

**Hewlett-Packard 9815A/S Calculator
98137A Tape Duplication Interface**



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1

Operating Information



Introduction

The HP 98137A Tape Duplication Interface is a special purpose cable which provides a fast and easy way to make copies of HP 9815 tape cartridges. To use this interface, two HP 9815 calculators with the same memory size and the I/O option are required. This tape duplication system will copy program files, special program files, and data files. Although secured files cannot be duplicated, secured copies can be made from unsecured masters. The interface also permits rapid verification of duplicate tapes.

Slave Calculator - GMN.

MASTER

- Automatic Accessories P/L

Duplication

*Plug to TOP Slot
both calculators*

Cable

*out of right side of calculator
master / slave names correct way of
not upside down.*

Both Calculators
on RUN

Printer
NORMAL

General Procedure

To duplicate tapes, you need only set up the calculators and press two special function keys. The calculators do the rest: reading every unsecured file from the master tape, recording the contents onto the copy tape, and verifying each copied file. The tape on which the copy is made can be blank or used, and no marking or initialization is necessary. If the copy is made on a used tape, the old files are written over as necessary to create the copy. This may or may not erase all the old files, depending upon the length of the old and new recordings.

The set-up and duplication procedures are explained in detail by the following paragraphs.

1. Two HP 9815 calculators with the same memory size and the I/O option are required. This can be two HP 9815A Option 002, two HP 9815A Option 001 and Option 002, or two HP 9815S calculators. The memory must be capable of holding any program or data file on the tape to be duplicated. Therefore, the preferred system for duplicating tapes from various machines is two HP 9815S calculators.
2. With power off, connect the two calculators with the tape duplication cable. The interface connectors must be installed in the top I/O slot of both calculators. There should be nothing plugged into the bottom I/O slot of either calculator.

2 Operating Information


3. The ends of the interface connectors are marked to identify one calculator as the "MASTER" and the other as the "SLAVE". This distinction is important. Place the original or master tape in the MASTER calculator. It is a good practice to keep master cartridge tab in the "record protect" position. Place a record enabled cartridge in the SLAVE calculator.
4. Switch on both calculators.
5. Press key or key on the SLAVE calculator. The SLAVE key must be pressed before the key on the MASTER is pressed. The action of each key is explained in subsequent sections.
6. Press key on the MASTER calculator. The duplication process will then begin and proceed automatically.
7. A successful duplication produces no printouts. At the end of the duplication, the MASTER and the SLAVE display the number of the last file transferred.

Normal Duplication

Step 6 in the General Procedure gives you a choice of keys to press on the SLAVE calculator. To start a normal duplication, press key . The following list shows the transfer action of a normal duplication.

MASTER File Type	becomes	SLAVE File Type
0 – program file		duplicate – type 0
1 – secured program		empty – type 5
2 – data file		duplicate – type 2
3 – special HP program		duplicate type 3
4 – secured special HP program		empty – type 5
5 – empty file		empty – type 5
6 – extra file		extra – type 6

Secured Duplication

Step 5 in the General Procedure gives you a choice of keys to press on the SLAVE calculator. To start a secured duplication, press key . The following list shows the transfer action of a secured duplication. Notice that secured files can be generated, but not duplicated. To make secured copies of your software, you must use an unsecured master tape.

MASTER File Type	becomes	SLAVE File Type
0 – program file		secured duplicate – type 1
1 – secured program		empty – type 5
2 – data file		duplicate – type 2
3 – special HP program		secured duplicate – type 4
4 – secured special HP program		empty – type 5
5 – empty file		empty – type 5
6 – extra file		extra – type 6



Error Messages

Any error detected by the MASTER or the SLAVE causes an error message printout and halts the duplication process. Some of the possible errors include CARTRIDGE OUT, PROTECTED TAPE, VERIFY FAILED, CHECKSUM ERROR, FILE NOT FOUND, and MEMORY OVERFLOW. The error messages have the same meanings described in the HP 9815A Operating and Programming manual, with the following amplification.

A CHECKSUM ERROR can occur if information is improperly transferred from the MASTER to the SLAVE or if a tape file is not accurately read. A FILE NOT FOUND error will occur if you attempt to duplicate a tape with an empty track. If the MASTER tape has no files on the negative track, the positive track will be duplicated, and the process will halt with an error message when the calculator fails to find file -0. If the MASTER tape has no files on the positive track, no duplication will occur because the process will halt with an error message when the calculator fails to find file +0.

