



CONVEX

Field Support Tech Tip

Product: C-1

Tech Tip Number: Tapes-001

Date: Wednesday, March 12, 1986

Subject: Tapes

Submitted By: Bill Georgia

The torque specifications of the standoffs and screws securing the AK card to the regulator assembly may be improper on some 2920 tape drives, causing overheating of resistors R169 and R192. All machines with AK cards below revision 49612 should be checked for 20 inch pounds of torque on the standoffs to regulator assembly and the AK card screws. To properly perform this check, remove the 7 AK card mounting screws, tighten the 7 standoffs to 20 inch pounds. Replace the AK card and tighten the mounting screws to 20 inch pounds.

The revision of the AK can be found by looking at the AK from the rear of the drive. The AK will have a white tag on one side which contains the label AK, a part number (402214405) and the revision (49612). If the revision is earlier than 49612, such as 49556, there may be a problem. If revision is 49612, no action is required.



CONVEX

Field Support Tech Tip

Product: C-1

Tech Tip Number: Tape-002

Date: April 3, 1986

Subject: STC 2920

Submitted By: Dick Baker

If your STC 2920 tape unit fails the power-up diagnostics with error code 1F1, check for the upper and lower tension arms being in phase with each other. This adjustment is made at the lower end of the retractor connecting rod and is quite critical.

There is a U shaped stop collar clamped to the upper end of the connecting rod that limits its downward travel. This may prevent proper adjustment and operation of the swing arms. According to STC the stop collar no longer serves a useful function and may be removed.

Since considerable time and effort is required to remove the stop collar it should be removed only if it is causing a problem.



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Field Support Tech Tip

Product: C-1

Tech Tip Number: Tape-003

Date: April 24, 1986

Subject: Cipher Tape Drives

Submitted By: Bill Georgia

Please check your spare cipher tape drives for proper configuration jumper installation. It is not readily apparent that there are jumpers and if not configured properly it will appear that the tape drive is bad.

Underneath the rear end of the printed circuit board beside the dc cable plug are pins for a possible four shorting jumpers. The middle two should have shorting jumpers installed. The positions on each end should be open.



Field Support Tech Tip

Product: C-1
Tech Tip Number: Tape-004
Date: November 19, 1986
Subject: 1960 & 2920 Error Codes
Submitted By: Brad Jones

Mag Tape Error Messages are usually displayed as shown in the example, below.

```
[CCU7@05:19:26] ta0: cmd 00cx esb 001x fsb 040x mux0 000x mux1 000x mux2 001x mux3 009x
```

Interpretation of this message is as follows:

[CCU7@05:19:26] - Defines the **CCU** Number (in this case, IOP 7) reporting the error and the **time** of the error (in this case, 05:19:26).

ta0: - Defines the **Tape** Drive Number (in this case, Unit 0) with the error.

cmd 009x - Defines the **Command** (in Hex) that was issued to the Tape Drive.
Valid **Commands** are shown in the table, below:

COMMAND (HEX)	MNEMONIC	COMMAND DESCRIPTION
000	NOP	No Operation
001	CLR	Clear
002	DMS	Diagnostic Mode Set
003	SNS	Sense Drive Status
004	RDF	Read Forward a Block
005	RDB	Read Backward a Block
006	WRT	Write Data Block
007	LWR	Loop Write-to-Read
008	BSF	Backspace a File Mark
009	BSB	Backspace a Data Block
00A	FSF	Forward Space a File Mark
00B	FSB	Forward Space a Data Block
00C	WTM	Write Tape Mark
00D	ERG	Erase Gap
00E	REW	Rewind to Load Point
00F	RUN	Rewind and Unload

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esb 001x - Defines the "Error Status Byte" that was generated by the Mag Tape Controller. The value of the **esb** can be Hex '000' thru '0FF'. Bit definitions of the **esb** are shown in the table, below (Bit 0 is Least Significant):

