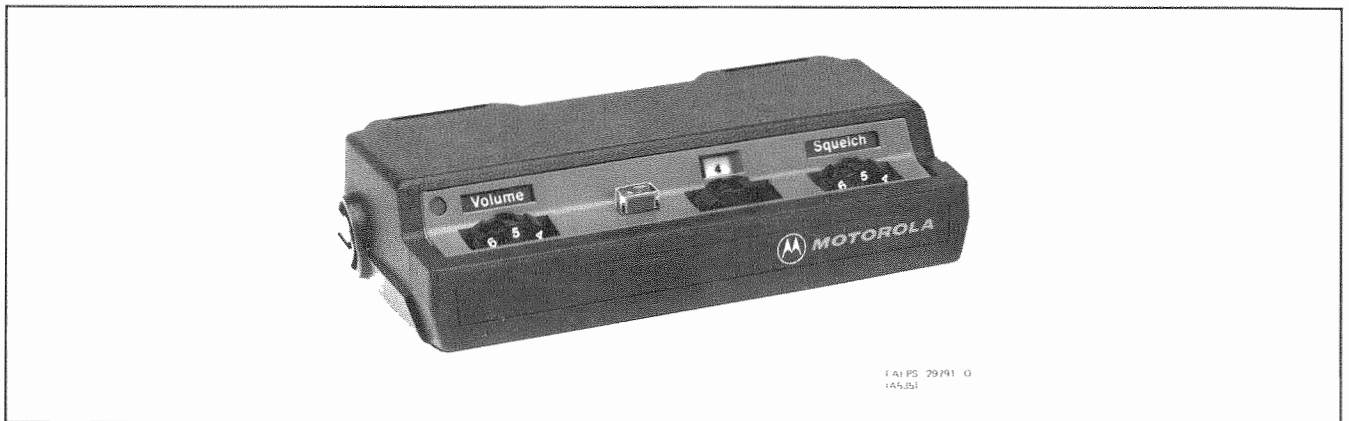




MOTOROLA INC.

Communications
Group

Rotary Mode-Select Control Head



1. Description

1.1 The *SYNTOR X* mobile radio control heads control the radio through a power on/off slide switch, a volume control potentiometer, a squelch control potentiometer, and a rotary mode-select switch. All controls and switches are connected to and mounted on an internal circuit board. A plastic two-piece housing encloses the circuit board and controls. The knurled volume, squelch, and mode-select controls project both above and below the housing to permit convenient adjustment by the operator. The power switch extends below the housing when off and above the housing when on. All control legends are illuminated, and a red transmit indicator lights whenever the operator pushes the PTT button.

1.2 *SYNTOR X* control cables connect the control head to the radio; power cables carry primary power as well as transmit and receive control power to the radio. The schematic diagram at the end of

this section and the Installation Section give details of the radio power control cable connections.

2. Control Head Maintenance

2.1 DISASSEMBLING

Two captive Phillips screws hold the upper and lower halves of the housing together (Figure 1). Four optical prisms are factory aligned and mounted in the top cover of the housing. These prisms require no service and must not be tampered with for any reason.

2.2 REPLACING BULBS

Pilot bulbs can be replaced from the rear of the control head. Rotate the socket counterclockwise 45° and withdraw it from the circuit board. Remove the wedge-type bulb by pulling it straight out of the socket.