If your application only uses only one track of the tape, it is recommended that you avoid the FILE NOT FOUND error by marking one short, empty file on the unused track.

Verification

The Tape Duplication Interface can also be used to verify copied tapes without performing any record operations. The verification insures that all unprotected files on the MASTER are also contained on the SLAVE. Note that this condition can be satisfied even if the MASTER and SLAVE tapes are not identical. The SLAVE can contain more files than the MASTER or have a recorded file where the MASTER has an empty. The only requirement is that the SLAVE contain **at least** everything that is on the MASTER. To be compatible with the duplication procedures, secured files on the SLAVE can be verified against unsecured files on the MASTER. Any file that is secured on the MASTER is ignored during the verification process. To perform tape verifications, use the following procedure.

1. Set up two calculators and the duplication cable as described in steps #1 and #2 of the duplication procedure.
2. Place the master tape in the MASTER calculator and the copy tape in the SLAVE calculator. It is suggested that both cartridges be record protected.
3. Switch on both calculators.
4. Press key on the SLAVE calculator. The SLAVE key must be pressed before the key on the MASTER is pressed.
5. Press key on the MASTER calculator. The verification process will then begin and proceed automatically.
6. A successful verification produces no printouts. At the end of the verification, the MASTER and the SLAVE display the number of the last file verified.
7. If a file on the original is not properly reproduced on the copy, the number of that file is printed by the SLAVE. The verification process does not halt for this error. Any other errors, such as CHECKSUM ERROR, CARTRIDGE OUT, FILE NOT FOUND, or MEMORY OVERFLOW cause an error message printout and halt the verification process. See the preceding section on "Error Messages" for details concerning the FILE NOT FOUND error.

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Service Information



Cable Connections

Wire color code is the same as standard resistor color code (shown below). The first number indicates the base color, the second number indicates the color of the widest stripe, and the third indicates the color of the narrow stripe. For example, 93 indicates a white wire with an orange stripe.

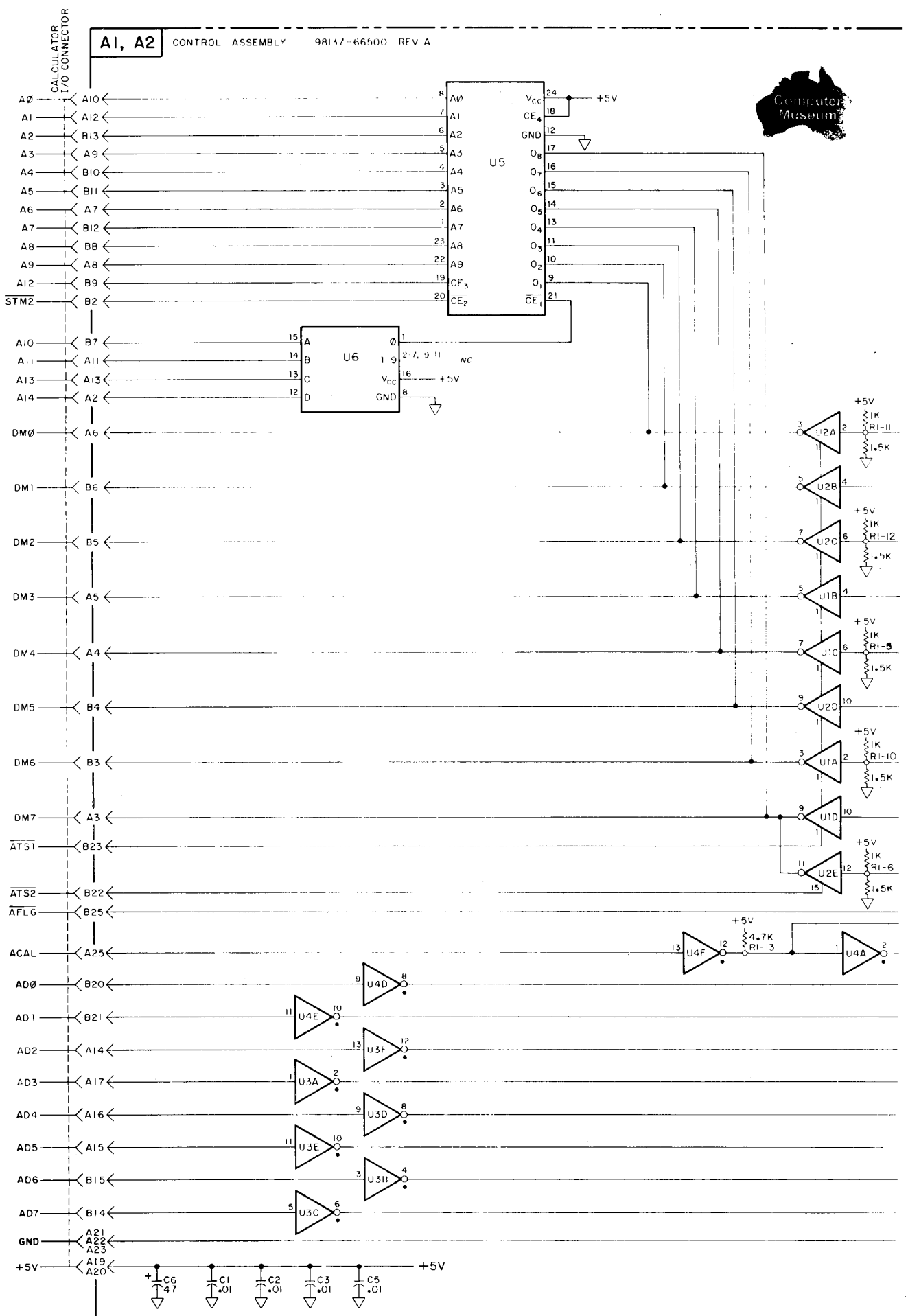
P1 Connector to A1 Board		
Connector Pin	Wire Color	Signal
1	3	I1
2	4	I2
3	93	I5
4	1	I0
5	903	O2
6	906	O5
7	913	CTL
8	905	O4
9	907	O6
10	915,916	GND
A	96	I7
B	94	I6
C	6	I3
D	91	I4
E	914	FLG
F	912	O7
H	904	O3
J	901	O0
K	902	O1
L	917,Shield	GND

