REGENERATOR ALARM MATRIX

The regenerator alarm matrix, Table H, can be used to quickly determine the most probable cause of a regenerator alarm and the corrective action necessary to clear the alarm. The block diagram of the regenerator, Fig. 5, supplements the alarm matrix by identifying the major regenerator units and the nominal power levels.

The regenerator requirements are provided in Table I. These requirements should be met after replacing a defective unit and/or when performing a test identified in the alarm matrix or the replacement matrix.

TABLE H

REGENERATOR FRAME ALARM MATRIX (NOTES 1 THROUGH 6)

REMOTE SCAN POINT – ALARM(A) OR STATUS(S)	UNIT	LOCAL INDICATION	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
REGEN POWER FAIL (A)	POWER UNIT	ALM/OFF	(1) Faulty power unit (2) Abnormal current demand from a supplied unit	(1) Replace power unit (2) Replace supplied unit causing failure
N/A	STATION CONTROLLER	COM ALM	(1) Indicates an alarm is present in radio or digital equipment at this station (2) Faulty STATION CONTROLLER unit	(1) Clear all alarms and indication should extinguish (2) Replace STATION CONTROLLER unit
REGENERATOR CONTROL SYSTEM ALARM (A)		RDN	(1) Faulty STATION CONTROLLER unit (2) Faulty CHANNEL MONITOR unit	(1) Replace STATION CONTROLLER unit (2) Replace each CHANNEL MONITOR unit until RDN indication is off
		CONTR FAIL	(1) Faulty STATION CONTROLLER unit (2) Faulty CONTROLLER I/O unit	(1) Replace STATION CONTROLLER unit (2) Replace each CONTROLLER I/O unit
	CHANNEL MONITOR	CONTR FAIL	Faulty CHANNEL MONITOR unit	Replace CHANNEL MONITOR unit
RADIO TRMTR FAIL, or RADIO RCVR FAIL (A)		RADIO FAIL (only)	Radio transmitter or receiver	At radio transmitter check ALARM AND METER unit for lighted indicators. Refer to "Radio Frame Trouble Isolation" tab in Regenerator Station Operation and Maintenance manual
		Both RADIO FAIL and REGEN FAIL	(1) Associated radio receiver (2) Regenerator transmitter	(1) If receive indicators on regenerator are lighted, refer to "Radio RCVR Trouble Isolation" tab in Regenerator Station Operation and Maintenance manual (2) If transmit indicators on regenerator are lighted, suspect faulty regenerator transmit units

Notes:

1. Knowledge of admonishments, equipment, and procedures is required to use this matrix.
2. Indications are listed in order of priority.
3. DC voltages and cable connectors should always be checked before attempting corrective action.
4. Detailed instructions to clear alarms are provided in "Regenerator Frame Trouble Isolation" tab in the Operation and Maintenance manual for the Regeneration Station (421-300-104).
5. If original unit has been replaced and new unit does not correct the problem, reinstall original unit. Detailed instructions to replace units are provided in "Regenerator Replacement Procedures" tab in the Operation and Maintenance manual for the Regenerator Station (421-300-104).
6. Regenerator requirements for the tests referenced in this matrix are provided in Table I.

TABLE H (Contd)

REGENERATOR FRAME ALARM MATRIX (NOTES 1 THROUGH 6)