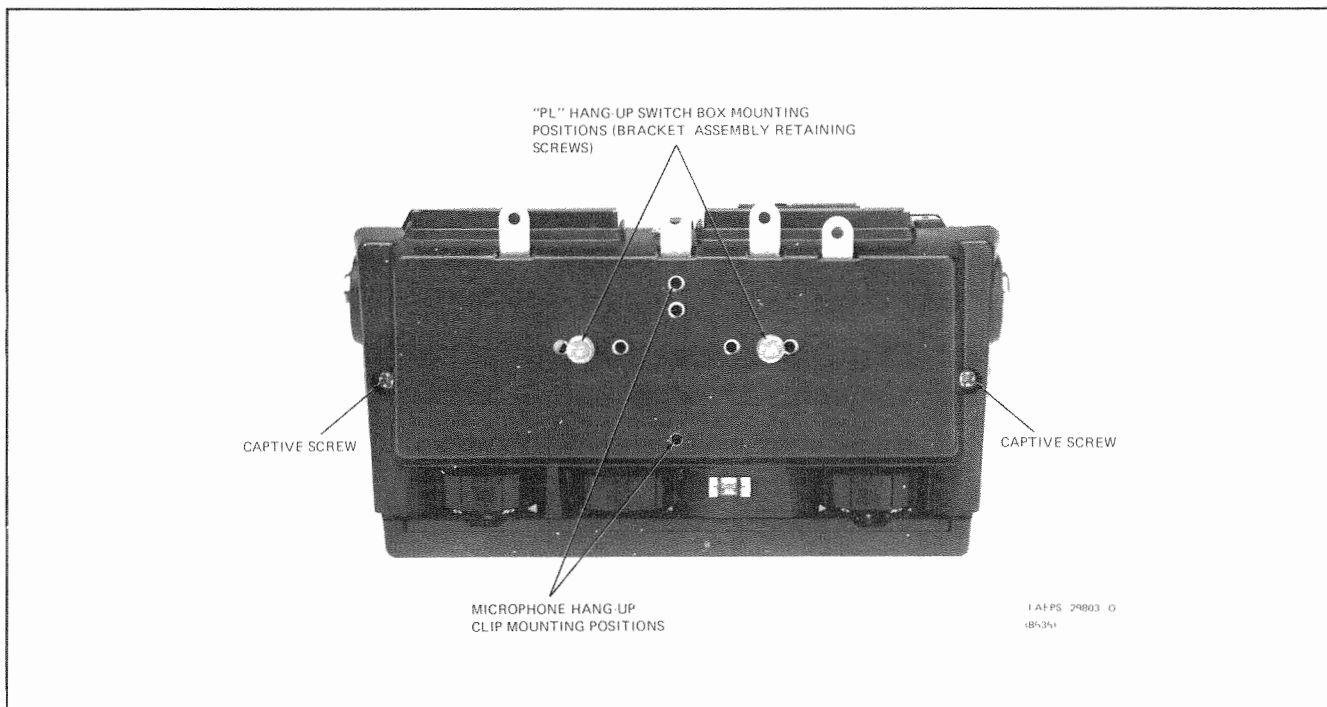


Figure 1. Disassembly Detail

2.3 REMOVING CIRCUIT BOARD AND BRACKET ASSEMBLY

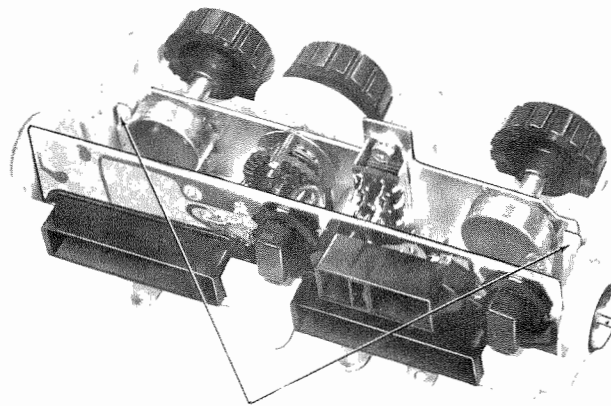
- (1) Loosen the two captive screws and remove the upper half of the housing (Figure 1).
- (2) Remove the two bracket assembly screws and lift out the assembly (Figure 2).
- (3) Reverse the procedure to replace the assembly.

2.4 REMOVING CIRCUIT BOARD

- (1) Remove the circuit board and bracket assembly from the housing (preceding paragraph).
- (2) Remove the circuit board from the bracket assembly (Figure 3).
- (3) Service the components mounted on the circuit board or bracket assembly.
- (4) Reverse the procedure to reassemble (Figure 3).

2.5 REMOVING SLIDE SWITCH AND MODE SELECTOR

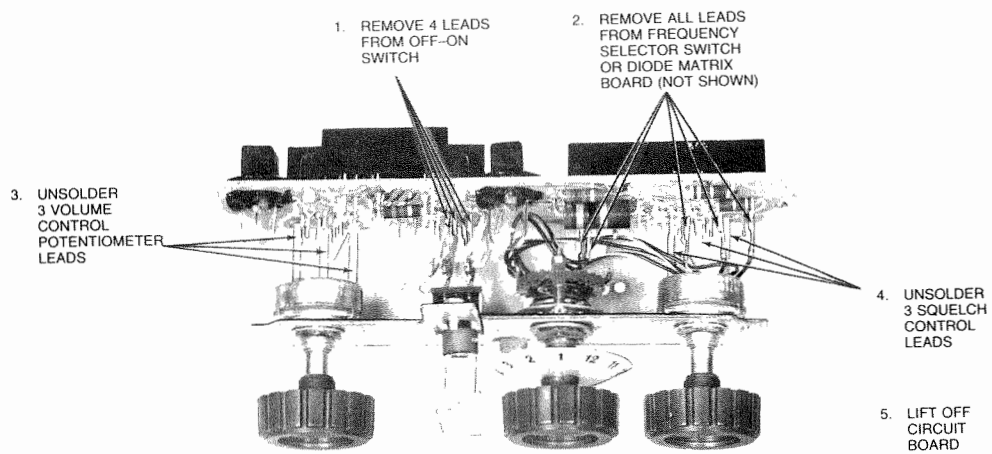
- (1) Remove the VOLUME and SQUELCH control knobs.
- (2) Remove the mounting nuts and lockwashers from both the VOLUME and SQUELCH controls. (Leave the slide switch and mode-selector switch mounted on the bracket.)
- (3) Slide the circuit board and attached controls out of the bracket.
- (4) Disconnect the leads connecting the slide switch and mode-selector switch to the circuit board.
- (5) Remove the two Phillips screws holding the slide switch to the bracket, and then remove the switch assembly.
- (6) Remove the mode-selector knob, indicator dial, mounting nut, and lockwasher; then remove the selector switch assembly.
- (7) Reverse the procedure to reassemble.



