

## ADVANCE CEM

DESTROY WHEN BLUE PAGE IS RECEIVED

Subject: Logic Change  
 IBM 729 NOR - Machines with JT 85180 V  
 (B/M's 8023445 and 8026561)  
 See Advance CEM dated August 11, 1964

Owing to different response times between circuits, on a few drive units a false "Go Interval" pulse may appear. This pulse can cause :

- 1) False load point during an HS Rewind sequence.
- 2) Tape damage when the left capstan is coming out.

To avoid this fault, apply the following changes :

Add : D18H to D19J \*  
 D18A to C23H  
 D18P to D12K

\* This wire should be connected to D18J after application of B/M 8026801.

This change will be included in the B/M 8026801 at JT 85593 B which is being shipped to the field.

The partial Right and Left brake adjustment is important (See Advance CEM 729 dated August 11, 1964). A loop above the columns, either during HS Rewind sequence or manual loading, causes tape damage.

The operators should be recommended to slightly stretch the tape in manual loading.

October 22, 1964



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Subject: Tape Drive Tester - Power Cable

**SAFETY** A possible safety hazard exists on the 2400 Tape Drives when using the 729 power cable P/N 8012757 instead of the 2400's Power Cable 50 cycles P/N 2086587.

Never use the 729 Power Cable on 2400's Tape Drives.

July 27, 65

TO : COUNTRY CE MANAGERS OR FIELD SERVICE GROUP MANAGERS

PLEASE FORWARD IMMEDIATELY TO ALL FRENCH BUILT 729 A (NOR)

SUBJECT : CORRECTIONS TO FIELD B/M 8026952 WTC CEM: 156 (-)

DESCRIPTION : Make "Process Line" down with the "ON/OFF line SW" in the off  
position  
MACHINE TYPE : 729 A (NOR) JT N° : 86068

This information is being forwarded so that all installations are aware of errors in the subject B/M. This information is to be attached to the Engineering Instructions.

A thorough investigation of the corrections should be made locally before installing the B/M. Even though records may indicate that the JT is installed (Factory or Field) machines should be physically checked for the existence of this correction.

*IMPORTANT : In order to speed up the distribution, this information is forwarded to all the installations, although some of them may not be concerned by the subject B/M.*

The Engineering Instructions 8026952 must be modified as follows :

Paragraph V - Installation, C, 5e

Solder a wire from Wafer D Pin 8 to K 18 N... (instead of K 19 M)

Paragraph V - Installation, C, 7e

Add

F 18 F to K 18 N (instead of K 19 M)

NOTE - A complementary B/M 8027009 JT 86068 A will be shipped automatically to provide corrected logic pages.



O. Mann  
Plant CE Manager  
Essonnes, France

TO : COUNTRY CE MANAGERS OR FIELD SERVICE GROUP MANAGERS

PLEASE FORWARD IMMEDIATELY TO ALL FRENCH BUILT

SUBJECT : CORRECTIONS TO FIELD B/M 2 086 550

WTC CEM : 168 (-)

DESCRIPTION : Missing Engineering Instruction

MACHINE TYPE : 729 B NORLAY

JT N° : 86 507 V

This information is being forwarded so that all installations are aware of errors in the subject B/M. This information is to be attached to the Engineering Instructions.

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*IMPORTANT : In order to speed up the distribution, this information is forwarded to all the installations, although some of them may not be concerned by the subject B/M.*

Engineering Instruction # 2 086 550 is missing. It will be shipped automatically.  
Engineering Instruction # 8 026 400 should be disregarded.

Please find a summary hereafter :

DESCRIPTION

Reduce neutral current from 3.0 Amps to 2.5 Aimps nominal.

INSTALLATION

A - Estimated time required

0.5 man hours

B - Procedure

- 1 - Remove cover over the prolay control box.
- 2 - Remove the R-19 potentiometer and replace it with 5 331 863 potentiometer supplied. The wiring removed is to be replaced identical to the way it was prior to this installation.
- 3 - Remove the R-8 resistor and replace it with 2 085 710 resistor supplied. Save screws and nuts for connection to new resistor. The wiring removed is to be replaced identical to the way it was prior to this installation.
- 4 - Replace cover.

C - Test procedure

- 1 - Place machine in a loaded status.
- 2 - Measure voltage drop across TB 8-6 and TB 8-7. Reading should be  $2.5 \pm 0.5$  Volts. Adjust R-19 to achieve this.
- 3 - Then re-adjust R-19 to achieve a 3.0 volt drop across TB 8-6 and TB 8-7.
- 4 - Perform the IRG diagnostic test.
- 5 - If short inter-record gaps are consistent at low go down times, refer to C.E. instruction manual, page 42, for further adjustment.

  
O. Mann

Plant CE Department  
Essonnes - France

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- 2) Tape damage when the left capstan is coming out.

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This change will be included in the B/M 8026801 at JT 85593 B which is being shipped to the field.

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The operators should be recommended to slightly stretch the tape in manual loading.

October 22, 1964

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Subject: 729 B II to VI (French origin)

### 1. TAPE DUMPING (ECR 90028)

To avoid tape dumping during loading after a HS Rewind, potentiometer R23 (P/N 8018018) and diode SR 17 (P/N 315902) have been added.

This potentiometer must be adjusted so that at the end of the HS rewind, the tape is slightly to be flush with the nylon pulleys. Avoid a loop above the column. (To check it, disconnect the head bake up motor during the HS Rewind). Then, check by depressing the tape with one finger, in front of the slit guides; a light depression should turn the left reel.

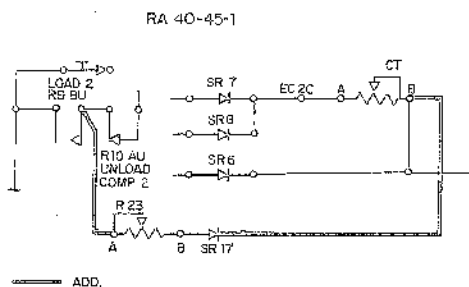
### 2. FALSE LOAD POINT INDICATIONS (ECR 90029)

Are particularly encountered on the load sequence following a HS Rewind. This failure has been eliminated by shorting R2 AU N/C contact (Logic RA 40-15-1) so that the TI and LP lamps light only when the head is in down position.

NOTE: Some Tape Drives between S/N 5357 and 5373 have been manufactured without these changes. Refer to machine history.

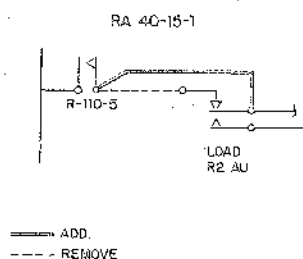
In order to standardize all the machines, apply the following modifications.

#### ECR 90028



Location of R23 - Hole CP12 on the CP panel  
Location of SR17 - above SR15.

#### ECR 90029



Add to the machine history: ECR 90028, ECR 90029.

WD-RA-10-50-0

Correct RA-40-15-1

RA-40-45-1 accordingly

3-Relay # 10

Some Tape Drives, between S/N 5357 and 5403, have been erroneously equipped with a 4 positions relay P/N 128843 instead of a 2 positions relay P/N 11135.

On the machines above mentioned connect the A lower wires to the A upper position according to WD RA-40-45-1-B-6.

Sept 2, 1964

MTA # 3

4. 3. 1965

**Betr.: Unberechtigtes Setzen des Tape Indicators**

Das Analysieren dieses Fehlers erfordert unter Umständen viel Zeit. Eine der möglichen Fehlerursachen sollten Sie deshalb sofort ausschalten. Nach den bisher gemachten Erfahrungen sind 729 US Origin betroffen.

Die linke Flanke des Read Write Head Shield liegt bei vielen Tape Drives am Tape Cleaner Block an. Die Kontaktfeder, P/N 528318, kann, wenn sie etwas über den Cleaner Block hinausragt, das Blech berühren und die -12V für die Load Point- und Tape Indicator-Lampen intermittierend kurzschließen.

Schon eine kurzzeitige Lichtschwankung genügt zum Aussteuern des Foto Sense Amplifiers. Der Tape Indicator geht EIN. Das Band wird wie EOF behandelt.

Abhilfe: Ein Stück Isolierband an der betreffenden Stelle auf dem Shield.

**Betr.: IBM 729 NOR, JT 85593 B, B/M 8026801**

Diese JT weicht in einigen Punkten von der JT 85593 ohne Suffix ab. Die letztere war im August 1964 an verschiedene GS verteilt worden.

Ergänzen Sie deshalb die Drahtung Ihrer Bändeinheiten - soweit es notwendig ist - mit Hilfe der B/M 8026801, JT 85593 B, die inzwischen vom Zentrallager ausgeliefert worden ist.





729 SA		729 SA		Title	Remarks
New WTC No.	New DOM No.	Old WTC No.	Old DOM No.		
1	-	1	-	Service Index - IBM 727*	DELETED
2	-	2	-	W/D History - IBM 727	DELETED
3	-	3	-	Capstan Motor - IBM 727	DELETED
4	-	4	1	Tape Transport Cleaning	
5	-	5	3	Reel Clutch	
6	-	6	9	Detection of Binding Prolays	
7	-	7	17	Skew - Cancelled, see CEM 729 SA - 54 (61)	
8	-	8	20	Ground Loops	
9	-	9	22	Pre-amps - Cancelled, see CEM 729 SA - 53 (60)	
10	-	10	23	Prolay with Removal Arm Assembly	
11	-	11	26	Reel Knob Stuffing	
12	-	12	27	Lubrication of Exterior Covers	
13	-	13	28	Shorted Write Head Cable	
14	-	14	29	Shimmed Prolays	
15	-	15	30	Prolay Adjustment Procedure	
16	-	16	31	Surface Finish - Nylon Pulley - Cancelled, see CEM 729 SA - 52 (52)	
17	-	17	4	Capstan Drive	
18	-	18	6	R/W Head Assemblies	
19	-	19	11	Capstan Motors	
20	-	20	14	Service Information	
21	-	21	24	Shorting of Diodes near Heat Sink	
22	-	22	25	Identification of Power Supplies	
23	-	23	12	False Tape Indicate	
24	-	24	15	R/W Heads	
25	-	25	18	Prolay Maintenance	
26	-	26	21	Ground Loops - Uninsulated Coax	
27	-	27	32	Modification of Tape Drive Tester	
28	-	28	33	7 1/4" R/W Head	
29	-	29	34	Metal Particles in Head Area	
30	-	30	35	200 Position Low Voltage Connector	
31	-	31	36	False Tape Indicate	
32	-	32	38	Faulty Capstan Motors	
33	-	33	39	I. R. G. Measurements	
34	-	34	40	Replacing Mylar Residuals	
35	-	35	42	"H" Shield Adjustment	
36	-	36	43	Interchangeability of Prolays	
37	-	37	44	Shimmed Prolays	
38	-	38	45	Defective Power Factor	
39	-	39	-	Rewind Coupling	
40	-	40	-	Crimping of Edge Connector Pins	
41	-	41	46	Skew Specifications - Cancelled, see CEM 729 SA - 71 (72)	
42	-	42	48	IRG Wire	
43	-	43	49	Door Maintenance Reduction	
44	-	44	50	TAU Clipping Level	
45	-	45	51	Tape Dumping	
46	-	46	53	Alternate Prolay Adjustment	
47	-	47	54	Cable Damage	
48	-	48	55	Intermittent Read Bus Noise	
49	-	49	56	H. S. Area Lamp	
50	-	50	57	"H" Shield Adjustment	
51	-	51	59	Tape Transport Cleaning	
52	-	52	52	Surface finish - Nylon pulley	
53	-	53	60	Pre-amps	
54	-	54	61	Skew	
55	135	55	62	Electrical noise deflection	
56	133	56	63	200 Position Connector Keeper Plate	
57	-	57	-	IBM 729 II, IV History	OBSOLETE
58	154	58	-	Prolay Maintenance	
59	158	59	-	R/W Head Wear	
60	160	60	-	Development H.D. Tape	
61	161	61	-	Tape transport degaussing	
62	162	62	-	Safety: IBM Cleaning Fluid	
63	163	63	-	Select Line Noise	
64	149	64	-	Erasure of extraneous bits in the IRG	OBSOLETE
65	138	65	-	H.S. Area Photo Cell	
66	137	66	65	Faulty Prolay Drivers	
67	150	67	66	Read and Write Cable Part Numbers	
68	142	68	67	Start-Stop Skew	
69	140	69	68	Rewind Past Load Point	
70	144	70	70	Signal Cable Termination	
71	143	71	72	Skew Specifications	

DELETED - These  
Service Aids are  
included in the  
CE Reference Manuals

729 Relay - F/N 223-6868-3  
729 NOR - F/N 223-6988-2

729 SA		729 SA		Title	Remarks
New WTC No.	New DOM No.	Old WTC No.	Old DOM No.		
72	-	72	58	Safety: Split Ring Reel Locking Device	OBSOLETE
73	156	73	75	Capstan Motors	
74	-	74	-	Bellow Switch Adjustment	
75	-	75	-	Reel Knob Assembly	OBSOLETE
76	-	76	78	Select Line Noise	OBSOLETE
77	168	77	79	Read Buss Levels	
78	167	78	80	Erase Head Positioning	
79	164	79	81	"H" Shield Improvement	
80	165	80	82	New Style Heat Sink	
81	166	81	84	Write Driver Cards	OBSOLETE
82	171	82	85	Write Skew Adjustment Jumpers	
83	-	83	87	AC Input Voltage	OBSOLETE
84	178	84	88	Noise Reduction	
85	175	85	90	Front Prolay Shield	
86	176	86	91	Rear Cover	
87	-	87	-	Prolay Drive Current	
88	-	88	-	High Speed Rewind Failures	
89	-	89	-	Loose Connections on AC Circuit Protectors	
90	-	90	-	Loose Connections in Power Units	
91	-	91	-	Tape Drive Tester	OBSOLETE
92	182	92	99	H. S. R. Lamp Adjustment	
93	180	93	100	Relay "Race"	
94	183	94	101	Power Supply Short	
95	-	95	102	Main Drive Belts	CANCELLED - See CEM SA-210(102)
96	184	96	103	Service Hints	
97	179	97	104	Power Cable Ground Connection	
98	181	98	105	Oscilloscope Procedure	
99	-	99	-	IBM 7330 History (French origin)	CANCELLED - See CEM 7330SA-1 (-).
100	-	100	106	IRG Test Measurement	
101	-	101	107	Felt Pad Lubrication	
102	193	102	111	Split Records on Magnetic Tape	
103	197	103	112	Prolay Drive Current	CANCELLED - See SA-181(242)
104	194	104	115	Magnetic Clutch and Brake	
105	169	105	83	Old Style 200 Pos. Connectors	
106	-	106	92	Rewind Arm Adjustments	CANCELLED - See CEM 7330SA-2(3)
107	-	107	93	General Adjustment Information	CANCELLED - See CEM 7330SA-3(4)
108	-	108	94	Service Aids	CANCELLED - See CEM 7330SA-4(5)
109	-	109	95	Tape Loading Procedure	CANCELLED - See CEM 7330SA-5(1)
110	-	110	96	Blown Fuses Power OFF	CANCELLED - See CEM 7330SA-6(7)
111	-	111	97	IRG Size	CANCELLED - See CEM 7330SA-7(6)
112	-	112	108	Condit. of T.D. used for Run. Sort	CANCELLED - See CEM 7330SA-8(-)
112	-	112	108	Condit. of T.D. used for Run. Sort I or Sort II	
113	-	113	109	General Information	CANCELLED - See CEM 7330SA-9(2)
114	199	114	117	Failing to stop at Load Point	DELETED - Included in Reference Manual
115	200	115	118	Degaussing Magnetic Clutch	
116	191	116	121	Input Contactor K3	
117	207	117	123	Clarification of EC 249230	
118	-	118	-	Power Drivers	
119	-	119	-	Door Cables	CANCELLED - See SA 250(-)
120	-	120	-	Capstan Main Drive Assembly	CANCELLED - See CEM 7330SA-10(-)
121	-	121	-	Safety	
122	-	122	116	Tape Damage	CANCELLED - See CEM 7330SA-11(15)
123	-	123	135	Tape Transport Adjustment Procedure	CANCELLED - See CEM 7330SA-12(15)
124	-	124	110	Correction to 7330SA-2(3)	CANCELLED - See CEM 7330SA-13(-)
125	-	125	119	Deg. of the Magn. R/W Head Assembly	CANCELLED - See CEM 7330SA-14(17)
126	-	126	120	Line Terminators	CANCELLED - See CEM 7330SA-15(16)
127	-	127	125	Start Stop Time	CANCELLED - See CEM 7330SA-16(19)
128	-	128	129	Signal Cable Connections	CANCELLED - See CEM 7330SA-17(-)
128	-	128	129	Signal Cable Connections	
129	-	129	137	Engineering Changes Suffix and Prefix	CANCELLED - See CEM 7330SA-18(-)
129	-	129	137	Engineering Changes Suffix and Prefix	
130	-	130	146	Mechanical Read Skew Adjustment	CANCELLED - See CEM 7330SA-19(8)
131	-	131	147	Socket Screw-Mechanical Skew Adjustment	CANCELLED - See CEM 7330SA-20(9)
132	-	132	148	False Load Point Indications	CANCELLED - See CEM 7330SA-21(12)
133	-	133	149	Service Aids	CANCELLED - See CEM 7330SA-22(13)
134	-	134	150	Pos. Saf. Hazard while Mof. Tape Drives	CANCELLED - See CEM 7330SA-23(-)
135	-	135	153	High Speed Rewind Adjustment R5	CANCELLED - See CEM 7330SA-24(14)
136	-	136	154	Tape Reloading Procedure	CANCELLED - See CEM 7330SA-25(27)
137	-	137	130	Bit Packing	
138	209	138	131	Nylon covered Door Cable	
139	211	139	133	Front CE Panel	DELETED - Included in Reference Manual
140	-	140	138	Tape switching Feature	
141	153	141	139	Idler Pulley Bushing Lubrication	
142	185	142	141	Extreme Lighting Conditions	
143	186	143	142	T3 Position Burndy Power Connectors	
144	192	144	144	Timer Mounting Screws	
145	201	145	145	Cleaning Prolay Cavities	
146	155	146	152	CP Numbering - DC Voltages	

