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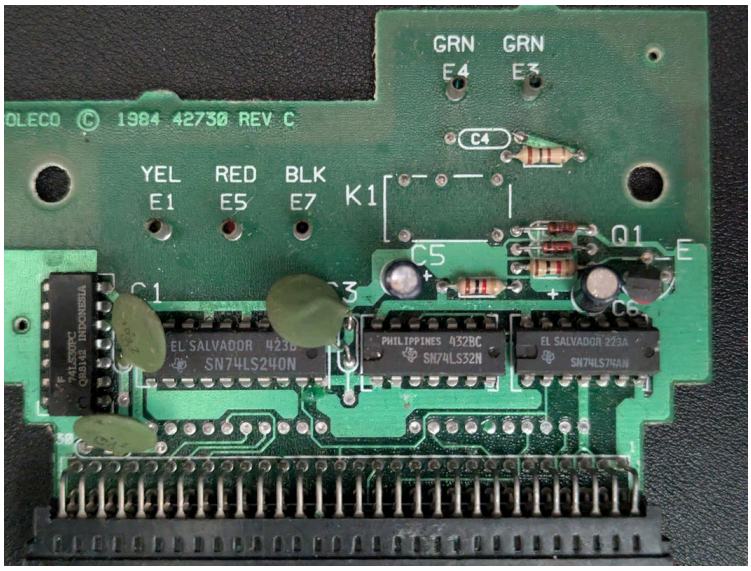
Mystery Uruguay Boards are The Coleco ADAM™ AutoDialer Side Expansion Port Interface

PCB #42730 REV C

Technical Documentation and Hardware Analysis



PCB #42730 REV C — Component Side

Document Version: 2.1 — IDENTIFIED

March 2026

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1. Executive Summary

PCB #42730 REV C is the ADAM AutoDialer — a side expansion port peripheral that provided automated telephone dialing capability for the Coleco ADAM computer system. The board decodes at Z80 I/O port $1E, which the ADAM Technical Reference Manual officially designates as "Optional Auto Dialer." More than 500 identical NOS (new old stock) boards were discovered in an electronics surplus store in Montevideo, Uruguay, with no documentation.

Identification was confirmed by three independent lines of evidence:

1. Port decode match: The board's address decoder responds at port $1E — the exact port officially assigned to the autodialer in the ADAM Technical Reference Manual (Chapter 3, Section 2.4: Z80 I/O Port Assignments).

2. Software compatibility: The board was installed in an ADAM and booted with the Address Book Filer with AutoDialer software (Rev 10D, 1984). The software fully recognized the board as an autodialer, booted without displaying the "NO AUTODIALER FOUND" error, and attempted to dial a phone number.

3. Firmware analysis: The Coleco In-House Test Utilities (Ver. 1, 2, 3) contain dedicated port $1E routines that perform board verification and output control, located adjacent to "AUTODIALER PASS/FAIL" status messages.

The released ADAM AutoDialer (Model #7815, FCC ID BNV8437815) uses this exact PCB — the board inside the released product is marked "COLECO © 1984 42730 REV C." The FCC label number 42722A refers to the enclosure assembly, not the PCB. The released unit differs from the NOS boards only in assembly state: the addition of an Aromat DS1E-M 12V relay, wire harness, RJ11 phone jacks, and beige enclosure shell. The 500+ NOS boards are production-ready autodialer PCBs that were never assembled into finished products.

Schematic tracing by John Lundy (Lundy Electronics) and pin-by-pin continuity verification confirmed the complete circuit. On Rev C, the board provides a single-bit software-controlled output (BD0) through a 2N3904 transistor driver at wire harness pads K1/E4/E3. The read-back path (BD7) is non-functional on Rev C due to trace cuts from earlier revisions.

2. Provenance

2.1 Discovery in Uruguay (2018)

In January 2018, AtariAge forum member “soviet” (Montevideo, Uruguay) reported finding a large cache of unidentified Coleco expansion port boards at a local electronics surplus store. The store had acquired Coleco factory scrap and surplus from importers who had dealt with Coleco’s liquidated inventory, selling the components as “hobby electronic parts.” In the store’s basement, soviet found more than 500 identical boards. He purchased several, noting the 60-pin edge connector fit the ColecoVision expansion module slot, but could not identify them.

Figure 2-1: NOS boards in storage (from soviet’s AtariAge post)

2.2 Community Analysis Attempts (2021)

The boards remained unidentified for three years. In June 2021, the AtariAge ColecoVision community examined the photographs:

Tursi (HarmlessLion, Calgary) identified the four ICs: 74LS30, SN74LS240N, SN74LS32N, SN74LS74AN. He noted the unpopulated location marked K1 “which I want to say would be a relay” and concluded “there’s no intelligence on this card, that is, no software… it might be some kind of I/O card.”

Tekman provided the most detailed early analysis: identified the GRN E4/E3 connections as relay output, noted the color wire designations suggested RJ11 phone connections, spotted the 100Ω pull-down resistor, and concluded it was “simply triggering a latch circuit for the relay and nothing more” used “in some sort of test environment.” He correctly identified the relay function and phone connection clues but did not connect them to the autodialer product.

NIAD (Richard DiRocco, ColecoVision ADAM Archive / AdamArchive.org) suggested the board may have been used with Coleco's In-House test utility cartridges, noting that multiple Coleco locations (CT, NY, Canada) did not always collaborate, making definitive identification difficult.

2.3 Acquisition and Distribution (2024)

By February 2022, soviet reported that a friend had acquired the remaining boards from the store. In late 2024, Richard DiRocco worked with soviet to acquire five boards and ship them to the United States. DiRocco distributed the boards to three hardware analysts for examination:

• Milli — received one board for analysis

• The Slopsema's / MicroFox — received one board for analysis

• John Lundy / Lundy Electronics — received one board; produced hand-traced schematic and dimensional drawings

Lundy's schematic and component analysis provided the foundation for this technical reference, but at that time no one could determine the board's purpose.

The project was set aside.

2.4 Identification (March 2026)

In March 2026, DiRocco resumed the investigation combining Lundy's schematic with pin-by-pin continuity verification, Z80 firmware disassembly of Coleco test software, ADAM Technical Reference Manual port map analysis, and live testing with the Address Book Filer with AutoDialer consumer software. The board was positively identified as the ADAM AutoDialer — the exact PCB used in the released Model #7815 product. The identification was confirmed when a released autodialer unit was opened and found to contain PCB #42730 Rev C.

