

LIST OF EFFECTIVE CHANGES

CHANGE NO.	DATE	SERIAL NO. AFFECTED
1	February 1982	All 377D-1's
2	11 May 1982	All 377D-1's
3	2 December 1982	All 377D-1's
4	1 July 1983	All 377D-1's
5	10 April 1987	All 377D-1's



377D-1

NOTE

A switch has been added to the 377D-1 unit to provide the ability to disconnect the internal battery for shipping purposes and periods of non-use. The switch is mounted on the left rear of the unit and should be in the ON position when the unit is placed in service.

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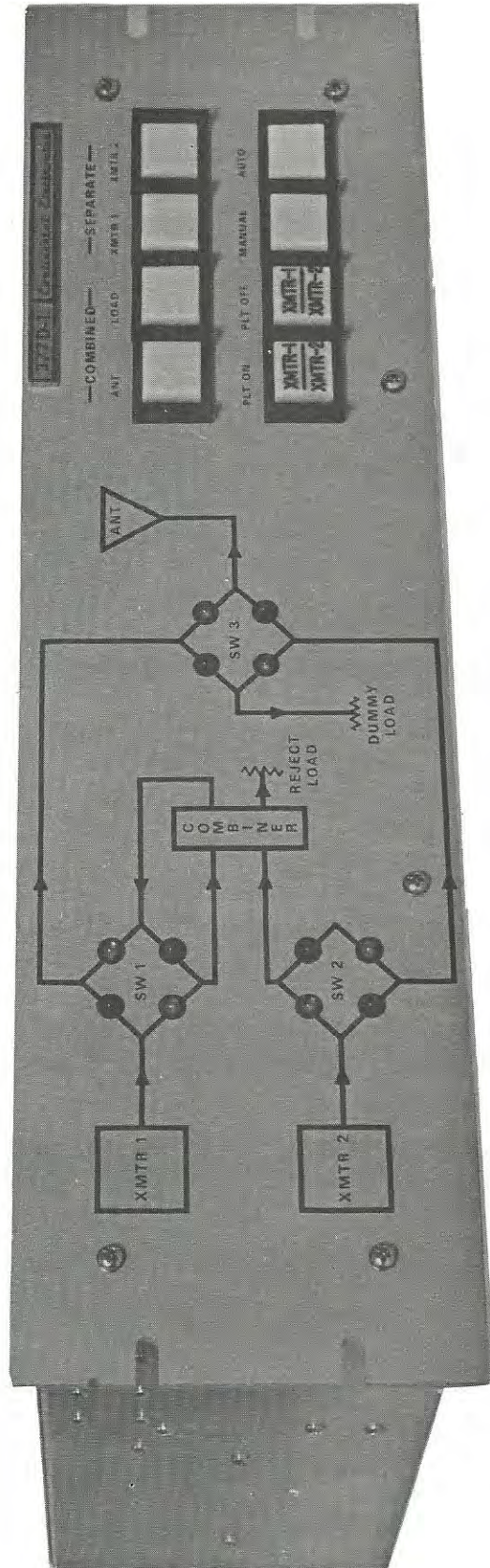
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SECTION 1 - GENERAL DESCRIPTION

1-1. PURPOSE OF EQUIPMENT

The 377D-1 Automatic Combiner Control (Figures 1-1, 1-2, and 1-3) performs monitoring and control functions for AM or FM transmitter systems that contain two identical transmitters whose outputs are combined to provide higher output power.

The combiner control is capable of automatically bypassing the combiner and routing one transmitter output directly to the station antenna if failure of the other transmitter occurs.

1-2. EQUIPMENT DESCRIPTION

1-2.1 PHYSICAL DESCRIPTION

The 377D-1 Automatic Combiner Control consists of two units, the combiner control unit and either an AM switch interface unit or an FM switch interface unit.

The combiner control unit is housed in a standard 133.35-mm (5.25-inch) high by 482.6-mm (19-inch) wide rack mounted enclosure.

The Am switch interface unit is contained on an aluminum panel suitable for installation in a standard cabinet.

The FM switch interface unit is housed in an aluminum enclosure suitable for mounting near the three coaxial switches associated with the combiner control.

1-2.2 ELECTRICAL DESCRIPTION

The 377D-1 Automatic Combiner Control Unit consists primarily of a front panel and a printed logic card contained within the mainframe assembly.

Control push-buttons and indicators are located on the front panel of the unit. The push-buttons provide for selection of operating mode, transmitter selection, and plate-on and plate-off control of the transmitter system. A set of 12 light emitting diodes provides visual indication of the status of the system.

Connections for RF sample inputs from each transmitter, control outputs to each transmitter, switch interface connections, and remote control inputs are located at the rear panel of the control unit. Control and status circuits are +28 volts, requiring only a momentary closure to +28 volts to initiate a control function.

Control functions to the associated transmitters are furnished as dry contacts for ease of interface with transmitters other than Continental manufacture.

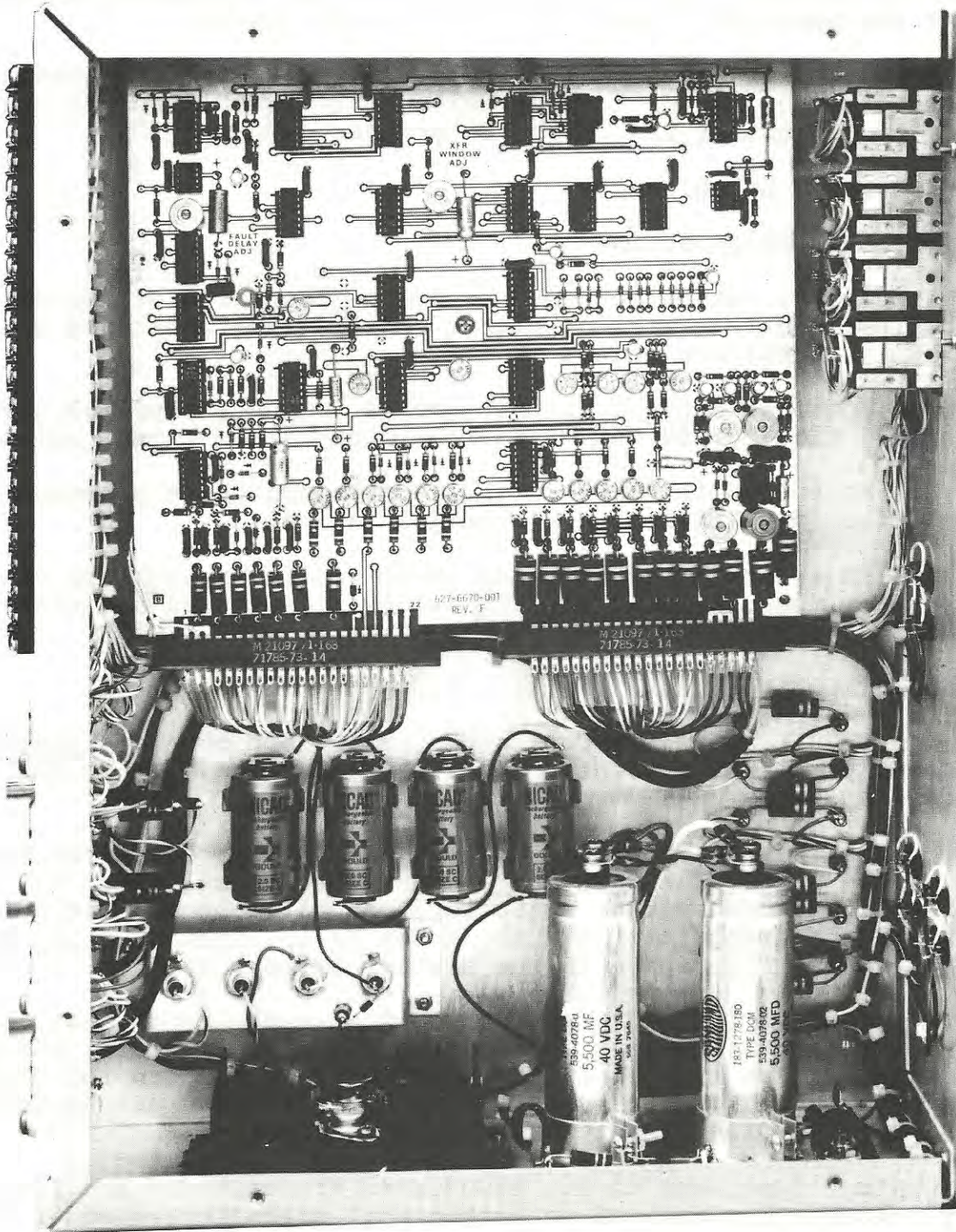


Figure 1-2. 377D-1 Automatic Combiner Control (Top View)

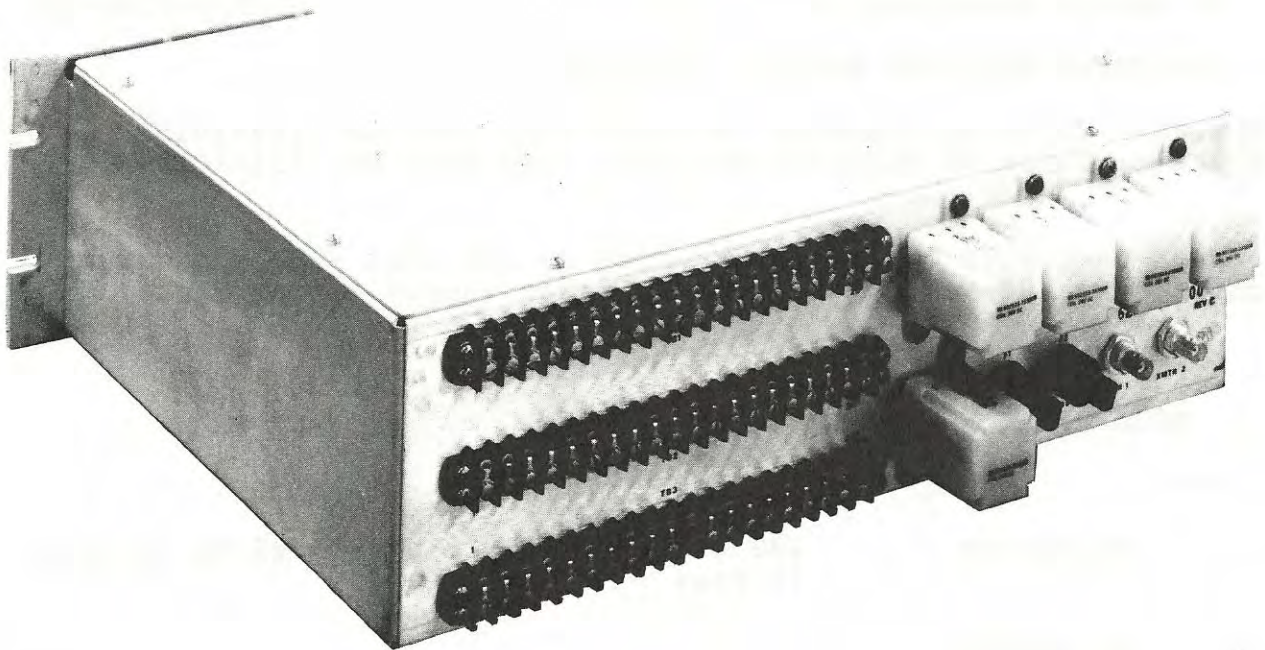


Figure 1-3. 377D-1 Automatic Combiner Control (Rear View)

Power is derived from the 28-volt control systems of the associated transmitters or a suitable 28-volt power supply capable of supplying 2 amperes or more. A rechargeable battery system is included to provide power for the logic system in the event of a power failure.

