

# Readiness report — DPScope USB Oscilloscope

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## Readiness: DPScope USB Oscilloscope

**Verdict: At risk** · 2026-09-02 · est. parts cost \$85–\$115 (excluding the bare PCB, which has no verified source) **Cybersecurity — software & network: Could not check**

Every discrete electronic part on this BOM can be bought today from an authorized distributor, either as the part the snapshot names or as a substitute verified below. What fails is the one item nobody else makes: the custom DPScope PCB. Its only stated source, <http://www.dpscope.com>, no longer resolves — a page fetch this run returned nothing — no Gerber or CAD files were supplied with the lab, and a web search for a bare board or layout files turned up nothing about this project. An instructor who already holds boards can rebuild everything else from this report; an instructor starting from zero cannot currently get a board. The verdict moves from **Ready with caveats** to **At risk** for that reason alone: parts availability did not deteriorate since the previous report — prices and stock are effectively unchanged — but this run checked the vendor site and the board, which the previous report left as "not checked". Nine BOM lines name a part that is obsolete, out of stock everywhere, or the wrong package for this through-hole board; three of those are errors in the snapshot's own example part numbers rather than market drift, and all nine have in-stock substitutes.

## Action required

| Part                                | Problem                                                                                                                                                                                                                                                     | Recommended action                                                                                                                                                                                                                                                                 |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Printed circuit board               | <b>New since the previous report</b> (it was "not checked"). No source found: the vendor site <a href="http://www.dpscope.com">www.dpscope.com</a> does not resolve, no layout files shipped with the lab, and a web search found no bare board or Gerbers. | Check the surviving mirror <a href="http://dpscope.freevar.com/downloads.html">dpscope.freevar.com/downloads.html</a> by hand for a layout file; otherwise the board must be reverse-engineered from the assembly manual's dimensioned drawings before a new section can be built. |
| ERA-6AEB912V (9.1 kΩ, R7/R10)       | <b>New since the previous report</b> (it was "not checked"). The snapshot's example part is a surface-mount 0805 chip resistor rated 0.125 W — wrong package for an all-through-hole board and under the 0.25 W the lab asks for.                           | Order axial <a href="http://Yageo.com">Yageo MFR-25FBF52-9K1</a> — 9.1 kΩ, 1%, 0.25 W, \$0.10, 7,853 in stock.                                                                                                                                                                     |
| RJ-6P504 (500 kΩ trimmers, VR1/VR2) | Out of stock at every authorized distributor (DigiKey 0 with a 12-week factory lead; Mouser 0; Avnet 0).                                                                                                                                                    | Substitute <a href="http://Bourns.com">Bourns 3362P-1-504LF</a> — \$1.23, 869 in stock; confirm the pin pattern against the board.                                                                                                                                                 |

| Part                                                    | Problem                                                                                                                                                                                                        | Recommended action                                                                                                                                                                           |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TZC3P300A110<br>(trimmer caps, C18/<br>C19)             | Obsolete, zero stock, and the part DigiKey returns is surface-mount with a 6.5–30 pF range — twice wrong for this board. The equivalent problem appeared under a different part number in the previous report. | Substitute through-hole <a href="#">EW Electronics GKG50015</a> — 10–50 pF, \$1.57, 2,459 in stock. Note its range stops at 50 pF, not 60 pF.                                                |
| TE 1-390261-3 (14-pin<br>DIP socket)                    | <b>New since the previous report</b> (it was "not checked"). Obsolete; zero stock at every distributor checked; ECIA lifecycle risk High.                                                                      | Substitute <a href="#">On Shore ED14DT</a> (\$0.52, 14,227) or <a href="#">Adam Tech ICS-314-T</a> (\$0.60, 26,816).                                                                         |
| 3M 4808-6004-CP (8-<br>pin DIP sockets)                 | <b>New since the previous report</b> (it was "not checked"). Not in the DigiKey catalogue at all, and no ECIA-authorized distributor lists it.                                                                 | Substitute <a href="#">On Shore ED08DT</a> (\$0.47, 11,853) or <a href="#">Adam Tech ICS-308-T</a> (\$0.69, 14,314).                                                                         |
| K470J15C0GF5TH5 /<br>K101J15C0GF5TH5 (47<br>pF, 100 pF) | <b>New since the previous report</b> (both were "not checked"). Both example parts have 5.00 mm lead spacing; the snapshot specifies 2.54 mm for these positions.                                              | Order the 2.50 mm-pitch siblings <a href="#">K470J15C0GH53L2</a> and <a href="#">K101J15C0GH53L2</a> — \$0.34 each, both in stock.                                                           |
| 68001-106HLF (6-pin<br>header, J_USB)                   | <b>New since the previous report</b> (never checked). The named part is the <b>vertical</b> variant; the BOM calls for a right-angle header.                                                                   | Order <a href="#">Amphenol ICC 68016-106HLF</a> — right-angle, same \$0.61, 16,566 in stock — if the board wants right-angle.                                                                |
| Keystone 1514-4 (CAL<br>turret pins)                    | <b>New since the previous report</b> (never checked). No DigiKey listing; ECIA shows zero stock at all five distributors, with 5,000-piece minimums where it is orderable.                                     | Use the assembly guide's 2-pin 0.1" header instead: <a href="#">Molex 0022284023</a> (\$0.48, 3,485 in stock) or a breakaway strip, <a href="#">Sullins PRPC040SAAN-RC</a> (\$1.23, 48,820). |
| 3M PB4NT18-C (nylon<br>cable tie)                       | <b>New since the previous report</b> (never checked). Discontinued at DigiKey, zero stock.                                                                                                                     | Substitute <a href="#">3M CT4NT18-C</a> (\$0.0474, 5,100 in stock), or any miniature nylon tie — the snapshot allows it.                                                                     |
| UVR1E101MDD (100 µF<br>option for C9)                   | <b>New since the previous report.</b> The part number in the snapshot returns no products at DigiKey and no ECIA-authorized distributor lists it.                                                              | Use the 470 µF option <a href="#">Nichicon UVR1E471MPD1TD</a> (\$0.48, 22,737), or the 100 µF <a href="#">Panasonic ECA-1VHG101I</a> (\$0.44, 417) if C9's pads are on 2.5 mm centres.       |