3. Board Identification

Board Identification	
PCB Number	42730
Revision	C
Copyright	COLECO © 1984
Manufacturer	Coleco Industries, Inc.
Board Type	Single-sided PCB with solder-side traces
Bus Interface	60-pin card edge (ColecoVision/ADAM side expansion port)
Lundy Working Title	"ADAM Mystery Universal Test PCB" / "Multi-Purpose Control"
Quantity Found	500+ reported in Uruguay; 5 acquired for analysis
Condition	New old stock (NOS), unsoldered harness pads

4. Board Dimensions

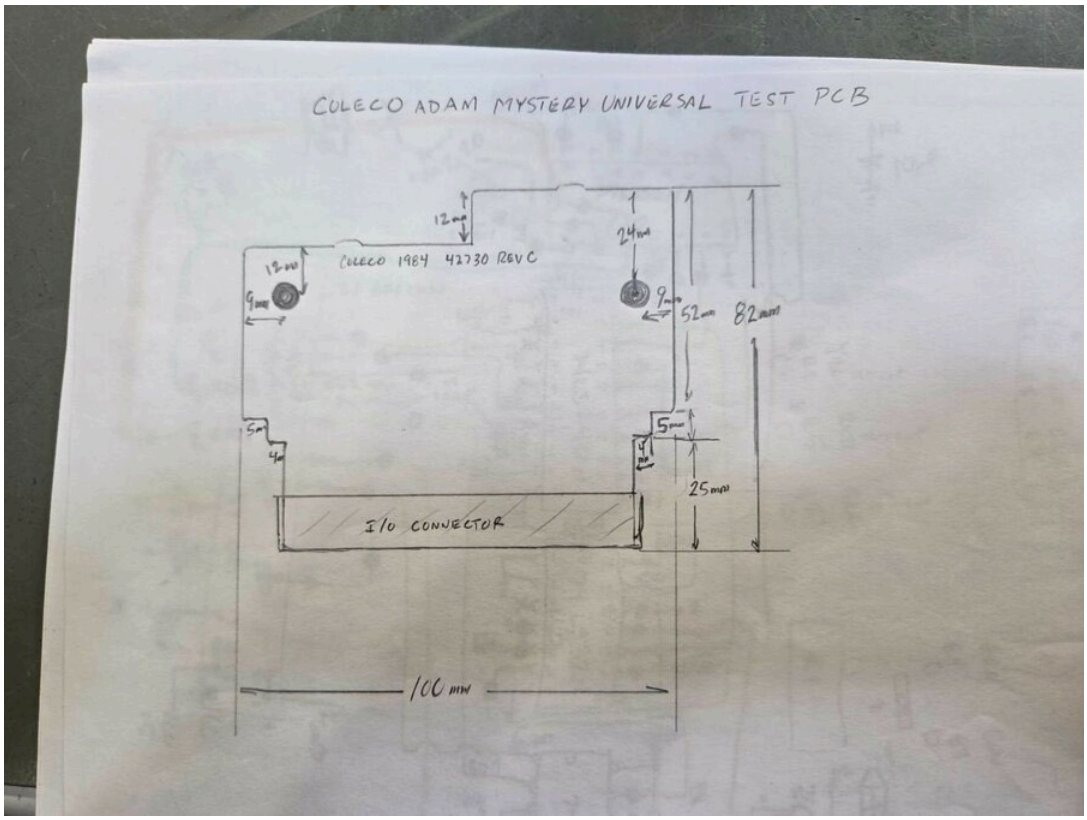

Figure 3-1: Dimensional drawing (Lundy)

Dimensions	
Width	100mm
Height	82mm
Card Edge	Bottom edge, 60-pin
Mounting Holes	2 — see drawing
L-Shaped Notch	Lower right, 25mm tall, 5mm step

4. Component Inventory

5.1 Integrated Circuits

Reference designators per Lundy's schematic.

Ref	Part Number	Package	Manufacturer
U1	SN74LS240N	20-pin DIP	TI, El Salvador, 4238
U2	74LS30PC	14-pin DIP	QR8142, Indonesia
U3	SN74LS32N	14-pin DIP	TI, Philippines, 4328C
U4	SN74LS74AN	14-pin DIP	TI, El Salvador, 223A

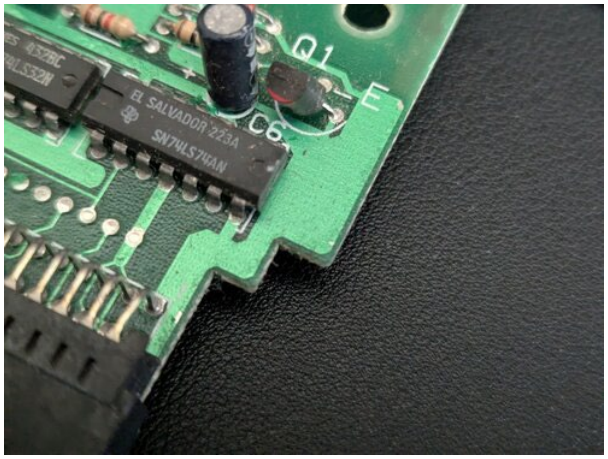

Figure 4-1: U4 confirmed as SN74LS74AN

5.2 Discrete Components

Ref	Part Number	Value	Notes
Q1	2N3904	NPN transistor	EBC pinout, confirmed by diode test + marking
C5	NIC electrolytic	10µF 16V	Near U3, +12V rail filter
C6	NIC electrolytic	10µF 16V	Near K1/U4 area
R1	Resistor	1KΩ	Q1 base bias (Lundy confirmed)
R	Resistor	120Ω	Near C4 (color bands: brown-red-brown)
R	Resistor	1.2KΩ	Driver circuit (brown-red-red)
CR1, CR2	Signal diodes	1N4148 type	Glass body, cathodes point left (away from Q1)
CM1	Electrolytic	10µF 16V NIC	Output filter near Q1

5.3 Wire Harness Pads

Wire Color	Designator	Status Rev C
YEL	E1	N/C — old cut
RED	E5	N/C — old cut
(none)	E6	N/C — old cut
BLK	E7	N/C — old cut
BLK	K1	ACTIVE — Q1 collector
GRN	E4	ACTIVE — tied to K1
GRN	E3	ACTIVE — tied to K1

K1, E4, and E3 are all the same electrical node — Q1's collector. Three pads for one signal.