729 SA		729 SA		Title	Remarks
New WTC No.	New DOM No.	Old WTC No.	Old DOM No.		
147	222	147	158	Keeper Breakage on Line Terminators	
147	222	147	158	Keeper Breakage on Line Terminators	CANCELLED - See CEM 7330SA-26(34)
148	-	148	159	Checking Preamp Levels Off-Line	CANCELLED - See SA - 216(-)
149	215	149	161	File Protect Lamp and 22 MH Choke	
150	221	150	162	Converting Line Terminators	
151	220	151	163	Erase Head Adjustment	
152	223	152	165	NOR Tester Card	DELETED - Included in Reference Manual
153	-	153	157	Preamp Adjustment	
153	-	153	157	Preamp Adjustment	CANCELLED - See CEM 7330SA-27(32)
154	-	154	151	Capstan Clutch Assembly	CANCELLED - See CEM 7330SA-28(29)
155	148	155	73	Tach-Generator	
156	206	156	126	Tape Switching Signal Cable Routing	
157	-	157	-	Adjustment Tape Wrinkle Potentiometer	
158	-	158	-	Tape Developer and Cleaner	OBSELETE
158	-	158	-	Tape Developer and Cleaner	See CEM 7330SA-29(-)
159	202	159	128	Servicing the 60/90 KC Tape System	
160	-	160	155	Part Number Additions to Catalog	CANCELLED - See CEM 7330SA-30(30)
161	-	161	156	Spring Washer Left Rewind Arm Shaft	CANCELLED - See CEM 7330SA-31(28)
162	-	162	160	False Load-Point Sensing	CANCELLED - See CEM 7330SA-32(33)
163	-	163	-	Partial Brake Adjusting Tool	
164	243	164	-	Shifting Mechanical Skew	OBSELETE
165	-	165	-	Reel Brake Assembly	CANCELLED - See CEM 7330SA-33(-)
166	-	166	-	Power Cable Assembly	CANCELLED - See CEM 7330SA-34(-)
166	-	166	-	Power Cable Assembly	
167	245	167	-	Treating Noise Trouble	
168	227	168	218	Reduce Clutch Powder Leakage	
169	226	169	178	Parts Catalogs Connections	
170	229	170	179	False Write Echo Errors	
171	225	171	180	Proloy Lubrication	
172	232	172	183	200 Position Connector Parts	
173	231	173	184	208 VAC Power Cables Safety	CANCELLED - See CEM 729SA-191(221)
174	-	174	185	Electrical Noise Detection	
175	270	175	186	Replaceable Capstan	
176	236	176	187	Safety Hazard	
177	238	177	190	Noise due to Motor Cables	
178	-	178	191	Line Voltage Adapter	OBSELETE
179	-	179	192	Magnetic Clutch Removal	
180	239	180	193	Asymmetry Adjustment	
181	242	181	199	Proloy Drive Current	
182	241	182	200	Eddy Current Switch	
183	246	183	202	Tape Wrinkle	
184	214	184	206	Fail to Stop at Load Point	OBSELETE
185	248	185	207	Safety - Top Filter Cover	
186	190	186	-	Erase Head Test	
187	-	187	-	Three Phase Rev. Cap. Mat.	CANCELLED - See CEM 7330SA-35(50)
188	-	188	-	Three Phase Rev. Cap. Motor	CANCELLED - See CEM 7330SA-36(-)
189	-	189	169	Revised Parts Catalog	CANCELLED - See CEM 7330SA-37(38)
190	-	190	171	Load Point and Tape Indicate Lamp Voltage	CANCELLED - See CEM 7330SA-38(41)
191	-	191	221	Vac. Powder Cables Safety	CANCELLED - See CEM 7330SA-39(40)
191	-	191	221	Vac. Powder Cables Safety	
192	-	192	173	Tape Damage Wrinkled Near Hub	CANCELLED - See CEM 7330SA-40(44)
193	-	193	174	Start Stop Adjustments	CANCELLED - See CEM 7330SA-41(45)
194	-	194	175	"H" Shield Mounting	CANCELLED - See CEM 7330SA-42(43)
195	-	195	181	Cleaning Vacuum Columns	CANCELLED - See CEM 7330SA-43(39)
196	-	196	189	1401 TAU Hang Up	CANCELLED - See CEM 7330SA-44(-)
197	-	197	196	Tape Cleaner Blade Installation	CANCELLED - See CEM 7330SA-45(47)
198	-	198	197	Clean. Proc. - Tape Cleaner Blade	CANCELLED - See CEM 7330SA-46(46)
199	-	199	203	Tape Cleaning Kit, P/N 352465	CANCELLED - See CEM 7330SA-47(-)
200	-	200	205	False Load Point at Beginning of H.S. Rewind	CANCELLED - See CEM 7330SA-48(51)
201	-	201	208	Logic Page Errors	CANCELLED - See CEM 7330SA-49(54)
202	-	202	213	Read Write Errors Noise Pick Up	CANCELLED - See CEM 7330SA-50(56)
203	-	203	219	Enlarged Cable Openings Raised Floats	CANCELLED - See CEM 7330SA-51(57)
204	-	204	222	Erase Head Cable Breakage	CANCELLED - See CEM 7330SA-52(59)
205	-	205	223	Write Skew Delay Line Taps	CANCELLED - See CEM 7330SA-53(60)
206	-	206	224	Adjustment of Tape Cleaner	CANCELLED - See CEM 7330SA-54(61)
207	244	207	210	729 CE Manuals	OBSELETE
208	213	208	215	New Stop Capstan	
209	250	209	214	Service Hints	
210	203	210	102	Main Drive Belts	
211	-	211	209	Tape Damage - Loosewind	CANCELLED - See CEM 7330SA-55(55)
212	-	212	165	Imp. Volt. - 208 V to 220 V or Vice Versa	CANCELLED - See CEM 7330SA-56(-)

New WTC No.	New DCM No.	Old WTC No.	Old DCM No.	Title	Remarks
213	-	213	167	Line Terminator Wiring P/N 556801	CANCELLED - See CEM 7330SA-57(36)
214	247	214	211	Improved R/W Head	
215	-	215	-	Field Replacement of the Capstans	
216	-	216	-	Checking Preamp Levels	
217	254	217	226	729 NOR Test Cards	DELETED - Included in Reference Manual
218	-	218	225	Logic Correction	CANCELLED - See CEM 7330SA-58(65)
219	-	219	229	Tape Tracking Problems	CANCELLED - See CEM 7330SA-59(68)
220	-	220	177	Tape Dam. during High Speed Rewind	CANCELLED - See CEM 7330SA-60(42)
221	-	221	-	Checking of the 45 MS Single Shot	CANCELLED - See CEM 7330SA-61(-)
222	-	222	-	P/N of the Paris incl. in the Rev. Mor. Ch.	CANCELLED - See CEM 7330SA-62(-)
223	-	223	227	CE Manuals	CANCELLED - See CEM 7330SA-63(66)
224	-	224	-	Safety Label	CANCELLED - See CEM 7330SA-64(-)
225	-	225	230	Vacuum Motor Brush Repl.	CANCELLED - See CEM 7330SA-65(69)
226	-	226	-	Dynamic Shield Adjustment	
227	-	227	-	Faulty Contacts in Volt. Adj. Pot.	
228	-	228	-	Parts Catalogs	
229	-	229	-	Ground Connections	CANCELLED - See CEM 7330SA-66(-)
230	-	230	-	Wiring Error	CANCELLED - See CEM 7330SA-67(-)
231	-	231	-	P/N's for M.D. Asm. Three Phase Rev. Mot.	CANCELLED - See CEM 7330SA-68(-)
232	-	232	236	Reel Drive Brake Assembly	CANCELLED - See CEM 7330SA-69(70)
233	-	233	246	Input Volt. Conversion	CANCELLED - See CEM 7330SA-70(73)
234	-	234	238	Tape Errors and Compatibility Prob. after Install.	CANCELLED - See CEM 7330SA-71(-)
235	-	235	241	Front Door Latch	CANCELLED - See CEM 7330SA-72(72)
236	-	236	239	Hang Up Condition - Sort II Program	OBSOLETE
237	260	237	245	Tape Drive Cleaning Kit	
237	260	237	245	Tape Drive Cleaning Kit	See CEM 7330SA-74(74)
238	-	238	244	EC 252271 V	CANCELLED - See CEM 7330SA-75(75)
239	-	239	234	Tape Drive Tester Logic	CANCELLED - See CEM 7330SA-76(63)
240	-	240	232	Erase Head Adjustment	CANCELLED - See CEM 7330SA-77(64)
241	-	241	233	Castor Brake P/N 280336	CANCELLED - See CEM 7330SA-78(62)
242	-	242	235	New Prod. Tape Drives 7330	CANCELLED - See CEM 7330SA-79(71)
243	-	243	-	False Load Point Detection	CANCELLED - See CEM 7330SA-80(-)
244	252	244	-	Tape System Noise	
245	253	245	243	Erasing in the EOF Area	
246	257	246	237	New Style Idler Pulley	
247	258	247	228	Vacuum Column Switch	
248	261	248	247	AC CP Cable Chafing	
249	262	249	-	Tape Cleaner Blade	
250	-	250	-	Nylon Covered Door Cable	
251	198	-	-	New Style Heat Sink	
252	204	-	-	Clipping Levels	
253	251	-	-	Head Cable Grounding	
254	256	-	-	60/90 KC Tape Systems	
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257	266	-	-	Head Cable Damage	
258	267	-	-	Binding Brake Assemblies	
259	268	-	-	Erase Head Leads	
260	269	-	-	Exhaust Fan	
261	-	-	-	729 All Models	
262	-	-	-	New Gate Fan (P/N 4062612)	
263	-	-	-	Faulty RP Cards P/N 371749	
264	-	-	-	Circuits Protectors - Type "SECUREX"	
265	276	-	-	Undetected Dropping of Ready	
266	277	-	-	Clarify Logic Page Updating	
267	278	-	-	Tape Damage (Edge Creasing)	
268	279	-	-	Duplicate or Missing Records	
269	281	-	-	Tape Dump after installing EC 252528	
270	271	-	-	Binary Tracking on 800 CPI	
271	272	-	-	Bit Viewer for Heavy Duty Tape	
272	273	-	-	Tie Down "4T" Read Gate	
273	274	-	-	Fail to Stop at Load Point	
274	280	-	-	Caution - Safety Hazard Accent Panel-Rear Door Trim	
275	282	-	-	Tape Transport Cleaning Operation	
276	283	-	-	Defective Erase Heads	
277	284	-	-	Capstan Rubber Change	
278	285	-	-	Door Maintenance Reduction	
279	286	-	-	Vacuum Switch Filters	
280	-	-	-	B/M 5324381 Installation CEM 144(101)	
281	-	-	-	Paris Catalogs Corrections	
282	283	-	-	729 NORLAY Magnetic Tape Unit	
283	-	-	-	Motors Connectors (French origin)	
284	-	-	-	Field Replacement of Vacuum Pumps P/N 8015289, P/N 8010396	
285	289	-	-	Installation Procedure	
286	290	-	-	Reduce Tape Dump	
287	304	-	-	Defective Filter Capacitors	
288	292	-	-	Possible Card Damage after Installation of EC 252528B	
289	293	-	-	T.D. Terminator Rework and Off Line Meter Check	

729 SA		Title	Remarks
New WTC No.	New DOM No.		
290	294	Hang-Up on Rewind Command at Load Point	
291	295	NOR Drives with Rear Preamps	
292	296	Clarify Logic Page Updating	
293	298	Tape Contamination	
294	299	1. Insure Ready does not become Active during Rew.-Unl. 2. Eliminate Ready Dropping	
295	301	Erase Head Check - Off Line	
296	308	Write Echo Errors	
297	303	High Res. Ground in Multiple Volt Power Supply	
298	314	Prolay Coil Assembly	
299	305	A. False Load Point Indications - B. Failing to Stop at L.P.	
300	306	Removal and Replacement of Pneumatic Door Cylinder	
301	309	Tape Losing Proximity with the Read/Write Head	
302	310	Backspace Test Procedure	
303	311	Vacuum Switch Filter	
304	313	Int. of Met. and Non-Met. Tape Drive Units	
305	-	Installation of B/M 8023445 and B/M 8026561	
306	-	729 B II to VI (French origin)	
307	316	Excessive Read/Write Errors or TAU	
		Hang-Up	
308	318	1200-Foot Master Skew and Pre-Amp.	
		Calibration Tapes	
309	319	Partial Brake Adjustment	Cancelled - See CEM 729 S.A. 351 (353)
310	320	Flapper Valve - Eddy Current	
		Switch and Tape-In Column	
		Switch Adjustment	
311	321	Read/Write Head Cover -(U.S. origin)	Cancelled
312	322	Power Cable Connector	
313	323	Replacement of Reel Drive Clutch	
		P/N 5,344,998 (U.S. origin)	
314	324	Excessive Read and Write Errors	
		(U.S. origin)	
315	325	General Service Hints	
316	326	P/N 528510 Prolay Armature	
317	327	Improve Asymmetry Adjustments	
318	328	Quick mount Tape Reel Latch	
319	-	New Style Autotransformer	
		P/N 8,023,393 (French Origin)	
320	330	Fail to H.S. Rewind	
321	331	General Service Hints	
322	332	Prevent Tape Twisting in Columns	
		on Load and Keep Ready Down if	
		Tape Dumps (U.S. origin)	
323	333	Prolay Pulley P/N 526,253	
324	334	AG Raceway Motor Plugs	
		(U.S. origin)	
325	335	DUO Relay Wiring (U.S. origin)	
326	336	FALSE Tape Indicate with Tape	
		Switching	
327	337	Tape Dump in Columns	
328	-	Manual Loading Improvement	
		(French origin)	
329	-	SMS Card Type RP P/N 371749	
		(French origin)	
330	300	Aluminum Hub Tape Reel	
331	338	Quick Reel Release Latch (U.S. origin)	
332	339	Capstan Motor Rebuild Kit (U.S.	
		origin)	
333	340	NORLAY Reel Control Vacuum	
		Column Switching	
334	-	Prolay Pulley Shaft Retaining Wire	
		P/N 528606	
335	341	Modified NORLAY Reel Drive Clutch	
336	342	Tape Losing Proximity With the Read/	
		Write Head	
337	-	Positioning of the Vacuum Switch	
		Capacitors (French origin)	

CEM Number WTC DOM		Title
38	343	1401 TAU Hang-Ups
39	344	Parts Catalogue Corrections (U. S. origin)
40	345	Eliminate Unnecessary Rebuilding of the Right Stop Clutch (U.S. origin)
41	346	5 1/4" Tape Reel
42	347	Excessive Burnout of R19 Neutral Potentiometer
43	348	Lint Free Cleaning Cloth
44	349	Lubrication of Exhaust Fan Motor (U. S. origin)
45	-	Installation of Quick Reel Release Latch
46	-	Improper Locking of the R/W Head
47	-	Unwanted Selection with Tape Switching (French origin)
48	350	729/7330 Universal Tester Problems
49	351	Alphabetical Labels
50	352	Shifting Mechanical Skew
51	353	Left/Right Partial Brake Adjustment
52	354	EC Information (U. S. origin)
53	355	729 Vacuum Blower Motors (U.S. origin)
54	-	Skew Error Problem (French origin)
55	-	Saarp Edges and Corners
56	-	Reassembling of Reel Clutches
57	-	Premature Wearing of Tape Reel Latch

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71 (143)	Skew Specifications
96 (184)	Service Hints
100(—)	IRG Test Measurement
104(194)	Magnetic Clutch and Brake Test
153(—)	Preamp Adjustment
155(148)	Special Tool for Variable Clutch Control
157(—)	Adjustment Tape Wrinkle Potentiometer
159(202)	Description and Service of 60/90 KC Tape System
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180(239)	Asymmetry Adjustment
216(—)	Checking Preamp Levels
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### 55 (135) Electrical Noise Detection IBM 729 II, IV

Electrical noise in Tape Drives is often the cause of false tape indicate, write checks and read checks. The following procedures have been found effective in detecting noise bursts.

#### Scope Setup

1. For installations having a 535 or 545 scope with "D" differential pre-amp:
  - A. Power scope in normal manner (do not float scope) and allow 5 minutes to warmup.
  - B. Compensate each probe (10:1 probe) individually, using the scope square wave calibrator output.
  - C. Set amplifier gain with Gain Adj. Pot to calibrated square wave output.
  - D. Compensate probes together for no signal at maximum gain, with 50 volts square wave output with input selected to A-B/AC, using the Diff. Bal. Pot on the pre-amp.
  - E. When possible, use an external sync on the suspected source of noise.
  - F. Connect probes without using ground jumper (the ground provided in the power plug is sufficient).
  - G. Use scope hood for easier viewing.

II. For installations that do not have a "D" differential pre-amp, or have a 310 scope:

- A. Power scope and allow to warm up 5 minutes.
- B. Use direct probes if possible.
- C. If a direct probe is not available, a 10:1 probe may be used, if it is calibrated correctly.
- D. It is important to ground the probe.
- E. Use scope hood.