## Cybersecurity — software & network

**Could not check** — Every software component in this lab is a proprietary vendor binary with no advisory database and no fetchable manifest, so no vulnerability or support check could run; the one thing that could be established is that their sole distribution site no longer resolves.

Since the previous report: First software check for this lab — the previous report predates the snapshot's software section and recorded nothing, so every finding here is new.

| Component                                         | Version        | How known                                                                                                                                                                                                      | Support status |
|---------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| DPScope PC Software (host GUI application)        | 1.4.6          | inferred (version printed on the cover of the lab's user_manual.pdf per the snapshot section; no package manifest exists and the vendor download site could not be reached this run to confirm what it serves) | —              |
| DPScope firmware (dsPIC30F2020)                   | V2.1           | inferred (version stated in the lab's user_manual.pdf (pages 2, 23-25) per the snapshot section; no source repository, commit or build artifact was supplied)                                                  | —              |
| FTDI Virtual COM Port (VCP) USB driver            | not determined | unpinned (the assembly guide (step 24) names only 'the FTDI USB driver'; whatever version the download site serves at install time is what students get)                                                       | —              |
| FTDI MProg / FT_PROG EEPROM configuration utility | not determined | not determined (the assembly guide's screenshots (page 28) show MProg 3.5 or an FT_PROG equivalent, but no version is stated anywhere in the lab materials)                                                    | —              |
| Microsoft Windows (host PC operating system)      | 10             | inferred (the snapshot's system requirements record the host software as tested on Windows XP, Vista, 7, 8 and 10; the newest of those is taken as the reference version)                                      | —              |

| Component                                  | Finding                                                                                                                                                                                                                                                                | Severity | Fix available?                                                                                                                                                                      |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DPScope firmware (dsPIC30F2020)            | The firmware image for the microcontroller is distributed from the same dead domain, so a blank replacement dsPIC30F2020 bought from a distributor cannot be programmed from the source the manual names. <b>(new)</b>                                                 | posture  | Mitigation only — read out and archive the firmware from a working board, or check the dpscope.freevar.com mirror for the hex file, before ordering blank microcontrollers.         |
| DPScope PC Software (host GUI application) | The only download source the lab names for the host application, www.dpscope.com, no longer resolves in DNS, so the installer cannot be obtained or re-obtained from the vendor and any copy found elsewhere cannot be checked against an original. <b>(new)</b>       | posture  | Mitigation only — archive the working installer you already have, and treat a copy from the surviving mirror at dpscope.freevar.com or any third-party site as unverified software. |
| FTDI Virtual COM Port (VCP) USB driver     | The USB serial driver is installed unpinned — no version is recorded anywhere in the lab materials — and one of the two sources the lab names for it is the dead vendor domain, so there is no version to check and no record of what students installed. <b>(new)</b> | posture  | Mitigation only — install the driver from FTDI's own site, then record the version installed with the lab materials so it can be checked next time.                                 |

## What this means for your lab

The DPSCOPE is a USB-only instrument. It has no network interfaces and no listening services, so there is nothing here for someone else on your campus network to connect to, and no student data leaves the PC it is plugged into. The fixed FTDI serial string 'FTE0ZZ3K' in the build instructions is a device-matching identifier that the PC program looks for when it hunts for the scope — it is not a password, and nothing is protected by it. The real problem is supply and provenance rather than attack: the vendor's website is gone, so the PC application, the firmware image and the FTDI configuration file can no longer be downloaded from the source the manual names, and a mirror site that still responds cannot be checked against an original. Practically: archive your working copies of the installer, the firmware hex and the DPSCOPE.ept file with the rest of the lab materials now, while you still have them; treat any copy downloaded from a third-party site as unverified and install it on a lab PC that does not hold student records or saved credentials; and do not assume you will be able to re-download any of it next term.