The switch interface units provide relay interface to all commonly used RF transfer switches and contactors. This is the only point in the system where line voltage AC power appears.

1-3. EQUIPMENT SUPPLIED

Table 1-1 lists equipment supplied as part of the 377D-1 Automatic Combiner Control.

TABLE 1-1. EQUIPMENT SUPPLIED

EQUIPMENT DESCRIPTION	QTY	CEC PART NO.
377D-1 Automatic Combiner Control Unit	1	622-2000-001
AM Switch Interface Unit	*	636-1440-001
FM Switch Interface Unit	*	636-5186-001

1-4. EQUIPMENT REQUIRED BUT NOT SUPPLIED

AM Systems: Three RF Transfer Switches (CED Part No. 124-3015-630)
 FM Systems: Three RF Transfer Switches (CEC Part No. 124-3015-563)

When used with transmitters which do not use +28V DC control circuits, one +28-volt, 2-ampere, DC power supply is required.

1-5. EQUIPMENT SPECIFICATIONS

1.5.1 MECHANICAL

Size:

Mainframe	133.4 by 482.6 by 318mm (5.25 by 19 by 15 inches)
AM Switch Interface Unit	501.6 by 355.6 by 127.0mm (19.75 by 14 by 5 inches)
FM Switch	406.4 by 254.0 by 76.2mm (16 by 10 by 3 inches)

Ambient Temperature Range: 0 to +50°C (32° to 122°F)

1-5.2 ELECTRICAL

Power Requirement 28 volts DC at 2 amperes (from associated transmitters or external power supply)

RF Input: 4 to 8 volts rms: 50 ohms nominal

Control Inputs: Momentary closure to +28 volts DC, any function

Status Outputs: Low, true (referenced to +28 volts DC): or lamps

Control Outputs:

Transmitters Plate-off, normally closed
 Plate-on, normally open
 Interlock, closed when valid

RF Switches

AM Switch interface, 120/140 volts AC, 30 amperes
 FM Switch Interface, 120 volts AC, 5 amperes

* One unit supplied, determined by system type, AM or FM.

SECTION 2 - PRINCIPLES OF OPERATION

2-1. GENERAL

The 377D-1 Combiner Control consists of a combiner control unit and either an AM or an FM switch interface unit. The combiner control unit contains a plug-in logic card that provides all preprogrammed logic required by the control system. The combiner control may be operated automatically or manually.

For purposes of description Figure 2-1 shows the following principle circuit areas for the 377D-1 control system.

RF sensors and automatic transfer logic
 Mode control logic
 Interlock comparison and transmitter restart logic

Refer to Drawing 147063.

2-2. RF SENSORS AND AUTOMATIC TRANSFER LOGIC

In the automatic mode of operation, the RF detectors monitor the status of the associated transmitters and provide control commands to the mode control logic.

The RF detectors consist of diodes CR3 and CR4 and their associated components for the XMTR 1 RF INPUT, and diodes CR1 and CR2 and their associated components for the XMTR 2 RF INPUT.

Diodes CR3 and CR4 rectify the RF sample from transmitter 1. The rectified sample is applied to transistor Q4.

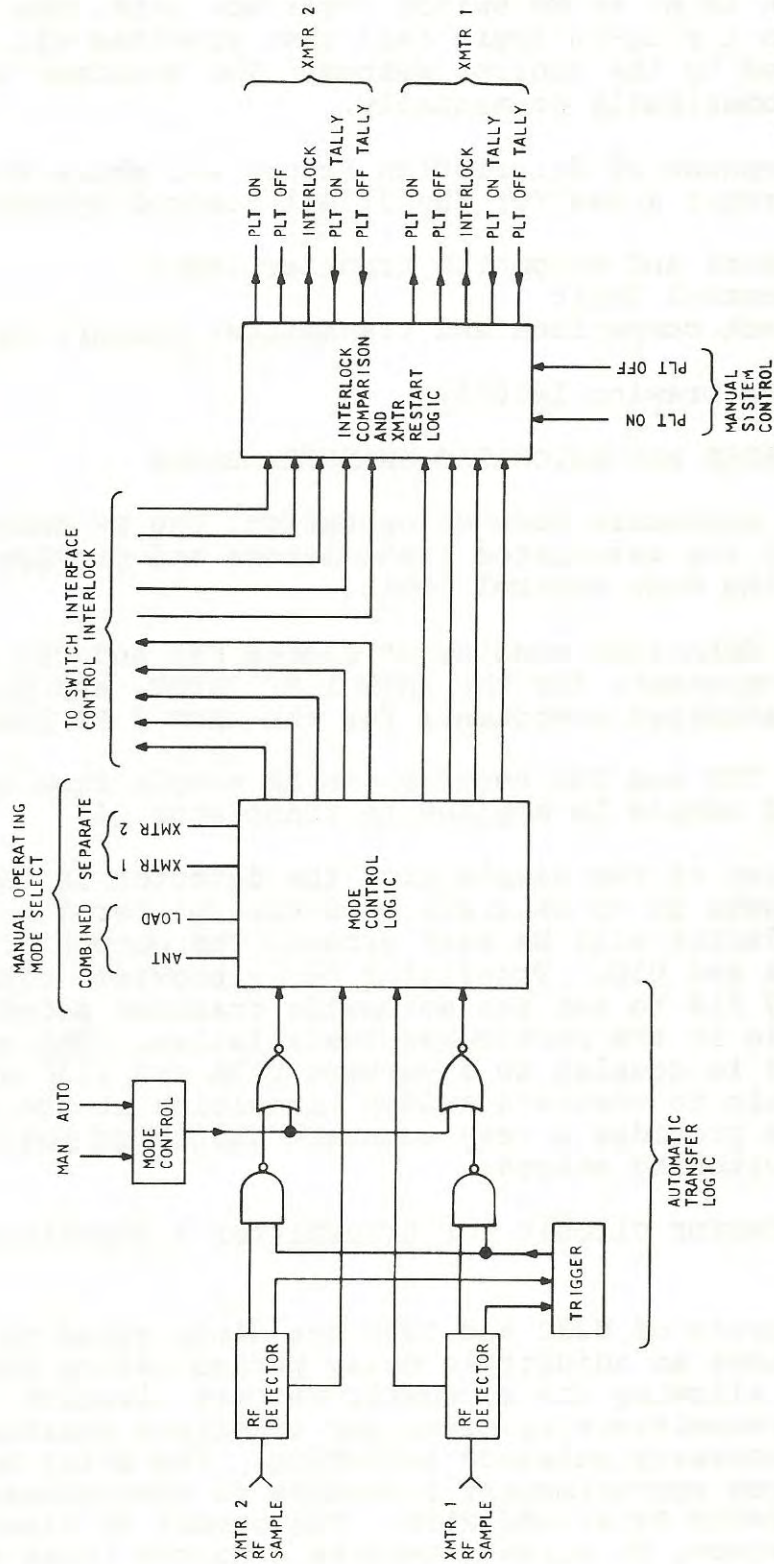
A portion of the sample from the detector is fed to transistor Q3, which causes Q3 to saturate when transmitter 1 is operating. Thus, Q3 collector will be near ground. The output of Q3 is applied to gates U11A and U3D. Transistor Q4 is provided with NO. 1 THRESHOLD ADJ R16 to set the automatic transfer point at any power level suitable to the particular installation. The output of transistor Q4 is coupled to inverters U23A and U23C which provide sufficient gain to ensure a sudden transition at the output of U23C. This function provides a very accurate switching point to trigger subsequent switching stages.

The detector circuit for transmitter 2 functions in the same manner.

The outputs of U23C and U23D are diode gated to DELAY TIMER U4. U4 provides an adjustable delay period before automatic transfer takes place, allowing the automatic restart circuits in the individual transmitters to clear any transient overloads and thus minimize unnecessary nuisance switching. The delay period is adjustable from approximately 5 seconds to approximately 30 seconds by means of FAULT DELAY ADJ R110. The output of timer U4 is coupled to pulse generator U5 which generates a narrow pulse that is applied to gates U3B and U3C.

CHANGE 1

principles of operation



MM100-0233-3

FIGURE 2-1. 377D-1 AUTOMATIC COMBINER CONTROL, BLOCK DIAGRAM

If a transmitter fails, one of the gate inputs will be high and will be passed through to gate U1D or U1C during the trigger pulse interval. If the defective transmitter has not recovered and if the mode control logic circuit is in the automatic mode, the failed transmitter will cause a positive-going pulse to be passed out of either U1D (transmitter 2 failure) or U1C (transmitter 1 failure). When both transmitters are operating normally, no pulse is generated at U3B or U3C since both control inputs are low, and hence no pulse will be passed from U1C and U1D.

To prevent false switching on system turnoff, U3D output goes low when both transmitters are turned off. This low output is inverted by U3A and blocks the transmission of a pulse through U1D and U1C. Manual operation is obtained by causing flip-flop U2 to provide a low input to U3A through Q6. Momentary override to manual operation for antenna transfer purposes is obtained by applying +28volts to the external override input TB2-16 on the rear panel. The output pulses of U1D (transmitter 2 failure) and U1C (transmitter 1 failure) are applied to the mode control logic which switches the remaining operational transmitter on the air directly.

2-3. MODE CONTROL LOGIC

The mode control logic circuit provides selection of the following four operating modes:

- MODE 1 - COMBINED into ANT. (S5)
- MODE 2 - COMBINED into LOAD (S6)
- MODE 3 - SEPARATE XMTR 1 into antenna (S8)
- MODE 4 - SEPARATE XMTR 2 into antenna (S7)

Selection of the operating modes is accomplished manually through push-button switches on the unit front panel, or by remote control. The switching function applies a momentary +28 volts to the card input.

For simplicity, MODE 1 COMBINED ANT. is described. Pressing COMBINED ANT. pushbutton S5 applies 28 volts and causes U7A pin 2 and U7C pin 9 to rise to approximately +4 volts DC which causes the outputs U7A pin 1 and U7C pin 10 to momentarily go low. This action causes U8A pin 6 to go high and trigger pulse generators U6 (plate of) and U10 (transfer window). U6 causes the plate circuits of both transmitters to turn off, and U10 causes a long pulse (approximately 5 seconds) to be generated. The pulse from U10 is fed to AC control gate U11A; and when RF from the transmitters drops to a safe level, transistor Q13 turns on and applies AC power to the RF switches.

The low output of U7A causes flip-flop U9A to change states so that pin 15 is high and pin 14 is low. The low output of U7C causes flip-flop U9B to change states so that U9 pin 11 is high and pin 10 is low. This combination is fed to NOR gate U12A and causes its outputs to go high. The high output of U12A turns on transistor Q14 which pulls in the mode 1 relay in the interface unit and causes the three transfer switches to move to position 1, combined antenna. Similar action occurs for modes 2, 3, and 4, and inspection of the Table 2-1 will reveal the status of the various integrated circuits for all four operational modes.