#### Scoping Points

There are two areas of the Tape Drive to scope for noise:

- I. Read Bus
  - A. Noise on the read bus can get through the final amplifiers and give read or write checks.
  - B. In general, noise amplitude should not exceed feed through specifications i.e., 0.4 V for 729 IV, and 0.6 V for 729 II.

The width of the noise pulse as well as the amplitude will determine whether it will be accepted by the final amplifier. Narrow pulses, less than 2 sec. wide at the base, of higher amplitudes will not normally be accepted by the final amplifiers. They are, however, considered undesirable and for best operation should be eliminated.

#### II. Back panel logic gate.

- A. Check for noise less than 100 mv at frequencies below 5 megacycles, and less than 1 volt at frequencies above 5 megacycles, between the following points.
  1. A 16 J and F 16 J
  2. -6 V and Gnd.
  3. -6 V and Gnd.
  4. +12 V and Gnd.
  5. -12 V and Gnd.
5. Any other two points where noise is suspected.

The most common sources of noise are the clutch brushes and the vacuum column switches.

To check the column switches it is necessary to manually put the tape loop in the column near one of the vacuum switch ports. Now, by turning the reel slightly to cause tape to operate the switch, an oscillating condition of the switch can be obtained. The make and break of the contact can now be checked for noise generation by scoping either at the read bus or on the back panel. Be sure to check each vacuum switch in this manner.

In order to check for clutch brush noise, the clutch must be activated as it would when it is trying to dump or take up tape. This can best be done by turning the reel until tape is beyond the vacuum port and holding it there. An example would be in checking the left down clutch, move the tape above the left column upper port and hold it there. Now the back panel and read bus can be checked for noise. All four clutches should be checked in this manner. While the two above sources of noise are the most common, it must be remembered that noise can come from defective switches on the tape operators panel and in some cases from relay operation. If the source of a problem is suspected to be noise, then all possible sources of noise generation should be explored.

A quick on-line check can be made for noise on the 7090 and 1401. 7090

Write a tape from the C.E. console with no bits in all tracks. Use the "Stop-on-Error" switch. Any errors that occur will be picked up and in most cases is an indication of noise.

#### 1401

First a tape (or part as desired) must be written with no bits. Do not use "Stop-on-Error". Rewind the tape and read it with "Stop-on-Error" on. Any errors that occur will be either bits written by noise, or direct noise itself.

June 23, 61

### 56 (133) 200 Position Connector Keeper Plate IBM 729 All Models

A newly designed stainless steel keeper plate is now being used on the 200 position signal connector.

Part	Quantity	Former P/N	Present P/N
Keeper	1	598239	591640
Screw # 8-32	4	598233	--
Screw # 6-32	4	--	591641

The former style parts are no longer available. Order the new style keeper and screws with Field Requisition Card 6, COP Only.

Correct the 729 Parts Catalog WTC edition, page 38, Ref. 38:

- delete P/N 598239
- add P/N 591640

Sept 14, 62

### 58 (154) Prolay Maintenance and Tape Motion Adjustments IBM 729 All Models

The procedure provided in this service aid was taken from a recent US field Technical Bulletin. It has been used by a number of installations with a great deal of success.

Though some of the specs are tighter than manual recommendations, the procedure is offered to supplement existing methods with another approach to prolays servicing.

I. Prolay arm and armature pivots are to be lubricated with IBM # 6 oil

II. All prolays are to be shimmed at 0.006" and EC 248710 installed as per CEM Service Aid # 37(-).

#### III. Start-Stop Adjustments.

A. Check arm assembly for wear in pivots by feeling for lost motion at idler with power on the prolays. The amount of allowable motion at this point will vary with each prolays, but usually if over 0.005 will require replacement of the arm assembly. Replace complete assembly, P/N 528520 or P/N 528515.

#### B. Start Time.

1. With a 5 second go down time (count 5), the initial 100 % amplitude point must not be later than 3 MS. Adjust drive gap dynamically starting from a wide gap until the above condition is reached. Do not go any closer. If the drive gap is too close, it will prevent the armature from sealing. This will cause a speed change several MS after the beginning of writing. This may not be apparent on the scope but will cause trouble when writing long records under count five condition. You should be able to obtain a satisfactory envelope with a drive gap clearance of 0.005 inches  $\neq$  0.001.

2. Test for the count five start time with a full loop of tape in the column opposite from the direction tape is being driven. The 100 % amplitude point may be allowed to go to 3.5 MS under this condition.

3. Set the drive current at 4A and neutral current at 3A. Looking at the forward start envelope, vary the go down from 10 MS down to 2 MS. At some point in this range the start time will move out to about 4 MS. Leave the go down at this setting and reduce the neutral current until the start time comes back to 3 MS. Do not go below 2A. This adjustment will assist in improving occurrences of low IR gaps in the low go down area.

#### C. Stop Time.

1. Set coast pots fully counterclockwise.

No coast.

2. Adjust forward stop time so that the amplitude of signal reaches zero at 2.5 MS. The stop capstan must stop the tape. The 100% amplitude of the stop envelope must extend to 1.5 MS. Use the forward coast pot if necessary. This adjustment should result in a forward stop gap clearance of 0.007"  $\neq$  0.001. Be sure the stop capstan is not grooved.

3. Adjust the backward stop time so that zero amplitude is reached at 2.0 MS. It should not be necessary to use the backward coast pots. This adjustment should result in a backward stop gap clearance of 0.005  $\pm$  0.001 inches. The backward stop time can be altered on line to satisfy creep specifications.

IV. Tape Motion, - 705 III, 7070, 7090 and 1401 Tape Systems.

A. IR Gaps.

1. The shortest IR gap generated under any condition of go down should not be less than 9.5 MS for Model II and 6.4 MS for Models III and IV.  
2. The vari-delay range should not exceed 2.0 MS (1-5 vari-delay 7T03). All other ranges should not exceed 1.0 MS or not be 0.3 MS greater than the 10 MS go down range.

3. No backward creep operations can be allowed. The average forward creep should be 1.4 MS  $\pm$  0.4 for Models III and IV and 2.0 MS  $\pm$  0.5 for Model II.

3. When we test an electronic device, we bias the voltages to test the worst condition. We should do the same when testing the mechanics of the 729. Do not clean the tape transport area before running tape motion. Keep the conditions the same as the customer has. If there is trouble in the tape transport area, correct the trouble by adjustment or replacement. Cleaning the tape transport may temporarily correct the trouble, but cleaning is not a permanent fix.

Sept 22, 61

59 (158) R/W Head Wear

IBM 729 All Models

Signs of R/W Head Wear are appearing on some of the older tape units. This "trenching" of the head surface (the width of tape) can be recognized by:

- 1. Excessive "fluttering" of the "1" and "C bit" read buss signals.
- 2. Buildup of "shoulders" (trenching) on the head. They are visible in bad cases, but can be felt or "hooked" with the fingernail in almost all cases.
- 3. Unexplained increase in tape checks. This will probably be one of the first symptoms.

It is very difficult to state generally at exactly what point a worn head should be replaced. This decision is left to the Customer Engineer who is in the best position to decide in an individual case.

**IMPORTANT** - It must be emphasized, however, that the head assembly is an expensive part. Replace only those heads which are actually causing excessive errors.

Always replace the entire head assembly where head replacement is indicated.

Oct 6, 61

60 (160) Development of Heavy Duty Tape

IBM 729 All Models

A number of fluids were tested in order to find an acceptable cleaning and development medium for Heavy Duty Tape before the tape was announced. These tests were suspended after the design of a Bit Viewing Device. Unfortunately, the device was not ready for production soon enough to accompany release of Duty Heavy Tape.

The present cleaning and development fluid, P/N 517960, should not be allowed to come in contact with Heavy Duty Tape. For those installations which have used to develop good Customer tape, the present developing technique may be used, provided that plain, clean water is used instead of the developer medium. Wipe tape with a clean dry cloth after developing. This practice should be discontinued when the Bit Viewing Tool is available.

The present cleaning fluid should still be used to clean tape transports. Be certain to caution customer operators who clean tape drives that the transport should be thoroughly dry before loading tape.

Oct 20, 61

61 (161) Tape Transport Degaussing

IBM 729 All Models

Tests have proven that minute metal particles on tape cause more read-write errors on a tape unit head which is magnetized. This condition can be greatly reduced by use of a Degausser, P/N 451064.

The head assembly should be demagnetized as needed. Once a month is a general recommendation. Degaussing is effective for both Mylar and Heavy Duty Tape, though a reduction in errors is more apparent where Heavy Duty Tape is used. This is so because Heavy Duty Tape has superior wearing qualities and will have fewer oxide particle errors. The following procedure should be used:

- 1. Remove magnetic tape from transport. Do not place on top of tape unit.
- 2. Remove decorative head cover and shields to expose front surface of R/W head.
- 3. Depress push-button on Degausser while at least 12 inches away from head and move in slowly.
- 4. Hold Degausser against the front surface of the head for about 10 seconds.
- 5. Pull Degausser straight out VERY SLOWLY to a distance of at least 12 inches and release the push-button switch.

This A.C. erasing should also be done if the head has been subjected to a strong magnetic field. DO NOT use the Degausser near magnetic tape of any kind because it will erase information on the tape.

Oct 20, 61

62 (162) Safety: IBM Cleaning Fluid Tape - Developer Medium & Transport Cleaner

IBM 729 All Models

**SAFETY** IBM Cleaning Fluid, P/N 450608, is a stabilized 1, 1, 1-Trichloroethane solution with an additive to improve odor. Tape Developer Medium & Transport Cleaner, P/N 517960, is a modified form of 1, 1, 1-Trichloroethane specially developed for use on magnetic tape.

These cleaning fluids are less toxic than Carbon Tetrachloride. However, exposure to extremely heavy concentrations of the cleaning fluid or internal consumption of the fluid may result in bodily damage.

While the hazard on such exposure resulting from general use of these products is negligible, the following information is presented for emergency use:

**SYMPTOMS:**

Nausea, confusion, central nervous system depression, or coma.

**TREATMENT:**

Induce vomiting, support respiration, wash with soap and water for skin exposure. Obtain immediate medical attention.

**EYE CONTACT:**

If splashed directly in the eye it may cause pain and soreness for a few days. Flush eye with large amount of water and seek medical attention.

**SINK CONTACT:**

Prolonged and repeated skin contact can cause some minor irritation to sensitive individuals. Avoid prolonged contact with contaminated clothing.

**VAPOR INHALATION:**

If a person shows ill effects which might be due to breathing vapors from the fluid, he should go to fresh air at once. Persons overcome by vapors should be removed to fresh air and should receive prompt medical attention. Apply artificial respiration if breathing stops. Never give Epinephrine to a person overcome by chlorinated hydro-carbons because of the possibility of inducing ventricular fibrillation.

The following safety precautions should be exercised in the use of all types of cleaning materials:

1. No smoking to be permitted in vicinity of cleaning solvents.
2. Use only in well ventilated areas. Avoid breathing fumes.
3. Wash hands thoroughly with soap and water after using solvents. Rubber gloves should be worn if the user is allergic to solvents.
4. Safety glasses should be worn as a precaution against any petroleum product. Do not store or use near source of open flame or high temperature which causes formation of toxic decomposition products. Present packaging of Tape Developer Medium & Transport Cleaner is in 6 oz. spout type containers. These containers all have First Aid Treatment imprinted on the label. Some of

the former containers having a screw cap do not have the first aid treatment on the label. Branch offices should check their stock and only those cans with the first aid treatment imprinted on the container be issued to installations where the customer may have access to this fluid. Under no circumstances are IBM customers to be issued IBM Tape Developer Medium & Transport Cleaner in any container that does not have first aid treatment imprinted on the container.

Oct 20, 61

63 (163) Select Line Noise

IBM 729 All Models

There have been several instances (especially on 1401 Systems) where a particular tape unit produces excessive errors, depending upon its physical location "on line". It will perform properly only if it is the last machine on the line with the signal line terminating shoe installed. The tape unit in question will produce excessive read/write errors in any other line position.

Magnetic Clutch generated noise, coupled to the Select Line, gets to the read busses and results in highly intermittent errors. Two known causes are:

1. Unsoldered Select Switch (shield) common.

2. Select lines improperly wired to the Select Switch from the T/C. A "floating" shield condition may exist. As a result, a high frequency noise pulse, at least 4 volts peak to peak, is present when the clutches are switched. They may be found on the read busses, read gate, select line, voltage busses and ground. Noise pulses (on the select line) should be less than 2 volts peak to peak, 0.3 to 0.4 usec. in width, and over 1 megacycle in frequency.

Oct 20, 64

### 65 (I38) High Speed Area Photo Cell IBM 729 US origin

Current production machines have a new type High Speed area photo cell. It is hermetically sealed in clear glass. Certain light rays can pass through the finger guard even though it appears opaque to the eye. This can cause the photo cell to be always activated so that the drive will not go into a high speed rewind. To remedy this problem, place a piece of black electrical tape on the back side of the finger guard plate over the area of the photo cell. This is a temporary "fix" until Engineering can release a change. French machines are not affected the guard plate being of a different material.

July 24, 61

### 66 (I37) Faulty Proloy Drivers IBM 729 Relay French or US origin.

A problem was discovered in the Plant recently, which may be causing problems on field machines. The power transistor on the Power Proloy Drivers, P/N 528405, was found to be breaking down. General proloy adjustment would be very critical, with symptoms varying depending on which driver was bad. Specifically, if Diode D6 is defective or has high resistance, the junction of T1 will break down. This will cause the turn-off time of this transistor to be slow. Depending on where the driver is used (go, stop or neutral) the effects seen are different.

By scoping across R3, a display similar to the following will be seen if the transistor is bad:



Scoping the same point on a good card will show a good square wave as shown below:



If proloys on a Tape Unit are hard to adjust this should be kept in mind as a possible cause. The easiest way to check would be by substitution of a new power driver card into the suspected location.

Jan 17, 64

### 67 (I50) Read and Write Cable Part Numbers IBM 729 II, IV

There has been some confusion as to which cable part number is correct with different style R/W head connectors. The latest style head and cable connectors are Amphenol. The older assemblies, especially on some 729 III's, used a Winchester connector. Most write cables use a Burndy connector on the opposite end.

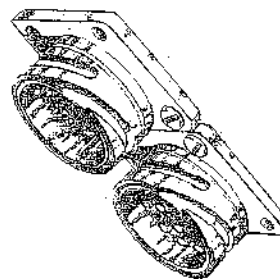
The cables are identified as follows:

TYPE	TAPE UNIT	CONNECTOR
------	-----------	-----------

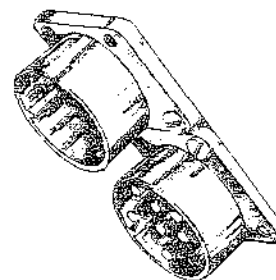
		Winchester	Amphenol
Read Cables	729 II, III, IV	528113	526513
Write Cables	729 II, IV	Winchester/Burndy 528112	Amphenol/Burndy 526512
	729 III	528112	Amphenol (Only) 526216 526222

Should a cable be defective, it is recommended that the entire assembly be replaced. The following cable connector part numbers are included for information purposes only.

Read -	Winchester 528179
	Amphenol 526288
Write -	Winchester 528178
	Amphenol 526287



AMPHENOL TYPE HEAD PLUG



WINCHESTER TYPE HEAD PLUG

Sept 8, 61

### 68 (I42) Start-Stop Skew IBM 729 All Models

It is possible for the left nylon pulley to cause as much as 4 micro seconds of skew under start-stop operations. When tape is either started or stopped, the nylon pulley can cause the tape to assume one of two tracking paths. The resulting skew between tracks "I" and "C" can be as great as 4  $\mu$ .

To detect this effect, scope tracks "I" and "C", syncing on track "I", in the same manner as when checking write skew (1  $\mu$ s/cm, 0.05 v/cm, 10:1 probes). Apply sufficient finger pressure against the left fork arm to take up any existing end-play in the fork arm itself. "Flick" the left nylon pulley (using snapping action with thumb and index finger) while writing continuous "I's" and monitoring skew as previously described. If skew between "I" and "C" changes, and remains changed until "flicked" again, the pulley must be replaced.

Often this effect is severe enough to be detected by simply performing a start-top operation, without the necessity for using any additional technique. Skew should always be checked whenever a nylon pulley is replaced for any reason. If skew is off, after installing a new pulley, be certain the new pulley is not at fault before adjusting mechanical skew.

July 24, 61

9 (I40) Rewind Past Load Point IBM 729 All Models

Several cases of tape units that occasionally rewind past Load Point have been traced to the connector at the bottom of the Tape Break Light intermittently shorting to the lower MU Metal head cover. This shorts out the LP and TI lamps.

This trouble can be prevented by checking for sufficient clearance between the connector and the head shield.

July 24, 61

0 (I44) Signal Cable Termination IBM 729 All Models

When interconnecting 200 position signal cables between tape drives do not carry the four voltages needed for termination. The terminator block must be placed in the connector in the last drive on a bank. It cannot be placed at the end of a cable connected to that drive.

Aug 25, 61

1 (I43) Skew Specifications IBM 729 All Models

To prevent possible skew incompatibility, the following procedure should be followed:

When installing a tape unit, read and write skew should be reset using the master skew tape for that particular installation. Only one Master Skew Tape, P/N 461096 (5568 PI), should be used for all tape units in that installation. The procedure in the Tape Unit Reference Manual should be used (section 3.1.3). Skew should be checked every 13 weeks and reset if specifications are exceeded.

The 0.25 microsec. specification in the manual is necessary to insure that tapes written at one installation can be read at another on a drive adjusted to a different master tape. Master skew tape specifications allow 0.5 microsec. between the most leading and lagging tracks; a possible total of 1.0 microsec. variation between masters.

Should the installation Master Tape become damaged, it must be replaced. The skew of all tape units should then be rechecked with the new master in order to establish a reference.