## Not checked

- DPSCOPE PC Software 1.4.6: proprietary Windows desktop binary: no public vulnerability database covers it, and the vendor site does not resolve, so the shipped installer could not be retrieved or examined
- DPSCOPE firmware V2.1: vendor firmware binary for a dsPIC digital signal controller: no advisory database covers it and no source was published
- FTDI Virtual COM Port (VCP) USB driver: unpinned vendor hardware driver: no version is stated in the lab materials, so there is nothing exact to look up
- FTDI MProg / FT\_PROG EEPROM configuration utility: legacy vendor utility with no version stated and no advisory database
- windows 10: support status: version matches no release cycle on endoflife.date

## Parts

### Microcontroller and Clock

| Part                                               | Spec/<br>Package                            | Status | Stock                                       | Price                  | Source  | Drift                                                                                                   |
|----------------------------------------------------|---------------------------------------------|--------|---------------------------------------------|------------------------|---------|---------------------------------------------------------------------------------------------------------|
| Microcontroller<br>(dsPIC):<br>DSPIC30F2020-30I/SP | 28-DIP<br>(0.300",<br>7.62 mm),<br>28-SPDIP | Active | 7 (DigiKey);<br>Mouser 444,<br>Spirit 1,275 | <a href="#">\$7.85</a> | DigiKey | Previous report had an<br>invalid MPN<br>( dsPIC30F2020-E/P ) and<br>no price; now priced and<br>Active |

| Part                                    | Spec/<br>Package                            | Status              | Stock                           | Price                  | Source  | Drift                                  |
|-----------------------------------------|---------------------------------------------|---------------------|---------------------------------|------------------------|---------|----------------------------------------|
| Ceramic Resonator (X1): CSTLS16M0X53-B0 | 16 MHz, Radial 3-lead, 2.50 mm pitch, 15 pF | Not For New Designs | 13,806 (DigiKey); Mouser 16,534 | <a href="#">\$0.34</a> | DigiKey | Unchanged (\$0.34, 13,806); still NFND |

## Analog Front-End ICs

| Part                                            | Spec/Package                      | Status | Stock                                  | Price                  | Source  | Drift                     |
|-------------------------------------------------|-----------------------------------|--------|----------------------------------------|------------------------|---------|---------------------------|
| Quad Op-Amp (OP1): MCP6024-I/P                  | 14-DIP (0.300"), supply 2.5–5.5 V | Active | 295                                    | <a href="#">\$2.72</a> | DigiKey | Unchanged (\$2.72, 295)   |
| Programmable Gain Amp (PGA1, PGA2): MCP6S22-I/P | 8-DIP (0.300")                    | Active | 25 (DigiKey); Mouser 214, Spirit 4,980 | <a href="#">\$1.97</a> | DigiKey | Unchanged (\$1.97, 25)    |
| Dual 12-Bit DAC (DAC1): MCP4822-E/P             | 8-DIP (0.300"), supply 2.7–5.5 V  | Active | 1,172                                  | <a href="#">\$4.28</a> | DigiKey | Unchanged (\$4.28, 1,172) |

## Diodes and Optoelectronics

| Part                               | Spec/Package                        | Status | Stock  | Price                  | Source  | Drift                                                                                            |
|------------------------------------|-------------------------------------|--------|--------|------------------------|---------|--------------------------------------------------------------------------------------------------|
| Clamping Diodes (D1–D4): 1N914ATR  | DO-35 axial, Vr 100 V, Io 200 mA    | Active | 50,665 | <a href="#">\$0.30</a> | DigiKey | Unchanged (\$0.30, 50,665)                                                                       |
| Status Indicator (LED1): LTL-4221N | 5 mm T-1 red diffused, through hole | Active | 23,803 | <a href="#">\$0.19</a> | DigiKey | Previous report priced a different LED (Kingbright WP7113ID, \$0.21) — no baseline for this part |

## Resistors

| Part                                            | Spec/<br>Package         | Status | Stock   | Price                  | Source  | Drift                                    |
|-------------------------------------------------|--------------------------|--------|---------|------------------------|---------|------------------------------------------|
| 470 $\Omega$ (R19): CF14JT470R                  | Axial, 0.25 W, $\pm 5\%$ | Active | 160,964 | <a href="#">\$0.10</a> | DigiKey | —                                        |
| 1 k $\Omega$ (R5, R8, R11, R14–R18): CF14JT1K00 | Axial, 0.25 W, $\pm 5\%$ | Active | 527,518 | <a href="#">\$0.10</a> | DigiKey | Stock 527,893 → 527,518; price unchanged |

| Part                                       | Spec/<br>Package                                             | Status                                | Stock                                     | Price                  | Source            | Drift                                                                                                 |
|--------------------------------------------|--------------------------------------------------------------|---------------------------------------|-------------------------------------------|------------------------|-------------------|-------------------------------------------------------------------------------------------------------|
| 9.1 kΩ 1% (R7, R10):<br>ERA-6AEB912V       | <b>SMD 0805</b> ,<br>0.125 W,<br>±0.1% —<br>wrong<br>package | Active but<br>unusable<br>here        | 9,900                                     | <a href="#">\$0.10</a> | DigiKey           | Was "not checked"; now<br>a hard package<br>mismatch — see<br>Substitutes                             |
| 249 kΩ 1% (R2, R4):<br>RNF14FTD249K        | Axial 2.35 ×<br>6.35 mm,<br>0.25 W,<br>±1%                   | Active                                | 21,094                                    | <a href="#">\$0.11</a> | DigiKey           | Replaces the previous<br>report's out-of-stock<br>RNMF14FTC249K; now in<br>stock                      |
| 750 kΩ (R1, R3):<br>CF14JT750K             | Axial, 0.25<br>W, ±5%                                        | Active                                | 33,521                                    | <a href="#">\$0.10</a> | DigiKey           | —                                                                                                     |
| 500 kΩ Trimmers<br>(VR1, VR2):<br>RJ-6P504 | 500 kΩ, 0.5<br>W, through<br>hole, round<br>7.00 mm          | Active, out of<br>stock<br>everywhere | 0 (DigiKey,<br>Mouser,<br>Avnet all<br>0) | —                      | DigiKey /<br>ECIA | Previous report priced<br>Bourns 3362P-1-504LF<br>instead; the snapshot's<br>own part is unobtainable |