BIT NUMBER	DESCRIPTION
7 and 6	Density last sent to the Tape Formatter; not necessarily the density currently in use. Values can be: '00' = PE (1600 BPI); '01' = GCR (6250 BPI); or '10' = NRZ1 (800 BPI).
5	Tape Mark Detected (tape is positioned in the middle of a Tape Mark).
4	Last Byte Invalid (last byte written into memory is invalid).
3	Command Aborted (pending Command was aborted due to error during previous Command).
2	Multibus Timeout Error (during an attempted DMA Transfer).
1	Read Parity Error (Data Byte from Formatter was Parity Incorrect).
0	Tape Error (Tape Formatter Detected).

fsb 040x - Defines the "Formatter Error Status Byte" that was generated by the Mag Tape Formatter. The value of the **fsb** can be Hex '000' thru '0FE'. Bit definitions of the **fsb** are shown in the table, below (Bit 0 is Least Significant):

BIT NUMBER	DESCRIPTION
7	Command Incomplete (Formatter and Drive unable to finish).
6	Command Reject (Previous Command not initiated).
5	Data Overrun (during Read or Write Operation).
4	Data Check (Examine Mux Bytes to determine reason).
3	PROM Error (Formatter Parity checker detected an error during command execution or, if an STC 2920 is used, the 2920 detected a PROM checksum error during power-up).
2	Correctable Error (A Correctable Tape Error has been detected).
1	Data Bus Parity Error (Uncorrectable Data Error between Tape Drive and Formatter).
0	Not Used (Reserved).

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mux0 000x - The contents (in Hex) of the Tape Subsystem's "Dead Track Register", **mux0**. Each bit in **mux0** equates to a specific channel (track) on the tape as is shown below (Bit 0 is Least Significant in the message):

MUX0 Bit	8	7	6	5	4	3	2	1	0
Dead Track	P	7	6	5	4	3	2	1	0

mux1 000x - The contents (in Hex) of the Tape Subsystem's "Read/Write Error Register", **mux1**. Each bit in **mux1** defines a particular type of Read or Write Error Condition as is shown below (Bit 0 is Least Significant in the message):

MUX1 BIT	DESCRIPTION
8 *	Cyclic Redundancy Check Error. If a 1960 Tape Subsystem, can be asserted during GCR, PE, or NRZ1 Read or Write Operations. If a 2920 Tape Subsystem, can be asserted during GCR Read/Write OR PE Write Operations.
7	Write Tape Mark Check (unable to write a valid Tape Mark). See NOTE 1 on Page 4 for additional information.
6	Uncorrectable Error. See NOTE 2 on Page 4 for additional information.
5 *	Partial Record. Interblock Gap (IBG) detected before end of data.
4	Multiple Track Error (PE and GCR) OR Longitudinal Redundancy Check (LRC) error if in NRZ1 mode (1960 only). See NOTE 3 on Page 4 for additional information.
3	Not Used.
2 *	End of Data Check. When operation is a PE or GCR Read or Write, the end-of-data characters were not detected OR the Preamble or Postamble did not meet format requirements. If the operation was a NRZ1 Read or Write (1960 only), a Vertical Redundancy Check (VRC) Error was present. The VRC Error is asserted whenever at least one byte of data OR the CRC Character OR the LRC Character is Parity incorrect.
1 *	Velocity Error. Asserted whenever the Tape Speed is outside of acceptable limits.
0	Diagnostic Mode Latch. The Tape Formatter is in Diagnostic Mode.

* = "DATA CHECK" (fsb Bit 4) will also be set.

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NOTE 1 - "Write Tape Mark Check" (**mux1 Bit 7**) status will be accompanied by the assertion of "Data Check" (**fsb Bit 4**) OR "Command Reject" (**fsb Bit 6**) which will further define the error as shown below:

DENSITY IN USE	ASSERTED BITS			DESCRIPTION
	MUX1 7	FSB 4	FSB 6	
PE or GCR	X	X		The Tape Mark is readable as such, but does not conform to ANSI Standards.
PE, GCR, or NRZ1	X		X	The Tape Mark written is not readable as such. Noise is left on the tape.
NRZ1	X	X		The Tape Mark written is not readable as such. The data left on tape appears as an illegally formatted record.