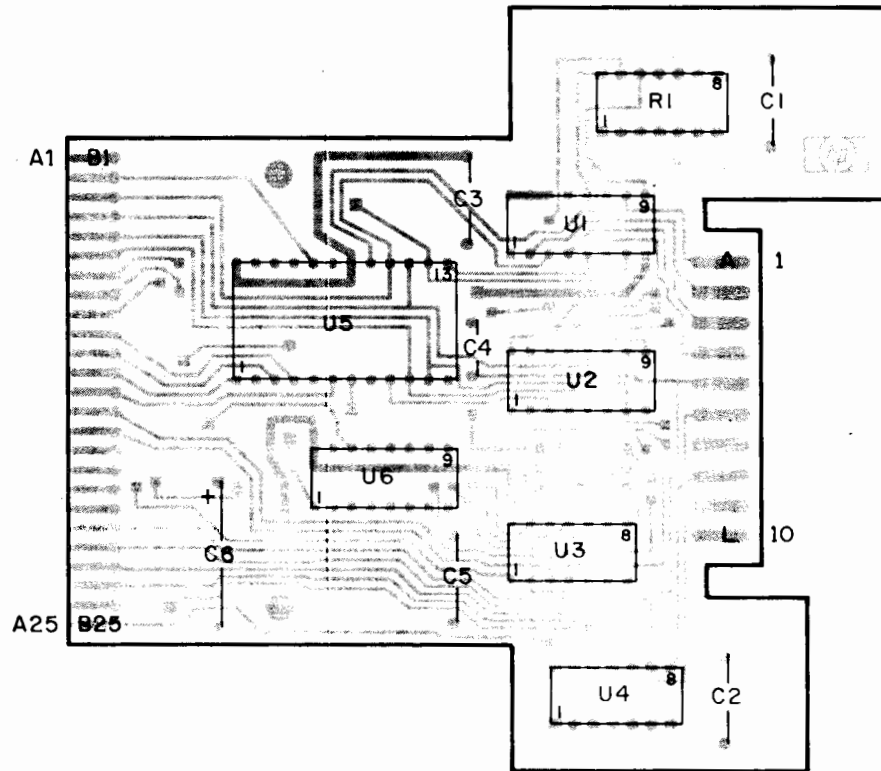
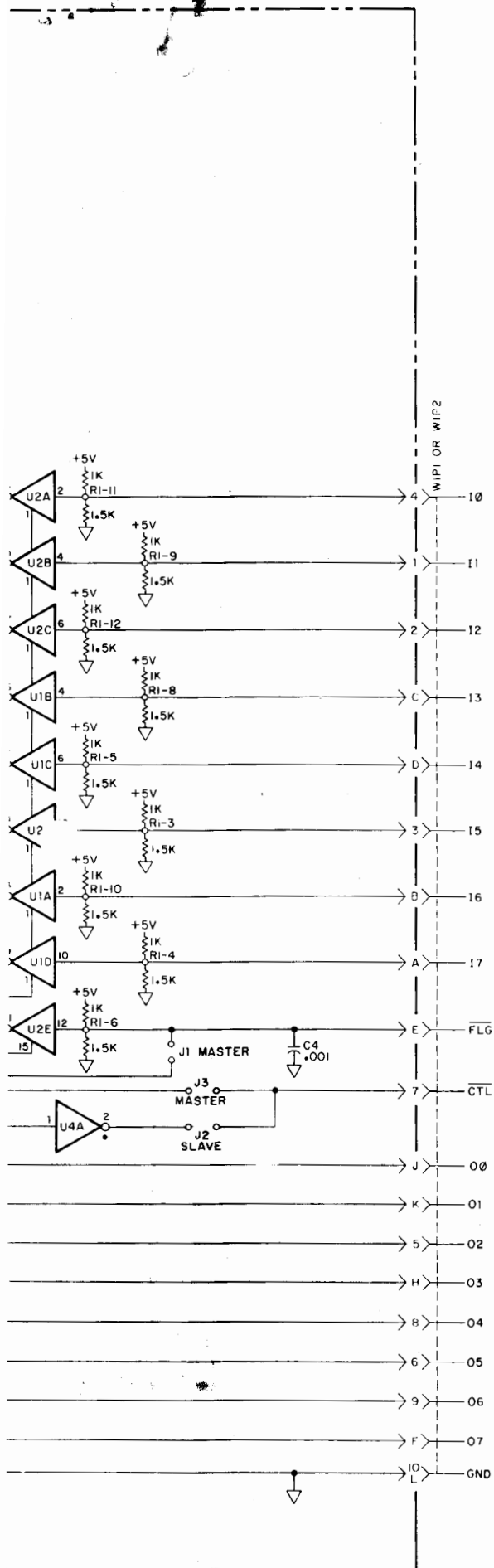
P2 Connector to A2 Board		
Connector Pin	Wire Color	Signal
1	902	I1
2	903	I2
3	906	I5
4	901	I0
5	4	O2
6	93	O5
7	914	CTL
8	91	O4
9	94	O6
10	915,916	GND
A	912	I7
B	907	I6
C	904	I3
D	905	I4
E	913	FLG
F	96	O7
H	6	O3
J	1	O0
K	3	O1
L	917,Shield	GND