## Capacitors

| Part                                        | Spec/<br>Package                                                               | Status                    | Stock                                 | Price                  | Source  | Drift                                                                                   |
|---------------------------------------------|--------------------------------------------------------------------------------|---------------------------|---------------------------------------|------------------------|---------|-----------------------------------------------------------------------------------------|
| 22 pF C0G (C5, C8):<br>K220J15C0GH53L2      | Radial, 100<br>V, lead<br>spacing<br>2.50 mm                                   | Active                    | 11,409                                | <a href="#">\$0.34</a> | DigiKey | Was "not checked";<br>correct pitch, no action<br>needed                                |
| 47 pF C0G (C6, C11):<br>K470J15C0GF5TH5     | Radial, 50<br>V, <b>lead<br/>spacing<br/>5.00 mm</b><br>(spec asks<br>2.54 mm) | Active,<br>wrong<br>pitch | 16,391                                | <a href="#">\$0.27</a> | DigiKey | Was "not checked"; see<br>Substitutes                                                   |
| 100 pF C0G (C14, C15):<br>K101J15C0GF5TH5   | Radial, 50<br>V, <b>lead<br/>spacing<br/>5.00 mm</b><br>(spec asks<br>2.54 mm) | Active,<br>wrong<br>pitch | 81,370                                | <a href="#">\$0.27</a> | DigiKey | Was "not checked"; see<br>Substitutes                                                   |
| Trimmer Caps (C18, C19):<br>TZC3P300A110R00 | <b>Surface<br/>mount</b> ,<br>4.50 × 3.20<br>mm, 6.5–30<br>pF                  | Obsolete                  | 0; no ECIA<br>distributor<br>lists it | —                      | DigiKey | Same problem as the<br>previous report's<br>TZ03Z500E169B00,<br>under a new part number |

| Part                                                                     | Spec/<br>Package                                               | Status       | Stock                       | Price                  | Source         | Drift                                                                                                                   |
|--------------------------------------------------------------------------|----------------------------------------------------------------|--------------|-----------------------------|------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------|
| 0.1 $\mu$ F X7R (C1-C4, C7, C10, C12, C13, C16, C17):<br>K104K15X7RF5TH5 | Radial, 50 V, lead spacing 5.00 mm                             | Active       | 345,661                     | <a href="#">\$0.29</a> | DigiKey        | Previous report priced the 2.50 mm sibling K104K15X7RF53L2 at \$0.27 (32,668 → 32,552 in stock today)                   |
| Electrolytic (C9), 470 $\mu$ F option:<br>UVR1E471MPD1TD                 | 470 $\mu$ F, 25 V, radial can, lead spacing 5.00 mm, 10 mm dia | Active       | 22,737                      | <a href="#">\$0.48</a> | DigiKey        | Was "not checked" under this part number; previous report priced Panasonic ECA-1VHG101I (\$0.44, 417 — unchanged today) |
| Electrolytic (C9), 100 $\mu$ F option:<br>UVR1E101MDD                    | 100 $\mu$ F, 25 V radial (per assembly guide)                  | No such part | 0 products; no ECIA listing | —                      | DigiKey / ECIA | New finding — see Substitutes                                                                                           |

## Sockets, Connectors, and Interconnects

| Part                                   | Spec/Package                                           | Status           | Stock                                    | Price                  | Source         | Drift                                                                                                   |
|----------------------------------------|--------------------------------------------------------|------------------|------------------------------------------|------------------------|----------------|---------------------------------------------------------------------------------------------------------|
| 28-Pin DIP Socket:<br>4828-6004-CP     | 28-pos DIP, through hole, 0.100" mating and post pitch | Active           | 2,147 (DigiKey); 5 distributors in stock | <a href="#">\$1.61</a> | DigiKey        | Replaces the previous report's obsolete 4828-3000-CP; now healthy                                       |
| 14-Pin DIP Socket:<br>1-390261-3       | 14-pos DIP, through hole, 0.100" pitch                 | Obsolete         | 0 at all five distributors checked       | —                      | DigiKey / ECIA | Was "not checked"; see Substitutes                                                                      |
| 8-Pin DIP Sockets (×3): 4808-6004-CP   | 8-pos DIP, 300 mil                                     | Not in catalogue | 0 products; no ECIA listing              | —                      | DigiKey / ECIA | Was "not checked"; see Substitutes                                                                      |
| BNC Connectors (J1, J2):<br>0731000105 | BNC receptacle, through hole, right angle, 50 $\Omega$ | Active           | 7,801                                    | <a href="#">\$2.25</a> | DigiKey        | Previous report priced Amphenol 112408 (\$5.45, 152) — this is the snapshot's named part and is cheaper |