LIFT FRONT OF BRACKET
ASSEMBLY UPWARD TO
CLEAR ALIGNMENT SLOTS
THEN LIFT OUT ASSEMBLY

FAEPS-6943-A

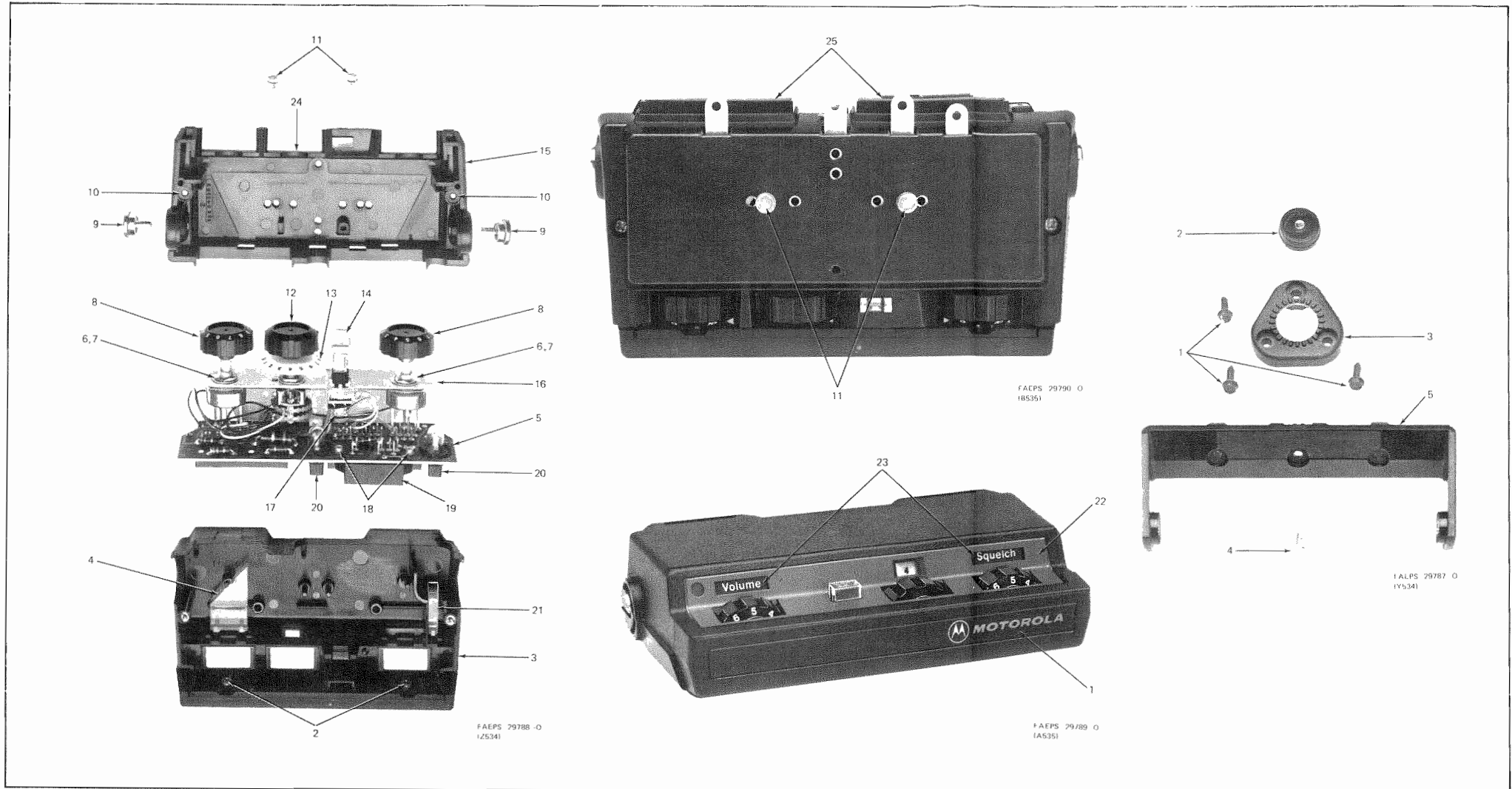
Figure 2. Circuit Board and Bracket Assembly Removal



FAEPS-6940-D

Figure 3. Circuit Board Removal

CONTROL HEAD
AND
CABLE KITS



parts list

HKNA4100A/TKN8087A/HKN4083A Control Cable, Negative Ground 17'
HKNA4101A/TKN8088A/HKN4084A Control Cable, Negative Ground 22'
HKNA4102A/TKN8090A/HKN4085A Control Cable, Positive Ground 22'
HKNA4103A/TKN8089A/HKN4086A Control Cable, Negative Ground 10' PL-7049-C

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
P1		connector, plug
		consists of:
	15-80215B01	front connector housing
	15-80216B01	rear connector housing
	36-80220B01	connector screw
P1101	42-80156B01	retainer ring
	03-00140079	tapping screw (6-19 x 1/2"), 4 used
	32-83859M01	connector gasket
		consists of:
	14-84556B01	black connector housing, 22-position
P1102	09-84151B03	contact receptacle
		consists of:
P1105	14-84556B02	blue connector housing, 22-position
	09-84151B03	contact receptacle
	30-80247D01	31-conductor cable (HKNA4100A-4103A only)
W1103		consists of:
	14-84590B06	yellow connector housing
	09-84151B03	contact receptacle
		cable assembly
		consists of:
W1107	01-80703A58	black lead and lug assembly, includes:
	29-84528B05	lug, ring tongue
	30-00851875	cable, battery, #8 ga., black, 66" long
	30-00812505	battery cable, #8 ga., red
		non-referenced items
	30-84875E01	27-conductor cable
	42-00893468	cable clamp
	42-00893464	cable clip hook
	42-10217A02	tie strap, 2 used
	29-00812980	closed-end terminal
	29-00840421	closed-end terminal
	54-84032M02	positive-ground label