Aug 25, 61

3 (I56) Capstan Motors IBM 729 II (US origin only)

Some Model II capstan motors have exhibited a tendency to vary in speed. Symptoms of this marginal condition are:

Whining Noise - Motor searching for correct speed.

Excessive Heat - Much too hot to touch.

Speed Variation - As low as 1100 RPM.

In three conditions are usually present with a defective motor. The exact cause of this problem has not yet been accurately determined. As a temporary measure, present production motors have a smaller flywheel to compensate for this infrequent marginal condition. Flywheels in the field will not be replaced at this time.

A very small percentage of field machines have experienced this trouble. This information is released to enable Customer Engineers to recognize symptoms before systems errors are encountered.

Oct 6, 61

74 (-) Bellow Switch Adjustment IBM 729 II, IV (French origin)

In order to improve the reliability of the machine, the bellow switch adjustment is modified as follows.

With the magnetic tape off the machine, depress the LOAD REWIND key. By rotating the switch bracket screw, clockwise squeeze the bellow until the machine stops. Then turn the screw counter, clockwise just enough for the machine to resume its loading operation. Turn the screw 1/2 turn further. With vacuum at normal value, the micro-switch will not transfer before the vacuum switches have transferred.

All machines must be checked next P.M.

June 20, 62

77 (I68) Read Buss Levels IBM 729 All Models

Occasionally the power switch on a tape unit is turned off while the unit is still "on line" in a system. The tape system will not function properly if any tape unit has power off.

The reason for this is that the read busses must be referenced at +6 volts. With power off, the read buss output, at that tape unit, will "float" at zero level and affect the level of the entire read buss.

Nov 3, 61

78 (I67) Erase Head Positioning IBM 729 All Models

The Erase Head EC was recently changed from optional to mandatory (B/M 585447). This improvement will be shipped automatically for all controlled machines.

It was recently discovered that the head could cause noise problems if mounted incorrectly. When installing the assembly, position the brass mounting bracket as far to the left as possible. In addition, orient the erase head to the left and in an extreme clockwise position about its mounting screw.

Nov 3, 61

79 (I64) "H" Shield Improvement IBM 729 All Models

Feedthru between the write and read head can be reduced by reworking the "H" shield. In the past, the shield spring was mounted "belly down".

Recent experiments have proven that "H" shield adjustment to reduce feedthru can be made less critical by inverting the spring and adding two more.

Additional Springs, P/N 526298 can be ordered with the COP Only, Field Requisition Card Code 6.

Nov 3, 61

80 (I65) New Style Heat Sink IBM 729 II, IV (US origin only)

Prolay and Relay Driver Heat Sink assemblies have been redesigned. The black metal mounting is replaced by a printed circuit type card. New sinks are electrically interchangeable with the old style and retain the same part numbers. Mechanical mounting is slightly different. The new style requires stand off spacers and screws which should be ordered with all sinks for older machines. Mechanicsburg now stocks only the new style sink cards.

For each sink, order:

2 Screws P/N 34512 (frame to spacer)  
2 Screws P/N 58207 (spacer to card)  
2 Spacers P/N 352569

These extra parts will not be necessary with newer tape units which already have the new style cards.

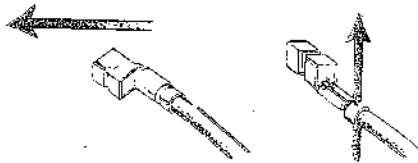
Nov 3, 61

82 (I71) Write Skew Adjustment Jumpers IBM 729 II, IV (US origin only)

The slide on jumpers used between SMS panel pins for write skew adjustment

may have been installed incorrectly on some tape units. Machines shipped from all plants between August 25 and October 20, 61 are involved.

The type of slide on connectors used during this period could cause intermittent write trouble if they are not correctly connected to the panel pins. Mechanical connection will not be rigid and may result in poor electrical connection.



Correct

Incorrect

If mounted incorrectly as shown above simply slip them off the pins, rotate 90° and slide back on.

Nov 3, 61

### 84 (178) Noise Reduction IBM 729 II, IV

The Clutch Filter Box Cable Shield is grounded near the hinge of the box. Recently, it was discovered that large transient noise spikes are occasionally coupled to critical circuits through ground by this connection. This is especially true on machines with the variable clutch control change installed. This possible cause of noise may be eliminated by "floating" the shield. Disconnect the shield lead at the box and tape the lead to the cable. Be certain it is completely insulated from any part of the machine frame.

This Service Aid is advance information of a forthcoming mandatory field change for machines of US or French origin.

Jan 5, 62

### 85 (175) Front Prolay Shield IBM 729 II, IV

The front shield on the prolays is unnecessary and is not included on newer machines. This shield, P/N 526021, was removed by a plant change only.

Older machines, which still have this shield intact, will function properly without it. The shield may be left off the next time it is removed for adjustment or PM.

Dec 1, 61

### 86 (176) Rear Cover IBM 729 II, IV

Many Customer Engineers do not know that the rear folding cover is removable. It can easily be removed by lifting it off its hinges. Removal of the cover for lengthy PM or EC activity will provide greater access. Be certain the cover is placed well out of the way to prevent accidental tripping and/or cover damage.

Dec 1, 61

### 87 (-) Prolay Drive Current IBM 729 II, IV (French origin)

In case of difficulties to obtain the correct 4 A drive current in prolays, primary of T 3 transformer may be connected to pin #2 (Logic 03.02.1).

July 8, 62

### 88 (-) High Speed Rewind Failures IBM 729 II, IV

High speed Rewind failures may be caused by the wires from the back of peens panel. Indeed the loops made by the wires can go into the time delay motor frame and perturb the functioning of the switch operating arm.

This point has been very carefully checked at the French factory starting February 1962, and new machines have a redesigned cable. All 729 machines in the field must be checked and wires moved up to prevent this trouble.

July 8, 62

### 89 (-) Loose Connections on AC Circuit Protectors IBM 729 II, IV (French origin)

To prevent a lot of troubles with loose connections on AC CP's tips are now soldered on new machines as from S/N 35-x1996.

Machines in the field can be modified.

July 8, 62

### 90 (-) Loose Connections in Power Units IBM 729 II, IV (French origin)

Many kinds of failures can be caused by loose connections in power units. This point must be checked on French machines before 35-x2050.

Jan 5, 62

### 92 (182) H. S. R. Lamp Adjustment IBM 729 All Models

Service Aid: On some occasions, it has been found that the High Speed Area Lamp image is not hitting the photo coll target. The H.S.R. lamp cover, P/N 528343, must be removed in order to adjust the light into the target. When it is replaced, it will often move the lamp in its socket and change the aim of the light beam. This is caused by the lamp socket, P/N 517846, which does not hold the lamp rigidly. A movement of the wires attached to the socket will cause the lamp to move. A small cable clamp can be installed to hold the wires rigid, or more simply, just tuck the excess wire into the angle of the mounting brackets, P/N 528357. This will prevent the cover from moving the wires when the cover is replaced.

Jan 5, 62

### 93 (180) Relay "Race" IBM 729 II, IV

Service Aid: After depression of the load-rewind button, the capstans may "pop" out momentarily due to a relay "race", and cause tape damage. This does not happen on all machines.

Wire the DP 1A points (unused) in series with the R2 AU N/C points and the DP3 coil. Make the necessary circuit correction on Page 02.02.1 of the ALD Manual.

March 30, 62

### 94 (183) Power Supply Short IBM 729 II, IV (US origin only)

Service Aid: A shorting problem was recently encountered on a tape unit that was caused by the cable assembly between power supplies being improperly positioned. The right edge of the upper power supply shelf penetrated the cable assembly that is secured to the right of the power supply shelves. This cable runs vertically inside of the power supply box to interconnect the three power supply levels and feed the various circuits of the 729. The grounding of this

able resulted in the melting of the insulation on about six wires in this cable. This was caused by the cable assembly being clamped too far to the left inside of the power supply box. The power supply shelf applied pressure to the cable when inserted in the machine, and then cut into the cable because of the sharp dressed edge on the shelf.

!! tape units can be very easily checked by opening the preamp gate. Using flash-light, look in and check cable clearance at power supply shelf.

Jan 5, 62

## 6 (184) Service Hints

IBM 729 II, IV

The following service hints will be helpful to All Customer Engineers servicing the 729 Tape Unit:

Adjusting LP and TI Photo Lamp Voltage Measure voltage at RT behind transistor panel instead of across the lamps. Hook one meter lead to frame ground and the other to load side of RT. This facilitates measuring and adjusting from the rear of the 729.

Minimum Go Down Time Range of Shimmed Prolays.

Problems experienced meeting IRG specifications due to high ranges at minimum go down time can be eliminated by setting the forward stop envelope to 2.2 milliseconds and using the forward go delay pot to fill out the envelope to 2.0 milliseconds.

### Tape Errors

Corrosion contact on door interlock switches can cause noise on the read bus during timing on reading tape.

### Tape Breakage or Stretching During High-Speed Rewind

This can be caused by sudden binds or drags in the clutches on the take-up shaft (left) allowing the machine reel to coast ahead of the tape reel. To detect this possible cause of trouble:

Mount a full reel of tape (with its end Scotch-taped to avoid flapping) on the left shaft.

Cover the high speed area photo-electric cell.

Remove the forward and reverse drive belts from their motors.

Initiate a rewind.

While rotating the forward and reverse clutches slowly by hand (one at a time) listen for an audible slow down of the high speed shaft. A spot in the clutches may be found (usually in the forward clutch) that will slow the shaft considerably. If you can hear it slow down without rotating the forward or reverse clutches, trouble is probably in the stop clutch.

CAUTION: Be careful of the voltage on the clutch slip rings.

### Round Loops

When the tape drive tester is mounted on the scope cart, it is possible to create a round loop. When checking for grounds at the pre-amp gate, the scope should be left unplugged.

### Magnetic Clutch Removal

Tape units at EC level 248166 (released December, 1962) include a hole through the inner side covers of the tape reel compartment. These 2" holes, which are normally covered with snap plugs, are intended to allow removal of the reel taper pin. A hub pin can be driven easily by passing the 10" pin punch through the hole. The hole also allows a visual check of tape-to-reel alignment. Snap plugs should always be replaced.

Nov 26, 62

## (179) Power Cable Ground Connection IBM 729 All Models

Service Aid: The grounding pins in the power cable receptacles are longer than others. This is intended to connect grounds before other connections are made. Customer Engineers should caution operators to use care when installing the cable. It is possible to insert the connector with this pin one hole too low. The connector could then be raised slightly, bending the pin, and force the connector "home" with the other pins correctly located. The ground pin will be badly bent. There have been no reported machine malfunctions as a result, but this is an annoyance which, with care, can be avoided.

Jan 5, 62

## 98 (181) Oscilloscope Procedure

IBM 729 All Models

SERVICE AID: All Customer Engineers using 535 and 545 oscilloscopes should be aware of the following procedure.

Due to inherent characteristics of tape writing and reading, jittering of displayed wave forms cannot be overcome when using delayed sweep unless internal triggering of the "A" sweep is utilized. Normally, in the delayed sweep application, the "A" sweep is allowed to free run.

In some tape read and write operations, it is advantageous to utilize internal triggering of the "A" sweep to further monitor the displayed wave forms. By doing this, confusing jitter is eliminated and the displayed wave form can be readily analyzed.

After setting up the scope in the usual manner on a delayed sweep application, turn the "A" triggering to internal plus or minus on. Adjust the "A" sweep stability and triggering level controls until the jittering of the displayed wave form is eliminated.

Jan 5, 62

## 100 (-) IRG Test Measurement

IBM 729 All Models

The acceptable individual gap and creep timing, as stated on Page 5 of Customer Engineering IRG Test (Block 5500B) are changed to include a tolerance of  $\pm 0.1$  millisecond. This tolerance is being added because the 1401 accumulator can compute the times to an accuracy of  $\pm 0.1$  millisecond only.

Feb 9, 62

## 101 (-) Felt Pad Lubrication

IBM 729 All Models

Following is a relatively fast method for lubricating the upper and lower pads in the head raising linkage:

1. Remove the upper decorative head cover. With the head up, the lower felt pads located on either side of the driver worm gear are accessible.
2. IBM #6 oil can be applied to the pads by putting several drops of a screwdriver tip and touching it to the felt pads.
3. Lower the head manually. With the head down, the upper felt pads can easily be seen between the tape head and frame casting. They are located approximately 60° down and back of the opening created with the head down and the decorative cover removed.
4. IBM #6 oil can be easily applied to the upper felt pads in the same manner as the lower felt pads.
5. IBM #70 grease can also be applied at this time, if needed, to the driven gear in the head raising mechanism.

Feb 9, 62

## 102 (193) Split Records on Magnetic Tape

IBM 729 All Models

A few cases of split or broken records being generated on magnetic tape by 729 Tape Units have been reported.

The cause of these split records was determined to be loose screws on the spring type contact terminals for LP, TI and TB photocell lamps. Poor electrical contact at these points can cause a momentary dropout of RI (Run Relay).

These screws and terminals should be checked during the next Preventive Maintenance period.

Feb 16, 62

## 104 (194) Magnetic Clutch and Brake Test

IBM 729 All Models

IBM 729 Magnetic Clutch and Brake response can be tested under "worst case" conditions by programming the Tape Unit to perform a continuous write-back-space-read operation using long length records (1,000 to 4,000 characters).

To thoroughly test all 6 magnetic clutches the test must be run with a full reel on the left hub and again with a full reel on the right hub. The greater weight and larger diameter of a full reel subjects the clutches to greater stress.

This test (received as a field suggestion) will show up intermittent magnetic clutch failures which are not evident during continuous forward or backward only tape motion.

Items to consider in analyzing magnetic clutch failures are:

1. Magnetic clutch brushes and contact rings.
2. Vacuum column switches and associated circuitry.
3. Reel drive motor "V" belt tension and wear.
4. Clutch and brake powder leakage and bearing contamination.

March 16, 62

### 105 (169) Old Style 200 Position Connectors IBM 729 II, IV (US origin only)

Early production 200 position cable connectors had latches which were too short. To compensate for this, the keeper plate was shimmed forward on early machines. The latch on later connectors was lengthened and keeper shimming was no longer necessary.

Occasionally an incompatibility problem may arise where new and old equipment is mixed in a particular installation.

Two conditions may exist:

1. Old connectors can not be latched to newer machines. If this connector must be used, then the machine keeper plates should be shimmed. Add a 0.016 thick washer, P/N 211034, on the four retaining screws between the keeper plate and lexan board, P/N 598688.
2. Newer connectors may mate loosely to machines with shimmed keeper plates. The washers should be removed from behind the keepers. This could be a source of intermittent trouble due to poor connections.

Nov 3, 61

### 112 (-) Condition of Tape Drives Used for Running Sort I or Sort II Programs - IBM 729 All Models

While running the IBM Sort I and Sort II Applied Programs on 1401 Systems; 729 Tape Drives are utilized under extreme operating conditions. For this reason, the importance of maintaining all tape drives using these programs at their maximum operating efficiency cannot be overemphasized. Preamp, as well as mechanical adjustments, must be properly maintained to minimize errors when running the Sort I and Sort II Programs.

July 14, 62

### 115 (200) Degaussing Magnetic Clutch Assembly - IBM 729 All Models

When rebuilding a magnetic clutch or brake assembly, it is often very difficult to remove any old magnetic powder or to recharge the clutch with new powder because of residual magnetism in the assembly.

This operation can be simplified by demagnetizing the unit before disassembly. A Degausser, P/N 451064, can be used for this purpose. It is available as an office tool or for general use at large system installations.

Sept 12, 62

### 116 (191) Input Contactor K3 IBM 729 II, IV

Intermittent and hard to analyse problems can result from loose terminal screws on the input contactor.

Check for loose screws on all tape units (during next scheduled PM period).

Sept 12, 62

### 117 (207) Clarification of EC 249230 IBM 729 II, IV (US Origin only)

This EC releases part numbers for 729 NOR Tape Units and is for factory use only. However, it has appeared in the EC History Block of 729 System Logic pages. EC 249230 should not be considered a prerequisite for installing Field Engineering Changes or system logic pages.

Sept 12, 62

### 118 (-) Power Drivers IBM 729 II, IV (French Origin only)

Hereunder is the list of the components used in the Drivers, the wiring diagrams of which are shown in the 729 general W/D (pages 8013362 and 8013363).

#### CAUTION

When a driver is ordered as a spare part, be sure to use the right part number indicated below. Do not use the P/N's of the wiring diagram which concern the W/D sheets themselves.

#### POWER PROLAY DRIVER ASSEMBLY P/N 8010328, Page 8013362

##### Transistors

T1	Type 022	P/N	526898
T3-T4	Type 028	P/N	518689

##### Diodes

# 6	Type P	P/N	2091969
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##### Resistors

# 1	P/N	283155
# 3	P/N	526062
# 5	P/N	317007
# 8	P/N	334928
# 10	P/N	317013

#### POWER RELAY - POWER LIGHT DRIVER ASSEMBLY - P/N 8010329, Page 8013363

#### Transistors

T2-T3-T4	Type 028	P/N	518689
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#### Diodes

# 3-5	Type P	P/N	2091969
-------	--------	-----	---------

#### Resistors

# 6-7-8	P/N	528486
---------	-----	--------

These P/N's may be manually entered in the W/D's, or the modified W/D's may be ordered to the French Plant.

Order P and S France

W/D	P/N	8013362	JT	82	949
W/D	P/N	8013363	JT	82	949

Sept 12, 62

### 121 (-) Safety - IBM 729 All Models

Safety Hazard exists when CE's clean the Vacuum Column. Be careful do not bump the fingers against the door latch pawls.