| Part                                                         | Spec/Package                                                               | Status                                                           | Stock                                                   | Price                  | Source  | Drift                                       |
|--------------------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------|------------------------|---------|---------------------------------------------|
| BNC Connectors<br>— panel-mount<br>option: 031-5540          | BNC<br>receptacle,<br>right angle,<br>bulkhead<br>front-side nut,<br>1 GHz | Active                                                           | 560<br>(DigiKey); 5<br>distributors in<br>stock         | <a href="#">\$6.47</a> | DigiKey | —                                           |
| 6-Pin Header<br>(J_USB):<br>68001-106HLF                     | <b>Vertical</b> 1×6,<br>0.100" pitch<br>(BOM asks<br>right-angle)          | Active, wrong<br>orientation                                     | 10,523                                                  | <a href="#">\$0.61</a> | DigiKey | Never checked<br>before; see<br>Substitutes |
| Calibration<br>Header (JP_CAL):<br>Keystone 1514-4<br>turret | Turret terminal<br>pin                                                     | Not stocked                                                      | 0 at all five<br>ECIA<br>distributors                   | —                      | ECIA    | Never checked<br>before                     |
| Calibration<br>Header (JP_CAL):<br>Molex<br>0022284023       | 2-pos vertical<br>header, 0.100"<br>pitch                                  | Discontinued at<br>DigiKey (9 other<br>distributors in<br>stock) | 3,485<br>(DigiKey); TTI<br>459,488,<br>Avnet<br>328,583 | <a href="#">\$0.48</a> | DigiKey | Never checked<br>before                     |
| 2-Pin Shunt:<br>SPC02SYAN                                    | 0.100"<br>shorting<br>jumper, gold<br>flash                                | Active                                                           | 771,589                                                 | <a href="#">\$0.10</a> | DigiKey | Was "not checked"                           |

## Modules, Accessories, and Enclosure Hardware

| Part                                                                      | Spec/Package                                       | Status | Stock | Price                   | Source  | Drift                                                                                |
|---------------------------------------------------------------------------|----------------------------------------------------|--------|-------|-------------------------|---------|--------------------------------------------------------------------------------------|
| FTDI Interface<br>(FT1):<br>TTL-232R-5V                                   | USB-to-UART<br>cable, 5 V,<br>0.1" 6-pin<br>header | Active | 195   | <a href="#">\$23.80</a> | DigiKey | Previous report<br>used a \$6.99<br>retail 2-pack;<br>this is the<br>authorized part |
| FTDI Interface<br>— cheaper<br>authorized<br>option:<br>SparkFun<br>09716 | USB 2.0 bridge<br>module, 5 V<br>supply            | Active | 232   | <a href="#">\$19.51</a> | DigiKey | —                                                                                    |

| Part                                                          | Spec/Package                                           | Status                                | Stock    | Price                                                                                                                                       | Source             | Drift                                                                                                                  |
|---------------------------------------------------------------|--------------------------------------------------------|---------------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------|
| FTDI Interface<br>— retail<br>options                         | FT232RL 6-pin<br>adapters                              | Available<br>(unverified<br>listings) | In stock | \$5.25<br>(ShillehTek),<br>\$7.95 (JemRF),<br>\$12.89 (Fermion/<br>Mouser), \$18.46<br>(SparkFun/<br>Mouser)                                | Google<br>Shopping | Previous<br>report's<br>ShillehTek 2-<br>pack at \$6.99 is<br>comparable                                               |
| USB Cable: A<br>to Mini-B, data                               | USB 2.0, 5-pin<br>Mini-B, fully<br>wired data<br>cable | Available<br>(unverified<br>listings) | In stock | \$1.04 (Monoprice<br>28/28 AWG,<br>OfficeCrave),<br>\$1.34 (Cable<br>Leader), \$2.99<br>(Micro Center),<br>\$8.28 (Monoprice<br>via Target) | Google<br>Shopping | Previous report<br>priced<br>Monoprice at<br>\$1.89                                                                    |
| Oscilloscope<br>Probes (×2)                                   | 1:1 / 1:10<br>switchable,<br>BNC, ≥20 MHz<br>required  | Available<br>(unverified<br>listings) | In stock | \$19.75 (Jameco),<br>\$21.88 (Newegg),<br>\$23.25 (Walmart<br>pair), \$27.00<br>(Mouser), \$29.68<br>(Pico)                                 | Google<br>Shopping | Was "not<br>checked" in the<br>previous report                                                                         |
| Enclosure:<br>A21,BK                                          | ABS black,<br>4.250" ×<br>2.600" ×<br>1.120"           | Active                                | 288      | <a href="#">\$12.79</a>                                                                                                                     | DigiKey            | Stock 298 →<br>288; price<br>unchanged                                                                                 |
| Rubber Feet<br>(×4): 3M<br>SJ5302                             | Adhesive<br>bumper,<br>0.312" (7.92<br>mm) dia         | Active                                | 262,544  | <a href="#">\$0.12</a>                                                                                                                      | DigiKey            | Was "not<br>checked"                                                                                                   |
| Nylon Cable<br>Tie: 3M<br>PB4NT18-C<br>(DigiKey<br>3M101C-ND) | 4" locking<br>nylon tie, 18 lb                         | Discontinued<br>at DigiKey            | 0        | —                                                                                                                                           | DigiKey            | Never checked<br>before; see<br>Substitutes                                                                            |
| Hookup Wire<br>22 AWG:<br>Jameco 36881                        | 22 AWG<br>insulated<br>hookup wire, 2<br>× 2"          | not checked                           | —        | —                                                                                                                                           | —                  | Jameco<br>catalogue<br>number, not a<br>distributor MPN<br>— cannot be<br>looked up at an<br>authorized<br>distributor |