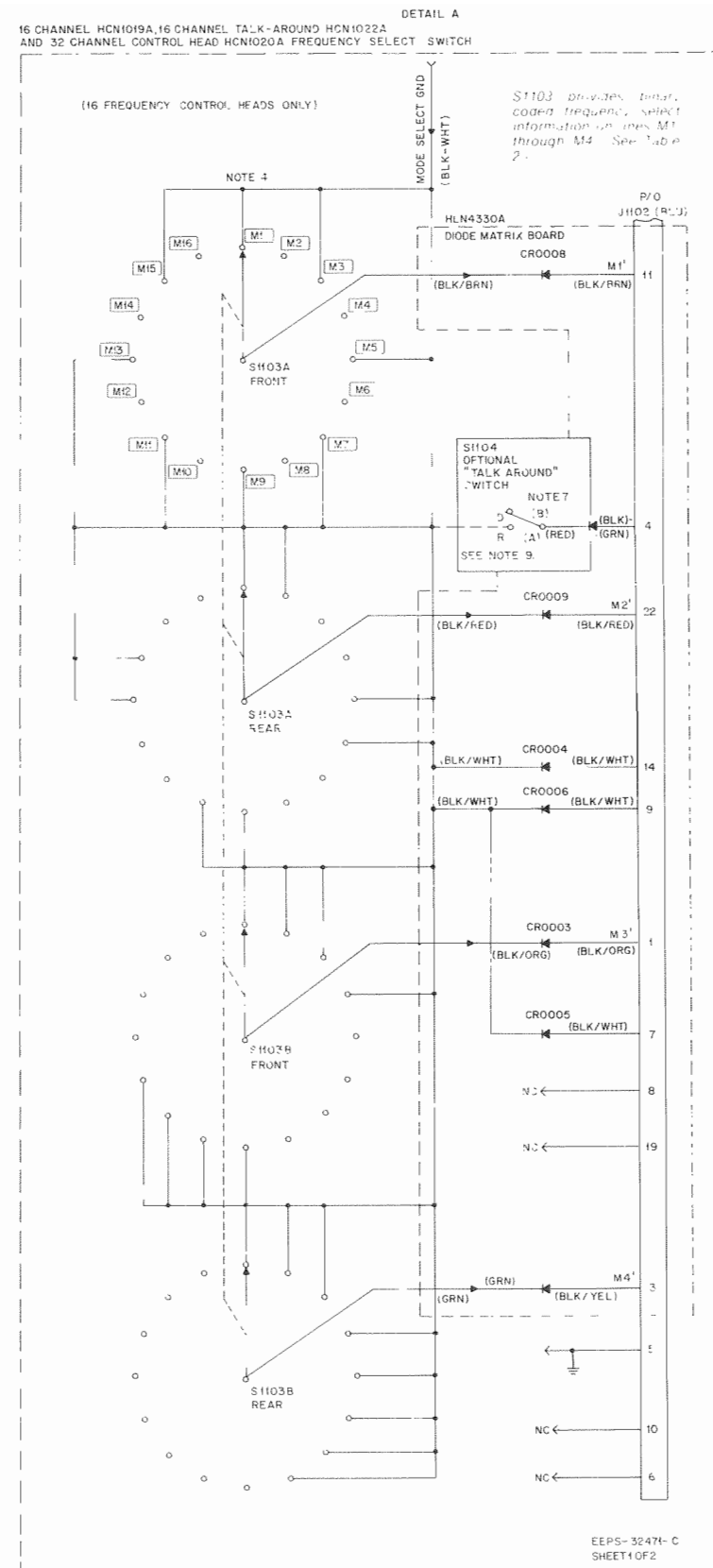
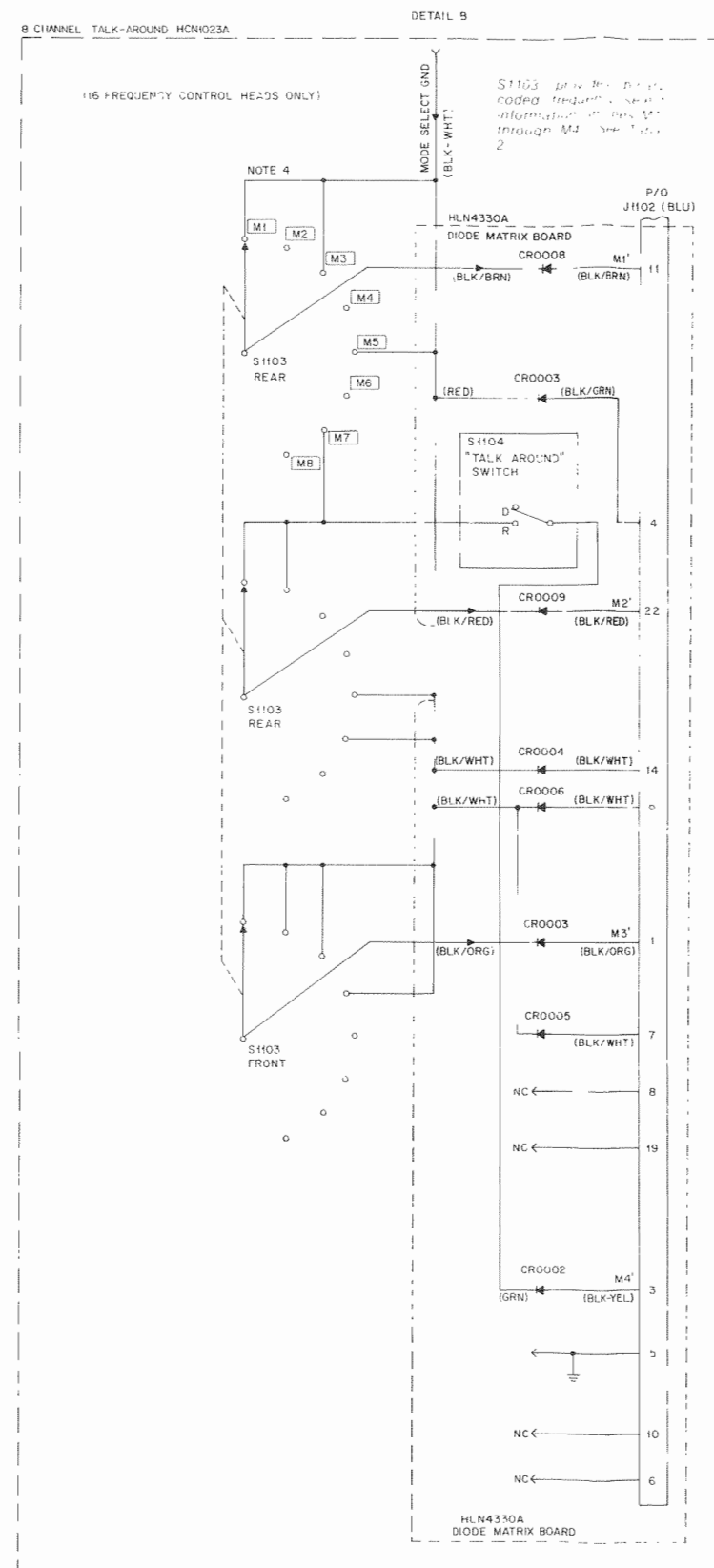
note: These control cable kits are all 12-mode.