The output of U12A is routed to the interlock comparison circuits for generation of interlock closure and transmitter restart information.

2-4. INTERLOCK COMPARISON AND TRANSMITTER RESTART LOGIC

Two interlocks are brought back from each transfer switch for comparison purposes to establish that the operating mode and selected mode are in agreement prior to the restoration of the system interlocks and restarting of the transmitters. One interlock is connected to +28 volts and the other is connected to ground. For purposes of discussion, position 1 of the switch places interlocks 1, 2, and 3 at +28 volts and interlock complements 1, 2, and 3 at ground. Position 2 of each switch simply reverses the condition.

Continuing with our discussion of MODE 1: COMBINED ANT., interlocks 1, 2 and 3 will be at +28 volts: interlocks 1, 2, and 3 at ground. The reject load cooling interlocks, if used, will also be at +28 volts. Consequently, the inputs to U13A and U13B will be high, their outputs both low, and the output of U16A will be high. This causes Q20 to turn on and illuminate the MODE 1 tally lamp in push-button switch S5. The output of U16A is also inverted by U17A, applied to U20A and U18A, and diode gated to the input of pulse generator U19. The output of U20 is diode gated to Q24 and Q25. A pulse is generated by U19 as soon as the interlocks are completed, and the output pulse is fed to U20A which causes Q24 and Q25 to turn on. This action closes the plate-on circuits of both transmitters. The output of U16A is also diode gated to Q26 and Q27 to close the interlock circuits of both transmitters. Any action which causes any interlock to open will cause Q26 and Q27 to turn off and break the transmitter interlock circuits.

If an interlock circuit fails to close properly, or is opened during operation, the output of U16D would go low and couple the output of flasher U22 to Q20, Q21, Q22, and Q23, causing the mode tally lamps to flash, indicating an interlock failure. The transmitter interlock circuits would also open immediately, disabling the transmitters.

Similar operation occurs for the other three operating modes. Table 2-2 shows the interlock status and switch positions for each operating mode.

TABLE 2-1 INTEGRATED CIRCUITS STATUS DURING OPERATING MODES

OPERATING MODE	COMBINED ANT.	COMBINED LOAD	SEPARATE XMTR 1	SEPARATE XMTR 2
U9				
PIN 15	H	L	L	H
PIN 14	L	H	H	L
PIN 11	H	H	L	L
PIN 10	L	L	H	H
U12				
PIN 1	H	L	L	L
PIN 4	L	H	L	L
PIN 10	L	L	H	L
PIN 13	L	L	L	H
Q14	ON	OFF	OFF	OFF
Q15	OFF	ON	OFF	OFF
Q16	OFF	OFF	ON	OFF
Q17	OFF	OFF	OFF	ON
U16				
PIN 1	H	H	L	L
PIN 4	L	L	L	L
U15				
PIN 6	H	H	L	H
PIN 8	H	H	H	L
U26				
PIN 1	H	H	H'	L
PIN 4	L	L	L	L
U21				
PIN 10	L	L	L	H
PIN 6	L	L	L	L
PIN 8	L	L	L	L
Q26	ON	ON	ON	OFF*
Q27	ON	ON	OFF*	ON

* WHEN DUMMY LOAD COOLING INTERLOCK CLOSED.

H' GOES HIGH MOMENTARILY THEN RETURNS TO LOW STATE.

TABLE 2-2 INTERLOCK STATUS AND SWITCH POSITIONS

OPERATING MODE	INTERLOCKS						TRANSFER SWITCHES				
	1	1	2	2	3	3	R	D	1	2	3
1. COMBINED ANT.	+28V	0	+28V	0	+28	0	+28V	0	1	1	1
2. COMBINED ANT.	+28V	0	+28V	0	0	+28V	+28V	*	1	1	2
3. SEPARATE XMTR 1	0	+28V	0	+28V	+28V	0	0	*	2	2	1
4. SEPARATE XMTR 2	0	+28V	0	+28V	0	+28V	0	*	2	2	2

* +28V PROVIDES INTERLOCK CIRCUIT TO TRANSMITTER ON LOAD.

SECTION 3 - INSTALLATION

3-1. PLACEMENT OF UNITS

The 377D-1 Control Unit should be located in a convenient location near the operator's position if used in an attended installation, near the transmitter control equipment if used in a remote control installation, or as required by the individual installation.

The switch interface assembly should be located near the RF transfer switches.

3-2. FM SYSTEM INTERCONNECTIONS

Refer to Drawings 147066 & 147067 for explanation of the following cables:

- Cable 1: 10-conductor 20 AWG stranded, connects 377D-1 control unit to transmitter 1.
- Cable 1: 10-conductor 20 AWG stranded, connects 377D-1 control unit to transmitter 2.
- Cable 3: 15-conductor 22 AWG stranded, connects 377D-1 control unit to switch interface.
- Cable 4: 6-conductor 22 AWG stranded, connects 377D-1 control unit to 377D-1 exciter control (if used).
- Cable 5: 2-conductor 22 AWG stranded, connects switch interface to dummy load cooling interlock.
- Cable 6: 2-conductor 22 AWG stranded, connects switch interface to reject load cooling interlock.
- Coaxial Cable 6: RG-223 coaxial cable, connects RF sample from transmitter 1 to 377D-1 control unit.
- Cable 7, 8, 9 8-conductor 22 AWG stranded, connects switch interface to the three transfer switches.
- Coaxial Cable 7 RG-223 coaxial cable, connects RF sample from transmitter 2 to 377D-1 control unit.

Spade lugs (CEC part number 304-0414-000) are used to connect the cables to the control unit and switch interface unit barrier strips.

BNC connectors (CEC part number 356-9292-000) are used to connect the coaxial cables to the control unit.

3-3. AM SYSTEM INTERCONNECTIONS

Refer to Figure 5-9 for explanation of the following cables:

- Cable 1: 15-conductor 22 AWG stranded, connects 377D-1 control unit to switch interface.
- Cable 2: RG-223 coaxial cable, connects transmitter RF sample outputs to 377D-1 control unit (two required)
- Cable 3: 4-conductor 20 AWG stranded, connects 377D-1 control unit to transmitter 2.

3-4. 377D-1 AUTOMATIC COMBINER CONTROL UNIT CONNECTIONS

Refer to Tables 3-1, 3-2, and 3-3 for control unit connections.

3-5. RF TRANSFER SWITCH CONNECTIONS

The RF transfer switches may be any of the common coaxial 4-port transfer switches for FM or HF use or any of the common push-pull solenoid actuated types for medium wave AM use.

Interlock contacts of the dry type are required in a DPDT configuration for proper operation of the 377D-1 control unit. The switch should be connected in such a manner that the position 1 interlock is closed to +18 volts and the position 2 interlock is closed to ground when the switch is in position 1. These conditions should reverse when the switch is in position 2. that is, position 2 interlock should connect to +28 volts and position 1 interlock should connect to ground. These conditions apply to both AM and FM systems regardless of the type of RF transfer switch used.

TABLE 3-1. 377D-1 AUTOMATIC COMBINER CONTROL UNIT,
REMOTE CONTROL CONNECTIONS

TERMINAL BOARD (TB1) TERMINAL	FUNCTION
1	Common connections (+28 volts DC)
2	Manual mode control
3	Manual mode tally
4	Automatic mode control
5	Automatic mode tally
6	Plate-off control
7	Plate-off tally transmitter 1
8	Plate-off tally transmitter 2
9	Plate-on control
10	Plate-on tally transmitter 1
11	Plate-on tally transmitter 2
12	Combined-antenna select
13	Combined-antenna tally
14	Combined-load select
15	Combined-load tally
16	Transmitter 1 select
17	Transmitter 1 tally
18	Transmitter 2 select
19	Transmitter 2 tally
20	Common ground

NOTE: All control switches and tally lamp connections are referenced to TB1-1, +28 volts DC. Switching action requires momentary contact closure to +28 volts DC.

TABLE 3-2. 377D-1 AUTOMATIC COMBINER CONTROL UNIT,
TRANSFER SWITCH INTERFACE CONNECTIONS

TERMINAL BOARD (TB2) TERMINAL	FUNCTION
1	Common connection, +28 volts DC
2	Common ground return
3	AC control relay
4	Mode 1 control
5	Mode 2 control
6	Mode 3 control
7	Mode 4 control
8	Switch 1, position 1, interlock
9	Switch 1, position 2, interlock
10	Switch 2, position 1, interlock
11	Switch 2, position 2, interlock
12	Switch 2, position 1, interlock
13	Switch 2, position 2, interlock
14	Reject load interlock
15	Dummy load interlock
16	External override
17	Exciter mute
18	+5 volts out
19	+28 volts out
20	Common connection

TABLE 3-3. 377D-1 AUTOMATIC COMBINER CONTROL UNIT,
TRANSMITTER INTERFACE CONNECTIONS

TERMINAL BOARD (TB3) TERMINAL	FUNCTION
1	Plate-on control, transmitter 1
2	Plate-on control, transmitter 1
3	Interlock, transmitter 1
4	Interlock, transmitter 1
5	Plate-on tally, transmitter 1
6	Plate-off tally, transmitter 1
7	Ground
8	+28 volts DC, from transmitter 1
9	Plate-off control, transmitter 1
10	Plate-off control, transmitter 1
11	Plate-on control, transmitter 2
12	Plate-on control, transmitter 2
13	Interlock, transmitter 2
14	INTERLOCK, transmitter 2
15	Plate-on tally, transmitter 2
16	Plate-off tally, transmitter 2
17	Ground
28	+28 volts DC from transmitter 2
29	Plate-off control, transmitter 2
20	Plate-off control, transmitter 2

SECTION 4 - PARTS LIST

4-1. GENERAL

This section contains a list of all repairable/replaceable electrical, electronic, and critical mechanical parts for the 377D-1 Automatic Combiner Control.

4-2. SYMBOL

This column contains the electrical symbols of all parts that have been assigned to schematics or wiring diagrams, and/or index number for all parts for which symbols have not been assigned. When the symbol, within a series of symbols, has not been assigned a part number, the unassigned symbol will be reflected as NOT USED in the DESCRIPTION column.

4-3. DESCRIPTION

This column contains the identifying noun or item name followed by a brief description. The description for electrical/electronic parts includes the applicable ratings and tolerances. For consecutively listed identical parts within an assembly, SAME AS--is reflected in the description of subsequent listing, referencing to the first listing within the assembly.

4-4. CONTINENTAL PART NUMBER

The Continental Specification or drawing number, for each item in the parts list, is reflected in this column.