5. Complete Verified Schematic

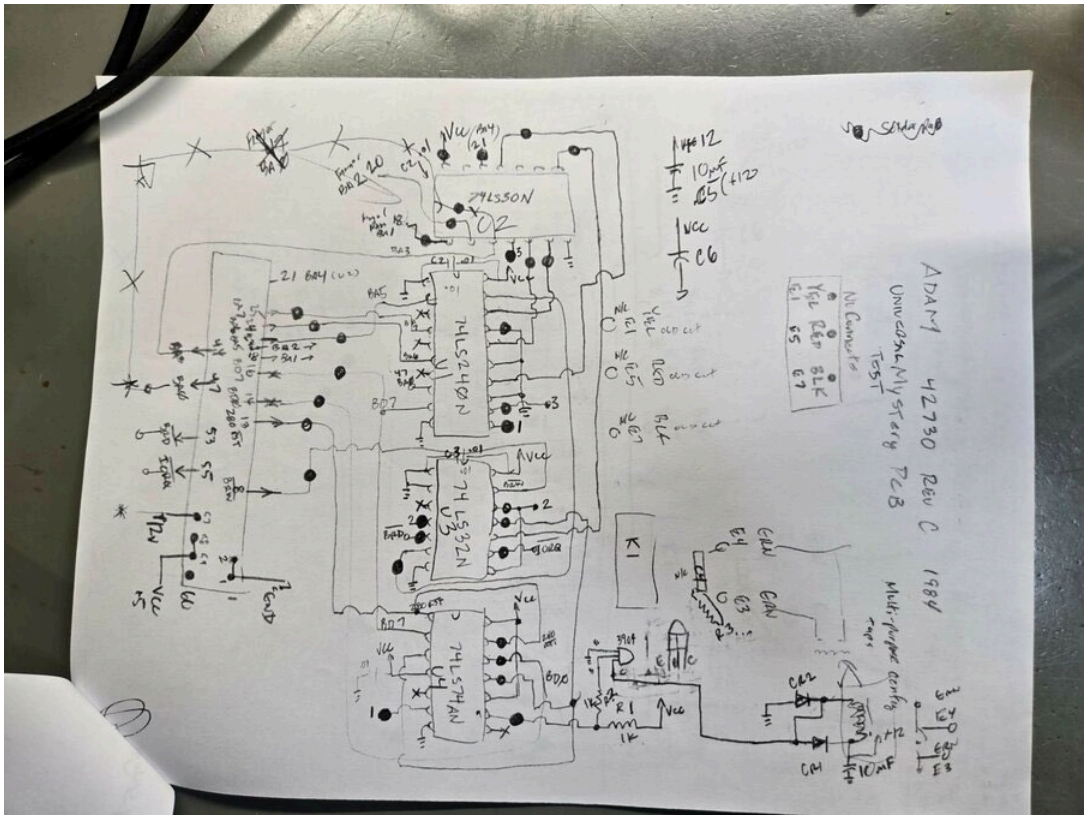

Figure 5-1: Hand-traced schematic (Lundy)

6.1 Card Edge Connections

Pin	Signal	Type	Destination
18	BA1	Addr	U2 pin 1 (decode)
20	BA2	Addr	U2 pin 2 (decode)
21	BA4	Addr	U2 pin 12 (decode)
44	BA3	Addr	U2 pin 3 (decode)
47	BA0	Addr	U1 pin 8 (1A4 input — NOT decoded by U2)
14	BD0	Data	U4 pin 12 (flip-flop 2 D input)
16	BD7	Data	U4 pin 2 (flip-flop 1 D input) via U1 pin 9
8	/BRW	Ctrl	U3 pin 13 (write strobe)
13	Z80 RST	Ctrl	U4 pins 1+13 (/CLR1+/CLR2 — reset clears both flip-flops)
53	/BRD	Ctrl	U3 pin 5 (read enable)
55	/IORQ	Ctrl	U3 pin 9 (I/O qualify)
1, 2	GND	Pwr	IC grounds + U1 section 2 outputs (pins 13, 15, 17)
57	+12V	Pwr	C5 filter
58/59	+5V	Pwr	IC VCC, pull-ups

6.2 U2 — 74LS30 Address Decoder (Complete)

Pin	Function	Connected To	State on Rev C
1	Input A	Exp pin 18 (BA1)	Must be HIGH
2	Input B	Exp pin 20 (BA2)	Must be HIGH
3	Input C	Exp pin 44 (BA3)	Must be HIGH
4	Input D	U1 pin 12 (cut from GND)	Floating — HIGH by default
5	Input E	U1 pin 16 (old cut)	Floating — HIGH by default
6	Input F	U1 pin 18 (old cut)	Floating — HIGH by default
7	GND	Ground	—
8	Output Y	U3 pin 10	Active-low decoded select
9	N/C	—	—
10	N/C	—	—
11	Input G	U1 pin 14 (old cut)	Floating — HIGH by default
12	Input H	Exp pin 21 (BA4)	Must be HIGH
13	N/C	—	—
14	VCC	+5V	—

Active decode inputs: BA1=1, BA2=1, BA3=1, BA4=1. Four inputs (pins 4, 5, 6, 11) are floating HIGH due to trace cuts on Rev C. BA0, BA5, BA6, BA7 are NOT decoded.

Decode pattern: xxxx1111x — BA0 is don't care, upper 3 bits are don't care.

The board responds at every address where bits 1–4 are all 1:

Addresses	Pattern	ColecoVision I/O Region
$1E/$1F	0001111x	$00–$1F: No connection — SAFE
$3E/$3F	0011111x	$20–$3F: No connection — SAFE
$5E/$5F	0101111x	$40–$5F: VDP — CONFLICT
$7E/$7F	0111111x	$60–$7F: VDP — CONFLICT
$9E/$9F	1001111x	$80–$9F: No connection — SAFE
$BE/$BF	1011111x	$A0–$BF: No connection — SAFE
$DE/$DF	1101111x	$C0–$DF: Sound — CONFLICT
$FE/$FF	1111111x	$E0–$FF: Controllers — CONFLICT

Loose decode with bus conflicts — acceptable only in a controlled in-house environment. Does NOT match Dual UART port range ($50–$5C).