REMOTE SCAN POINT – ALARM(A) OR STATUS(S)	UNIT	LOCAL INDICATION	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
REGEN FAIL for associated channel (A)	CHANNEL MONITOR	REGEN FAIL (only)	(1) DC power failure (2) Controller failure (3) Channel failure (4) Performance failure (5) Signaling failure	Look for other lighted regenerator indications.
PERFORMANCE ALARM and REGEN FAIL for associated channel (A)		ERR RATE EXCESS ACT EXCESS ERR RATE EXCESS MFR	Performance objectives of equipment between the previous station digital transmitter and this digital receiver are not met	Refer to Regenerator Frame Performance Alarm-Clearing Flowchart in "Regenerator Frame Trouble Isolation" tab in Regenerator Station Operation and Maintenance manual
REGEN FAIL for associated channel (A)	DECISION (2 units)	LOCK LOSS	(1) Faulty regenerator receiving unit (2) Bad IF input to regenerator	(1) Check for Radio Receiver Alarm. Check IF input, may want to loop back from IF OUT to IF IN on regenerator channel to ensure good IF input (2) If only one DECISION unit LOCK LOSS indicator, is lighted, replace the following one at a time: DECISION with LOCK LOSS lighted CARRIER RECOVERY DEMODULATOR (3) If both DECISION unit LOCK LOSS indicators (LOCK LOSS on CARRIER RECOVERY unit can be on or off), replace the following one at a time: CARRIER RECOVERY DEMODULATOR DECISION (both units)
	CARRIER RECOVERY	LOCK LOSS		(1) Check IF input, may want to loop back from IF OUT, to IF IN on regenerator channel to ensure good IF input (2) Replace CARRIER FREQUENCY unit (3) Replace both DECISION units

TABLE H (Contd)

REGENERATOR FRAME ALARM MATRIX (NOTES 1 THROUGH 6)

REMOTE SCAN POINT – ALARM(A) OR STATUS(S)	UNIT	LOCAL INDICATION	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
REGEN FAIL for associated channel (A)	DECODER	OUTPUT LOSS	(1) Faulty regenerator receiving unit (2) Bad IF input to regenerator	(1) Check IF input, may want to loop back from IF OUT to IF IN on regenerator channel to ensure good IF input (2) Replace DECODER unit (3) Replace all units from DEMODULATOR to DECODER unit
	LOW SPEED FRAMER	FR LOSS		(1) Check IF input, may want to loop back from IF OUT to IF IN on regenerator channel to ensure good IF input (2) Replace LOW SPEED FRAMER unit (3) Replace HIGH SPEED FRAMER unit (4) Replace all units from DEMODULATOR to LOW SPEED FRAMER unit
	FRAME RESUPPLY	MAN FRS	(1) MAN FRS pushbutton operated (2) Faulty FRAME RESUPPLY unit	(1) Release MAN FRS pushbutton (2) Replace FRAME RESUPPLY unit
		FRS ON	(1) MAN FRS pushbutton operated (2) Faulty regenerator receiving unit (3) Faulty FRAME RESUPPLY unit	(1) Check for previous receive unit indication or EXCESS indications on CHANNEL MONITOR unit. Refer to Regenerator Frame Performance Alarm-Clearing Flowchart in "Regenerator Frame Trouble Isolation" tab in Regenerator Station Operation and Maintenance manual (2) Replace FRAME RESUPPLY unit
	ENCODER	DATA LOSS	(1) Faulty ENCODER unit (2) Bad input to ENCODER unit	(1) Replace the ENCODER unit (2) Suspect receiver circuits feeding this unit. Replace the following units one at a time: FRAME RESUPPLY HIGH SPEED FRAMER LOW SPEED FRAMER (3) Replace all units from DEMODULATOR to LOW SPEED FRAMER unit

TABLE H (Contd)

REGENERATOR FRAME ALARM MATRIX (NOTES 1 THROUGH 6)