SYMBOL	DESCRIPTION	CEC PART NUMBER
377D-1 AUTOMATIC COMBINER CONTROL 622-2000-001		
BT1- BT4	BATTERY	221-0036-150
C1, C2	CAPACITOR, 5500 UF	183-1278-180
C3	CAPACITOR, 0.1 UF	913-3813-000
C4	CAPACITOR, 220 UFD	183-2338-000
CR1 - CR5	DIODE, 1N4007	353-6442-070
CR6	DIODE, 1N1202	353-1889-000
CR7	SAME AS CR6	
CR8	SAME AS CR1	
C5R9	SAME AS CR6	
CR10	SAME AS CR6	
CR11	DIODE, LIGHT-EMITTING	353-3725-070
CR12	SAME AS CR11	
CR13	DIODE, LIGHT-EMITTING	353-0293-010
CR14	SAME AS CR13	
CR15	SAME AS CR11	
CR16	SAME AS CR11	
CR17 - CR20	SAME AS CR13	
CR21	SAME AS CR11	
CR22	SAME AS CR11	
CR23	SAME AS CR1	
F1	FUSE	264-0297-000
F2	SAME AS F1	
J1	CONNECTOR	
J2	SAME AS J1	M39012/19-0101
K1 - K5	RELAY	970-2454-270
K6	RELAY, 28V	970-0002-030

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SYMBOL	DESCRIPTION	CEC PART NUMBER

377D-1 AUTOMATIC COMBINER CONTROL-Cont.622-2000-001		
P1	CONNECTOR	372-7502-200
P2	SAME AS P1	
Q1	TRANSISTOR, 2N3741	352-0695-020
R1 - R6	RESISTOR, 1500 OHMS, 2W	RCR42G152JS
R7	RESISTOR, 220 OHMS, 1/2 W	RCR20G221JS
R8	RESISTOR, 2200 OHMS, 1 W	RCR32G222JS
R9	RESISTOR, 15 OHMS, 26 W	747-1770-000
S1	SWITCH	266-7509-020
S2Q	SAME AS S1	
S3 - S8	SWITCH	266-7509-010
S9	SWITCH	266-5321-200
TB1 - TB3	TERMINAL BOARD	367-0028-000
U1	REGULATOR	351-1120-080
VR1	DIODE, VARACTOR, 1N4735A	353-6481-151
VR2	DIODE, VARACTOR, 1N3997A	353-6233-000
XF1	HOLDER, FUSES	265-1241-040
XF2	SAME AS XF1	
XK1- XK5	SOCKET, RELAY	220-1399-010
XK6	SOCKET, RELAY	220-1543-000
XQ1	SOCKET, TRANSISTOR	220-0968-020
XU1	SOCKET, INTEGRATED CIRCUIT	220-0968-010

SYMBOL	DESCRIPTION	CEC PART NUMBER
----- LOGIC CARD		627-6670-001
C1, C2	CAPACITOR, 1000 PF	CM06FD102J03
C3	CAPACITOR, 33 UF, 20V	184-9103-410
C4	SAME AS C1	
C5	SAME AS C1	
C6	SAME AS C3	
C7	CAPACITOR, 1.0 UF	913-3810-000
C8	CAPACITOR, 100 UF, 10V	184-9086-220
C9 - C14	SAME AS C7	
C15	CAPACITOR, 180 UF	184-8664-000
C16 - C25	SAME AS C7	
C26	CAPACITOR, 22 UF, 25V	184-9103-550
C27 - C30	SAME AS C7	
C31	SAME AS C15	
C32 - C51	SAME AS C7	
C52	CAPACITOR, 100 UF, 25V	184-9103-570
C53 - C55	SAME AS C7	
C56	NOT USED	
C57	NOT USED	
C58	SAME AS C7	
CR1	DIODE, 1N4148	353-3763-010
CR2 - CR13	SAME AS CR1	
CR14	DIODE, 1N4003	353-6442-030
CR15 - CR38	SAME AS CR1	
Q1 - Q6	TRANSISTOR, 2N2222	352-0661-020
Q7 - Q10	TRANSISTOR, 2N3053	352-0613-010
Q11	SAME AS Q1	
Q12	SAME AS Q1	
Q13 - Q17	SAME AS Q7	
Q18	SAME AS Q1	
Q19	SAME AS Q1	
Q20 - Q28	SAME AS Q7	
R1, R2	RESISTOR, 27 OHMS, 2W	RCR42G270JS
R3	RESISTOR, VAR, 500 OHMS	380-3761-030
R4	RESISTOR, 2200 OHMS	RCR07G222JS
R5	SAME AS R1	
R6	SAME AS R1	

CHANGE 1

SYMBOL	DESCRIPTION	CEC PART NUMBER
----- LOGIC CARD - Cont. -----		
R7	SAME AS R3	
R8, R9	SAME AS R4	
R10	RESISTOR, 4.7 KILOHMS, 1/4 W	RCR07G472JS
R11	SAME AS R4	
R12	SAME AS R10	
R13	RESISTOR, 1000 OHMS, 1/4 W	RCR07G102JS
R14	SAME AS R13	
R15	RESISTOR, VR 10 KILOHMS	380-3761-070
R16	SAME AS R15	
R17 - R20	RESISTOR, 1000 OHMS, 1/4 W	RCR07G102JS
R21	SAME AS R4	
R22	SAME AS R17	
R23	SAME AS R4	
R24	SAME AS R10	
R25	RESISTOR, 10 KILOHMS, 1/4 W	RCR07G103JS
R26	SAME AS R10	
R27	RESISTOR, 15 KILOHMS, 1/4 W	RCR07G153JS
R28	RESISTOR, 2200 OHMS, 1 W	RCR32G222JS
R29	RESISTOR, 220 OHMS, 1/4 W	RCR07G221JS
R30	SAME AS R28	
R31	SAME AS R29	
R32	SAME AS R17	
R33	SAME AS R25	
R34	SAME AS R17	
R35	RESISTOR, 470 OHMS, 1/4 W	RCR07G471JS
R36 - R38	SAME AS R17	
R39	SAME AS R4	
R40	SAME AS R4	
R41	RESISTOR, 39 OHMS, 1/2 W	RCR20G390JS
R42	SAME AS R41	
R43	RESISTOR, 1000 OHMS, 1 W	RCR32G102JS
R44	SAME AS R29	
R45	SAME AS R43	
R46	SAME AS R29	
R47, R48	SAME AS R43	
R49	RESISTOR, 2700 OHMS, 1 W	RCR32G272JS
R50, R51	SAME AS R17	
R52	SAME AS R25	
R53	SAME AS R17	

CHANGE 1

SYMBOL	DESCRIPTION	CEC PART NUMBER
-----		-----
	LOGIC CARD -Cont.	627-6670-001
-----		-----
R55	SAME AS R25	
R56	SAME AS R29	
R57	SAME AS R29	
R58	SAME AS R4	
R59 - R65	SAME AS R17	
R66	RESISTOR, 1000 OHMS, 2 W	RCR42G102JS
R67 - R73	SAME AS R66	
R74 - R81	SAME AS R29	
R82	SAME AS R10	
R83	SAME AS R25	
R84	SAME AS R35	
R85	RESISTOR, 470 KILOHMS, 1/4 W	RCR07G474JS
R86	SAME AS R17	
R87	SAME AS R25	
R88	RESISTOR, 330 KILOHMS, 1/4 W	RCR07G3334JS
R89	RESISTOR, 680 KILOHMS, 1/4 W	RCR07G684JS
R90	RESISTOR, 1 KILOHMS, 1/4 W	RCR07G102JS
R91		
THRU	SAME AS R17	
R103		
R104		
THRU	SAME AS R41	
R107		
R108	SAME AS R4	
R109	SAME AS R4	
R110	RESISTOR, VARI, 100 KILOHMS	380-3761-250
R111	RESISTOR, VARI, 25 KILOHMS	380-3761-230
U1	INTEGRATED CIRCUIT, SN7402A	351-7628-010
U2	INTEGRATED CIRCUIT, SN7476N	351-7702-010
U3	INTEGRATED CIRCUIT, SN7400N	351-7629-010
U4	INTEGRATED CIRCUIT, NE555V	351-1137-020
U5, U6	INTEGRATED CIRCUIT, SN74121N	351-7645-010
U7	SAME AS U1	
U8	INTEGRATED CIRCUIT, SN7420N	351-1548-090
U9	SAME AS U2	
U10	SAME AS U5	
U11	SAME AS U8	
U12	SAME AS U1	
U13		
U14	SAME AS U8	

CHANGE 4

SYMBOL	DESCRIPTION	CEC PART NUMBER
----- LOGIC CARD - Cont. -----		627-6670-001
U15	SAME AS U8	
U16	SAME AS U1	
U17	INTEGRATED CIRCUIT, SN7404N	351-7630-010
U18	SAME AS U8	
U19	SAME AS U5	
U20	SAME AS U1	
U21	SAME AS U3	
U22	SAME AS U4	
U23	SAME AS U17	
XU1	SOCKET, 14 PIN	220-0049-010
XU2	SOCKET, 16 PIN	220-0049-020
XU3	SAME AS XU1	
XU4	SOCKET, 8 PIN	220-0001-060
XU5 - XU8	SAME AS XU1	
XU9	SAME AS XU2	
XU10 - XU21	SAME AS XU1	
XU22	SAME AS XU4	
XU23	SAME AS XU1	
----- AM SWITCH INTERFACE UNIT -----		636-1440-001
CR1	DIODE, 1N4003	353-6442-030
CR2 - CR8	SAME AS CR1	
K1	RELAY	970-2426-070
K2 - K5	SAME AS K1	
K6	RELAY	970-0002-030
K7	SAME AS K6	
K8	SAME AS K6	
TB1	TERMINAL BOARD	367-4200-000
TB2	SAME AS TB1	
TB3	TERMINAL BOARD	367-5030-000
XK1 - XK5	NOT USED	
XK6 - XK8	SOCKET, RELAY	220-1543-000

SYMBOL	DESCRIPTION	CEC PART NUMBER
----- FM SWITCH INTERFACE UNIT -----		627-5186-001
CR1	DIODE, 1N4003	353-6442-030
CR2 - CR5	SAME AS CR1	
F1	FUSE, 2 AMP	264-0297-000
F2	SAME AS F1	
F3	SAME AS F1	
K1 - K5	RELAY	970-2454-270
R1 - R3	RESISTOR, 0.10 MEGOHM, 1/2 W	RCR20G104JS
S1	SWITCH	259-9475-590
TB1, TB2	TERMINAL BOARD	367-0926-000
TB3	TERMINAL BOARD	367-0916-000
XF1 - XF3	HOLDER FUSE	265-1241-090
XK1 - XK5	SOCKET, RELAY	220-1399-010