6.3 U3 — 74LS32 Control Logic (Complete)

Pin	Func	Connected To	Purpose
1	G1 inA	GND (pins 1/2) + U3-2	Tied LOW
2	G1 inB	GND (pins 1/2)	Tied LOW (U4-6 does NOT connect here)
3	G1 out	Terminates	Gate 1 disabled (inputs grounded, output LOW)
4	G2 inA	U3-8 + U3-12 (Gate 3 out node)	Qualified I/O select
5	G2 inB	Exp pin 53 (/BRD)	Bus Read
6	G2 out	U1 pin 19 (/OE2)	Read enable (dead path on Rev C)
7	GND	Ground	—
8	G3 out	U3-4 + U3-12	Qualified I/O select → Gate 2 + Gate 4
9	G3 inA	Exp pin 55 (/IORQ)	I/O Request
10	G3 inB	U2 pin 8	Address decode output
11	G4 out	U4-3 + U4-11	Write clock to BOTH flip-flops
12	G4 inA	U3-4 + U3-8 (Gate 3 out node)	Qualified I/O select
13	G4 inB	Exp pin 8 (/BRW)	Bus Write
14	VCC	+5V	—

Gate 3 output fans out to both Gate 2 (read path) and Gate 4 (write path). No feedback to U2. The address decoder operates independently; U3 handles all control logic internally: decode → qualify with /IORQ → split into read enable and write clock.

6.4 U1 — 74LS240 (Complete)

Pin	Function	Connected To	Status Rev C
1	/OE1	VCC (pin 20)	Section 1 DISABLED — outputs hi-Z
2	1A1 in	Exp pin 23 (BA5)	Address bit 5 (not used in decode)
3	1Y4 out	Terminates	Dead — /OE1 disabled
4	1A2 in	Exp pin 25 (BA7)	Address bit 7 (not used in decode)
5	1Y3 out	Terminates	Dead — /OE1 disabled
6	1A3 in	Exp pin 24 (BA6)	Address bit 6 (not used in decode)
7	1Y2 out	Terminates	Dead — /OE1 disabled
8	1A4 in	Exp pin 47 (BA0)	Address bit 0 (not used in decode)
9	1Y1 out	BD7 + U4 pin 2	Pass-through (hi-Z, doesn't drive)
10	GND	Ground	—
11	2Y1 out	U4 pin 6 (/Q1)	Receives flip-flop 1 inverted output
12	2A4 in	U2 pin 4 (CUT from GND)	Floating — isolated from card edge on Rev C
13	2Y2 out	Exp pins 1, 2 (GND)	Grounded — no data bus connection
14	2A3 in	U2 pin 11	To address decoder (floating)
15	2Y3 out	Exp pins 1, 2 (GND)	Grounded — no data bus connection
16	2A2 in	U2 pin 5	To address decoder (floating)
17	2Y4 out	Exp pins 1, 2 (GND)	Grounded — no data bus connection
18	2A1 in	U2 pin 6	To address decoder (floating)
19	/OE2	U3 pin 6	Read enable from Gate 2
20	VCC	+5V	—

Section 1: All inputs receive address lines BA0, BA5–BA7 but /OE1 is tied HIGH (disabled). Outputs are hi-Z. Pin 9 serves as passive routing point for BD7 to U4.

Section 2: Inputs connect only to U2 (address decoder). Outputs: pin 11 connects to U4 pin 6 (/Q1) but reaches no data bus line. Pins 13, 15, 17 are grounded through card edge pins 1/2. When /OE2 enables during a read, no useful data reaches the data bus. Read-back is non-functional on Rev C.

6.5 U4 — 74LS74A Output Latch (Complete)

Pin	Function	Connected To	Status Rev C
1	/CLR1	Exp pin 13 (Z80 Reset)	Reset clears flip-flop 1
2	D1 data	Exp pin 16 (BD7) via U1-9	Latches bit 7
3	CLK1	U3-11 + U4-11	Both clocks tied together
4	/PRE1	VCC	Preset disabled
5	Q1 out	Terminates	DEAD END on Rev C
6	/Q1 inv	Cap → VCC; U1-11	AC-coupled to VCC + routed to U1
7	GND	Ground	—
8	/Q2 inv	Not connected	—
9	Q2 out	390Ω → Q1 base	ACTIVE — drives transistor → K1/E4/E3
10	/PRE2	VCC (via pin 14)	Preset disabled
11	CLK2	U3-11 + U4-3	Both clocks tied together
12	D2 data	Exp pin 14 (BD0)	Latches bit 0
13	/CLR2	Exp pin 13 (Z80 Reset)	Reset clears flip-flop 2
14	VCC	+5V (+ U4-10)	—

Both flip-flops latch simultaneously on every write. Only flip-flop 2 (BD0) has an active output path. Flip-flop 1 (BD7) Q output is dead; /Q1 goes to U1 pin 11 and through a cap to VCC. Z80 Reset clears both flip-flops to LOW — ensuring output starts OFF after reset.

6.6 Q1 Transistor Driver (Complete)

Q1 Output Driver	
Transistor	2N3904 NPN, pinout E-B-C (confirmed by marking + diode test)
Base	Driven from U4 pin 9 (Q2) through resistor network
Emitter	Ground (expansion port pin 1)
Collector	K1/E4/E3 wire harness pads (all three tied together)
Load	Aromat DS1E-M relay, DC 12V coil (connected via wire harness in assembled units)
Protection	CR1+CR2 diodes — back-EMF clamp for relay coil switching
Filtering	CM1 (10µF 16V) output filter
Operation	BD0=1 → Q1 ON → relay energized → phone line switched