REMOTE SCAN POINT – ALARM(A) OR STATUS(S)	UNIT	LOCAL INDICATION	POSSIBLE CONDITION(S) CAUSING ALARM	SUGGESTED CORRECTIVE ACTION
REGEN FAIL for associated channel (A)	MODULATOR	OUTPUT LOSS	(1) Faulty MODULATOR unit (2) Bad input to MODULATOR unit	(1) Replace the MODULATOR unit (2) Replace the ENCODER unit (3) Suspect receiver circuits feeding this unit. Replace the following units one at a time: FRAME RESUPPLY HIGH SPEED FRAMER LOW SPEED FRAMER (4) Replace all units from DEMODULATOR to LOW SPEED FRAMER unit
REGENERATOR SERVICE CHANNEL (A) SW ALARM	CONTROLLER I/O	SW (Red)	(1) A failure in the equipment between the previous station digital transmitter and this digital receiver has caused the service channel to switch to a state where it is receiving on the protection channel and transmitting on the regular channel 1, or vice versa (2) Faulty CONTROLLER I/O (3) Faulty SRV CHANNEL INTERFACE unit (4) Faulty SRV CHANNEL MULDEM unit	(1) Clear all other alarms and switch should return to normal operating state (2) Replace CONTROLLER I/O unit (3) Replace W-Channel interface circuit associated with SRV CHANNEL INTERFACE unit (4) Replace the SRV CHANNEL MULDEM unit
REGENERATOR SWITCH SIGNALING (A) FAIL		OPP DIR SIG FAIL	(1) Faulty control units at this station or the service channel transmitter sending signal information to this station (2) Equipment failure in the W2 sub-channel at this station or station sending signed interaction to this station	Refer to Regenerator Frame Signaling Fail Alarm-Clearing Flowchart in "Regenerator Frame Trouble Isolation" tab in Regenerator Station Operation and Maintenance manual
N/A	ORDER WIRE TERMINATION	LOCAL OFF-HK	(1) Indicates the HNDST SWHK pushbutton is operated (2) Faulty ORDER WIRE TERMINATION unit	(1) Release HNDST SWHK pushbutton (2) Replace ORDER WIRE TERMINATION unit

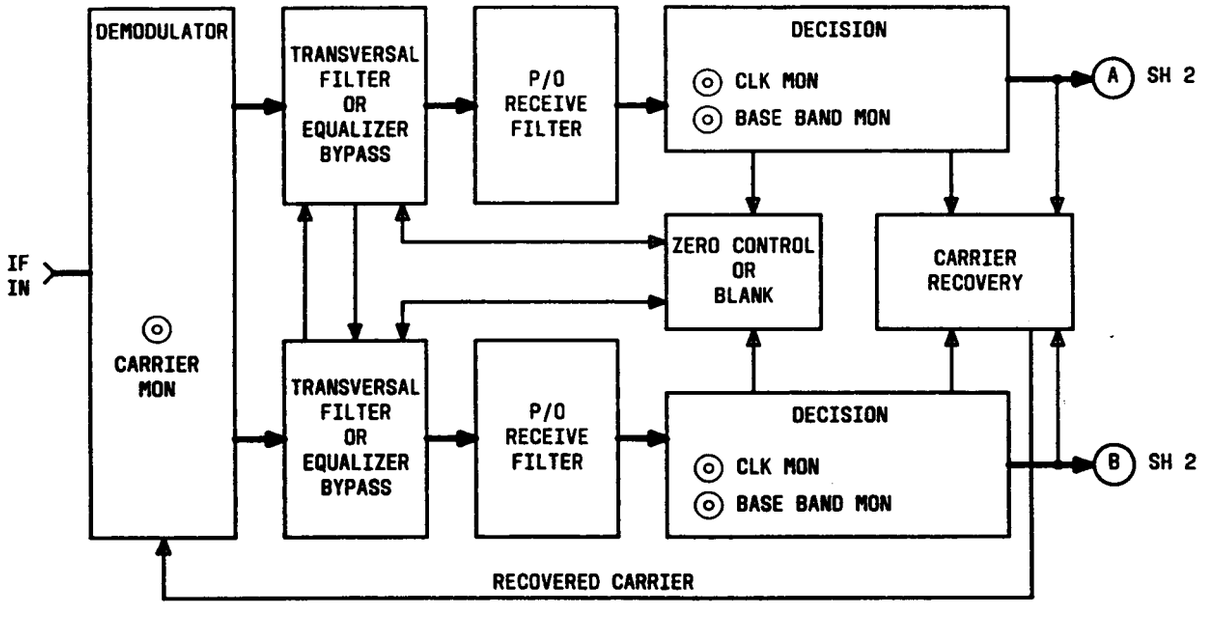

Fig. 5—Digital Regenerator Block Diagram (Sheet 1 of 2)