NOTE 2 - "Uncorrectable Error" (**mux1 Bit 6**) status will be accompanied by the assertion of "Data Check" (**fsb Bit 4**) during PE, GCR, or NRZ1 Read or Write Operations. Also, if the NRZ1 Mode is being used, Bits 8, 7, and 6 of the "Dead Track Register" (**mux0**) will be asserted.

NOTE 3 - "Multiple Track Error" (**mux1 Bit 4**) is asserted when two or more tracks are detected in error. "Data Check" (**fsb Bit 4**) will also be asserted if the error is detected during a PE Read or Write Operation **OR** any GCR Write Operation. If the Operation is a GCR Read, "Data Check" will only be asserted if the errors are **not** correctable.

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mux2 001x - The Most Significant Bit (8) of **mux2** is the digital tachometer line from the Tape Drive for use by certain Diagnostic routines. Bits 7, 6, and 5 are for Diagnostic Mode use only. Bits 4 through 0 define **Reject Codes** as shown below (Bit 0 is Least Significant). The valid range of Bits 4 through 0 is Hex '00' through '1F'.

CODE	REJECT CODE DESCRIPTION
01	The addressed Tape Unit is not Ready.
02 *	The Formatter Control Unit has detected an internal firmware parity error.
03 *	TRAK responses to the first two TREQs not received within 75 ms during a Write.
04 *	2920 - Reserved. 1000 Only - Unimplemented word detected in microprogram.
05	File Protect Status when a Write-type Command was attempted.
06 *	The addressed Tape Unit did not go to Erase Status only.
07	Illegal Command sequence.
08 *	The addressed Tape Unit did not go to Read Status.
09 *	The addressed Tape Unit was unable to read a PE or GCR Identification Burst.
0A *	2920 - Reserved. 1000 Only - The addressed Tape Unit did not drop Write Inhibit Status.
0B	2920 - Reserved. 1000 Only - The addressed Tape Unit not On-Line.
0C *	The addressed Tape Unit did not go to Write Status after a Write Command.
0D *	2920 - Reserved. 1000 Only - During Backward motion after writing the Identification Burst, BOT was not reached in the expected distance.
0E *	2920 - Reserved. 1000 Only - The addressed Tape Unit did not go to Backward Status.
0F *	Noise (possibly data) was detected during an Erase Gap or Write (following a Read) Command.
10	1960 - Reserved. 2920 Only - No data is in the Buffer for a Read in Cache Data Mode.
11 *	The addressed Tape Unit reset Ready Status.
12 *	2920 - Reserved. 1000 Only - PE or GCR Identification Burst written on wrong track(s).
13	A Backward-type command (except Rewind or Rewind/Unload) was given and tape was already at BOT.
14 *	The ARA Burst portion of the GCR Identification Burst did not have all nine tracks active.
15 *	An IBG longer than 25 feet (PE/NRZ1) or 15 feet (GCR) was detected during a Read or Space.
16	1960 - Reserved. 2920 Only - More than one speed change requested with no intervening motion.
17 *	2920 - Reserved. 1000 Only - The addressed Tape Unit failed to reset Ready during a Rewind.
18 *	The addressed Tape Unit does not indicate being in the selected density.
19	1960 - Reserved. 2920 Only - Loop Write-To-Read attempted with tape loaded and not at BOT.
1A *	The addressed Tape Unit failed to initiate tape motion.
1B *	During Read-After-Write, data was detected in the Inter-Block Gap (IBG).
1C *	2920 Reserved. 1000 Only - No Inter-Block Gap (IBG) detected following the ARA ID Burst.
1D *	The Tape Drive attempted to Backspace over a bad record, but was unable to detect the record.
1E *	The ARA Identification Burst was unreadable during a GCR Write Command.
1F *	No data was detected during a Read-After-Write while in Write or Write Tape Mark Mode.