Sept 12, 62

### 128 (-) Signal Cable Connections IBM 729 All Models

SERVICE AID: Signal and power cables can be installed in a manner which makes it impossible to terminate cables at the 1401 receptacle. To avoid lost installation time which results from reversing cable connections, the following procedure should be followed.

1. Power cable connections must be started at the 1401 receptacle.
2. Signal cable connections must be started at the 1401 receptacle, or last tape drive providing the terminator is first installed.

Oct 15, 62

### 129 (-) Eng. Changes Suffix and Prefix IBM 729 All Models (US Origin only)

A number of Suffixes or prefixes are used to identify types of Engineering changes as well as to identify corrected changes.

Generally, Suffixes (A, B, C, etc.) are used to revise the parent EC. These Suffixes correct errors or modify original parts. The "A" Suffix indicates the first revision, "B" Suffix is the second revision, etc.

V, W, X, Y, and Z Suffixes have specific meanings.

The "V" Suffix Change was adopted to correct Manual Pages and do small amounts of rework to alleviate the time lag and cost of a formal field bill of material.

To keep the cost low and to supply Customer Engi-

ers with correct Systems Manuals, the responsibility for the proper installation of Manual Pages is placed with the Customer Engineer.

The following precautions should be taken when installing a new Manual Page:

- The part number of the pages must agree.
- Due to model change or special features, the same page number, i.e., (32.02.06.) may have several part numbers.
- The Engineering Change level of the page being replaced should be the change level just before the Engineering. Change level of the page being installed. This information is available in the EC History block on the page being installed.
- Item 2 above, if the page to be replaced is of a higher level than the page being installed, (this information should be in the EC History block of the page to be replaced) this "V" Suffix can be considered installed, the Manual Page destroyed and the Inquiry Card returned as installed. If the page to be replaced is not at Engineering Change level high enough to install the "V" Suffix Manual Page, a change should be made until such time as the level of this page is raised by installing field Bills of Material to a level at which the "V" Suffix Page may be installed.

When an additional "V" Suffix is required, a "W" Suffix is used.

"X", "Y", and "Z" are used in sequence either when an additional "V" Suffixes are needed, or to replace the parent EC.

In all cases, the Inquiry Card should be returned as soon as possible to assure the prompt shipment of subsequent Bills of Material for machines under the Change Control Group.

To decrease the number of "V" Suffix changes, an "L" prefix type of change is being used. Generally the "R" prefix is used for re-drawing of a systems page when no logical changes are made.

A change, is denoted as an "R" prefix (i.e., 49721) in the History block of a systems page or drawing, it should be disregarded as a prerequisite for manual page replacement.

Oct 15, 62

### 17 (-) Bit Packing - IBM 729 All Models

Bit packing in records generated on 729 Tape drives with a "Count Five Condition" can result in "A" Register checks when these records are re-read. Do not overlook this possibility when troubleshooting Tape "A" Register errors which are difficult to diagnose.

Oct 22, 62

### 18 (209) Nylon Covered Door Cable IBM 729 All Models (US Origin only)

248175 which released the nylon covered door cable, P/N 526265, also modified the door retaining plate, P/N 535816, to enable to accommodate the larger diameter cable.

New production retaining plates are now EC level 248175. New retainer plates could be ordered for tape units in which the nylon coated cable is to be used.

New plates and cable are to be ordered on PR Card Code 01, Mechanicsburg.

Oct 22, 62

### 140 (-) Tape Switching Feature, -6V CP Failures IBM 729 II, IV (US Origin only)

Service Aid: If after installation of the subject feature, the -6V circuit protector opens in either the tape control or the tape unit, check the wiring on relay contacts (Tp. Sw. relay gate) 16-11 and 23-11. There should be only one wire plugged into the terminals of the N/O contacts. If there are two wires (from T/C 14 and 20), the wire from T/C 14 should be removed and taped back (relay contact end only).

This is provided for in the respective cable drawings (574010 and 574011) and is necessary to prevent direct connections between the -6V power supplies of separate machines.

Oct 22, 62

### 141 (153) Idler Pulley Bushing Lubrication IBM 729 All Models

Service Aid: Pre-lubricated idler pulley bushings (bronze bearings) would speed up replacement of a worn pulley. The following idea was received as a suggestion and is generally recommended.

Pulleys can be "strung" on an oiled pipe cleaner while in storage as spare parts. The bronze bushing will soak up a maximum amount of oil (EM # 6) resulting in longer bearing life. Additional oiling will not be necessary on installation.

Caution: The pipe cleaners should be wet with oil but not saturated so that they drip. Clean the bushings carefully before slipping on to the pipe cleaner. Store the pulleys in a plastic type container to prevent the accumulation of dust and dirt.

The outside diameter of the pulley should be thoroughly cleaned of any oil before installation in a tape unit.

Oct 22, 62

### 142 (185) Extreme Lighting Conditions IBM 729 All Models

Service Aid: IBM 729 installations should be aware that flood lamps, direct sunlight or other extreme lighting conditions can cause marginal problems in photo-sensing circuits. Although extreme lighting conditions have not been a common problem, all 729 installations should be aware of the effects. Future installations should consider the effect of extreme lighting conditions when planning tape unit locations.

Oct 22, 62

### 143 (186) 13 Position Burndy Power Connectors - IBM 729 All Models

Some installations have had broken pins and sockets in the 13 position Burndy power con-

nectors. The pins or sockets are not supplied with 13 position plug or receptacle when shipped from Mechanicsburg. For your information, the part numbers of the various pins and sockets used in the connectors are listed below:

Location Pin Number	Plug 585516 P/N of pin	Receptacle 526517 P/N of socket
1	535085	535084
2	535085	535084
3	535679	535084
5	535083	535082
10	535083	535082
11	535087	535086
12	535087	535086
13	535087	535086

Starting from edition # 3 (May 61) WTC Catalogs show these part numbers.

Pin # 3, ground, is 1/8" longer than others. Positions 4, 6, 7, 8 & 9 are not used. The pins and sockets listed above are available through the COP Orly France.

Oct 22, 62

### 144 (192) Timer Mounting Screws IBM 729 II, IV

Service Aid: The nuts which lock the micro switch to the timer housing are coated with glyptal making them difficult to loosen. Frequently, the screw studs loosen in the mounting making it very difficult to remove the nut.

When it is necessary to remove a micro switch, the nuts can be loosened easily if a hot soldering iron is applied to the nut first. The glyptal will soften enough to remove the nut with ease.

Oct 22, 62

### 145 (201) Cleaning Prolay Cavities IBM 729 All Models

Service Aid: When the protective plastic covers on the inside of the 729 prolays become dirty, they contribute to poor performance and should be cleaned.

A cotton tipped swab or "Q-Tip" can be used to clean the prolay cavity without removing the prolay from the machine. A great deal of time can be saved using this method. "Q-Tips" or other swabs are easy to obtain.

Inspect the prolay cavity with a light after cleaning to make sure no residue remains.

Oct 22, 62

### 146 (157) CP Numbering-DC Voltages IBM 729 II, IV

Service Aid: When the Phase III Power Supply was released DC circuit protector designation (on System pages) did not correspond to the numbers previously associated with each voltage. EC 248692 "V" corrected system page CP numbering as follows:

Voltage	Previous No.	Corrected No.
12V	CP1	CP15
6V	CP2	CP14
6V	CP3	CP13
12V	CP4	CP12



The ECV did not however correct all pages. To prevent confusion until another EC is released, the incorrect pages should be changed. Mark (with ink) the appropriate CP's as noted above on the following pages:

Page	P/N
03.07.1	316161
03.08.1	316162
03.10.1	316200

Page 02.07.1 at EC 248692 is correct.

### MACHINES OF FRENCH ORIGIN

Since JT 80458 A has been applied the numbering of the DCCP protectors is correct. On the W/D page 03.01.1, prior to 80458 A JT level, correct the numbering of the CP, according to the following chart:

Voltage	Previous No.	Corrected No.
+12V	CP1	CP5
+ 6V	CP2	CP4
- 6V	CP3	CP3
-12V	CP4	CP2

Pages 03.02.1 and 00.05.1 are correct.

Oct 22, 62

### 147 (222) Keeper Breakage on Line Terminators IBM 729 - All Models

The new production of tape drive line terminators have plastic handles. Some terminators were released with a shoulder type screw for the keeper plate mounting. This allowed the 200 position connector to shift forward and catch on the edge of the plate which covers the cut out where the cable would normally be. This would result in excessive keeper plate breakage.

The problem is corrected by replacing the shoulder screw with a 6-32 countersunk screw. P/N 438573, which mounts the connector rigidly.

Current production of line terminators is being checked for proper mounting screw before shipping.

Any line terminators that have been recently received should be checked for rigid mounting of the connector.

Oct 22, 62

### 149 (215) File Protect Lamp, and 22 MH Choke P/N's IBM 729 NOR

File protect light is a 12V Lamp, P/N 589102. The chokes on the SMS backpanel are 22 mh, P/N 554161.

Oct 22, 62

### 150 (221) Converting Line Terminators IBM 729 All Models

Present 729 MOD II and IV Line Terminators

may be reworked so they can be used on 729 MOD II, IV, V and VI tape Drives.

#### Rework as follows:

In the terminator, connect a piece of yellow wire to the unused 5 mfd. capacitor onboard "A". Terminate a dual contact P/N 598041 on the other end to be used in position T/C 114.

"A" terminator changes from P/N 529285 to P/N 348590.

"B" terminator changes from P/N 352463 to P/N 348591.

Oct 22, 62

### 151 (220) Erase Head Adjustment IBM 729 All Models

Remove the H shield and reposition the erase head mounting bracket as far left as possible. Using no tape, lower the head until it is fully closed. Place a 0.005 inch shim, P/N 461162, across the head and cleaner block. Turn and hold the erase head in a clockwise direction and at the same time lower it until it just touches the 0.005 inch shim.

This should result in the erase head being approximately 0.003 inch above tape and as far to the left of the Read/Write head as possible. The erase head can cause considerable pulse asymmetry if too close to the write gap.

After the erase head has been mechanically set, it must be checked for proper electrical operation. Write all bits on tape and rewind. Disconnect the write head cable and write again. The erase head should erase all bits to less than 0.4V.

Four basic items in adjusting the erase head:

1. The erase head must not touch tape.
2. The erase head polarity must be correct.
3. Locate it as far to the left of the write head as possible.
4. It must erase to less than 0.4V noise left on tape.

Oct 22, 62

### 153 (-) Preamp Adjustment IBM 729 - All Models

This CEM supersedes the preamp adjustment procedure as outlined in the 729 reference manuals.

SERVICE AID: Preamplifier gain is adjusted by a potentiometer on the amplifier card. Clean the Read/Write head thoroughly, and then adjust preamps as follows using the standard signal level tape, P/N 461108. This tape provides an output signal that varies less than  $\pm 1\%$  from the accepted standard signal output level.

1. Set density switch on tape unit to the High Density position.
2. Initiate a continuous Write operation from the control unit, and write all bits in all tracks on the standard signal level tape.
3. While writing in this manner, adjust each

preamplifier control, in turn, for maximum gain. Preamp maximum output must be 10 volts or more peak to peak.

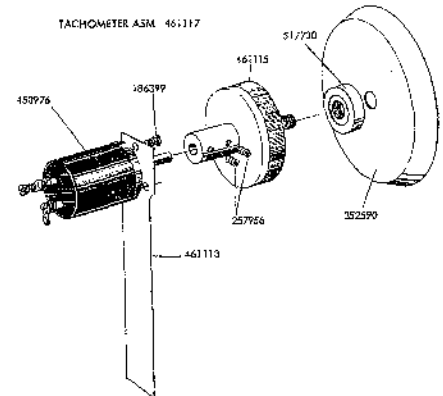
4. Readjust each preamp gain control for an output of 8.8 volts peak to peak.

Oct 25, 62

### 155 (148) Tach-Generator for variable Clutch Control IBM 729 II, VI - 729 A IV, A VI

A tachometer generator will be needed to make the necessary magnetic clutch current adjustments on 729 II and IV Relay machines with B/M 8018597 - see CEM 729 EC 79 (68) and 729 NOR Machines Models IV or VI.

The figure below shows the parts necessary to mount the tach-generator in place of the cover and handle of the Quick Release Reel Latch.



Description	P/N
1-Knob Assembly	461115
2-4-40 Set Screws	257956
1-Bar	461113
3-2-56 X 3/16 Screws	186399
1-Tach-Generator	450976
1-Cover	352590
1-Bearing	51730

P/N 461117

All parts other than the cover and the bearing may be ordered as an assembly, P/N 461117.

The Tach-generator unit, P/N 450976, is the same as used on the 1443 and 1403 printers.

#### Test Procedure

Replace the Quick Release Reel Latch cover and handle (P/N's 5344951 and 5344954) with cover P/N 352590, Bearing P/N 517730 and the tach-generator assembly P/N 461117. Connect tachometer to oscilloscope with a direct probe. Scope setting; 1 volt/cm 50 ms/cm sweep.

Trigger scope with external trigger from current jacks on variable clutch control assembly. Adjust each clutch response with the respective pot. Turning pot clockwise decreases response time.

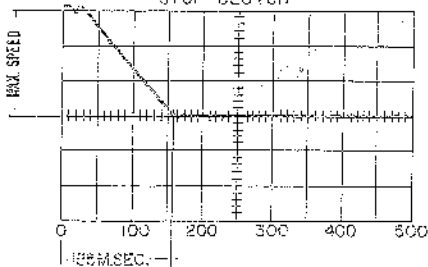
If clutch response cannot be brought to specifications with full adjustment of potentiometer, check the current in the circuit. With the potentiometer

In the extreme clock wise position, the current should be 420-450 ma. If current value is correct and the clutch is still out of spec, the clutch must be rebuilt.

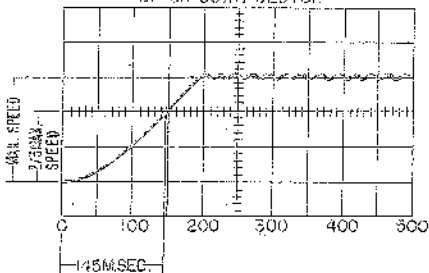
### Clutch Response Specifications

1. Up or down clutch must obtain 2/3 maximum speed in 0.140-0.150 seconds, with full reel of tape.
2. Stop clutch must stop a full reel of tape from full speed in 0.150-0.160 seconds. See graphs below.

TYPICAL CLUTCH RESPONSE CURVES  
STOP CLUTCH



UP OR DOWN CLUTCH



IBM USE ONLY

TYPE A, Field Requisition Card, COP Only.

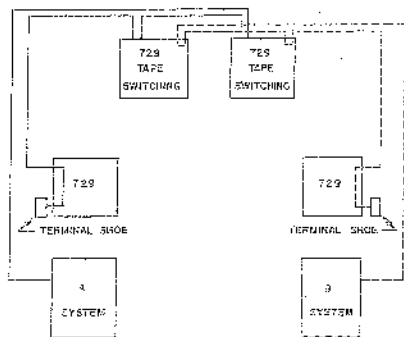
revised Sept 17, 65 (Aug 25, 61)

### 56 (206) Tape Switching Signal Cable Routing IBM 729 II, IV, V, VI

In some dual system installations with type switching, it may be necessary to drop power on one system and continue operating on the second system. Unless the Signal Cables are properly terminated, operation on one system is not possible if power is down on the other system.

The Signal Lines for each system must be terminated at a tape unit that has power on.

The sketch below illustrates one method of connecting the Signal Cables and Terminator shoes so that the system may operate while power is down on the other system.



In this case, of course, if we suppose that each system powers two 729's, and the power is down on system B, only the two 729's on the left can be used with the system A.

Nov 27, 62

### 157 (-) Adjustment of the Tape Wrinkle Potentiometer on NCR Machine IBM 729 II, IV, V, VI - NCR Drives (French Origin)

On 729 NCR machines, the potentiometer No. 3 (located between the H.S. Rewind Coast Potentiometer and the partial left Brake Control Potentiometer) adjusts the partial Brake during High Speed Rewind.

To adjust this potentiometer the procedure described in the CEM 729 EC - 32 is still valid but furthermore, the eddy current mercury switch should be closed during the adjustment.

Nov 28, 62

### 159 (202) Servicing the 60/90 KC Tape System IBM 729 V, VI

The 729 V & VI Tape Units can operate at a density of 800 characters per inch (800 BPI) in addition to existing densities of 200 and 556. They are able to write or read at any of three combinations of high low density. The set or "pair" of densities desired by customer is selected by setting the Channel Density Switch. Density combinations which may be selected are:

Pair of Densities	IBM 729 Model V		IBM 729 Model VI	
	Density Mode Low	Density Mode High	Density Mode Low	Density Mode High
556/800	41,667	60,000	62,500	90,000
200/800	15,000	60,000	22,500	90,000
200/556	15,000	41,667	22,500	62,500

Figure 1

It is important that on 90KC Systems the tape control unit density switch and the tape unit density switch are set according to the density of the tape being read. It is possible to read tapes with the switches set incorrectly although intermittent errors, which are difficult to analyze, can result.

The V & VI may be field converted II's and IV's. Any of the four models may be either relay or NCR type tape units. NCR types can be identified by serial numbers as follows:

729 II, V	30, 000 series
729 IV, VI	90, 000 series

### SYSTEM CHANGES

#### Channel (TAU)

In order to operate at the new 60KC and 90KC character rates, changes in TAU are necessary. These changes are slightly different according to the TAU model.

1. Write and Read clock oscillators are added.
2. Cards in the final amplifier are changed.
3. The final amplifier clipping circuits may have to be modified.

#### 729 II and IV

Changes necessary to convert a model II or IV to a V or VI - 60/90KC operation are:

1. R/W head assembly

Model II, P/N 347891 Amphenol replaces P/N 526294 Amphenol (now obsolete).