6. Signal Flow (Rev C)

7.1 Write Cycle

1. Z80 places address on bus with BA4–BA1 = 1111
2. Z80 asserts /IORQ (pin 55 goes low)
3. U2 NAND decodes all inputs HIGH → output (pin 8) goes low
4. U3 Gate 3 ORs U2 decode (pin 10) + /IORQ (pin 9) → output goes low (qualified I/O select)
5. Gate 3 output fans out to Gate 2 (pin 4, read path) and Gate 4 (pin 12, write path)
6. Z80 asserts /BRW (pin 8 goes low)
7. U3 Gate 4 ORs Gate 3 output + /BRW → output goes low
8. Z80 places data on bus — BD0 at U4-12, BD7 at U4-2
9. /BRW returns high → Gate 4 rising edge → both flip-flops latch
10. U4 pin 9 (Q2) = latched BD0 → resistor → Q1 base → collector pulls K1/E4/E3

7.2 Programming Interface

Z80 Instruction	BD0	Output K1/E4/E3
OUT ($1E), $00	0	HIGH (Q1 off, output floats)
OUT ($1E), $01	1	LOW (Q1 on, collector pulls low)
OUT ($1E), $80	0	HIGH (Q1 off) — BD7=1 for verify on Rev A/B
OUT ($1E), $81	1	LOW (Q1 on) + BD7=1

Firmware uses port $1E. Any port where bits 1–4 = 1 works ($1E/$1F, $3E/$3F, $9E/$9F, $BE/$BF). Only BD0 affects output. Output is active-low.

7.3 Read Cycle

Read path exists in hardware: Gate 3 output (qualified I/O select) feeds Gate 2 (pin 4), which ORs with /BRD (pin 5) to enable U1 /OE2. However, on Rev C the read path is non-functional — U1 section 2 outputs are routed to GND/BD7 network. No useful data returns.

7.4 Reset Behavior

Z80 Reset (expansion port pin 13) connects to both /CLR1 and /CLR2 on U4. System reset forces both flip-flop outputs LOW, which turns Q1 OFF, ensuring the output at K1/E4/E3 starts in a known de-energized state.