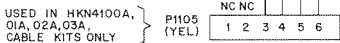
HKNA4052A Control Head Power Cable PL-6845-A

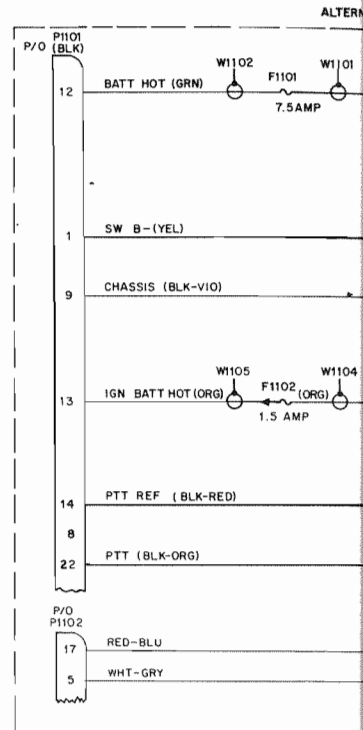
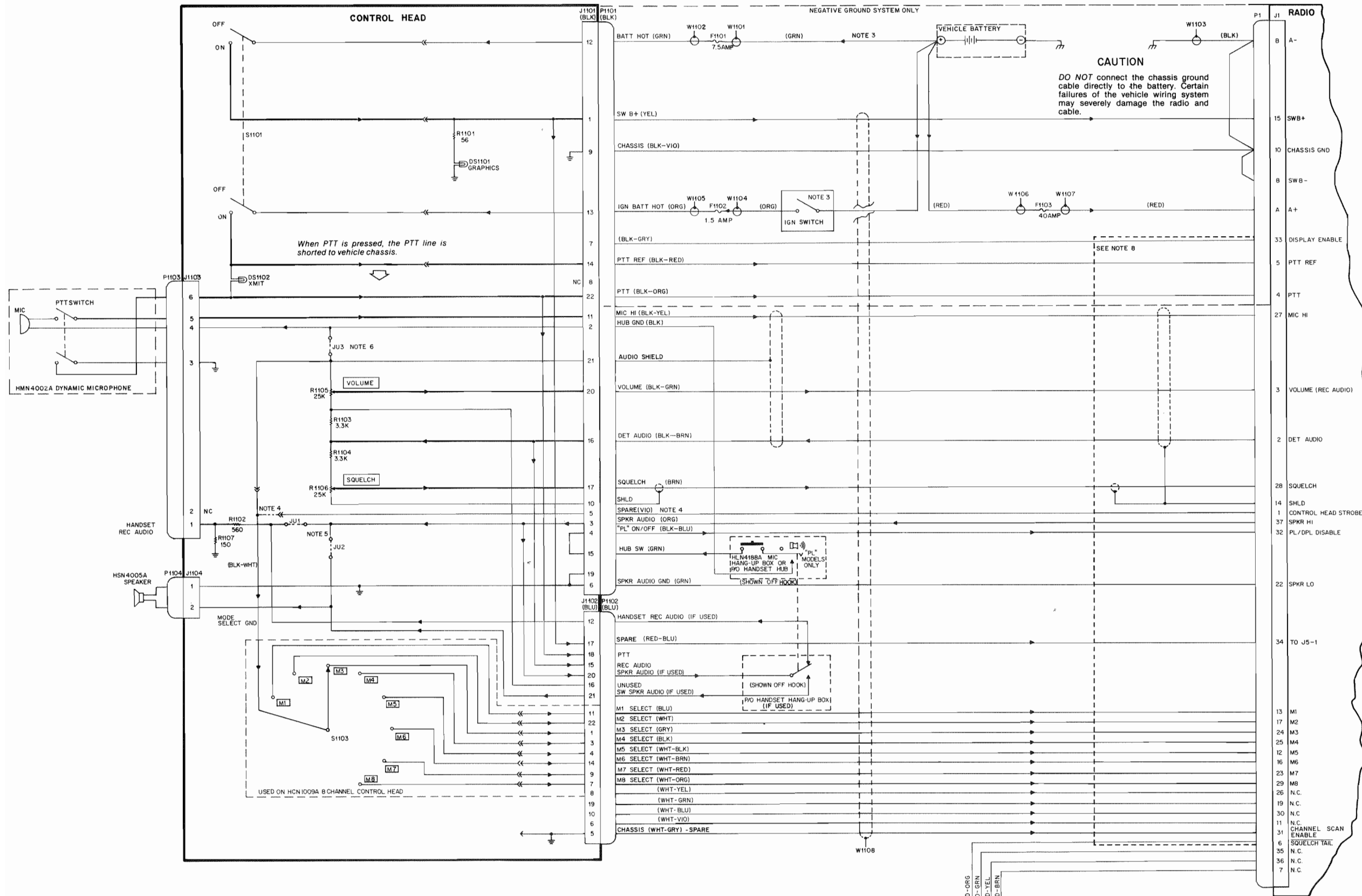
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
F1101	65-00086099	fuse, cartridge
F1102	65-00890033	7.5 amp, 32 V
		1.5 amp, 250 V
W1101		cable assembly
	01-80701T31	lead and clip assembly (green), includes:
	30-10310A63	wire, #18 ga., str. (green), 1.5' long
	42-82884A01	clip, fuse
	01-80701T51	lead and fuse cap (green), used with
W1102		W1101, includes:
	30-10310A63	wire, #18 ga., str. (green), 4' long
	14-82883A01	insulator, fuse holder cap
	42-82884A01	fuse clip
	09-84151B03	contact receptacle
W1104	01-80701T62	lead and clip, assembly (orange), includes:
	30-10310A62	wire, #18 ga., str. (orange)
	42-82884A01	fuse clip
	01-80702T62	lead and fuse cap (orange), used with
		W1104, includes:
W1105	30-10310A62	wire, #18 ga., str. (orange)
	42-82884A01	fuse clip
	14-82883A01	insulator, fuse holder cap
	09-84151B03	contact receptacle
		non-referenced items
	01-80702T64	fuse and lead assembly (green)
	14-82882A01	includes: ref. items F1101, W1101, W1102
	41-82885A01	insulator, fuse holder body
	01-80704T69	spring, fuse compression
		fuse and lead assembly (orange)
		includes: ref. items F1102, W1104, W1105
	14-82882A01	insulator, fuse holder body
	41-82885A01	spring, fuse compression
	29-00136968	lug, solder, 2 used
	29-00824456	lug, ring tongue
	29-00865065	lug, ring tongue, 2 used

