES

5.01 The following list of schematic drawings (SDs), circuit descriptions (CDs) and Bell System Practices (BSPs) are supplied as a source of additional information concerning the DSAU and associated equipment.

NUMBER	TITLE
SD-&CD-73131-01	Data System—Digital Data System-Central Office-DS-1 Signal Access Unit
107-605-100	KS-21899 Data Test System—Description
107-605-200	KS-21899 Data Test System—Installation
107-605-300	KS-21899 Data Test System—Operation
107-605-500	KS-21899 Data Test System—Maintenance
314-960-300	Digital Data System—DS-1 Signal Access Unit and Auxiliary Circuits—Maintenance and Trouble Locating Procedures