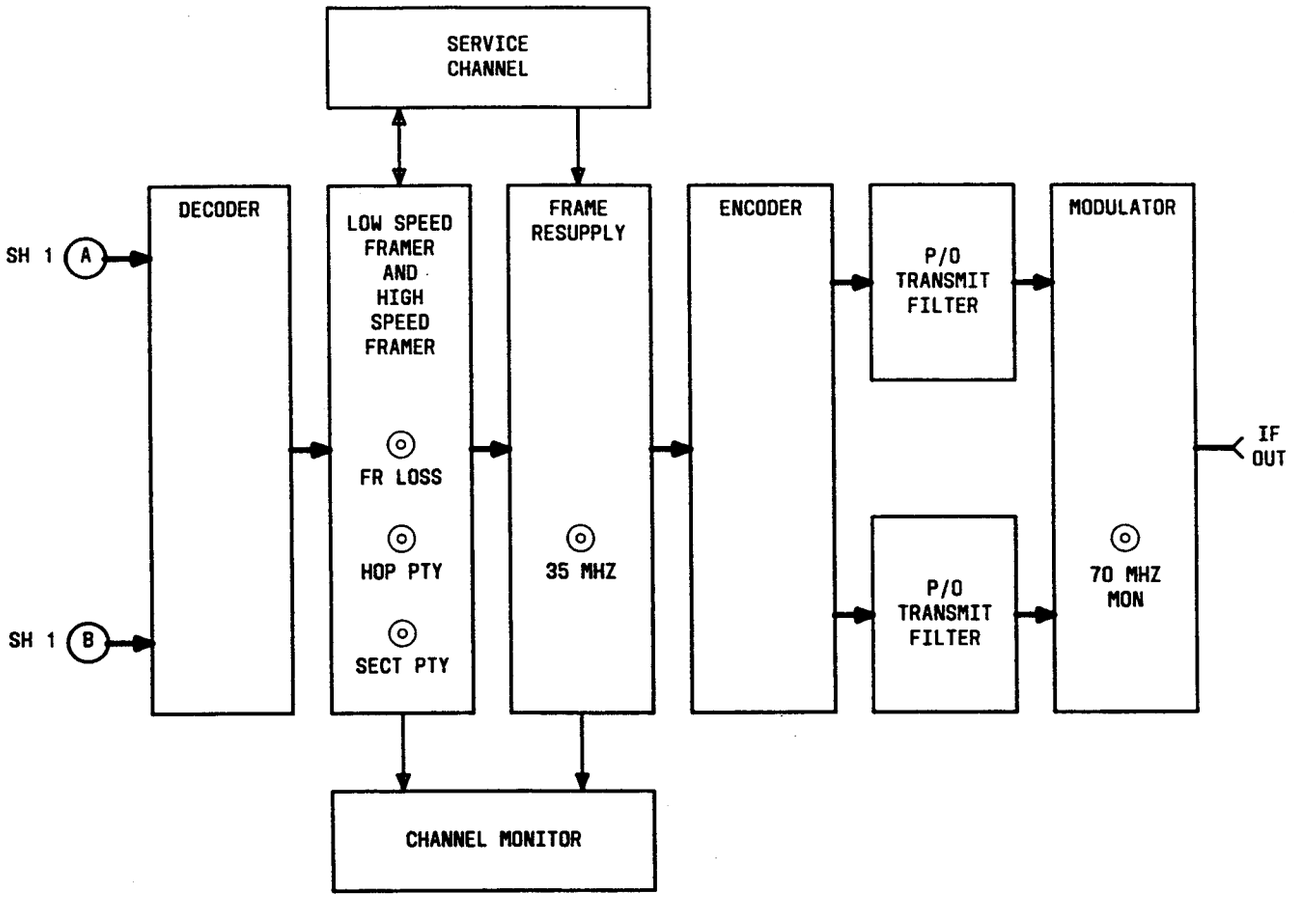

Fig. 5—Digital Regenerator Block Diagram (Sheet 2 of 2)