* = "Command Incomplete" (fsb Bit 7) will also be set.

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mux3 009x - **mux3** reflects the contents of the Status Lines from the addressed Tape Drive. Interpretation of **mux3** is shown in the table below. Bit 0 is Least Significant.

BIT	STATUS DESCRIPTION
8	Write Tape Status (2920 Only; not used in 1960). Tape Drive is in Write Mode.
7	End-of-Tape Status. Tape positioned at or beyond the EOT marker.
6	Beginning-of-Tape-Status. Tape positioned at BOT (Load Point).
5	Write Inhibit (1960 Only; not used in 2920). Asserted in Write Mode when the Read/Write Head is positioned in the Inter-Block Gap (IBG).
4	File Protect Status. No Write Enable Ring installed in the File Reel.
3	Backward Status. Asserted when the Command in progress requires Backward Tape Motion and the motion is in progress.
2	High Density Status. Tape Drive is in GCR Mode.
1	Ready Status. Tape is loaded and Drive is able to accept a command.
0	Online Status. Tape is loaded and the Online Switch on the Operator Control Panel has been depressed.



CONVEX

Field Support Tech Tip

Product: C-1

Tech Tip Number: Tape-005

Date: March 20, 1988

Subject: STC Tape Drives

Submitted By: Ron Engelking

Some of the 2920 series tape drives have experienced problems reading certain brands of magnetic tape.

During the past year of 1987, STC has modified four (4) boards which have an effect on this problem. The current tape drives being shipped have up-rev'd boards. The way STC reflects an upgrade is to increase the last three digits of their part number. The following table reflects what the MINIMUM STC part number should be... when you are trouble-shooting tape read problems.

DESCRIPTION	STC PART#	CONVEX PART#
RD	402261308	900-000191-001
WR	402273313	900-000193-001
DP	403118303	900-000203-001
IF	403222318	900-000206-001

Some of the boards from STC are now beyond the level in the table. Due to the rate of change, this information only reflects a minimum level and not the exact current level of the boards.



Field Support Tech Tip

Product: Mag Tape Diag
Tech Tip Number: Tape-008
Date: April 12, 1988
Subject: Dev4200 bug
Submitted By: Ron Engelking

"STC dev4200 BUG"

There has been noted a problem with the current tape diagnostic (dev4200). If you make the block size parameter greater than 16K bytes in size test 312 (read reverse at 800 bpi) will fail. The following is the response from engineering:

All of the subtests in dev4200 use absolute timeouts (i.e., the timeout window is not weighted by geometric parameters such as block size, etc.). All of the subtests I have reviewed use 60 seconds as the timeout. This explains why you had problems with subtest 312. It takes longer than 60 seconds to space to the end of written data following the rewind. I would suggest you use small block sizes to get around this. This problem will be addressed in a future release.

Standard parameters work because the block size is defined as 512 bytes. It appears problems occur around 16k bytes. To find out exactly you will have to experiment because 2920s will be slower than 1960s etc.



Field Support Tech Tip

Product: 2920/2922 Parts Difference

Tech Tip Number: Tape-007

Date: Sept. 15, 1989

Subject: STC to Convex Part Numbers

Submitted By: Ray Anderson

The following chart will cross the STC part numbers to a Convex part number for the STC 2920 and the STC 2922 tape; difference parts. All the remaining parts are common between the two tape drive models.

DESC	STC 2920 PART#	CONVEX PART#	DESC	STC 2922 PART#	CONVEX PART#
AK50	402214405	900-000189-001	AK100	403832901	900-000401-001
RD50	402261308	900-000191-001	RD100	403504303	900-000407-001
WR50	402273315	900-000193-001	WR100	403503303	900-000408-001
DP50	403118405	900-000203-002	DP100	403633307	900-000402-001
IF50	403222420	900-000206-002	IF100	403486311	900-000405-001

Some of the boards from STC maybe of a different level than that shown in the table. This information only reflects a current level and not the operational level of the boards.