| Part                  | Spec/Package                                              | Status                 | Stock | Price | Source | Drift                                                                                         |
|-----------------------|-----------------------------------------------------------|------------------------|-------|-------|--------|-----------------------------------------------------------------------------------------------|
| Printed Circuit Board | Custom 2-layer through-hole, ~100 × 50 mm, "DPScope V1.4" | <b>No source found</b> | —     | —     | —      | Was "not checked"; the vendor site no longer resolves and no board or layout files were found |

## Substitutes

| For part                        | Substitute                            | Differences                                                                                                                                                                                                                   | Verified                                                                                                                                                                                                                               | Judgment                                                                          |
|---------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| ERA-6AEB912V (9.1 kΩ, SMD 0805) | <a href="#">Yageo MFR-25FBF52-9K1</a> | Axial through-hole body 2.40 mm dia × 6.30 mm L instead of an 0805 chip; 0.25 W instead of 0.125 W (meets the requirement the original missed); ±1% instead of ±0.1% (still meets the lab's 1% spec). \$0.10, 7,853 in stock. | Package (Axial), resistance 9.1 kΩ, tolerance ±1%, power 0.25 W — DigiKey parametrics on both parts                                                                                                                                    | Acceptable — the axial part the lab actually needs.                               |
| RJ-6P504 (500 kΩ trimmer)       | <a href="#">Bourns 3362P-1-504LF</a>  | Rectangular 6.99 × 6.60 mm face instead of round 7.00 mm dia; same 500 kΩ, 0.5 W, ±10%, through-hole top adjust. Cheaper at \$1.23.                                                                                           | Resistance, power 0.5 W (exceeds the 0.25 W required), tolerance, through-hole mounting, top-adjust actuation, body size within the 6–7 mm envelope — DigiKey parametrics.<br><b>Not verified: lead pitch</b> (DigiKey publishes none) | Acceptable; confirm the three-pin pattern against the board before a class order. |

| For part                               | Substitute                                | Differences                                                                                                                                                                                    | Verified                                                                                                                                                   | Judgment                                                                                                                                                                                           |
|----------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RJ-6P504 (500 kΩ trimmer)              | <a href="#">Bourns 3329P-1-504LF</a>      | Round 6.35 mm dia body rather than the snapshot's square description; same 500 kΩ, 0.5 W, ±10%, through-hole top adjust. \$2.84 — more than double substitute 1.                               | Resistance, power (exceeds), tolerance, through-hole, top adjust, body diameter within the envelope — DigiKey parametrics. <b>Not verified: lead pitch</b> | Acceptable fallback; second choice on price.                                                                                                                                                       |
| RJ-6P504 (500 kΩ trimmer)              | TT Electronics/BI 72PR500KLF              | Square 9.53 × 9.53 mm face — far outside the snapshot's 6–7 mm body envelope.                                                                                                                  | Resistance, power, tolerance, through-hole — DigiKey parametrics                                                                                           | <b>Rejected</b> — body will not fit the trimmer footprint.                                                                                                                                         |
| TZC3P300A110R00 (trimmer cap)          | <a href="#">EW Electronics GKG50015</a>   | Through-hole instead of surface-mount; 6.00 mm dia, 5.00 mm seated height; 100 V instead of 50 V (exceeds); range 10–50 pF against the specified 10–60 pF — <b>falls short at the top end.</b> | Mounting type (through hole), body diameter 6.00 mm, voltage 100 V, capacitance range 10–50 pF — DigiKey parametrics. <b>Not verified: lead pitch</b>      | Acceptable with a caveat: it covers the 10–35 pF probe-compensation window the snapshot records, but not trim above 50 pF. No through-hole trimmer reaching 60 pF appeared in this run's evidence. |
| K470J15C0GF5TH5 (47 pF, 5.00 mm pitch) | <a href="#">Vishay BC K470J15C0GH53L2</a> | Lead spacing 2.50 mm instead of 5.00 mm — the difference that matters; 100 V instead of 50 V (exceeds); straight leads instead of formed. \$0.34 vs \$0.27.                                    | Capacitance, tolerance ±5%, dielectric C0G/NP0, through-hole mounting, <b>lead spacing 2.50 mm</b> — DigiKey parametrics on both parts                     | Acceptable — order this variant instead.                                                                                                                                                           |