HKNA4051A Power Cable and Fuse Kit MXW-1354-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		fuse, cartridge
	65-84161B01	40 amp, 32 V
		cable assembly
	01-80711B12	red lead and lug assembly, includes:
	29-84528B05	ring-tongue lug
	30-00812505	red battery cable, #8 gauge
		non-referenced items
	03-00139931	tapping screw (10-16 x 3/4")
	09-84277B02	fuse receptacle
	38-84383D02	protective cap
	42-84275B01	fuse retainer
	54-84697B01	label

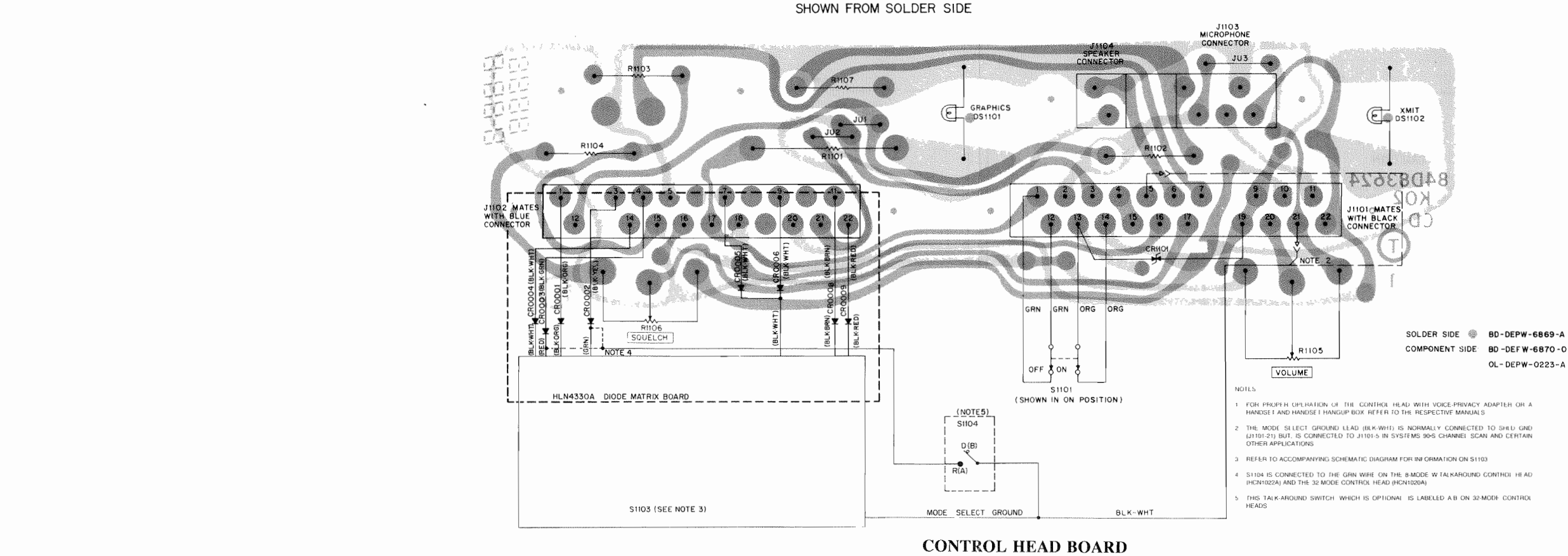






NOTES:

- Unless otherwise stated, all resistor values are in ohms.
- For proper operation of control heads, privacy adapter (VPA) or with a handset hangup box, refer to the associated instructions.
- The radio input power connections are recommended configuration. In this configuration, the receiver portion of the radio is operable when a control head is switched ON but the transmitter is disabled unless the vehicle ignition switch is turned ON to prevent excessive battery drain. See the instructions for other configurations.
- The mode select ground lead (BLK-WHT) is connected to SHLD GND (J1101-21) but is not connected to J1101-5 in SYSTEMS 90•S channel scan applications.
- Jumpers JU1 through JU3 modify the operation of the control head as follows:
 - JU1 and JU2 are normally in and must be removed when a handset and handset hangup box are used. Removal of JU1 mutes the handset speaker when the handset is on-hook. Removal of JU2 mutes the handset speaker when the handset is off-hook.
 - JU3 is normally in but may be removed for certain applications.
- For proper operation of the handset hangup box, the handset hangup box must be present.
- Switch S1104 is labeled A/B on 32-mode control heads.
- Black/Gray goes to P1-33 on all standard models (TKN8087A, HKN4083A, TKN8088A, TKN8089A, HKN4086A, TKN8090A, and TKN8091A). Black/Gray goes to P1-6 on cable kits (used for mode select with scan display control heads). In applications where Black/Gray goes to P1-6, the display is desired, Display Enable (J1-33) is normally jumpered to SWB- (J1-8) in radio only applications.



parts list

HCN1009A Control Head, 8-Mode
HCN1019A Control Head, 16-Mode
HCN1020A Control Head, 32-Mode
HCN1022A Control Head, 16-Mode with Talk-Around
HCN1023A Control Head, 8-Mode with Talk-Around

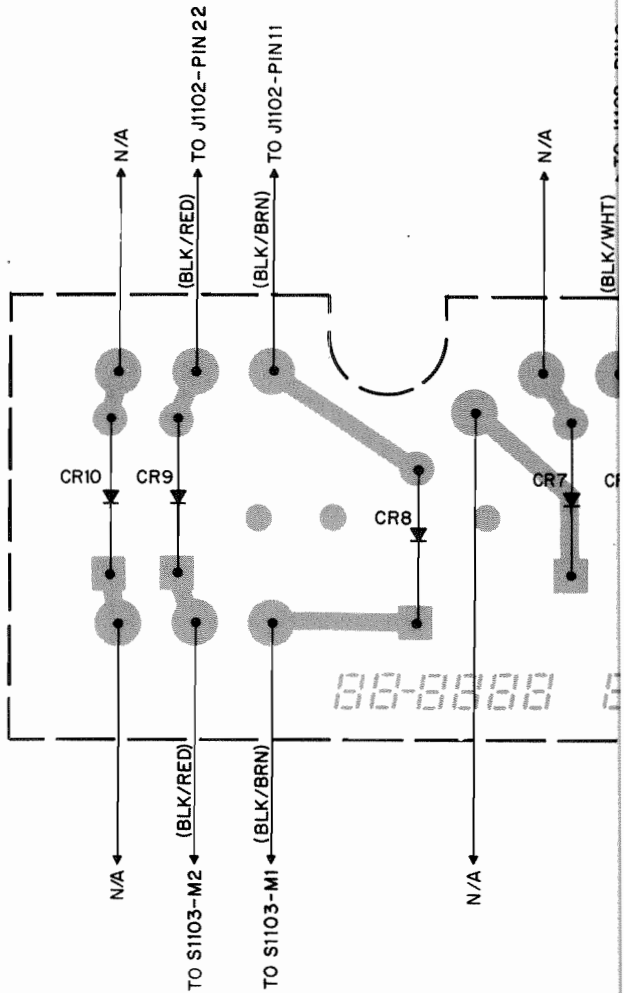
REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
CR1101	48-83461E45	diode (see note): zener; 25 V
DS1101, 1102	68-83554G01	lamp, incandescent: type 161; 12 V
J1101, 1102 J1103 J1104	29-84547B01 29-84547B01 29-84547B01	connector, plug: terminal pin, male; 20 used terminal pin, male; 5 used terminal pin, male; 2 used
R1101 R1102 R1103, 1104 R1105, 1106 R1107	6-127C19 6-125C43 6-125C61 18-84584A02 6-125C29	resistor, fixed; $\Omega \pm 10\%$, $\frac{1}{2}$ W: unless otherwise stated 56; 2 W 560 3.3k variable; 25k 150
S1101 S1103	40-84622B02 40-84149C02 or 40-80281B01 or 40-80285C01	switch: slide, dpst rotary, 8-position, non-shorting; includes mounting hardware (HCN1009A) rotary, 16-position; includes mounting hardware (HCN1019ASP01, 1020ASP01, and 1022A) rotary, 8-position; includes mounting hardware and two adjustable stop washers (HCN1023A)
S1104	40-84698K02	toggle, spst; includes mounting hardware (HCN1020ASP01, 1022A, and 1023A)
non-referenced items		
	33-80035B01 29-10134A48	nameplate bumper lug, connector

note: For best performance, order diodes, transistors, and integrated circuits by Motorola part number.

Mechanical Parts List

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
1 2 3	75-82619M01 3-124616 1-80702T37	bumper, front screw, tapping, 6-20 x $\frac{1}{16}$ "; 2 used top cover assembly housing; includes: items 1, 2, 4, 21, and 23 (used on HCN1009A and 1019A)
	or 1-80706T06	top cover assembly housing; includes: items 1, 2, 4, 21, and 23 (used on HCN1020A, 1022A, and 1023A)
4 5	— TLN4369B	prism, optical (see note) plate circuit board assembly; includes: J1101, 1102, 1103, 1104, and item 25
6 7 8 9 10 11 12 13	2-136272 4-2636 36-80024B02 3-84548B01 3-134169 3-138717 36-80024B01 36-84006C01	nut, $\frac{3}{8}$ x 32 x $\frac{1}{2}$ "; 3 used washer, lock $\frac{3}{8}$ internal; 2 used knob, control (volume & squelch); 2 used screw, cap (trunnion-mount); 2 used screw, tapping, 4-40 x $\frac{1}{4}$ "; 2 used screw, tapping, 6-20 x $\frac{3}{16}$ "; 3 used knob, control; mode selector knob, disc, 8-channel switch position indicator
	or 36-80148B02	knob, index, 16-channel
14 15 16 17 18 19 20 21 22	45-84004C01 15-84920B02 7-84005C01 1-80702T69 3-135084 42-84067G01 9-84627B01 — 13-84000C03 or 13-84000C06 or 13-84000C05	actuator, switch cover, bottom bracket, mounting switch assembly; includes S1101 screw, tapping, 4-40 x $\frac{3}{16}$ "; 2 used retainer, connector socket, lamp holder prism, optical (see note) bezel (HCN1009A and 1019A) bezel (HCN1020A) bezel (HCN1022A and 1023A)
23 24 25	33-80040B01 38-84357C03 42-84962C01 14-80275D01	nameplate plug, snap-in (single-frequency only) connector, retainer insulator (HLN4330A); not shown