Model IV, P/N 347892 Amphenol replaces P/N 526297 Amphenol (now obsolete).

2. New Pre-Amplifier cards, 14 per model

729 II to V, pre-amp panel cards at:  
L01 through L07 replaced by ARL cards, P/N 370707 (7)  
M01 through M07 replaced by ARK cards, P/N 370706 (7)

729 IV to VI, pre-amp panel cards at:  
L01 through L07 replaced by APZ cards, P/N 370681 (7)  
M01 through M07 replaced by ALZ cards, P/N 370680 (7)

3. Write Pulse Time asymmetry adjustment cards added at:

E09, E10 & E11 YEU cards  
P/N 370688 (3)

4. Improved vacuum column top plates and guides.

5. TC Signal Connector wire rework.

#### Line Terminators

The terminating "shoes" are also reworked. Part numbers are changed as follows:

"A" terminator P/N 529285 converted becomes P/N 348590.

"B" terminator P/N 352463 converted becomes P/N 348591.

Model II or IV tape units which will be used interchangeably on line with models V or VI must have a jumper added between the A & B TC connectors. A black and yellow twisted pair jumper, P/N 348668, connects:

TC 115 "A" to TC 115 "B" (yellow)

TC 114 "A" to TC 114 "B" (black)

#### ADJUSTMENT AND PM

##### 729 V & VI

Service and PM is the same as II & IV except for the following additional information. When complete adjustments are made, they should be made in the order listed below:

1. Read pre-amplifiers are adjusted to 10.0V peak to peak while writing at 800 BPI. The tape transport and head area should be cleaned first. Change density to 200 BPI and check to see that the amplitude in each track is not reduced by more than 28% for model V and 22% for model VI. (If they are, try replacing the pre-amp cards).

2. Mechanical Read Skew should be checked using the new 800 BPI Master Tape, P/N 461197. Adjust the scope for dual channel DC operation, 0.2 volts/CM, 1.0 usecs/CM. Adjust the head positioning screw for zero skew where necessary.

NOTE: Accuracy of the 800 BPI Master Tape can best be preserved by using the following precautions:

- Before adjusting skew, degauss the tape transport as described in WTC CEM 729 SA - 61.
- Starting and Stopping tape should be kept to a minimum.
- Run the Master Tape for a complete pass. Do not high speed rewind. This will result in even wear throughout the length of tape.

3. **Electrical Read Skew** should be set, in each track, to within 0.25 usecs (one tap) of the most lagging track. These settings should be rechecked after head assembly movement to determine if mechanical skew has changed.

With tape in motion while displaying I and C, scope, unload and load a minimum of five times. Skew should not exceed 0.5 usecs. If it does, check for:

- Worn or grooved nylon pulley or shaft. Flick the pulley with the finger tip (while watching scope); skew should remain within limits (refer to CEM 729 SA 68 (67)).
- Dirty or binding ceramic guides.

The head assembly may need to be replaced if neither a or b above is at fault.

4. **Write Skew** (check after asymmetry which follows), each track should be set to 0.25 usecs (one tap) of the most lagging track.

### PULSE TIME ASYMMETRY

A different amount of current flowing through each section of the center tapped write head can cause a time shift between successive bits written on tape. This time difference can be seen as a "double pulse" when scoping the output of a final amplifier.

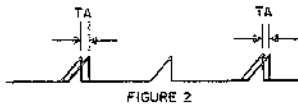


Figure 2 actually shows the difference in distance between alternate "sets" of read pulses. This, of course, is the result of "bits" written by opposite sections of the write head which, when seen on the read bus, appear as alternate pulses of negative and positive polarity. The time difference (shift) or difference in distance between sets of pulses is referred to as Time Asymmetry (TA).

Write current differences should be "balanced out" by adjusting the potentiometer connected between the head driver and write head coils.

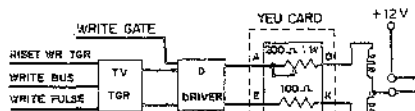


FIGURE 3

On 7070 systems the TA can also be adjusted to zero (balanced out) with a pot in the new final amp card ARA.

Time asymmetry should be adjusted to zero because it could cause skew errors when operating at 800 BPI.

Asymmetry should be checked on each tape unit every 3 months when checking skew. It should also be checked whenever write circuit cards for a particular track or an entire R/W head assembly are replaced in a tape unit.

### Off line check of asymmetry, 729 V & VI.

Asymmetry is adjusted off line by installing the first two stages of the TAU final amplifier in the pre-amp gate of the tape drive. The cards are ARA P/N 370685 and FC P/N 371408. The card ARA must be "zeroed" previously. Also, the French Plant has released a card ARA under the P/N 8020354 for checking of the TA off line. Before a 60/90 KC conversion at least one card ARA P/N 8020354 and one card FC P/N 371408 must be ordered. Additional wiring must be added to the pre-amp back panel as follows:

- JO3 F to JO5 A
- JO5 D to JO5 K (-6v)
- JO3 A to JO3 M (-12v)

Wire wrap one end of a belly dancer jumper to JO3 B. The other end is used to connect to pre-amp outputs LO1H to LO7H for individual track adjustment. Always return the connector end of the jumper to JO3 B (looped back on itself) when adjustment is complete.

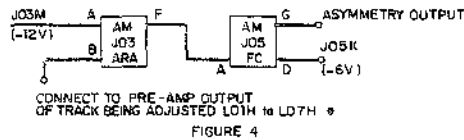


FIGURE 4

\* On NOR machines, ground H17P in the rear logic gate to activate read gate with CE switch on "off line" status. Be sure to remove jumper before returning machine to system.

- Install spare ARA card (P/N 8020354) in JO3 and the FC card in JO5. These cards are used in the tape unit only when adjusting asymmetry.
- Connect terminator end of jumper to LO1H-LO7H depending on track being adjusted (Other end is wire wrapped to JO3B).
- Scope settings are important for this adjustment. Sync negative internal with vertical amplitude at 1 v/cm and scope JO5G. For a model VI use 2 usec/cm; for a model V use 2-5 usec variable. Adjust the variable for 2 pulses (not counting the sync pulse). Switch 5X multiplier on.
- Adjust while writing all bits 800 BPI prior to setting write skew.
- Vary the pot for the track being adjusted.

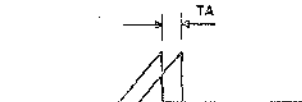


FIGURE 5

- Always check write skew after asymmetry.

Service Note: Be sure all mu metal shields are installed on the read/write head and the H shield. Magnetic clutch fields can cause the asymmetry pulses to "Breathe".

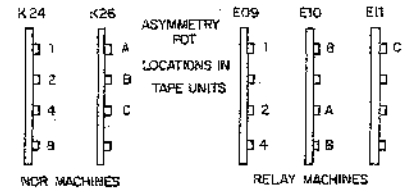


FIGURE 6

### On Line check of Tape Unit Asymmetry

- Scope settings are the same as for off line adjustment.
- Write ones from the CE panel in the channel.
- Observe the output of the register "A" trigger. Adjust the asymmetry pot in the tape unit for coincidence of the trigger turn on.

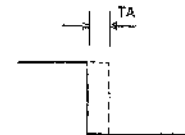


FIGURE 7

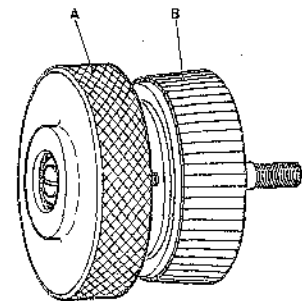
- Adjust pot in each track on all tape units.

NOTE: The card ARA (P/N 8020354) and FC (P/N 371408) for test purpose must be ordered from COP Only by Field Requisition Card, Code 8.

Jan 3, 64

## 163 (-) Partial Brake Adjusting Tool P/N 8018462 IBM 729 All Models French Origin

A new tool has been developed to perform the adjustment of the partial brake during HS Rewind (to prevent Tape Wrinkle).



P/N 8018462

The principle of operation of this tool is similar to the one of a torque wrench. It is constituted by a knurled disk (A) mounted on a reel knob assembly (B). The disk (A) drives the knob (B) by means of a cam,

an the resistant torque on the knob is below 2.92 /kg.

adjust the partial brake, proceed as follows:

connect the high speed rewind motor and seal the high speed rewind lamp.

NOR machines close the mercury switch.

move the reel knobs from the right clutch shaft and fall the tool by tightening the knob (B).

press the load rewind button and rotate the right reel clockwise and forth in order to remove any sticking caused by residual magnetism.

turn the knurled disk (A) slowly counter clockwise to increase the value of the right brake clutch by turning the pot (No. 8 on relay machines, or No. 10 on NOR machines) clockwise, so that the reel is just driven.

then turn the pot counter clockwise and stop just when the reel is driven by means of the disk (A).

check 3 or 4 times that the reel is just driven when the disk (A) is turned slowly.

NOTE: Before any checking or adjustment, reposition the tool by turning the disk (A), until the low point of the cam is found.

#### IBM USE ONLY

E A, P/N 8018462, P & S Requisition France.

Jan 24, 63

### ( - ) Power Cable Assembly (P/N 460663 or P/N 8012757) IBM 729 Relay and NOR Machines.

When errors were made in the field when using the correct cables. These cables are necessary to power tape units "off line".

Power cable P/N 460663 must be used to power the tape units to be connected to 220 volts. This cable has 4 wires (Phase 1, 2, 3 and Ground) and the points 5 and 10 are connected between phases. These points are the main contactor of the tape drive.

When subject cable used on 380 volts may cause binding and burning of the main contactor. Cable P/N 8012757 must be used to power tape units to be connected to 380 volts. This cable has 5 wires (Phase 1, Neutral and Ground). Points 5 and 10 are connected between phase and neutral in order to have 220 volts on the main contactor.

Under are the P/N's of the tester assemblies and cables used for tape drives:

#### Relay:

Tester assembly for 220V P/N 8012729

This P/N includes:  
Tester P/N 460633  
Cable asm (200 pos.) P/N 460673  
Cable asm ( 24 pos.) P/N 460674  
Power cable 220V P/N 460663  
Signal cable terminator P/N 348590

Tester assembly for 380V P/N 8012756

This P/N includes:  
Tester P/N 460633  
Cable asm (200 pos.) P/N 460673  
Cable asm ( 24 pos.) P/N 460674  
Power cable 380V P/N 8012757  
Signal cable terminator P/N 348590

#### NOR:

When machine includes the tester. In consequence, one power cable is necessary to connect the machine "off line":

P/N 460663 for 220V  
P/N 8012757 for 380V

#### 7330:

Tester assembly P/N 8021313 for 220V

Tester assembly P/N 8021314 for 380V

(see CEM 7330 SA - 3 (2) for details).

revised April 15, 64 (March 1, 63)

### 167 (245) Treating Noise Trouble IBM 729 II thru VI Relay machines (French and US origin)

#### Prevent false tape indicate (Relay Type 729)

Intermittent electrical noise frequently causes the tape indicate trigger to turn on erroneously. This indicates that the noise level in the tape unit or system is increasing and should be investigated before excessive Read/Write errors occur.

The cause(s) of noise is frequently difficult to determine and sometimes cannot be found immediately. To prevent system problems, the circuit described below should prevent false tape indicate trouble.

Connect a 0.001 MFD and a 10 MFD, 20V capacitor in parallel from the "Turn on TI" shield wire to -6 volts at the back panel. Insulate the capacitor leads with spaghetti tubing. Wire wrap the plus side of the capacitor network directly to the "J" pin at A15, the other side to any "K" pin (-6V) close by. Refer to page 01.05.1.

#### Set write status during read (Relay Type 729)

Some permanent read errors are caused by partially erased records. This condition can be seen when a developed tape record shows all characters erased for about 1/4 inch approximately 1/4 inch from the beginning of the record.

An idle tape unit which is loaded, selected, ready, in Read Status and not file protected is subject to this condition. If an operator loads or unloads an adjacent tape unit which is noisy (bad relays for instance), the "Write Status" trigger in the idle machine could be turned on.

To prevent this accidental status change, use the same circuit described for false tape indicate. Connect the capacitor network plus side to the shield line "J" pin at A19, which is the "Set Write" circuit. Refer to page 01.02.1.

A 0.001 and 10 MFD parallel capacitor network is available as an assembly. This capacitor assembly, P/N 352482 may be ordered with Field Requisition Card Code 6 from Orly.

March 1, 63

### 168 (227) Reduce Clutch Powder Leakage IBM 729 II through V (US Origin)

A new part number, P/N 554173, has been released for the cover plate, P/N 535628, and the felt seal, P/N 535627, as an assembly. It is recommended, that this assembly be used when rebuilding magnetic clutches to ease assembly and reduce powder leakage.

P/N 554173 - Cover Plate Assembly  
(1 per machine)

#### IBM USE ONLY

TYPE A, Field Requisition Card Code 6, Orly.

March 11, 63

### 169 (226) Parts Catalog Corrections IBM 729 II through V (US Origin)

The automated version of the 729 Parts Catalog, Form 123-0393-0, is available in the Endicott Stationery Stores. This lists parts for all 729 tape units, relay and NOR, except the 729 MOD.1. It is recommended that all field installations requiring a catalog for servicing the 729 II, IV and V tape drives order Form 123-0393-0. All future 729 part numbers and references will be made to this new catalog.

The following corrections and additions should be made in the new catalog:

#### CORRECTIONS

Page No.	Fig. No.	Item No.	Old P/N	New P/N	Description
3	1	52	526257	352508	
5	1	58	580964	530946	Should read "DISC"
13	3	17	526265	no change	Should read (cable)
39	9	--	348494	348484	Sw. and indicator panel Assembly
45	11	29	528512	528254	
89	36	28	532590	530914	
98	36	24	352591	530913	Latch Ring (Rubber)
105	40	0	535628	554173	Mag. clutch cover Assembly with seal
118	3	30	535731	352508	Spring, Door Interlock

#### ADDITIONS

Page No.	Fig. No.	Item No.	Old P/N	New P/N	Description
3	1	--	---	529297	Empty Tape Reel
39	9	--	---	589102	12V lamp, file protect
60	18	--	---	348425	Filter, air
110	42	26	---	528258	Screw, plug mounting
110	42	28	---	227161	Retaining washer (rubber)
36	8-G	--	---	536147	Set screw, rewind coupling
64	20	--	---	591640	Keeper plate
64	20	--	---	591041	Screw, keeper mounting
60	18	--	---	133858	Capacitor, 1, 3 mfd. (NOTE: It is located on online, offline switch).

March 11, 63

### 170 (229) False Write Echo Errors IBM 729 NOR

False write echo errors have been encountered when as many as six tape units or more have been connected to the same channel on a system.

The problem is the write echo pulse becomes so narrow it fails to turn off the TAU echo error trigger.

When the problem is encountered, widening of the echo pulse can be accomplished by changing R11, presently a 270 ohms resistor, to a 47 ohms resistor, P/N 317003, on the APG card located at A3J14 in the NOR tape drive.

March 21, 63

### 171 (225) Prolay Lubrication IBM 729 II through V!

Aeroshell 14, P/N 461099, has been discontinued as a stock item. When the present supply is exhausted it will no longer be available. Engineering recommends using No. 6 oil as a substitute for Aero-shell 14. It has been found that many lubricants

including Aeroshell 14, have proven to be satisfactory for prolay maintenance but have shown no significant advantage over No. 6 oil. The use of No. 6 oil on all points of lubrication on the prolay should no increase frequency of maintenance or affect its operation in any way.

P/N 223980 is for No. 6 oil in pint quantities.

March 21, 63

## 172 (232) 200 Position Connector Parts IBM 729 II through VI

The present production 200 position cable connectors have a plastic covered handle and may be readily disassembled for parts replacement. When the present supply of parts for the older cable connector is exhausted, only parts for the newer plastic handle connector will be available.

The following parts are used in the new 200 position connector assembly.

### NEW PARTS:

339272	Connector assembly (complete shell asm.)
591748	Latch (replaces P/N 598223)
591640	Keeper (No change)
591641	Keeper mounting screws (No change)
591607	Handle (replaced P/N 598242)
591609	Carrier (replaces P/N 598227)
591747	Cam Pin (replaces P/N 598230)
597578	Spring (No change)

### IBM USE ONLY

TYPE A, Field Requisition Card Code 6, Orly.

March 21, 63

## 174 (-) Electrical Noise Detection IBM 729

A quick check to determine if vacuum column switches or reel clutch contacts are noisy is as follows:

1. Move tape away from load point.
2. Disconnect capstan drive motors but keep capstans out so that the drive remains ready.
3. Cheat the door interlock switch to gain access to the tape reels.
4. Write no bits from the TAU panel in a continuous mode with the amp bias switch on.
5. Turn the left reel clockwise until the take up clutch is energized and then release it. Check for bit pickup in B register indicating dirty or bouncing lower column in switch or take up clutch contact points.
6. Repeat operation on right reel to check the right upper column switch and the right lower clutch contacts.

NOTE: Left reel down clutch, right reel up clutch and associated vacuum column switches may be checked by changing to a backspace operation.

If vacuum column switches and reel clutches are eliminated as the source of noise, the following items should be checked:

### WTC 729 SA CEMs:

8 (20) & 26 (21)	Ground Loops
48 (55)	Read Bus Noise
50 (57)	"H" Shield Adj.
55 (62)	Electrical Noise Detection
76 (78)	Select Line Noise
151 (163)	Erase Head Positioning

A check of decoupling capacitors and filter networks in the preamplifier gate should be made if a persistent noise problem is encountered. Check for broken wires or defective components in this area.

revised June 4, 63

## 175 (270) Replaceable Capstan IBM 729 II through VI (US Origin only)

A replaceable capstan, P/N 554148, has been made available for field use. When it becomes necessary to replace the capstan due to rubber deterioration or glazing, it will no longer be necessary to replace the capstan motor assembly.