7. Photographic Documentation

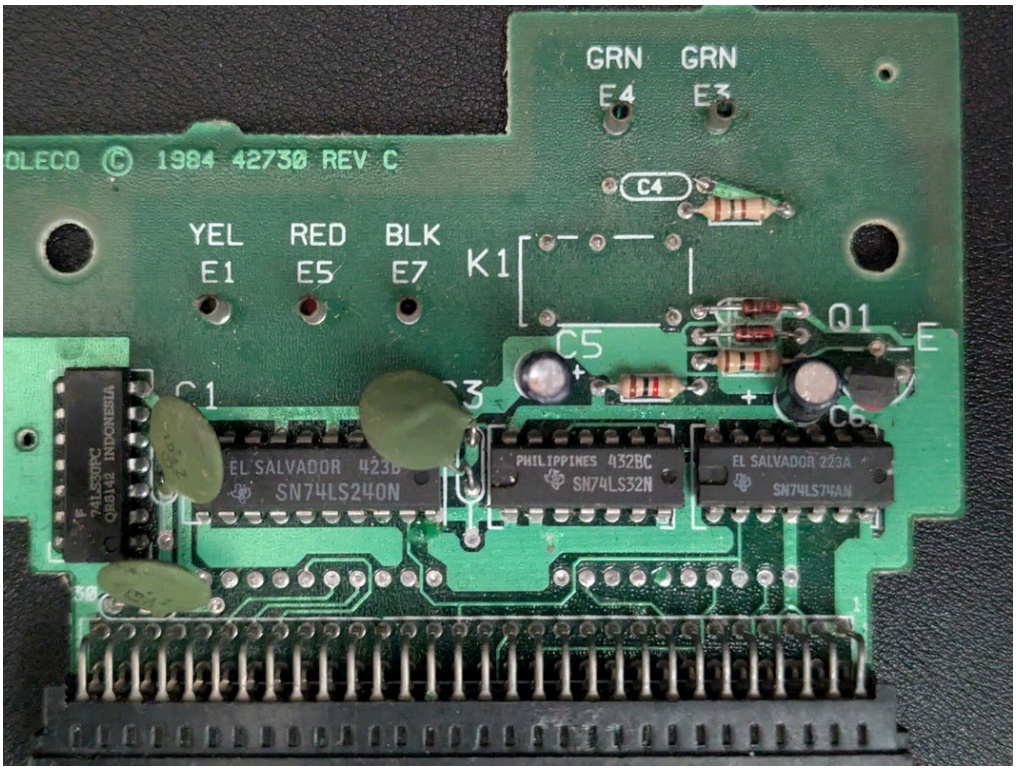

Figure 7-1: Component side

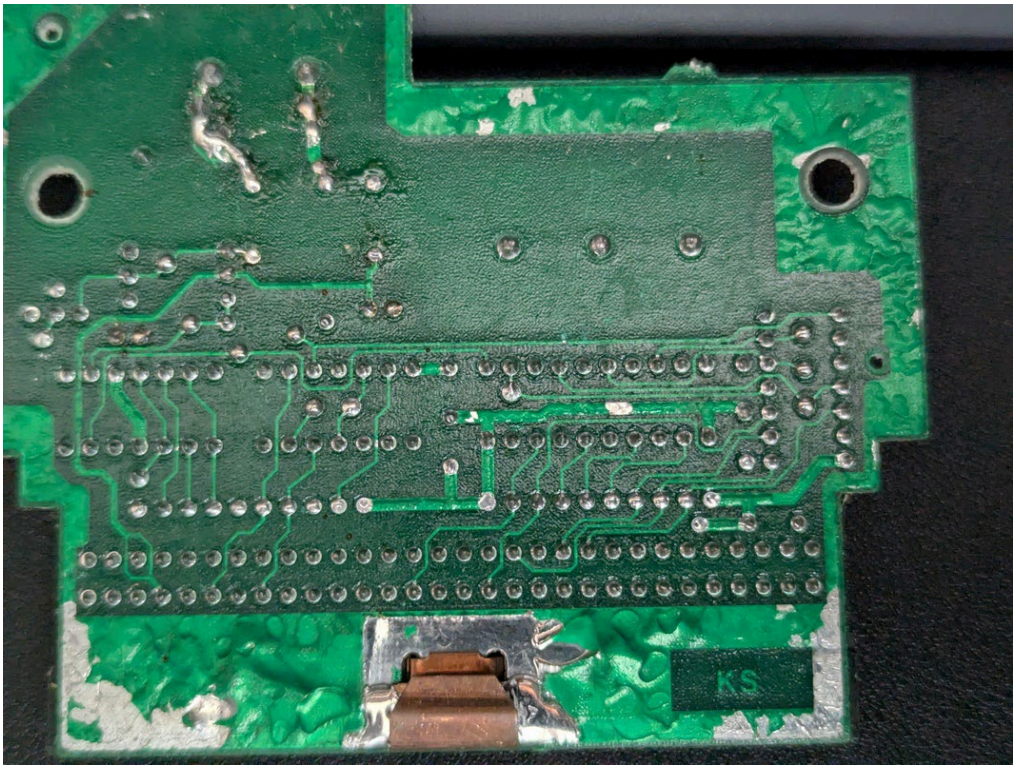

Figure 7-2: Solder side

8. Product Identification

9.1 ADAM Technical Reference Manual — Port $1E Assignment

The ADAM Technical Reference Manual (Preliminary Release, Chapter 3, Section 2.4) provides the official Z80 I/O Port Assignments for the ADAM computer system. Port $1E is designated “Optional Auto Dialer.”

ADAM Z80 I/O Port Map (excerpt)	
$00–$1D	Reserved
$1E	Optional Auto Dialer
$1F	Reserved
$20–$3E	Reserved
$3F*	Network reset; EOS enable
$40–$4E	Reserved
$4F	Expansion connector #2
$50–$5D	Reserved
$5E	Optional Modem Data I/O
$5F	Optional Modem Control Status
$60–$7E	Reserved
$7F	Memory Map Control
$80–$FF	Reserved for ColecoVision use

PCB #42730’s address decoder responds at port $1E — the exact port officially assigned to the Optional Auto Dialer. This is the primary evidence for identification.

9.2 Released Product — ADAM AutoDialer Model #7815

Figure 8-1: ADAM Address Book Filer and AutoDialer retail package

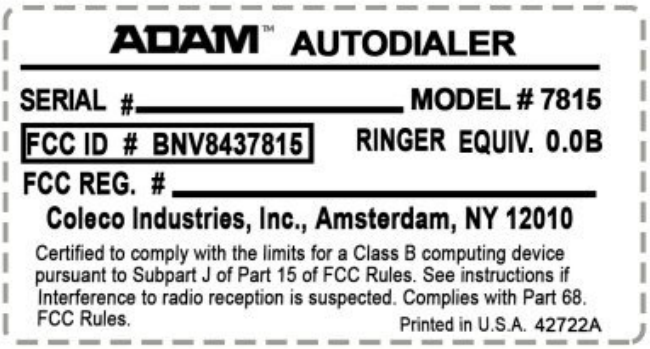

Figure 8-2: ADAM AutoDialer FCC label (Model #7815, assembly 42722A)

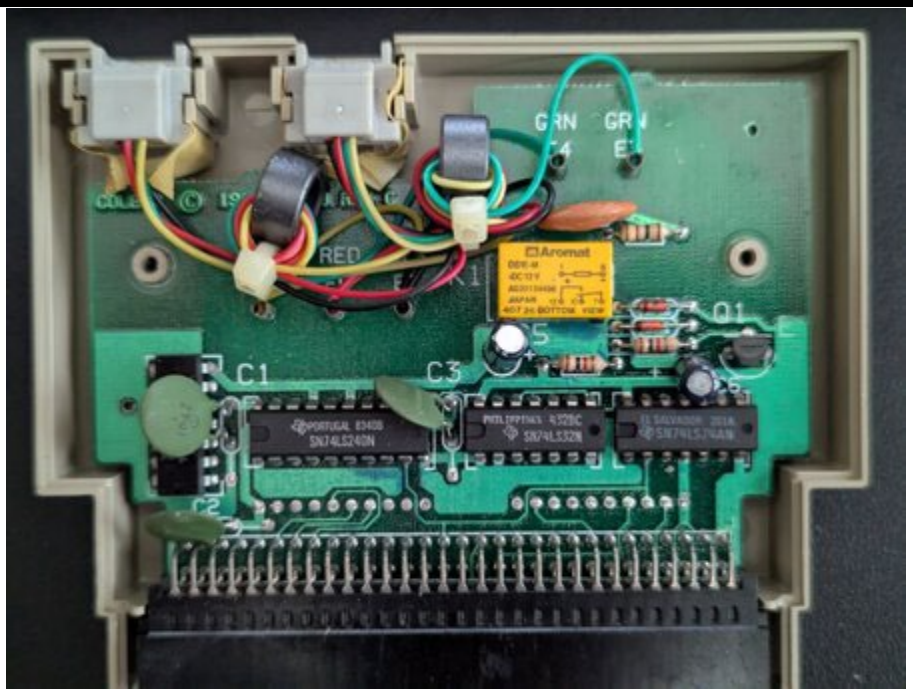

Figure 8-3: Released ADAM AutoDialer interior — PCB #42730 Rev C with relay and harness

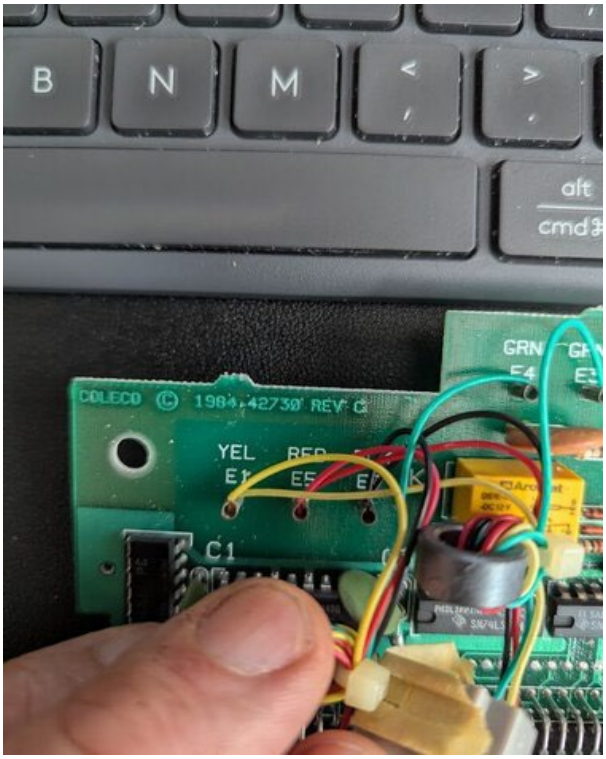

Figure 8-4: Released autodialer PCB marking — COLECO © 1984 42730 REV C

Figure 8-5: Aromat DS1E-M DC 12V relay (0.6A 125VAC / 2A 30VDC)

The released ADAM AutoDialer (Model #7815, FCC ID BNV8437815) uses PCB #42730 Rev C — the identical board. The "42722A" on the FCC label is the assembly or enclosure number, not the PCB number. The circuit board inside the released product is clearly marked "COLECO © 1984 42730 REV C."