TABLE I

REGENERATOR FRAME REQUIREMENTS

UNIT	SHELF	TEST POINT	NOMINAL VALUE	RECOMMENDED ADJUSTMENT OR OPTIMUM TOLERANCE	MAINTENANCE OPERATING WINDOW
471/474BA POWER UNIT	DIGITAL REGENERATOR (Lower half)	V1	−5.2 V	No Adjustment	−4.9 V to −5.5 V
		V IN	−24 V		−20 V to −28.5 V
		V IN	−48 V		−42 V to −60 V
471/474EA POWER UNIT	DIGITAL REGENERATOR (Upper half)	V1	−5.2 V		−4.9 V to −5.5 V
		V2	−15 V		−14.5 V to −19 V
		V2	+15 V		+14.5 V to +19 V
		V IN	−24 V		−20 V to −28.5 V
		V IN	−48 V		−42 V to −60 V
471/474EA POWER UNIT	DIGITAL REGENERATOR (Lower half)	V1	+5 V		+4.7 V to +5.3 V
		V2	−15 V		−14.5 V to −19 V
		V2	+15 V		+14. 5V to +19 V
		V IN	−24 V		−20 V to −28.5 V
		V IN	−48 V	No Adjustment	−42 V to −60 V

TABLE I (Contd)

REGENERATOR FRAME REQUIREMENTS

UNIT	SHELF	TEST POINT	NOMINAL VALUE	RECOMMENDED ADJUSTMENT OR OPTIMUM TOLERANCE	MAINTENANCE OPERATING WINDOW
471/474EA POWER UNIT	SERVICE CHANNEL	V1	+5 V	No Adjustment	+4.7 V to +5.3 V
		V2	−15 V		−14.5 V to −19 V
		V2	+15 V		+14.5 V to +19 V
		V IN	−24 V		−20 V to −28.5 V
		V IN	−48 V		−42 V to −60 V
1470CA DEMODULATOR	DIGITAL REGENERATOR	CARRIER MON	70 MHz	±280 kHz	69.720 MHz to 70.280 MHz
			−9.5 dBm	±3.5 dB	−13 dBm to −6 dBm
1470BP DECISION	DIGITAL REGENERATOR	CLK MON	35 MHz	Not required for normal maintenance	35.2 MHz to 35.5 MHz
		BASEBAND MON	0.0 dBm when IF input is −8.2 dBm		−0.3 to −2.3 dBm when IF input is −8.2 dBm at IF IN jack.
1470CN LOW SPEED FRAMER	DIGITAL REGENERATOR	FR LOSS	Not required for normal maintenance. The requirements reflect the effect on performance when a specified interference tone is introduced to the signal. Refer to appropriate signal-to-interference test		
		HOP PTY			
		SEC PTY			
1470CM FRAME RESUPPLY	DIGITAL REGENERATOR	35 MHz (MAN FRS Operated)	35 MHz	Not required for normal maintenance	35.2 MHz to 35.5 MHz

TABLE I (Contd)

REGENERATOR FRAME REQUIREMENTS

UNIT	SHELF	TEST POINT	NOMINAL VALUE	RECOMMENDED ADJUSTMENT OR OPTIMUM TOLERANCE	MAINTENANCE OPERATING WINDOW
1470CB MODULATOR	DIGITAL REGENERATOR	70 MHz MON	70 MHz	±700 Hz	69,999,300 Hz to 70,000,700 Hz
			-9.5 dBm	±3.5 dB	-13 dBm to -6 dBm
PATCH PANEL	DIGITAL REGENERATOR	IF IN	-8.2 dBm	±1.0 dB	-7.2 to -9.2 dBm
PATCH PANEL	DIGITAL REGENERATOR	Cable removed from IF OUT	-7.1 dBm	±1.0 dB	-6.1 to -8.1 dBm
1470BT CHANNEL MONITOR	DIGITAL REGENERATOR	ERR RATE (S/I Stress)	Not required for normal maintenance. The requirements reflect the effect on performance when a specified interference tone is introduced to the signal. Refer to appropriate signal-to-interference test		