0 = Black
1 = Brown
2 = Red
3 = Orange
4 = Yellow
5 = Green
6 = Blue
7 = Violet
8 = Grey
9 = White

Replaceable Parts

REFERENCE DESIGNATOR	-hp- PART NO.	TQ	DESCRIPTION
A1	98137-66500	1	Master Assembly
C1,C2,C3,C5	0160-3847	4	C: Fxd, .01UF, 50V
C4	0160-3456	1	C: Fxd, 1000PF
C6	0180-1704	1	C: Fxd, 47UF, 6V
R1	1810-0230	1	Resistor Network
U1,U2	1820-1255	2	IC: DM8098
U3,U4	1820-0471	2	IC: 7406N
U5	T-46422	1	IC: PROM, Master
U6	1820-1418	1	IC: 74LS42N
A2	98137-66501	1	Slave Assembly
C1,C2,C3,C5	0160-3847	4	C: Fxd, .01UF, 50V
C4	0160-3456	1	C: Fxd, 1000PF
C6	0180-1704	1	C: Fxd, 47UF, 6V
R1	1810-0230	1	Resistor Network
U1,U2	1820-1255	2	IC: DM8098
U3,U4	1820-0471	2	IC: 7406N
U5	T-46423	1	IC: PROM, Slave
U6	1820-1418	1	IC: 74LS42N
			Miscellaneous
P1,P2	98137-61601	1	Molded Cable & Connectors
W1	1251-2262	2	Connector, PC
	5041-1462	1	Molded Cable
	5040-8176	2	I/O box, bottom
	5040-8177	2	I/O box, top
	7120-7158	1	Label, Slave
	7120-7159	1	Label, Master





COMPONENT SIDE

A1 -hp- Part No. 98137-66500 Rev A

A2 -hp- Part No. 98137-66501 Rev A