The released unit differs from the NOS boards only in assembly state:

Released AutoDialer Assembly Components	
Relay	Aromat DS1E-M, DC 12V coil, SPDT signal relay
Relay ratings	0.6A 125V AC / 0.6A 110V DC / 2A 30V DC (UL LR26550, CSA)
Wire harness	YEL (E1), RED (E5), BLK (E6/E7), GRN (E4/E3) — all populated
GRN wires	E4/E3 to relay coil (Q1 transistor switches 12V through coil)
Phone jacks	Two RJ11 connectors: LINE in + PHONE pass-through
Enclosure	Beige ADAM expansion port shell (assembly #42722A)
ICs	SN74LS240N, SN74LS32N, SN74LS74AN — identical to NOS boards

The Aromat DS1E-M relay is the phone line switching element. Q1 (2N3904) drives the relay's 12V coil via the wire harness at K1/E4/E3. When BD0=1, Q1 turns on, the relay energizes, and the phone line circuit closes (off-hook / dial pulse). When BD0=0, the relay releases and the line opens. CR1/CR2 diodes clamp the back-EMF spike from the relay coil. The +12V coil supply comes from expansion port pin 57.

The NOS boards are production-ready autodialer PCBs that were never assembled with relays, wire harnesses, and enclosures. They are functionally identical to the released product and require only mechanical assembly to become complete ADAM AutoDialers.

9.3 Live Software Test — CONFIRMED

PCB #42730 Rev C was installed in an ADAM via the side expansion port and booted with the Address Book Filer with AutoDialer software (Rev 10D, 1984). Results:

1. Software booted fully — did NOT display “NO AUTODIALER FOUND” error

2. Software recognized the board as autodialer hardware

3. Software attempted to dial a phone number using the board

4. No audible sounds or measured voltage changes at K1/E4/E3 (pending detailed measurement during dial sequence)

The software’s acceptance of PCB #42730 as a valid autodialer confirms functional compatibility with the released product at the I/O protocol level.

9.4 Earlier Candidates — Ruled Out

KID VID Voice Module Adapter: Ruled out by John Lundy. “The board you sent me was modified over and over for different applications and a product like KID VID would be a more complete PCB design.”

In-House Generic Test Tool: Initially assessed as most likely based on loose decode and factory test ecosystem fit. Superseded by autodialer identification through port map evidence, software compatibility, and firmware analysis. The loose decode (responding at $1E/$1F, $3E/$3F, $9E/$9F, $BE/$BF, etc.) was a cost-reduction decision acceptable for a peripheral that would be the only device on the side expansion port.

9.5 NOS vs. Assembled: Same Board, Different Assembly State

Feature	Released (Assembled)	NOS (Unassembled)
PCB	42730 Rev C	42730 Rev C
Product	ADAM AutoDialer Model #7815	Same PCB, pre-assembly
ICs	SN74LS240N, 74LS32N, 74LS74AN	Identical
Relay	Aromat DS1E-M 12V (installed)	Not installed
Wire harness	YEL/RED/BLK/GRN populated	Pads empty
Phone jacks	Two RJ11 (in enclosure)	None
Enclosure	Beige shell (assy #42722A)	None — bare PCB
Software	Compatible	Compatible (tested)
Quantity	Rare (few known complete)	500+ NOS boards found

10. Firmware Analysis — Port $1E in Coleco Test Software

A scan of 13 Coleco test ROMs and disk images, plus the Address Book Filer with AutoDialer consumer software, for OUT instructions matching the board's decode pattern revealed dedicated port $1E routines in the Coleco In-House Test Utilities and autodialer detection via port $3F in the consumer software.

10.1 Files Scanned

File	Size	Port $1E Hits
Coleco In-House Test Utilities Ver. 1	160KB	41 accesses
Coleco In-House Test Utilities Ver. 2	160KB	41 accesses
Coleco In-House Test Utilities Ver. 3	160KB	40 accesses
Address Book Filer with AutoDialer Rev 10D	160KB	0 ($1E), 1 ($3F)
ADAM Final Test - Menu Version (3 variants)	16KB ea	0 (port $1E)
ADAM Final Test Rev 3.3	16KB	0 (port $1E)
ColecoVision Final Test (4 variants)	7-32KB	0 (port $1E)
CBS ColecoVision Final Test	32KB	0 (port $1E)
System Hardware Test	8KB	0 (port $1E)

Port $1E accesses appear ONLY in the In-House Test Utilities disk images — the software specifically labeled for internal Coleco factory use. None of the consumer-facing Final Test ROMs or the System Hardware Test ROM contain $1E accesses. The $BF/$BE and $FF hits found in all ROMs are standard TMS9928A VDP and controller port operations that would trigger the board as a side effect of the loose decode but are not intended for it.

10.2 Routine 1: Board Presence Verification

The primary routine performs a four-pass write/read verification of bit 7 (BD7) through port $1E. This routine appears identically in all three versions of the In-House Test Utilities.