### Installation Procedure

1. Remove the capstan motor from the tape drive.
2. Support the capstan when driving the pin permitting removal of the old capstan.
3. Place the new capstan, P/N 554148 on the shaft and tighten the pointed set screw into the old pin hole. This gives proper capstan alignment with respect to the tape path.
4. Using a No. 30 drill; drill through the motor shaft and the other side of the new capstan using the pilot hole as a guide. Caution should be exercised to keep the capstan and motor shaft clean and free from metal particles.
5. The hole should be taper reamed so the taper pin will be approximately flush with the capstan.
6. DO NOT REMOVE THE SET SCREW. Any shavings or metal particles in the old pin hole will not be able to get out to contaminate the capstan area by leaving the set screw in place.

### TOOLS REQUIRED:

1. Electric Drill.
2. No. 30 Drill.
3. Taper Reamer.

P/N 554148 - Replaceable Capstan.

Some installations have been using set screws to clamp the replaceable capstan to the shaft instead of using the above pinning procedure. It should be pointed out that using set screws instead of pinning can result in up to 0.0025 inches of eccentricity in the capstan. Extreme caution should be exercised in this area.

Capstan eccentricity can lead to improper Prolay adjustments resulting in a variety of troubles, including "count five" conditions, burning or stretching tape, excessive read and write errors, etc.

### IBM USE ONLY

TYPE A, Field Requisition Card Code 6, Orly.

April 8, 63

## 176 (236) Safety Hazard IBM 729 NOR (US Origin only)

### SAFETY

A 729 NOR Tape unit with a fuse 1 in the power supply T2 transformer primary may cause operator injury or tape damage should this fuse open during high speed rewind.

Only 729 NOR tape units wired to factory EC 250259 have this fuse 1 installed. The circuit is

shown on system page TU. 95.00.0, sheet 1 of 3, P/N 348547, EC level 250259. Unaffected, older NOR Tape units have the older page, P/N 348655, which may also show EC level 250259. This just puts the discontinued stamp on the page.

The fuse is physically located on the power supply (left side of machine) near the bottom. It is in a black bayonet cap fuse holder. Electrically, the fuse is connected from TB 1-8 to TB 2-1.

To prevent possible injury or tape damage this fuse must be jumpered out of the circuit for the present. A dummy fuse, such as P/N 9022, should not be used because it might be inadvertently replaced with a regular fuse at some later date.

A short piece of No. 16 or 18 insulated black wire should be soldered between the fuse holder terminals. Loosening and rotating the fuse holder will make the terminals more accessible.

March 28, 63

## 177 (238) Noise due to Motor Cables IBM 729 II through VI (US Origin only)

Cables which plug into the AC raceway fan out to all of the motors in the upper half of the tape unit. The "set" shape of these cables is variable and does not follow a pattern. On many tape units (both Relay and NOR) some of these cables pass very closely to the capstan motor flywheels.

Intermittent noise or shorting may result if a cable occasionally touches the flywheel and cable insulation is worn away. Highly intermittent machine noise of this type can be very difficult to trace.

All motor cables should be dressed away from the flywheels and taped together in two or four separate bunches. Use "dryback" tape if it is available.

April 8, 63

## 179 (-) Magnetic Clutch Removal IBM 729

Tape units at EC level 248166 include a hole through the inner side covers of the tape reel compartment. These 2" holes, which are normally covered with snap plugs, are intended to allow removal of the reel hub taper pin. A hub pin can be driven easily by passing the 10" pin punch through the hole. The hole also allows a visual check of tape-to-reel alignment. Snap plugs should always be replaced.

April 8, 63

## 180 (239) Asymmetry Adjustment IBM 729 V, VI

The information contained in Service Aid 68(202) will be helpful when checking and adjusting time asymmetry. Recent experience has indicated that tape unit asymmetry should be adjusted only after:

1. The erase head has been positioned as far to the left as possible; adjustment see CEM 729 SA-63(220).
2. Head Mu Metal Shields are in place. These shields (P/N's 526054 and 528694) must be in

place in order to make proper asymmetry adjustments.

revised July 24, 63

## 81. (242) Prolay Drive Current IBM 729 NOR (US Origin)

eady state prolay drive current cannot be adjusted higher than 3.7 amps on many NOR tape units. This condition is prevalent with machines manufactured during the first half of 1962, not at EC level 50259.

Some tape units with this limited drive current perform satisfactorily but may have unacceptable tape action (diagnostic) typeouts. This marginal condition may be improved by decreasing prolay circuit resistance to increase drive current. Current specifications are now 3.5 to 4.3 amps.

Refer to system page TU.09.50.3. Resistors R3 and R4 (blocks 1B and 1C) form a one ohm parallel network across which drive current is normally measured directly in volts. By adding a one ohm resistor in parallel, total network resistance becomes a half ohm. A 1 ohm, 10 watt resistor, P/N 8454, may be used. Use nothing less than 10 watt resistor.

Remove the resistor with short solid wires, spaghetti wiring and spade clips. The drive current adjustment pot should be set to minimum current before connecting the resistor. Simply install the resistor mounting at screw terminals TB11-8 and TB11-9.

**CAUTION:** Voltmeter readings will become one half of what they were before the change. For instance, 4.0 amps of drive current will be indicated by 2.0 volts across the network which is now one half ohm.

Drive current should be set only as high as is necessary for proper operation. Never adjust current above 4.3 amps (2.15 volts) or prolay coils will be damaged.

April 8, 63

## 82 (241) Eddy Current Switch IBM 729 NOR

"reels stopped" condition after high speed rewind indicated by the mercury switch contacts on the eddy current device. It is important that the tape stops completely before tape begins to load.

Positioning of the eddy current counterweight stator which the mercury switch is mounted, should be varied as long as possible.

The original clearance adjustment between the rotor magnet assembly and the stator was 0.015 to 0.020 inches. To allow later transfer of the stator this clearance should be reduced to about 0.006 (thickness of one IBM card). Do not allow the rotor and stator to touch during normal operation.

April 8, 63

## 83 (246) Tape Wrinkle IBM 729 NOR II through V, IBM 729 Relay II through VI (US Origin only)

Occasionally a tape which has been rewound loosely may wrinkle near the middle layers when it is spooled later. This happens because the outer layers of tape cannot follow the snappy action of the clutch shaft. Magnetic tape with a low coefficient of friction is far more prone to this problem.

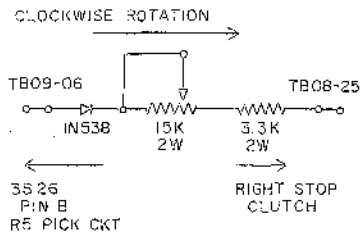
This condition can be eliminated by increasing tape

tension during High Speed Rewind. The result will be a tighter tape wind. Normal "drag" (mechanical), which may diminish with use, can be increased by adding electrical braking to the machine reel shaft. This can be accomplished by applying a low current to the right stop clutch circuit through a variable resistance.

A 2 watt, 15K potentiometer, with the slider shorted to one resistance terminal, can be physically mounted wherever convenient. Connect as follows:

729 Relay Taps Unit - add across the R6 BL N/C points

729 NOR Tape Unit - from R5 pick circuit through a diode, pot and fixed resistor to the right stop clutch (see diagram)



A suggested procedure for installation of these components on the NOR tape units is:

- Mount the pot and a 2 position terminal strip very close together on the CP panel (near pot 1 and pot 2)
- Connect the resistor and diode between pot terminals and one set of terminal strip screws. Insulate component leads with spaghetti tubing.
- Wire from second set of terminal screws to TB09-06 and TB08-25 (or 59 BL operating, refer to 15.00.0).

Rewind tension should be adjusted for approximately 250 grams drag with a full reel of tape on the machine reel side as follows:

- Attach an open paper clip to end of tape with scotch tape.
- Disconnect High Speed Rewind motor.
- Depress Load-Rewind.
- Measure tension with a steady pull to the right and down.

Tape tension is usually sufficient on a new tape unit if a pot is installed, it will probably have to be adjusted for minimum current. Readjust the pot for proper tension after a reasonable wear-in period.

P/N 352385 - IN 538 Diode Assembly

P/N 317089 - Resistor, 3.3K, 2W

P/N 503986 - Potentiometer, 15K, 2W

P/N 80817 - Two Position Jones Terminal Strip

IBM USE ONLY

TYPE A, Field-Requisition Card Code 6, Only.

April 8, 63

## 185 (248) Safety - Top Filter Cover IBM 729 II - V

**SAFETY** Caution should be exercised when removing the Tape Drive Top Cover Assembly. Injury can result from the louver filter cover which is free to fall if the Top Cover Assembly is tilted. The filter cover, P/N 352586, is not fastened to the Top Cover Assembly to provide easy access to the filter. The louvered filter cover should be removed before the Top Cover Assembly is removed.

April 8, 63

## 186 (190) Erase Head Test - IBM 729

There have been several cases where the erase head on the 729 was not functioning or that the polarity was incorrect. This function can be tested with a short program which can be added to an existing diagnostic or used by itself.

The following is the general logic for such a test which can be applied to any system:

### A. Polarity Test

- Skip twice to clear an area of tape.
- Write a record (A) to be used later for compare 1 word or 5 characters.
- Rewind.
- Write a record (B) the same record used at 2.
- Backspace.
- Read over record B (Written item 4)
- Read again - We should read record A written by item 2. If the polarity of the erase head is reversed, a 7 bit splash, left on the tape as the result of item 5, will be read.
- Compare read-in area with the write area (record A).
- If equal, the erase head is correct.

### B. Operation Check

- Clear A field to zero.
- Write a long record, 1000 to 2000 characters (B).
- Backspace.
- Write one word or 5 characters.
- Read into A field.
- Compare a zero field (constant) to A field while the reading is taking place.
- If equal, add one to the accumulator and transfer back to item 6.
- When not equal, the first bits of the B record written at item 2 have been read.
- The result in the accumulator is now compared to a constant (established for each system or tape model).
- If the count is higher, the erase head is working. The distance from the read head to the first bits of record B will be longer when the erase head is working.

April 8, 63

## 191 (231) VAC Power Cables Safety IBM 729

**SAFETY** The VAC Power cables, 220/380 Volts for French machines, 208/230 Volts for US machines, should not be removed from or connected to the tape drives with the tape system power on.

There is a safety hazard created if the cable connector pins are bent and plugged into the wrong pin hole of the receptacle. The ground pin (longer than the other connector pins) is the one most susceptible to being bent.

The AC power to the tape system should be shut down before removing or connecting power cables to tape drives. Caution should be exercised to avoid pin damage when making power cable terminations to ensure proper pin seating.

May 13, 64

## 208 (215) New Stop Capstan, P/N 526035 IBM 729 II through VI

New Production 729 Read/Write head assemblies have a new type stop capstan. It is adjustable so that all 360 degrees of the rubber surface may be used. This new capstan has two adjustments:

- The 1/4" allen screw is used to tighten the

outer shell. By loosening the 1/4" allen screw, the outer shell may be rotated so that any portion of the outer shell may be used as the stopping surface.

- The 1/8" allen screw allows the entire capstan to turn in order to adjust the stop wave from. Insure that both allen screws are tight after completing any adjustment.

May 16, 63

### 209 (250) Service Hints IBM 729 II through VI

#### DECORATIVE HEAD COVERS

Lower head cover screws are lost occasionally when the "horseshoe" clip falls off. Loss of the clips can be prevented by staking or peening the shoulders of the screws.

To prevent the upper and lower covers from meeting, form the lower cover support brackets. The corners of the lower cover should also be formed to prevent interference with the prolay covers.

#### EMPTY TAPE REELS - MACHINES OF US ORIGIN

Empty machine reels, now shipped with new tape units, will be supported by cardboard inserts to prevent warping during shipment. Badly warped reels can cause tape damage.

When installing a new tape unit, the empty reel should be thoroughly cleaned of all cardboard dust to prevent tape contamination. Dust free type inserts are now being investigated for shipment with all empty reels.

#### DP RELAYS - 729 NOR - US ORIGIN

DP Relays may be either of two types. Potter Brumfield or RBM. Some machine problems have been traced to improperly adjusted Potter Brumfield DP Relays.

If difficulty is experienced with this type of relay, the armature to base clearance should be checked and adjusted to approximately 0.020 inch. This can be accomplished by loosening the spring holding screws and positioning the armature for the proper clearance.

May 14, 63

### 210 (203) Main Drive Belts IBM 729 II through VI (US and French origin)

Service Aid: Reel Drive Motor "V" Belts have been "notched" to reduce shedding of fine particles of rubber. This was done by EC 248968 for new production machines and replacement parts only.

These new style belts have been found to stretch easier than the old style after a short period of operation. Loose belts can cause tape dumping.

Using the Reference Manual Adjustment Procedure, belt tension (notched) should be checked.

- On all tape units in a new system about one week after installation.
- On any machine after one or two weeks of operation.

The Part Number of the belt, P/N 515909, has not been changed. Though the Mechanicsburg RAMAC

System automatically specifies a pair of belts when one part number is ordered, be sure to specify a "matched pair" when ordering. Always replace both belts with a "matched pair" when any replacement is necessary.

May 22, 63

### 214 (247) Improved R/W Head Assembly IBM 729 II through VI

The tape surface of the R/W head assembly has been redesigned to reduce the possibility of generating noise. Square edges of the read and write head laminations have been rounded off by undercutting the head surfaces at the point where the laminations meet the brass body at the center section of the head.

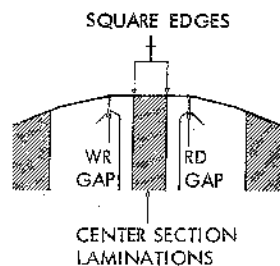


FIGURE 1

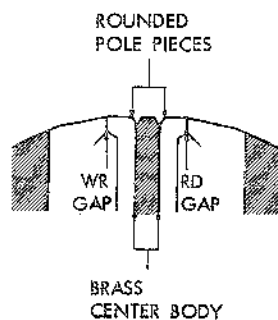


FIGURE 2

Figure 1 shows the original head surface where figure 2 shows the undercut surfaces. Rounding of the pole pieces reduces the possibility of writing or picking up low amplitude noise (minor bits) as the tape passes the square edges of the pole piece laminations. A tendency toward base line shift is also reduced by this undercutting.

This service aid is released simply to inform Customer Engineering of the reasons for the design change. It should not be considered authority to replace all

heads which exhibit the symptoms described. Base-line shift and/or minor bit noise (more critical at 800 BPI) should seldom be severe enough to require head replacement.

The head change is a factory only EC released for the newer style heads announced in 729 Service Aid 159(128). Tape unit models and correct head part numbers are again listed here for clarification.

- P/N 347891 - R/W Head Assembly for either 729 II or V, NOR or Relay type.
- P/N 347892 - R/W Head Assembly for either 729 IV or VI, NOR or Relay type.

Both head assemblies above have Amphenol head connectors. Head assemblies with Winchester head connectors are as follows:

- P/N 347893 - 729 II R/W Head Assembly with Winchester head connectors.
- P/N 347894 - 729 IV R/W Head Assembly with Winchester head connectors.

Machines of French origin have been equipped with Amphenol head connectors only.

The following part numbers are now obsolete:

628220	535074	530746
526291	526294	526297

Though P/N's 526294 and 526297 are obsolete, remaining field stock is still satisfactory for replacement as follows:

- P/N 526294 - 729 II only, NOR or Relay
- P/N 526297 - 729 IV only, NOR or Relay

Those P/N's returned for repairing keep the same P/N's but are brought to the last technical level.

#### IDENTIFICATION

In order to physically identify a Read/Write Head Assembly to determine on which model tape unit it may be used, both of the following details must be known:

- The tape unit model number etched on the top or front of the brass head itself.
- The method of attaching the head mounting plate to the head casting.

Before release of the Model V and VI Tape Units, model numbers II or IV etched on the head was sufficient to determine the proper tape unit model. After release of the new machines and new heads (P/N's 347891 and 347892), head marking became inconsistent and have been marked either II or V, or IV or VI.

Either P/N 347891 or P/N 347892 can be identified by the rigid mounting of the head mounting plate (skew plate); with the head open, a 1/16 inch brass shim can be seen between the right side of the steel head plate and head casting. Moreover, on R/W head asm. of French origin, P/N 347891 or 347892 are stamped on the left side of the casting. On old style head assemblies such as 526294 or 526297, the head mounting plate is spring loaded and does not include the shim.

#### Example:

A model V Tape Unit Head Assembly (P/N 347891) may be etched with either a "II" or a "V" but must also have the brass shim mounting which is necessary for 800 BPI operation. This head, of course, may also be used on a Model II Tape Unit.

May 22, 63

### 215 (-) Field Replacement of the Capstans IBM 729 II through VI (French origin)

Starting from approximately S/N x 0700, 729's of French origin have been equipped with field replaceable capstans. This type of capstan is coupled to the

rotor shaft by a conical fitting. The end of the rotor shaft is tapered and a holding screw permits to cure the fitting of the capstan.

This type of capstan has not been installed on 19 units in sequential order, in any case it is suggested to check if the unit is or is not equipped with capstans fastened by a pin.

A capstan must be replaced when the rubber is deteriorated or glazed. Persistent "count five" noises may be eliminated by the replacement of the capstan.

When performing the replacement of the capstans in the field, two pockets, including all necessary material, have been released.

For Model II or V : P/N 8018040  
For Model IV or VI: P/N 8018041

Each pocket includes:

Capstan (Mod. II or V - P/N 8022771  
Mod. IV or VI- P/N 8022772)

Screw P/N 8018039 and  
Screw P/N 8022775 (\*)  
Cap P/N 8022774

Two types of screws have been mounted by the manufacturer. Thus the two types are delivered so that the right one might be used.