CHANGE 1

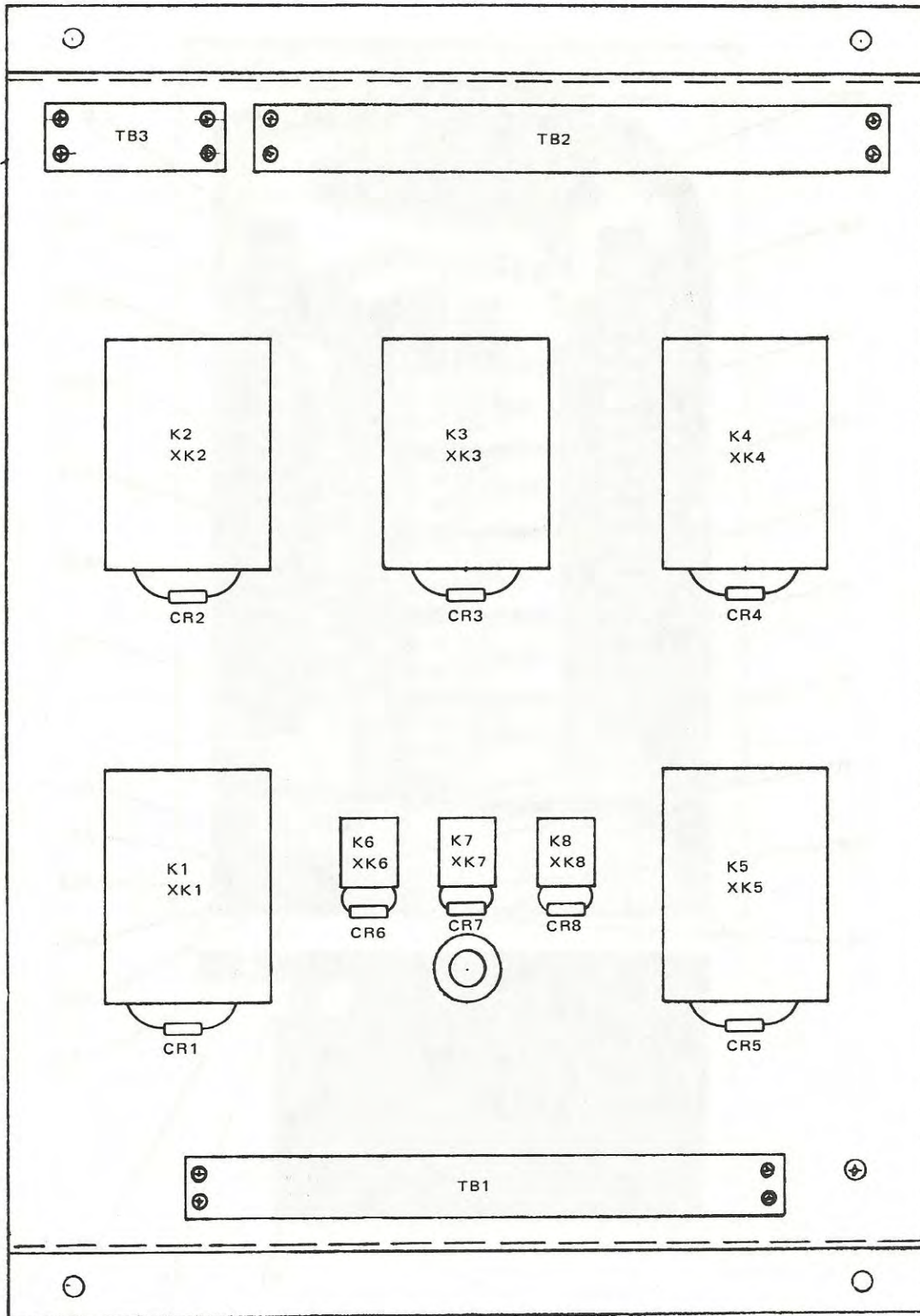
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SECTION 5 - SCHEMATICS AND DRAWINGS

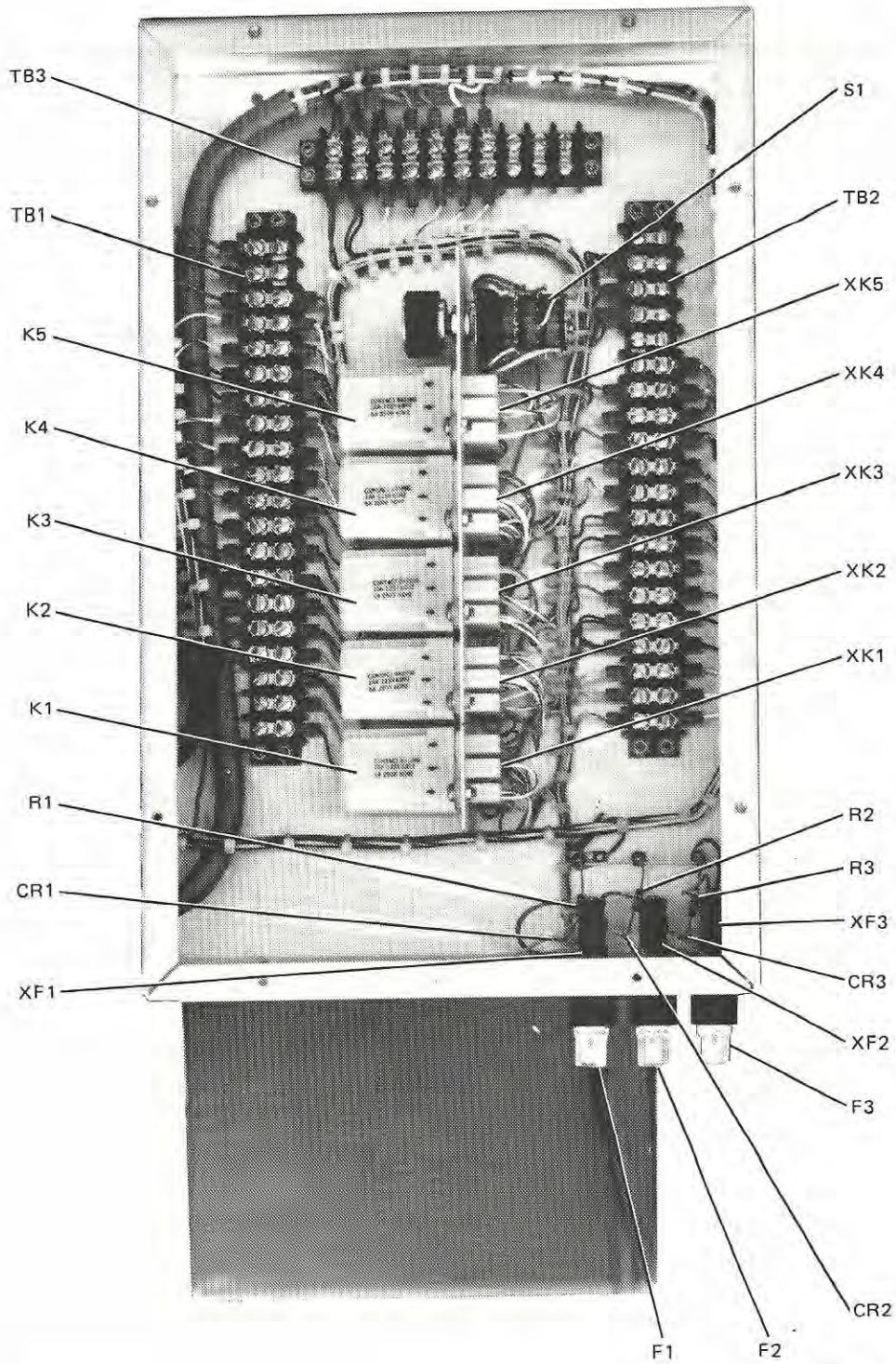
Automatic Combiner Control Mainframe Schematic	147063
AM Switch Interface Unit Schematic	147066
FM Switch Interface Unit Schematic	147067
Logic Card	147068
Interconnect Diagram - Single Transmitter	147064
Interface Unit, Component Location	AM SWITCH
Interface Unit, Component Location	FM SWITCH
Logic Card, Component Locations	

CHANGE 1

5-1/5-2

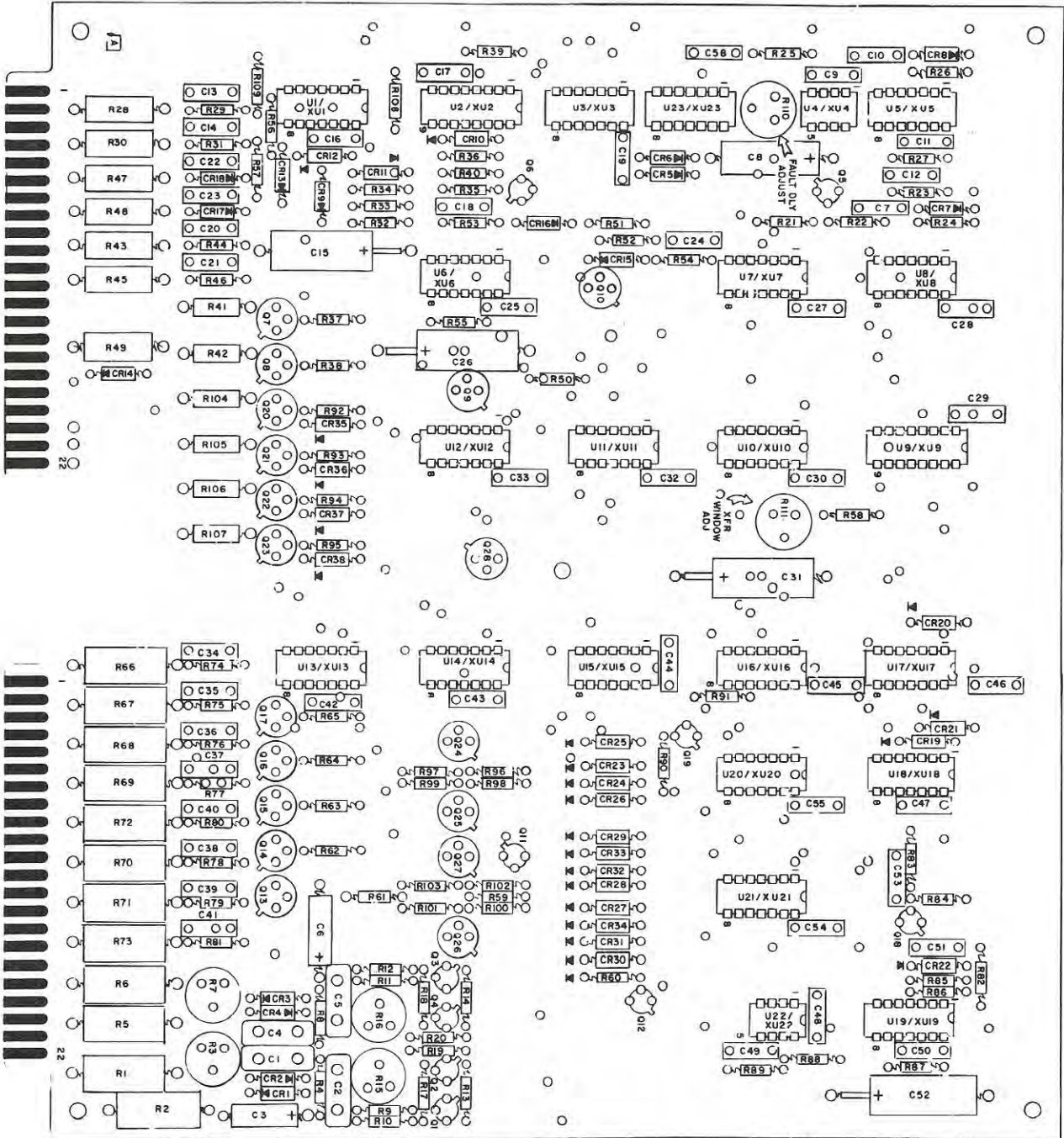


AM Switch Interface Unit, Component Location.