Annotated Z80 disassembly (from Ver.1 at disk offset $1B2CE):

Address	Instruction	Purpose
	LD A,($8645)	Load board-present flag
	CP $FF	Already tested?
	RET Z	Return if already done
		--- Pass 1: Write HIGH ---
	LD A,$80	A = $80 (bit 7 = 1)
	OUT ($1E),A	Write to board — latches BD7=1
	IN A,($1E)	Read back from board
	AND $80	Mask bit 7 only
	CP $80	Bit 7 came back HIGH?
	JP NZ,fail	FAIL if not — board absent/broken
		--- Pass 2: Write LOW ---
	LD A,$00	A = $00 (bit 7 = 0)
	OUT ($1E),A	Write to board — latches BD7=0
	IN A,($1E)	Read back from board
	AND $80	Mask bit 7 only
	CP $00	Bit 7 came back LOW?
	JP NZ,fail	FAIL if not
		--- Pass 3: Write HIGH (repeat) ---
	LD A,$80 / OUT / IN / AND / CP	Same as Pass 1
		--- Pass 4: Write LOW (repeat) ---
	LD A,$00 / OUT / IN / AND / CP	Same as Pass 2
		--- Board Verified ---
	LD A,$55	Success marker
	LD ($8645),A	Store “board present” flag
	CALL sub (B=1,9,3,5...)	Begin test sequence with 11 sub-calls

CRITICAL FINDING: This routine requires a working BD7 read-back path. It writes $80 (BD7=1) to the board, then immediately reads port $1E and checks whether bit 7 returns HIGH. On Rev C, the read path is dead — U1 section 2 outputs are grounded, and no useful data returns from a read. This software was written for an earlier revision (Rev A or Rev B) where flip-flop 1’s output was routed back through the ’74LS240 to the data bus during read cycles.

10.3 Routine 2: Active Output Control (BD0)

After the board passes verification, a second routine uses BD0 (bit 0) as an active control output — exactly as the Rev C hardware supports:

Address	Instruction	Purpose
	LD A,$01	A = $01 (bit 0 = 1)
	OUT ($1E),A	Write to board — BD0=1 → Q1 ON → K1 LOW
	LD DE,$0260	Delay loop: 608 iterations
	(delay loop)	~1.8ms at 3.58MHz
	IN A,($FC)	Read ADAMnet status register
	AND $01	Check ADAMnet bit 0
	(RAM test at $8000)	Write/read $8000 while output active
	LD A,$00	A = $00 (bit 0 = 0)
	OUT ($1E),A	Write to board — BD0=0 → Q1 OFF → K1 floats
	(delay + verify)	Repeat timing loop and verification

The routine activates the board's transistor output (K1/E4/E3), performs timed operations involving ADAMnet and RAM testing, then deactivates the output. The delay loops and ADAMnet polling suggest the board's output was controlling external test equipment — possibly a relay switching a signal path, a fixture solenoid, or an indicator on a test station — while the software verified ADAM system functions.

10.4 Routine 3: Port $3F Pulse

A separate routine in the In-House Test Utilities writes to port $3F (also within the board's decode range):

Address	Instruction	Purpose
	LD A,$0F	A = $0F (bits 0–3 set)
	OUT ($3F),A	Write to port $3F — BD0=1 → Q1 ON
	(delay: count 255→0)	~710µs pulse width
	XOR A	A = $00
	OUT ($3F),A	Write $00 — BD0=0 → Q1 OFF

This generates a single timed pulse on the output — approximately 710 microseconds at 3.58MHz. The use of $3F rather than $1E may indicate a different test module or configuration that expected a different port, or it may be a secondary test of the same board at an alternate decoded address.

10.5 Firmware Analysis Summary

Firmware Findings	
Factory test software	Coleco In-House Test Utilities Ver. 1, 2, 3 — port $1E
Consumer software	Address Book Filer with AutoDialer Rev 10D — port $3F detection
Port $1E assignment	ADAM Technical Reference Manual: “Optional Auto Dialer”
BD7 function	Write/read verification of board presence (In-House Test Utilities)
BD0 function	Active output control — dial pulse generation via Q1 transistor
Rev C compatibility	Consumer software works. Factory test Routine 1 fails (no BD7 read-back).
Test context	Port $1E code near “AUTODIALER PASS/FAIL” messages in FINAL ADAM TEST

The firmware evidence confirms PCB #42730 as the ADAM AutoDialer. Port $1E is the officially designated autodialer port in the ADAM architecture, and both factory test and consumer software communicate with hardware at this address.

11. Remaining Investigations

#	Item	Status
1	I/O port address	RESOLVED — xxxx1111x, primary port $1E
2	Product identification	RESOLVED — ADAM AutoDialer (port $1E per ADAM Tech Ref Manual)
3	Software compatibility	RESOLVED — Address Book Filer recognizes board, attempts dial
4	Firmware match	RESOLVED — In-House Test Utilities + consumer autodialer software
5	All IC pins traced	RESOLVED — U1, U2, U3, U4 complete
6	Q1 transistor	RESOLVED — 2N3904 NPN, E-B-C, emitter→GND, collector→K1
7	Diode orientation	RESOLVED — CR1/CR2 cathodes left
8	Voltage test during dial	PENDING — meter K1 vs GND while software dials
9	PCB vs. released product	RESOLVED — same board (42730 Rev C confirmed in released unit)
10	Rev A/B boards	PENDING — locate earlier revisions with BD7 read-back
11	Enclosure match	RESOLVED — fits beige ADAM autodialer shell (assy #42722A)
12	Passive component detail	PENDING — John Lundy verification of resistor/diode/cap network
13	Wire harness destination	PENDING — K1/E4/E3 → DAA / phone line interface circuit

12. Contributors

Contributors	
Richard DiRocco	Board acquisition, photography, pin-by-pin verification, live software testing, firmware collection, ColecoVision ADAM Archive
John Lundy (Lundy Electronics)	Hand-traced schematic, dimensional drawing, component analysis & online daily support
The Slopsema's (MicroFox)	Hardware analysis
Milli	Hardware analysis
soviet (AtariAge)	Original discovery in Uruguay (2018), board source
Tursi (AtariAge)	IC identification, early analysis (2021)
Tekman (AtariAge)	Relay and phone line analysis, early analysis (2021)
Claude (Anthropic)	Firmware disassembly, port map analysis, document generation (2026)

Related Documents	
ADAM Technical Reference Manual	Chapter 3, Section 2.4: Z80 I/O Port Assignments — port $1E
Address Book Filer with AutoDialer	Rev 10D (1984) — consumer software, compatibility confirmed
Coleco In-House Test Utilities	Disk images Ver. 1, 2, 3 — factory test routines at port $1E
ADAM AutoDialer Model #7815	Released product, PCB #42722A, FCC ID BNV8437815
Expansion Port Pinout	60-pin side connector signal assignments

This document is part of the ColecoVision ADAM Archive preservation project.