| For part                                       | Substitute                                | Differences                                                                                                                                              | Verified                                                                                                                                                                                                                | Judgment                                                                                                                             |
|------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| K101J15C0GF5TH5 (100 pF, 5.00 mm pitch)        | <a href="#">Vishay BC K101J15C0GH53L2</a> | Lead spacing 2.50 mm instead of 5.00 mm; 100 V instead of 50 V (exceeds); straight leads. \$0.34 vs \$0.27.                                              | Capacitance, tolerance $\pm 5\%$ , dielectric C0G/ NP0, through-hole, <b>lead spacing 2.50 mm</b> — DigiKey parametrics on both parts                                                                                   | Acceptable — order this variant instead.                                                                                             |
| K104K15X7RF5TH5 (0.1 $\mu$ F, 5.00 mm pitch)   | <a href="#">Vishay BC K104K15X7RF53L2</a> | Lead spacing 2.50 mm instead of 5.00 mm; identical 0.1 $\mu$ F, $\pm 10\%$ , 50 V, X7R. Cheaper at \$0.27.                                               | Capacitance, tolerance, voltage, dielectric, through-hole, lead spacing 2.50 mm — DigiKey parametrics                                                                                                                   | Acceptable — only needed if the board's decoupling pads are on 2.54 mm centres; the 5.00 mm part is within the snapshot's allowance. |
| UVR1E101MDD (100 $\mu$ F option, no such part) | <a href="#">Panasonic ECA-1VHG101I</a>    | 100 $\mu$ F, 35 V instead of 25 V (exceeds the $\geq 16$ V requirement); radial can 6.30 mm dia, lead spacing 2.50 mm. \$0.44, 417 in stock.             | Capacitance (within the 100–470 $\mu$ F latitude), voltage, through-hole radial can, lead spacing 2.50 mm, body diameter — DigiKey parametrics                                                                          | Acceptable — use where C9's pads are on 2.5 mm centres; use the Nichicon 470 $\mu$ F for 5 mm centres.                               |
| TE 1-390261-3 (14-pin socket, obsolete)        | <a href="#">On Shore ED14DT</a>           | Same construction (tin over phosphor bronze), same 0.100" mating and post pitch; \$0.52 with 14,227 in stock. DigiKey classifies it a Direct substitute. | 14 positions, through-hole mounting, mating pitch 0.100", post pitch 0.100", contact material and finish — DigiKey parametrics on both parts. <b>Not verified: row spacing</b> (DigiKey publishes none for DIP sockets) | Acceptable.                                                                                                                          |
| TE 1-390261-3 (14-pin socket, obsolete)        | <a href="#">Adam Tech ICS-314-I</a>       | 14-position DIP socket, 2.54 mm pitch; \$0.60 with 26,816 in stock — the deepest stock of the options.                                                   | 14 positions, through-hole, mating pitch 0.100", post pitch 0.100" — DigiKey parametrics. <b>Not verified: row spacing</b>                                                                                              | Acceptable.                                                                                                                          |

| For part                                                               | Substitute                                | Differences                                                                                                                                               | Verified                                                                                                                                                     | Judgment                                                                                 |
|------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 3M 4808-6004-CP<br>(8-pin socket, not catalogued)                      | <a href="#">On Shore ED08DT</a>           | 8-position DIP socket, tin over phosphor bronze, 0.100" mating and post pitch; \$0.47 with 11,853 in stock.                                               | 8 positions, through-hole, mating pitch 0.100", post pitch 0.100" — DigiKey parametrics. <b>Not verified: row spacing</b>                                    | Acceptable — the snapshot allows any standard 8-pin 300 mil socket.                      |
| 3M 4808-6004-CP<br>(8-pin socket, not catalogued)                      | <a href="#">Adam Tech ICS-308-I</a>       | 8-position DIP socket, 2.54 mm pitch; \$0.69 with 14,314 in stock.                                                                                        | 8 positions, through-hole, mating and post pitch 0.100" — DigiKey parametrics. <b>Not verified: row spacing</b>                                              | Acceptable.                                                                              |
| 68001-106HLF<br>(vertical 6-pin header)                                | <a href="#">Amphenol ICC 68016-106HLF</a> | Right-angle instead of vertical — the only difference at issue; same series, same 0.100" pitch, same \$0.61, 16,566 in stock.                             | <b>Right-angle through-hole mounting</b> , 6 positions, mating pitch 0.100", male pin contact type — DigiKey parametrics on both parts                       | Acceptable — order this if the board wants a right-angle header.                         |
| Keystone 1514-4 turret / Molex 0022284023<br>(discontinued at DigiKey) | <a href="#">Sullins PRPC040SAAN-RC</a>    | 40-position breakaway strip — snap off two pins for CAL and GND; vertical, 0.100" pitch, \$1.23 with 48,820 in stock (one strip serves 20 boards).        | Male pin contact type, mating pitch 0.100", vertical through-hole mounting — DigiKey parametrics                                                             | Acceptable — the snapshot explicitly allows a standard 0.1" breakaway header.            |
| 3M PB4NT18-C<br>(cable tie, discontinued)                              | <a href="#">3M CT4NT18-C</a>              | 4.10" locking nylon tie, 18 lb, free hanging; \$0.0474 with 5,100 in stock. Also flagged "Discontinued at DigiKey" — stocked today, not a long-term line. | Length 4.10" (the snapshot asks approx. 4"), 18 lb locking nylon tie, free-hanging mounting — DigiKey parametrics; DigiKey classifies it a Direct substitute | Acceptable — and any miniature nylon tie will do; do not let this line hold up an order. |