MW100-0282-PB

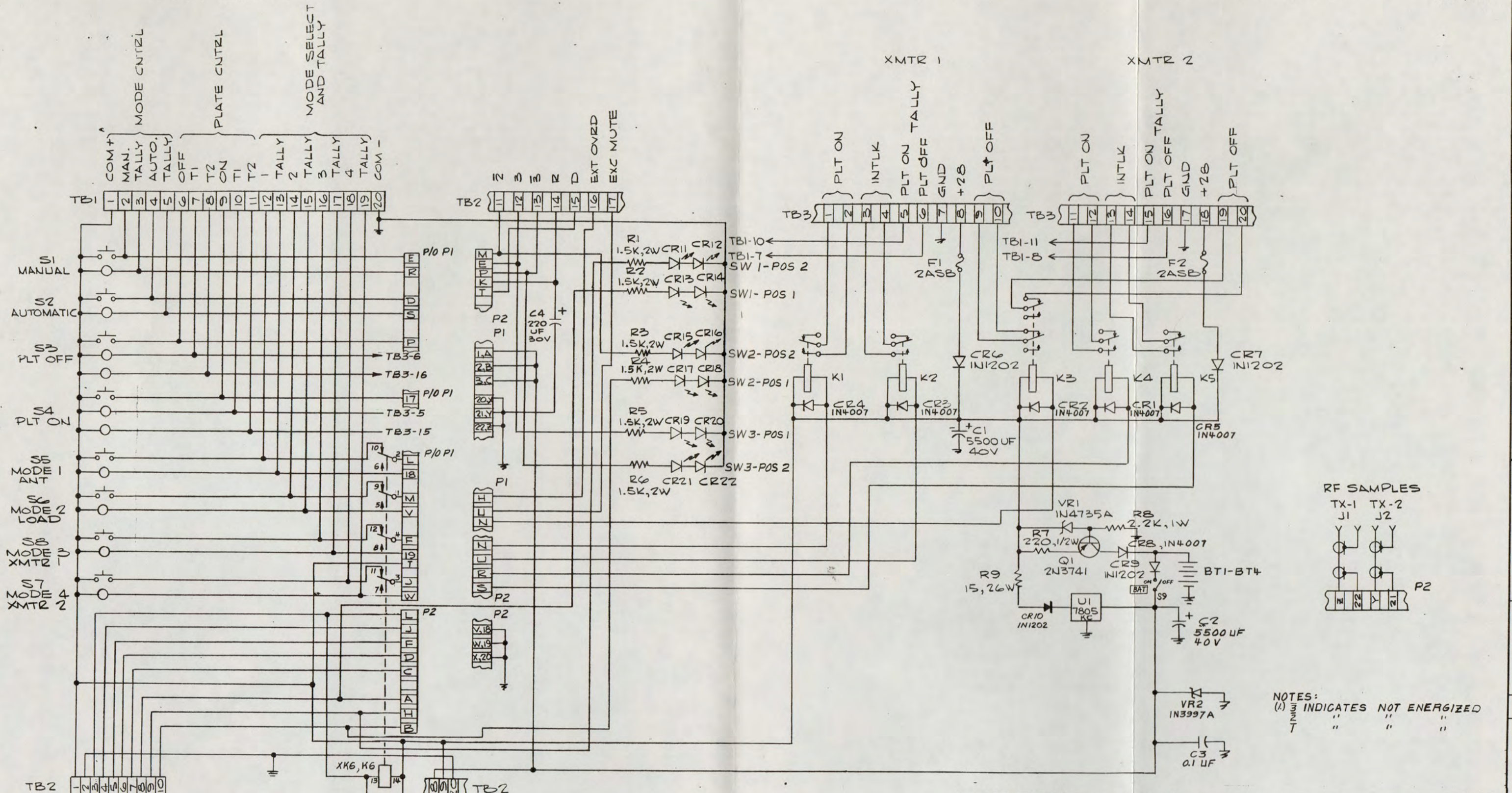
FM Switch Interface Unit, Component Location.



Logic Card, Component Location.

REMOTE CONTROL

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		ADD X6 AND CR23	4/10/87	CJA



TB2-1 THRU 7 TO COAX SWITCH J.B.

TO 377C-1

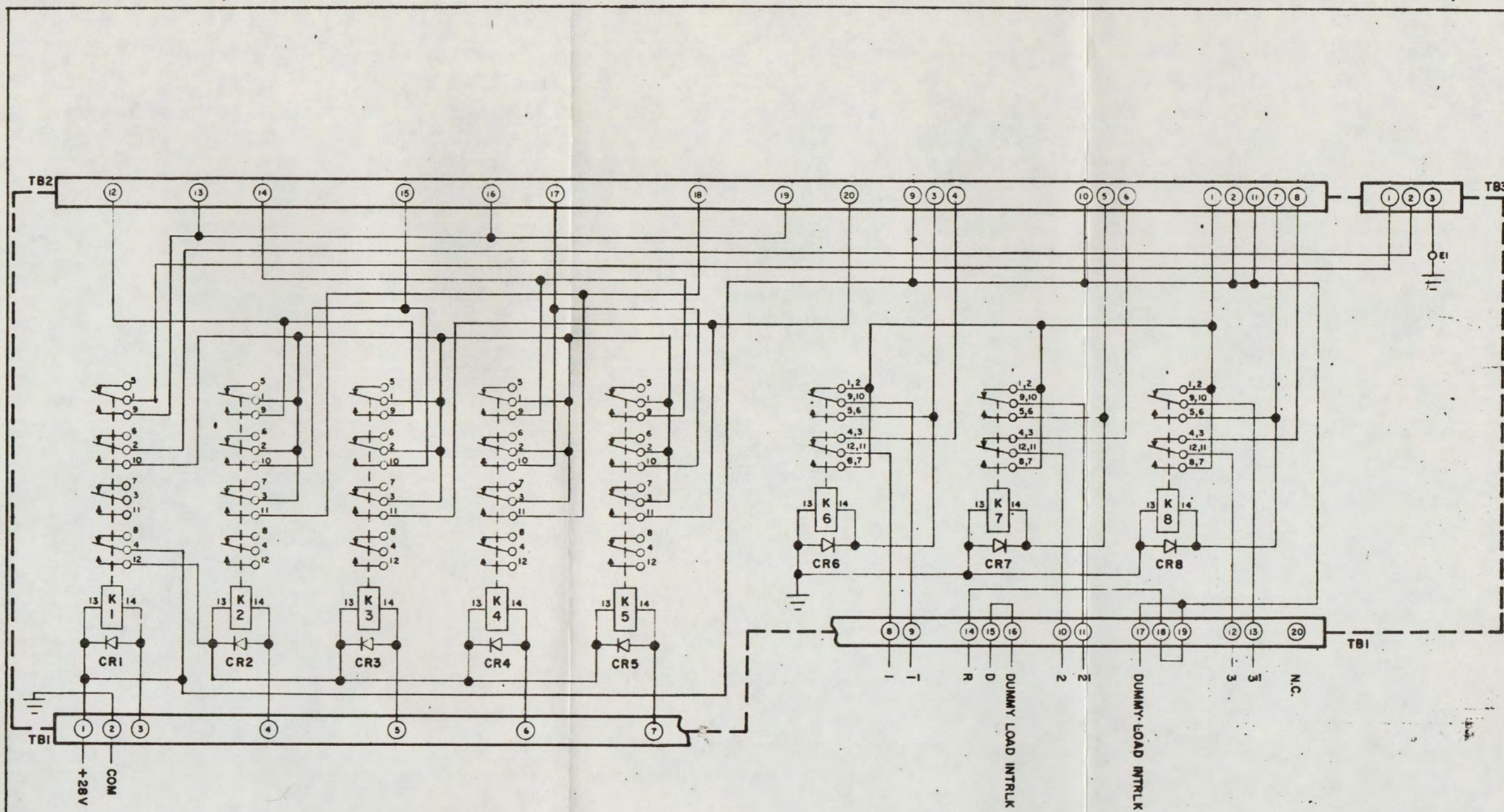
- MODE 1 - ANT
- 2 - LOAD
- 3 - XMTR 1
- 4 - XMTR 2

NOTES:
 (1) 3/2 INDICATES NOT ENERGIZED
 " " " "

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ITEM	ZONE	PART OR IDENTIFYING NO	DWG SIZE	NOMENCLATURE OR DESCRIPTION	CODE IDENT
LIST OF MATERIAL OR PARTS LIST					
UNLESS OTHERWISE SPECIFIED					
TOLERANCE ON		FRAC		DRAWN	
2 PLACE DEC		3 PLACE DEC		CHECKED	
ANGLES				DATE	
MACHINED SURFACE FINISH 125/		AND		MECH DSGN	
ALL DIMENSIONS ARE IN		INCLUDE APPLIED FINISH		ELEC ENGR	
REMOVE ALL BURRS AND SHARP EDGES				APPROVED	
NEXT ASSY	DWG SIZE	USED ON			
				SIZE	CODE IDENT NO
				D	52151 147063
				SCALE	WT
				SHEET 1 OF 1	

Continental Electronics
 MFG CO.
 DALLAS TEXAS
 SCHEMATIC, OUTPUT SWITCHER
 377D-1 MAINFRAME