note: Items 4 and 21 are not replaceable; for field-replacement order Item 3 (top cover assembly).



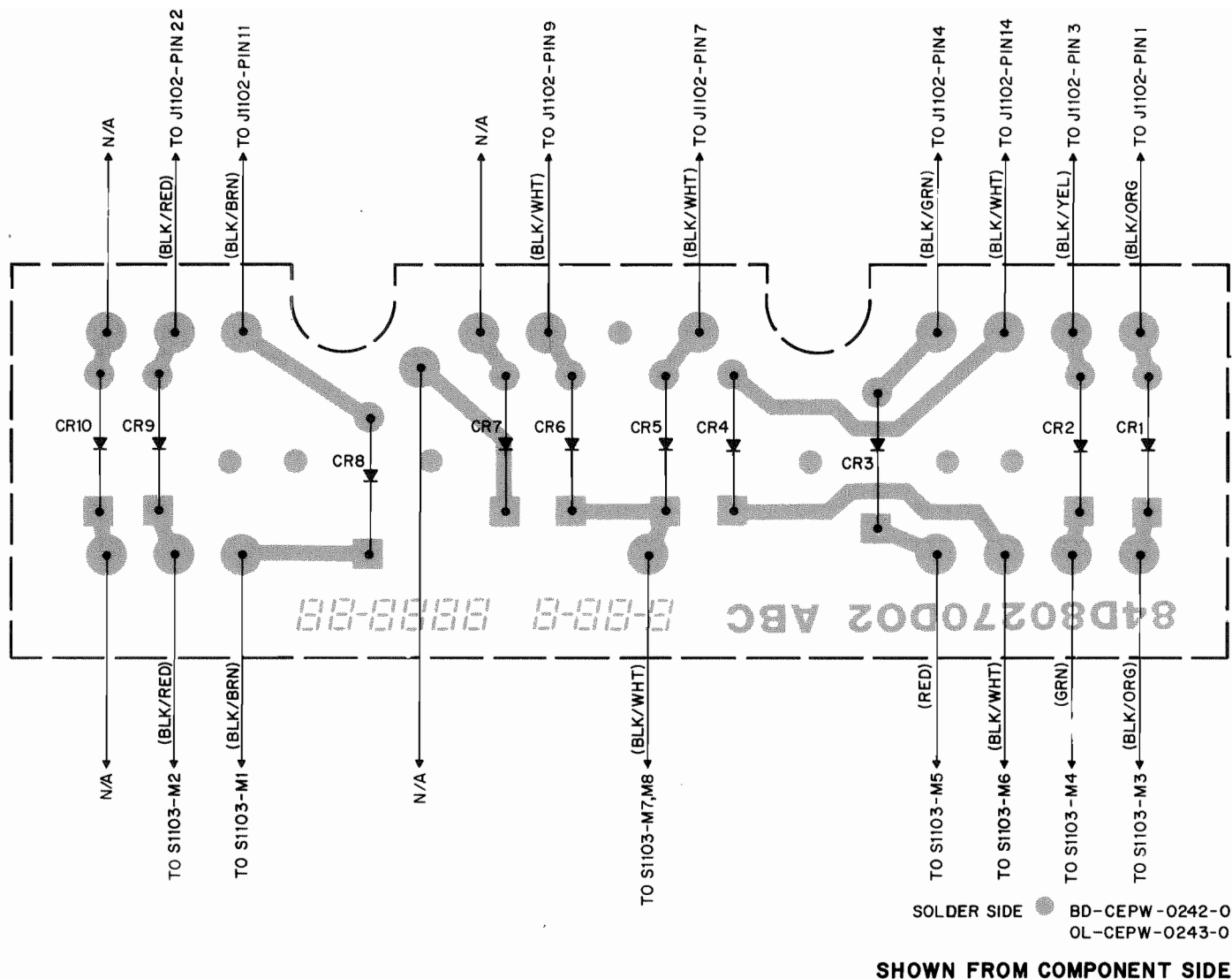
parts list

HLN4330A Diode Matrix Board

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
CR1 - 6, 8, 9	48-82392B03	diode (see note 1): silicon
non-referenced items		
	84-802700D1	PC BOARD

Notes:

- For best performance, order diodes, transistors, and integrated circuits by Motorola part number.
- This diode matrix board is used on HCN1019A, 1020A, 1022A, and 1023A.



DIODE MATRIX BOARD

parts list

HLN4330A Diode Matrix Board PLW-0111-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
CR1 - 6, 8, 9	48-82392B03	diode (see note 1): silicon
non-referenced items		
	84-802700D1	PC BOARD

Notes:

- For best performance, order diodes, transistors, and integrated circuits by Motorola part number.
- This diode matrix board is used on HCN1019A, 1020A, 1022A, and 1023A.