| For part                              | Substitute                                                                | Differences                                                                                                                                                                                            | Verified                                                                                                                                                                                            | Judgment                                                                                                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CSTLS16M0X53-B0<br>(resonator, NFND)  | Murata<br>CSTLS16M0X54-B0                                                 | Same radial 3-lead 2.50 mm pitch family, 22 pF internal load instead of 15 pF — but <b>zero stock at every authorized distributor</b> (DigiKey 19-week lead, Mouser 11-week, Avnet 0, Future 12-week). | Package and lead pitch (Radial 3-lead, 2.50 mm), frequency 16 MHz, through-hole — DigiKey parametrics on both parts. <b>Not verified:</b> whether the 22 pF load keeps the dsPIC oscillator in spec | <b>Rejected</b> on availability — no supply advantage over the NFND original, which two distributors still stock in quantity.                                                  |
| TTL-232R-5V (FTDI interface, \$23.80) | <a href="#">SparkFun 09716</a>                                            | USB 2.0 bridge module at \$19.51 with 232 in stock, from an authorized distributor.                                                                                                                    | 5 V supply rail — DigiKey parametrics. <b>Not verified:</b> the 6-pin FTDI pinout order, the FT232RL chip, 500 kbaud support, and EEPROM reprogrammability — DigiKey's listing states none of these | Plausible, unverified — check the product page before ordering.                                                                                                                |
| TTL-232R-5V (FTDI interface, \$23.80) | Retail FT232RL modules (ShillehTek \$5.25, JemRF \$7.95, Fermion \$12.89) | A quarter to a third of the authorized price; the Waveshare \$6.99 listing uses an FT232RNL, not an FT232RL.                                                                                           | <b>Nothing verified</b> — these are Google Shopping aggregator listings and no merchant product page was fetched                                                                                    | Plausible, unverified. The lab needs FT232RL/FT232R, 5 V I/O, the standard 6-pin pinout, 500 kbaud and a writable EEPROM; buy the authorized cable if that must be guaranteed. |

Instructors should verify any substitute against its datasheet before ordering.

## Other dependencies

- **DPScope official website ( <http://www.dpscope.com> ) — **dead**.** A page fetch this run returned "Page could not be downloaded (blocked, timeout, or gone)". This is the snapshot's sole stated source for the board, the documentation and the vendor downloads, and the domain behind the `support@dpscope.com` contact address.
- **Mirror site ( <http://dpscope.freevar.com> ) — **alive**.** A fetch of `https://dpscope.freevar.com/downloads.html` returned page text headed "DPScope - Software,

Drivers, Documentation", whose copyright notice refers to "Circuit schematics, layout files, PC software etc. on this site". The individual download links were not readable from the extracted text, so what the mirror still serves is unverified — check it by hand.

- **PCB fabrication data (Gerbers for the 2-layer, ~100 × 50 mm board)** — not available. None were supplied with the lab, and an organic web search for a DPScope bare board or layout files returned only generic articles about Gerber formats, nothing about this project.
- **Tektronix reference application notes ( <http://www.tektronix.com> )** — not checked; cited in the user manual as background reading only.

## Watch list

- **The custom PCB and the vendor's distribution channel.** This is the single point of failure for the whole lab. If the `dpscope.freevar.com` mirror also disappears, the schematics, the assembly manual and any layout files go with it. Archive everything you have — manual, schematic, layout files, PC software, firmware image, the `DPScope.ept` configuration file — off that site now, while it still answers.
- **Murata CSTLS16M0X53-B0 resonator** — Not For New Designs, and the obvious through-hole successor in the same family (CSTLS16M0X54-B0) has zero distributor stock with 11–19 week factory leads. Roughly 30,000 pieces sit at DigiKey and Mouser today; buy the resonators for future sections while they are there.
- **Microchip MCP6S22-I/P** — DigiKey holds 25 pieces and the board needs two, so DigiKey alone covers 12 boards. Mouser (214) and Spirit (4,980) carry the depth. The sibling MCP6S92-I/P was not looked up this run.
- **DSPIC30F2020-30I/SP** — DigiKey is down to 7 pieces at \$7.85; Mouser has 444 at \$7.62. Order the MCU from Mouser for a section, and remember distributor stock arrives blank.
- **Through-hole trimmer capacitors** — the category is shrinking: the snapshot's part is obsolete and surface-mount, DigiKey's suggested replacement is also surface-mount, and the one through-hole option found (GKG50015, 2,459 in stock) tops out at 50 pF rather than 60 pF.
- **Through-hole DIP sockets and legacy connectors** — the 14-pin socket went obsolete, the 8-pin part number left the catalogue, the CAL turret is unstocked and the Molex CAL header is "Discontinued at DigiKey". None is hard to replace today, but the specific part numbers in this BOM will keep rotting.
- **Mini-B USB hardware** — cables and 6-pin FTDI breakouts are legacy items as USB-C takes over. Keep spares, and check that any replacement module keeps 5 V logic, the same 6-pin order and a writable EEPROM.