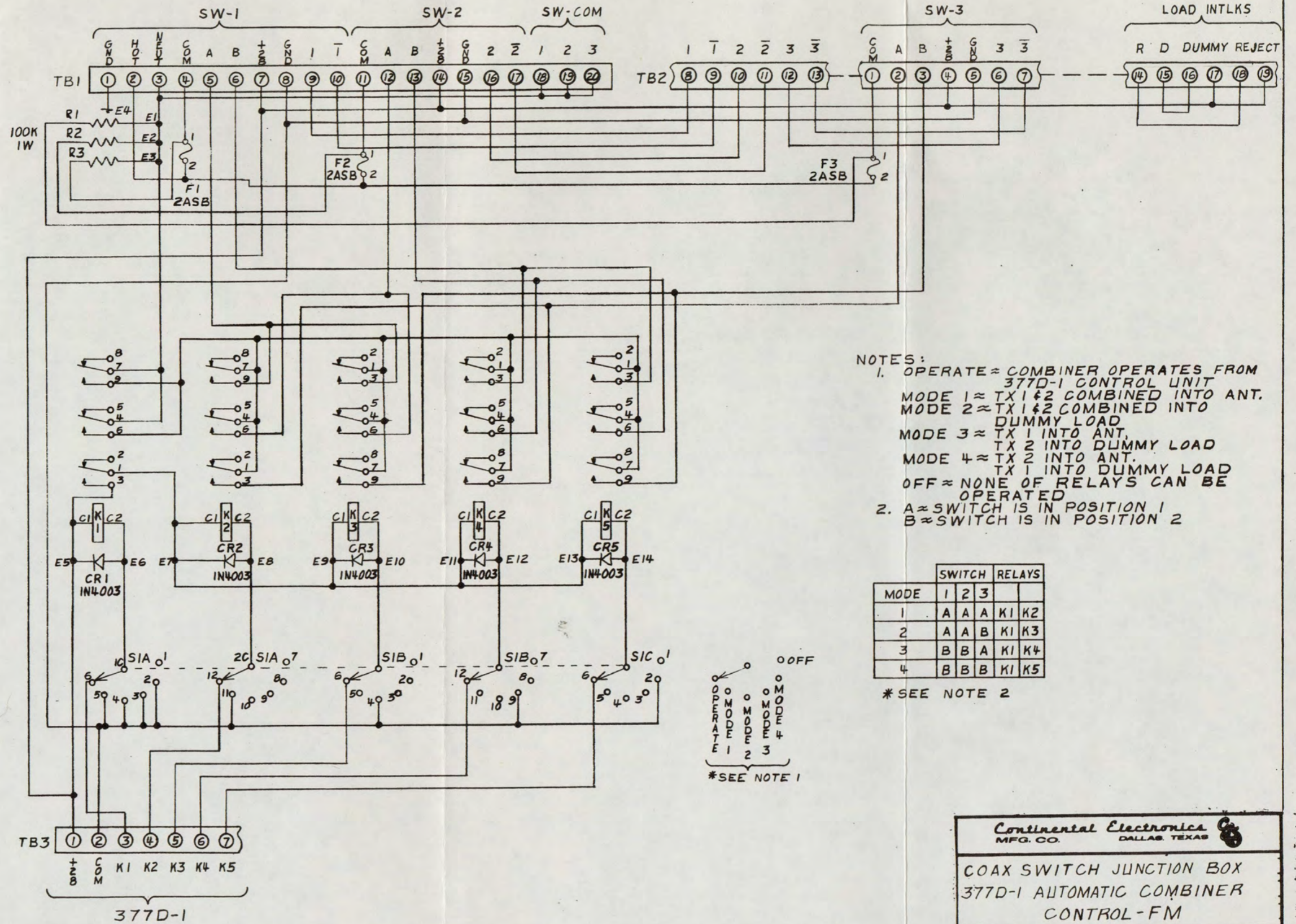
221

Continental Electronics
MFG. CO. DALLAS, TEXAS

SCHEMATIC DIAGRAM,
AM SWITCH INTERFACE UNIT

SIZE	CODE IDENT NO.	
C	52151	147066
SCALE:	WT	SHEET / OF

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NOTES:
 1. OPERATE ≈ COMBINER OPERATES FROM 377D-1 CONTROL UNIT
 MODE 1 ≈ TX 1 & 2 COMBINED INTO ANT.
 MODE 2 ≈ TX 1 & 2 COMBINED INTO DUMMY LOAD
 MODE 3 ≈ TX 1 INTO ANT, TX 2 INTO DUMMY LOAD
 MODE 4 ≈ TX 2 INTO ANT, TX 1 INTO DUMMY LOAD
 OFF ≈ NONE OF RELAYS CAN BE OPERATED
 2. A ≈ SWITCH IS IN POSITION 1
 B ≈ SWITCH IS IN POSITION 2

MODE	SWITCH RELAYS				
	1	2	3	4	5
1	A	A	A	K1	K2
2	A	A	B	K1	K3
3	B	B	A	K1	K4
4	B	B	B	K1	K5

* SEE NOTE 2

OFF
 OPERATE 1 2 3
 *SEE NOTE 1

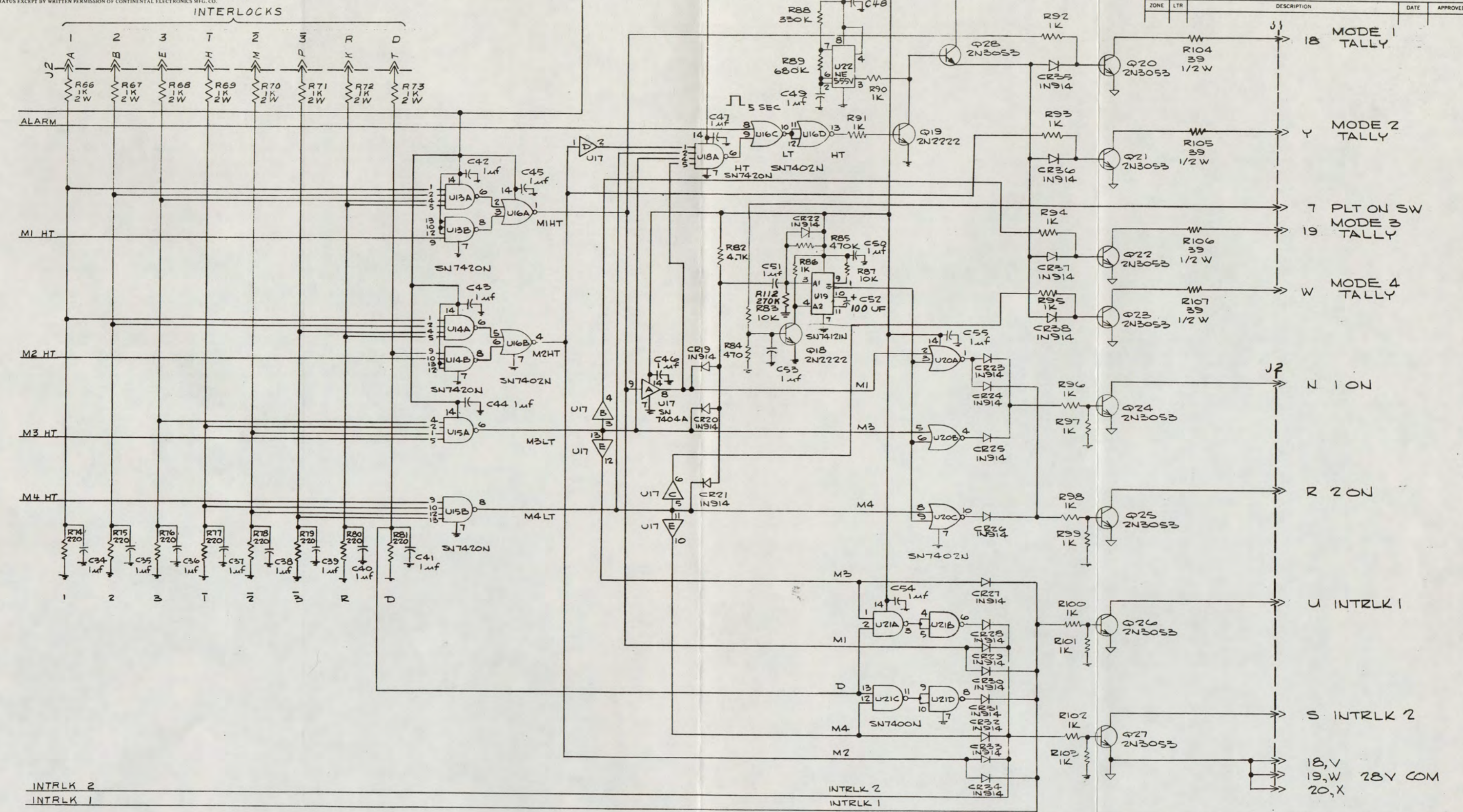
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Continental Electronics
 MFG. CO. DALLAS, TEXAS

COAX SWITCH JUNCTION BOX
377D-1 AUTOMATIC COMBINER
CONTROL-FM

SIZE	CODE IDENT NO.	
C	52151	147067
SCALE	WT	SHEET / OF /

CEMC FORM 300



SEE SHEET 2

INTRLK 2
INTRLK 1

REVISES		DATE	APPROVED
ZONE	LTR		

DESCRIPTION	DATE	APPROVED
18 MODE 1 TALLY		
Y MODE 2 TALLY		
7 PLT ON SW MODE 3 TALLY		
W MODE 4 TALLY		
N I ON		
R Z ON		
U INTRLK 1		
S INTRLK 2		
18, V 19, W 28V COM 20, X		

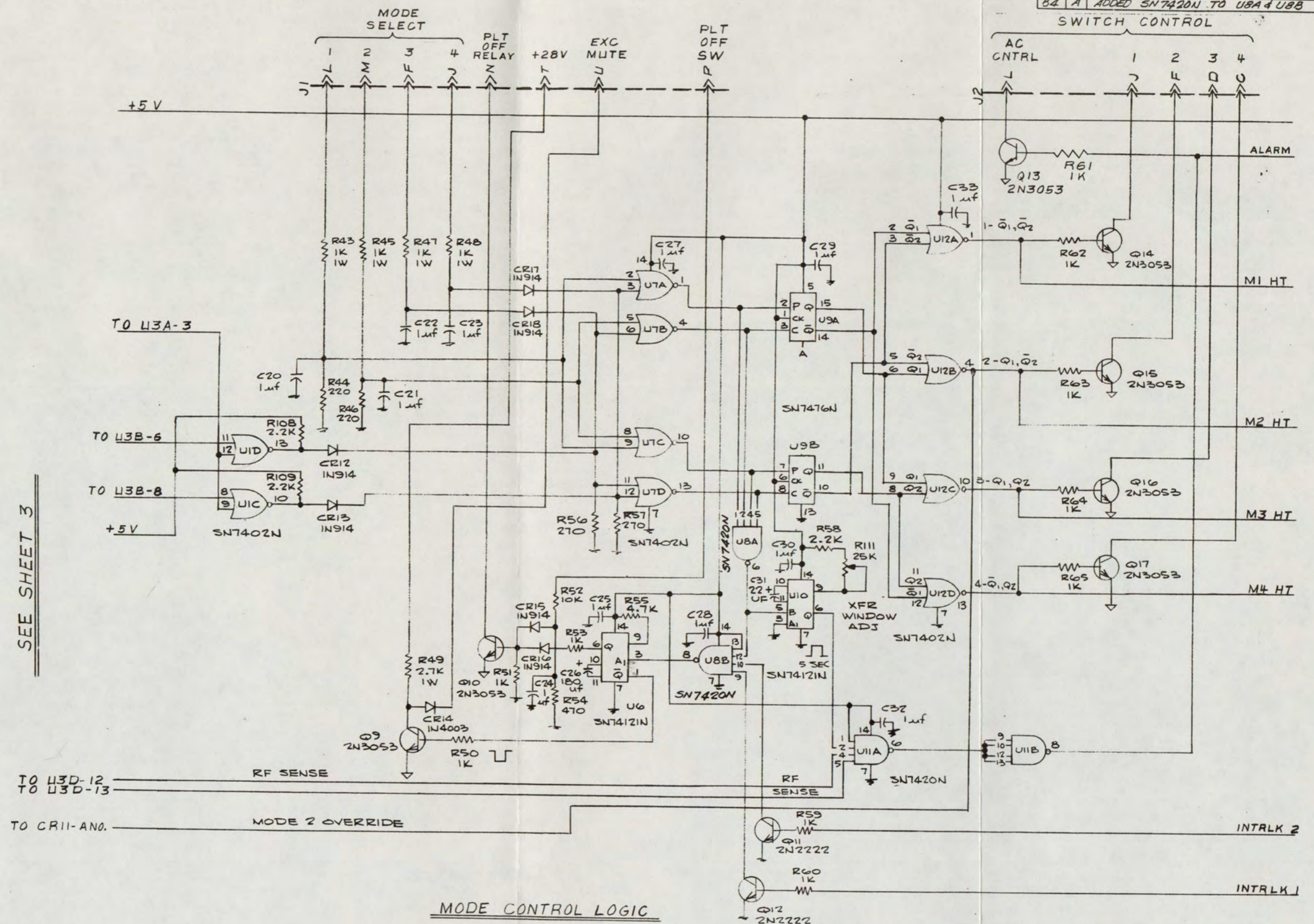
INTERLOCK COMPARISON & XMTR RESTART LOGIC

QTY REQD PER DASH NO	ITEM	ZONE	PART OR IDENTIFYING NO	DWG SIZE	NOMENCLATURE OR DESCRIPTION	CODE IDENT

UNLESS OTHERWISE SPECIFIED		DATE
TOLERANCE ON:	FRAC	2/5/81
2 PLACE DEC	3 PLACE DEC	
ANGLES		
MACHINED SURFACE FINISH 125/	AND	
INCLUDE APPLIED FINISH		
REMOVE ALL BURRS AND SHARP EDGES		

LIST OF MATERIAL OR PARTS LIST
Continental Electronics MFG CO
DALLAS TEXAS
SCHMATIC DIAGRAM
377D-1 LOGIC CARD
SIZE CODE IDENT NO
D 52151 147068
SCALE WT SHEET

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
B4	A	ADDED SN7420N TO USA & U8B	5/1/62	lvey



SEE SHEET 3

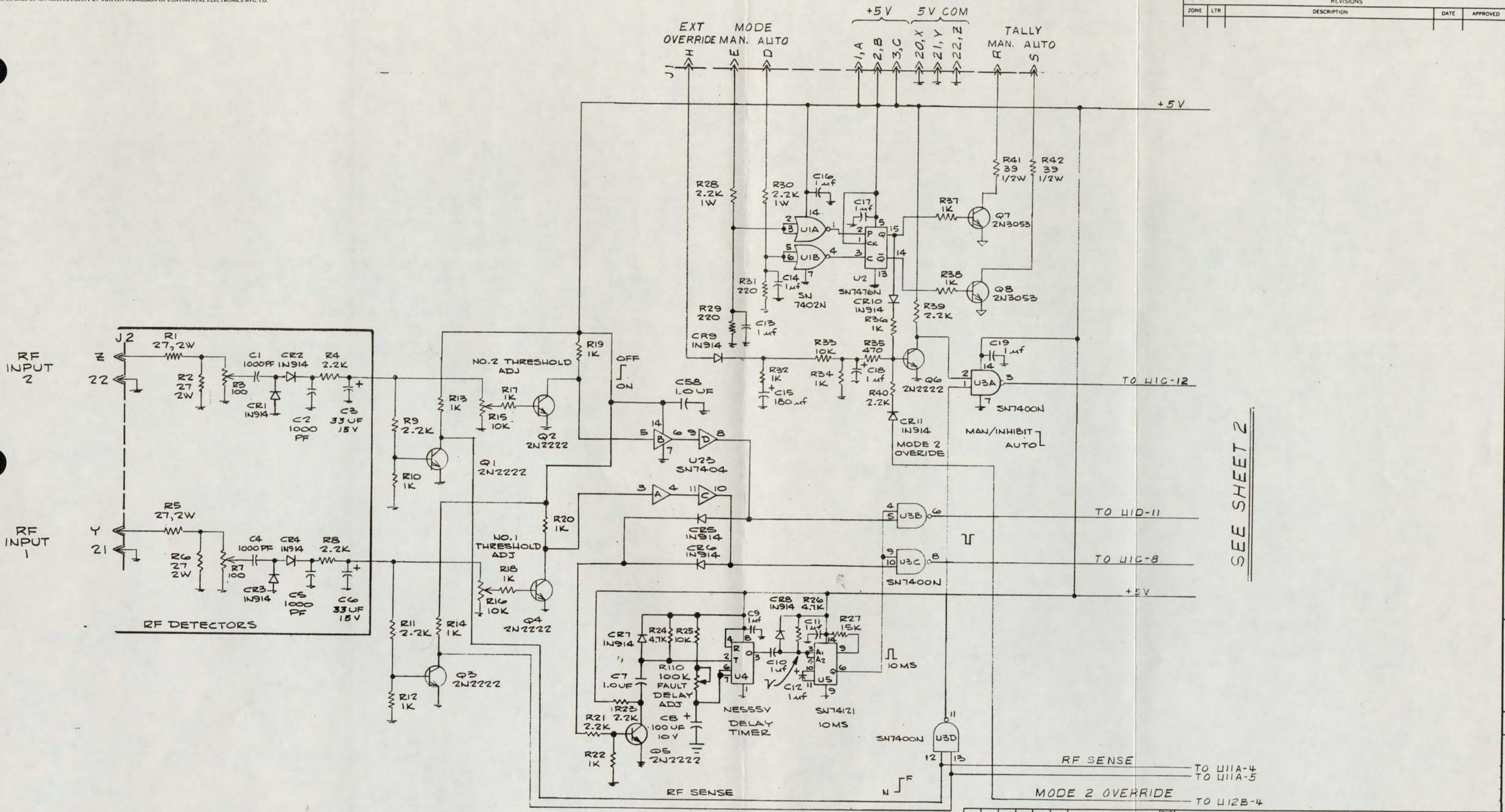
SEE SHEET 1

MODE CONTROL LOGIC

QTY REQD PER DASH NO.		ITEM	ZONE	PART OR IDENTIFYING NO.	DWG SIZE	NOMENCLATURE OR DESCRIPTION	CODE IDENT
UNLESS OTHERWISE SPECIFIED							
TOLERANCE ON		FRAC	DRAWN		DATE		
2 PLACE DEC		3 PLACE DEC	CHECKED				
ANGLES			MECH DSGN				
MACHINED SURFACE FINISH 125/			ELEC ENGR				
ALL DIMENSIONS ARE IN		AND	APPROVED				
INCLUDE APPLIED FINISH							
REMOVE ALL BURRS AND SHARP EDGES							
NEXT ASSY	DWG SIZE	USED ON					
				Continental Electronics MFG CO.			
				DALLAS TEXAS			
				SCHEMATIC DIAGRAM 377D-1 LOGIC CARD			
SIZE	CODE IDENT NO.						
D	52151	147068					
SCALE	WT						
						SHEET 2 OF 3	

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



SEE SHEET 2

RF SENSORS

AUTOMATIC TRANSFER LOGIC

QTY REQ PER DASH NO	ITEM	ZONE	PART OR IDENTIFYING NO	DWG SIZE	NOMENCLATURE OR DESCRIPTION	DATE	CODE IDENT

UNLESS OTHERWISE SPECIFIED		DRAWN		DATE	
TOLERANCE ON	FRAC	CHECKED			
2 PLACE DEC	3 PLACE DEC	MECH DSGN			
		ELEC ENGR			
MACHINED SURFACE FINISH 125/	AND	APPROVED			
ALL DIMENSIONS ARE IN	INCLUDE APPLIED FINISH				
REMOVE ALL BURRS AND SHARP EDGES					

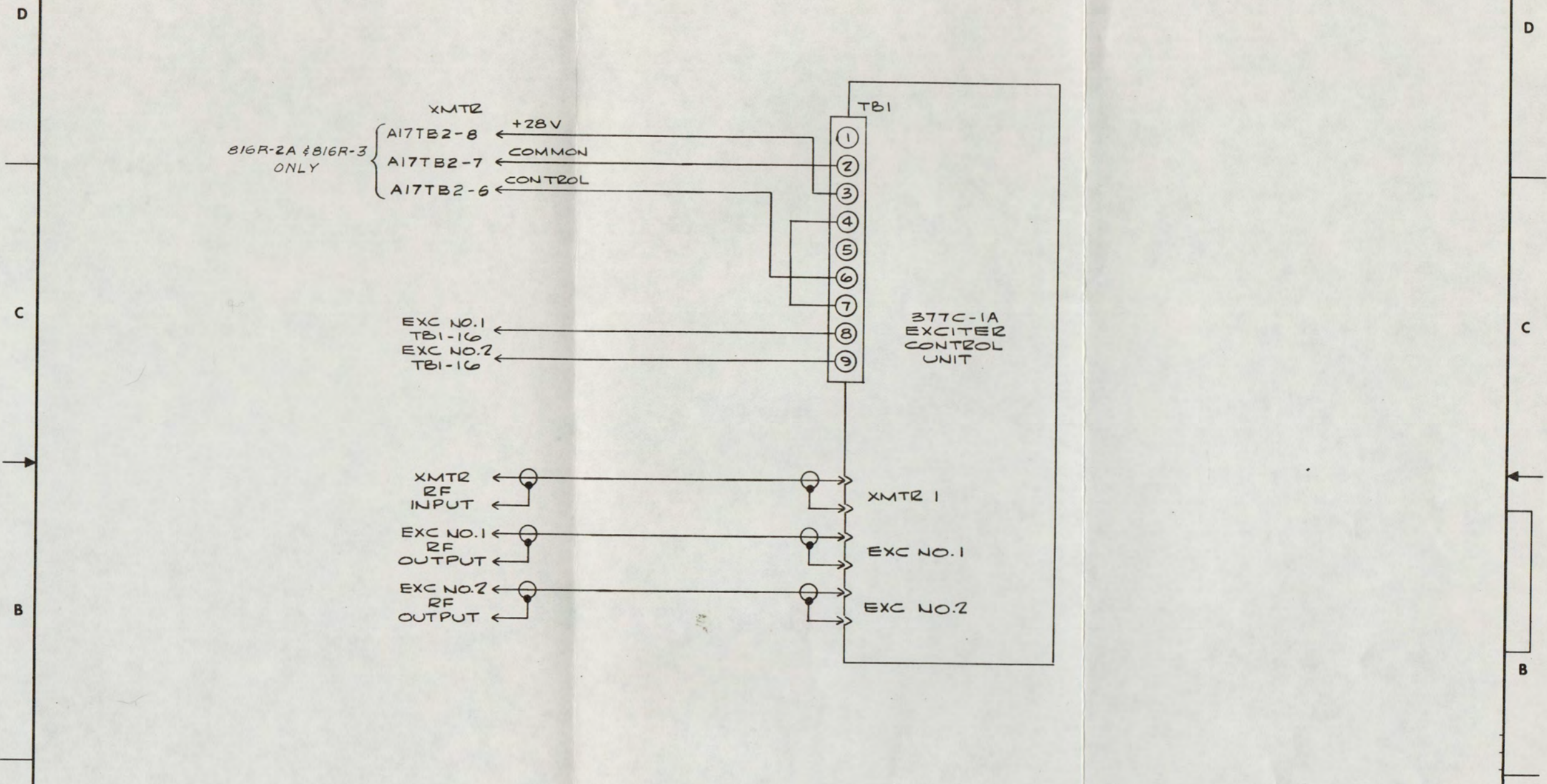
Continental Electronics
 MFG CO.
 DALLAS TEXAS

SCHEMATIC DIAGRAM
377D-1 LOGIC CARD

SIZE	CODE IDENT NO	
D	52151	147068
SCALE	WT	SHEET 3 OF 3

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		CHG NOMENCLATURE OF 377C-1 AND 816R-2A	5/2/84	CJA



QTY REQD PER DASH NO.	ITEM	ZONE	PART OR IDENTIFYING NO.	DWG SIZE	NOMENCLATURE OR DESCRIPTION	CODE IDENT
-----------------------	------	------	-------------------------	----------	-----------------------------	------------

UNLESS OTHERWISE SPECIFIED		DRAWN <i>Charles Wiley</i>	DATE 1/20/81	Continental Electronics MFG. CO. DALLAS TEXAS	
TOLERANCE ON:	FRAC	CHECKED		INTERCONNECT DIAGRAM SINGLE TRANSMITTER	
2 PLACE DEC	3 PLACE DEC	ANGLES			
±	±	±			
MACHINED SURFACE FINISH 125/√		ELEC ENGR		SIZE CODE IDENT NO.	
ALL DIMENSIONS ARE IN INCLUDE APPLIED FINISH. REMOVE ALL BURRS AND SHARP EDGES.		APPROVED		C	52151 147064
NEXT ASSY	DWG SIZE	USED ON		SCALE:	WT SHEET / OF /

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