#### INSTALLATION PROCEDURE

An old capstan can be removed without removing the capstan motor from the tape drive.

Remove the cap by breaking it with a center punch.

Unscrew the capstan holding screw. Use a screwdriver perfectly sharpened. The shaft must be firmly held. Vise-pliers tightened on the steel disk may be used. If vise-pliers are not available, after the removing of the bracket sensing switch, the shaft can be held manually using a cloth to avoid personal injury.

The capstan can be removed by striking the shaft end by the mean of a brass rod. Hold the rear of the shaft to prevent striking of the rotor against the rear flange.

A better solution to extract the capstan is to use a special puller, P/N 8019875, which has been developed for this purpose. By using this tool, the capstan will be gently removed without striking the shaft. Thus, any binding on the capstan motor shaft can be avoided.

After the cleaning of the conical part of the shaft, to eliminate possible rust build-up, the new capstan can be installed. It is recommended to not force the capstan on the shaft by using a hammer. Indeed tightening the screw is sufficient. Glue the new cap on the capstan. The motion adjustment, of course, has to be checked and re-adjusted if necessary.

#### MARKS

It should be noted that there are two ways to replace a capstan.

Without special tool, the CE has to be doubled.

With vise-pliers and the special puller, the work is performed by one man only. On the other hand, damaging of the shaft by striking is prevented.

Order on Field Requisition Card Code 6, Only.

Capstan replacement on Model II or V - P/N 8018040  
Capstan replacement on Model IV or VI - P/N 8018041

#### COMMENDED TOOLS

Vise-pliers  
Capstan puller, P/N 8019875

Order on P & S Requisition, France.

June 12, 63

### 216 (-) Checking Preamp Levels IBM 729 NOR

This CEM supersedes CEM 729 SA-148 (159).

When using the NOR tape drive built in tester the on-line switch is in the off-line position which holds the Read Gate line down. Consequently, the preamps cannot be set, scoping at pin "H".

Scoping at pin "G" is not recommended as a difference may exist in levels in relation to pin "H". Preamps should be set with the tape drive on the system, scoping the TAU amplifier inputs from the read bus.

June 7, 63

### 226 (-) Dynamic Shield Adjustment IBM 729 on 1401 Systems

Service Aid: A "Dynamic H Shield Adjustment Method" has been used in the field on 1401 systems, with success. This method is as follows:

1. Use a good magnetic tape (10 to 50 pass usage).
2. Write long records (Switch position: Write Bits, connect 02A1 to A26D).
3. Switch "Amplifier Bias" to ON position.
4. Find out the critical GO down Time (with the potentiometer "Vary go down") so that the most frequent error indications appear.
5. Move the H Shield until the error indicator lamps flash at the minimum frequency. Vary often it is possible to obtain no error indication.
6. Modify the GO down Time to check if the number of error indications are not increasing.

July 22, 63

### 227 (-) Faulty Contacts in the Voltage Adjusting Potentiometers IBM 729 Relay and NOR prior to S/N X3484 (French origin)

Dropping of voltages -6V-12 or +12, may be caused by poor contacts in the adjusting potentiometers R9, R22, R36, and R51. This is due to the low amount of current flowing through the sliding contacts. To avoid such problem it is recommended, during the P/M, to move several times the slide contact back and forth to clean it (Power should be OFF on the unit). Set approximately the pots to the former position before applying Power on the unit. Check and readjust the voltages if necessary.

July 22, 63

### 228 (-) Parts Catalogs IBM 729 (French origin only)

The latest editions of the 729 parts catalogs are:

729 Relay machines - F/N 10.706.469.6

The former 729 Relay catalog (edition No. 5) has been completely reviewed. Additional figures and more details are shown in this catalog. Moreover the latest field changes have been taken into consideration. Therefore, the availability of this catalog in each installation is highly recommended. However, keeping the catalog shipped with the system will be helpful, as some minor factory changes may exist between the machines.

729 NOR machines - F/N 10.706.561.1

Pages 39, 41, 42 of the subject catalog show the new front door, new power supply and new prolay

control.

NOTE: The P/N of the "block", Ref. 18, shown Fig. 5 of the catalog 729 NOR, is 352600. Correct the subject catalogs accordingly. The P/N of the block "old style" (with two hex screws) is 528534.

July 29, 63

### 236 (-) Hang Up Condition, Sort II Program - IBM 1401 with Magnetic Tape Feature

A tape mark normally consists of a one character record if written using the normal Write Tape Mark Op Code (U%UXM).

Actually, any length record with a tape mark (8421 bit) as its first character will turn on the Tape Indicate Latch when in Read status.

Sort II programming assumes that a tape mark will appear as a one character record. If other than a one character tape mark record is encountered, the program will not continue correctly and a hang up occurs at the end of Phase I.

If a sort II hang up condition is occurring check input tape for this erroneous condition.

Sept 26, 63

### 237 (260) Tape Drive Cleaning Kit IBM 729

A cleaning kit is now available from Mechanicsburg. Each kit contains the following items that will assist when cleaning or performing PM on tape drives:

P/N 352468 Cloth Squares (1 package)  
P/N 352605 Felt Pads (1 package)  
P/N 352606 Pad Holder  
P/N 517960 Cleaning Fluid  
P/N 556944 Cotton Swabs (1 package)  
P/N 556945 Small Brush  
P/N 1018992 Cleaning Brush

Assembly number of the complete kit is P/N 352465. One kit per installation is recommended.

Order-Field Requisition Card Code 6, Only.

Sept 26, 63

### 244 (252) Tape System Noise IBM 729 All Models

Locating a tape drive which is generating noise can often be difficult.

The following general procedure is suggested to help determine if a system has any tape drives creating noise:

1. From the TAU, Write a section of tape with No Bits.
2. Reset TAU and Write a tape mark.
3. Backspace over the tape mark. Do another backspace operation. The tape should now return to load point unless noise is encountered. A bad spot on tape must not be overlooked as a possible source of terminating the operation.
4. After tape reaches load point, assuming no stops, a read forward operation should be initiated. The tape should read to the tape mark. This will only determine if a tape drive is generating noise. The source of the noise still has to be located.

The following items are suggested as possible sources of noise:



1. Magnetic clutch brushes.
2. Ground loops.
3. Vacuum column switches.
4. Wires rubbing on Magnetic Clutches.
5. Noisy micro-switches.
6. Noisy relays due to arcing.
7. Suggest reviewing 729 Service Aids and Reference Manual for additional information.

Oct 3, 63

### 245 (253) Erasing in the EOF Area IBM 729 Relay

On some systems, Read status is not set in a 729 Relay tape unit during a rewind operation following a write instruction. The last record written may be partially erased as the tape moves over the write heads. This condition can result in excessive read errors in the EOF area and may be seen as weak or "blurred" bits when tape is developed.

During a rewind operation, File Protect Status is set when the NFP relay 112 drops. R 112 points do open the write head coil center tap circuit (+12V) but the write drivers are still conditioned by Write status. The 50 MFD filter capacitor, located on the head side of the NFP points, can discharge through the write coils which cause them to act as weak erase heads.

To correct this condition, the write driver circuits (LZ--cards) should be deconditioned with Read status (-P at pin A) during a rewind. Read status can be set within the tape unit by conditioning (opening) the "Read TR Set" line (ALD page 02.01.1, page location 28). This is done by simply wiring in the unused NFP-2 relay points. Add the 112-2 N/O points in series with the R106-3 N/O point (start). Also correct the page by drawing in the 112 N/O points.

Oct 3, 63

### 246 (257) New Style Idler Pulley IBM 729 II thru VI

A heavier more sturdy nylon idler pulley was released during the latter part of 1962. The older style pulleys were frequently found to be warped and out of round. Performance of the improved design has been satisfactory to date.

There are some minor differences in the start waveforms which some may question. Sample waveforms in figures 1 and 2 picture the major difference.

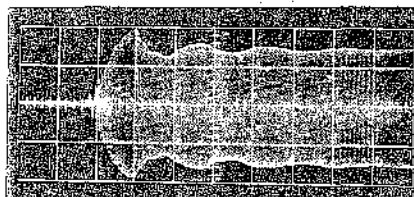


FIGURE 1  
OLD STYLE IDLER

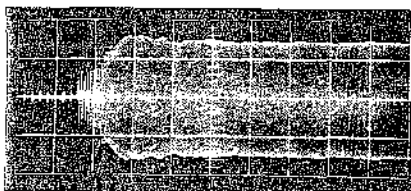


FIGURE 2  
NEW STYLE IDLER

The new style idler has practically eliminated the initial start envelope "overshoot". There are no noticeable differences in the stop envelope. When running IRG diagnostics, slightly less forward creep may be apparent on some tape units. Generally speaking, the heavier idler has resulted in more consistent performance with no serious side effects.

It should be noted here that poor start and/or stop waveforms are frequently traced to faulty prolay driver cards. A right "neutral" driver (P/N 371880) in the NOR tape unit, as an example, may cause a late "Forward Go" and a long tapered "Backward Stop" if the driver is slow in cutting off. Exchanging driver cards with known good cards is an effective troubleshooting procedure.

Oct 3, 63

### 247 (258) Vacuum Column Switches IBM 729 II thru VI

Tape in column and vacuum column switch assemblies are identical except for contact springs and arc suppression networks. The basic assemblies are:

P/N	Description	Use
526094	Vacuum Switch Assm. (tape loop sensing)	II thru VI, NOR and Relay
352481	Vacuum Switch Assm. (tape in column)	II and V only, NOR and Relay
526284	Vacuum Switch Assm. (tape in column)	IV & VI only, NOR and Relay

#### Differences

There are two styles of helical compression springs and two styles of top spring stiffeners. The stiffeners are the slightly curved flat springs (closest to the screw heads) used to increase contact tension.

- P/N-320891 - light compression spring and
- P/N 526282 - short stiffener spring. These springs are used on all Model tape unit column switches and tape in column switches for Model II and V only. (526094 and 352481)
- P/N 526283 - heavy compression spring and
- P/N 125872 - long stiffener spring. These springs are used on tape in column switches for Model IV and VI only (525284)
- P/N 352390 (US) or 8020300 (FR) - Filter assembly arc suppression network used on column switches only (526094)
- P/N 526503 (US) or 8010475 (FR) - Filter assembly arc suppression network used on both style tape in column switches (352481 and 526284)

#### Adjustment

- A. Normally open contact gap should be  $0.040 \pm 0.010$ .
- B. There should be  $1/64$  to  $1/32$  overtravel (wipe) on the N/O points with the contacts transferred. The same amount of overtravel should exist for the N/C points when the contacts are normal.
- C. Each N/C contact must break before the N/O contact makes and vice versa.

The adjusting nuts on the push rod should have been set correctly in the factory to obtain the above conditions. Minor adjustment can be made by reforming the contact straps or tension springs.

The heavy compression spring should be used only in the 526284 assembly. Occasional trouble has been traced to use of the heavy spring in vacuum column switches, 526094.

Improper tension or adjustment as well as dirty contacts can cause tape damage, tape dumping, dropping ready or capstans bouncing in or out. Following are two methods of checking vacuum switch contact tension which can help determine troublesome switch assemblies.

#### Switch assembly out of machine

Using an ohm meter and the 10X gram gauge (at contact screw), approximate gram tension to transfer contacts are:

Switch Assembly P/N	To open N/C contacts	To close N/O contacts
526094 - Column switch	85 to 115 grams	105 to 135 grams
352481 - Tape in column switch	110 to 130 grams	125 to 145 grams
526284 - Tape in column switch	210 to 240 grams	245 to 275 grams

#### Operational check

Since tape in column contacts are the largest cause of troubles noted above, an operational check can be performed. Form an opened paper clip with a small hook at one end and a  $1/4$  inch loop bent sideways 90 degrees at the other.

With power down, remove the two mounting screws and dust cover from a tape in column switch and bring forward. Attach the loop end of the paper clip to the contact screw with an extra nut. Power up and load the tape unit being careful not to allow the contacts to short to the machine frame.

With tape loaded and vacuum up, the gram tension necessary to pull open the N/O contacts (capstans will retract) is approximately:

352481 - (light spring) Model II or V	250 to 300 grams *
526284 - (heavy spring) Model IV or VI	350 to 400 grams *

\* It must be remembered that vacuum leaks or low vacuum will effect these readings. Check the vacuum vent on dual vacuum pump assemblies.

**IMPORTANT:** Faulty vacuum switch RC networks can cause system R/W errors (noise) and/or tape damage and dumping. Always replace the entire RC network assembly when burned resistors are found. Faulty capacitors do not always show up with an ohm meter.

revised April 14, 64 (Oct 3, 63)

248 (261) AC CP Cable Chafing  
IBM 729 Relay II thru VI

When the rear cover of the gate is opened, the AC CP cable assembly may move slightly within the large spaghetti tubing insulator. The lower wires in the cable assembly wrap closely around the upper terminal screw of CP 1. These wires can chafe with excessive movement and may short to the screw resulting in a shower of sparks and hot metal.

This cable should be checked for movement when the cover is opened. Adjust the cable clamp for least cable movement and wrap insulating tape around the cable near CP 1 if chafing is apparent.

Oct 3, 63

249 (262) Tape Cleaner Blade, P/N 512449  
IBM 729 II thru VI

A tape cleaner blade must be in good condition in order to be effective in removing foreign and tape wear particles from tape. It is important, therefore, that the blade be periodically inspected for damage or excessive wear.

The following information will act as a guide in determining when the cleaner blade should be replaced.

Damage

Replace any blade with nicks, scratches, dents or any surface defect which could permanently damage tape or cause excessive oxide collection in the head area.

Wear

Determining when a cleaner blade should be replaced due to wear cannot be sharply defined. A badly worn blade does not clean tape effectively and can actually damage tape by shaving long slivers from its edges.

As a general rule, replace the blade whenever there is any evidence at all of shoulder buildup (trenching) or wide width of tape. Indications are that this will occur within roughly six months of maximum shift usage or between 9 to 15 months where usage is less severe. Wear varies, of course, with the amount of tape processed.

Placement

The tape cleaner block assembly should not be disturbed when replacing the blade. Adjustment of the block for correct head wrap angle in the field is not recommended as a general practice. The silver polish method of checking wrap angle is not consistent enough to always allow accurate adjustment of the tape approach angle.

It is recommended that at least two full reels of work be passed over a new cleaner blade to "wear in" before returning the tape unit to service. In a few cases it may be necessary to repeat this process to remove any sharpness which might scrape oxide from tape.

Oct 3, 63

0 (-) Nylon Covered Door Cable  
IBM 729 all Models  
(French origin)

CEM supersedes CEM 729 SA-119 (-).

JT 84202 releases a nylon covered door cable N 8023361. The former cable, P/N 8022910, is obsolete. Correct WTC Parts Catalog accordingly.

Oct 14, 63

251 (198) New Style Heat Sink  
IBM 729 Relay (US origin)

Proloy and Relay Driver Heat Sink assemblies have been redesigned. The black metal mounting is replaced by a printed circuit type card. New sinks are electrically interchangeable with the old style and retain the same part numbers.

Mechanical mounting is slightly different. When the new style is used on older machines, stand off spacers and screws are required.

P/N 34512 - 2 Screws (frame to spacer)  
P/N 58207 - 2 Screws (spacer to card)  
P/N 352569 - 2 Screws

When the old style is used on newer machines, nylon holding screws will be needed.

P/N 528462 - 2 Screws

All installations with the newer machines should stock a minimum quantity of these nylon screws until the new type Heat Sinks become available. When the new type Heat Sinks are available installations with older machines should insure that they have a minimum stock of the screws and spacers.

March 2, 63

252 (204) Clipping Levels  
IBM 729 - II, IV, V and VI

Information and checking procedures for TAU Final Amplifier Clipping levels are released as a 729 Service Aid because operation is so closely tied to proper operation of the tape unit. This service aid covers TAU I clipping as used with the 7070, 7074, 7080, 7090 and 7094 Systems.

Clipping level checking information for the 1410 System is included in the Customer Engineering Instruction-Reference-Manual for the 1414 Model 1, 2 and 7 1/2 Synchronizer, F/N R23-2554-1.

The approximate percentage of input signal clipping (bias) to the "A" and "B" registers is based on an 8.0 volt signal level. Though percentages are listed for information purposes, the actual voltage levels will be used for checking.

Original TAU Final Amplifier clipping levels have been reduced as follows:

	WRITE		READ	
	OLD	NEW	OLD	NEW
A register (high clip)	45% to 35%	35% to 30%	35% to 20%	30% to 7.5% (7090 only)
B register (low clip)	30% to 25%	20% to 7.5%	No change on other systems	

The reduced level changes are released by:

EC 249243B - for 7080 System  
EC 249243C - for 7070 & 7074 Systems  
EC 249870 - for 7090 & 7094 Systems

The following method of clipping level checking (new level) measures the DC voltages at the first card of the TAU final amplifier circuit. At least a 20,000Ω per volt meter is necessary. A Weston 630 or Simpson 260 will do fine but a deviation meter should not be used.

All voltage measurements will be taken between -12V and the A or D pin of the first card of any bit amplifier (TAU system page A1.40.10.3). It will be necessary to exchange meter leads when moving between an A or a D pin. Bit track panel locations are as follows:

1 bit 00Y 4J27 A or D A bit 00Y 4J19 A or D  
2 bit 00Y 4J25 A or D B bit 00Y 4J17 A or D  
4 bit 00Y 4J23 A or D C bit 00Y 4J15 A or D  
8 bit 00Y 4J21 A or D

WRITE CLIPPING LEVEL CHECK

Mount a tape on one tape unit and load it. Unplug both capstan motors and extend the capstans after they stop spinning. Depress the tape unit "ready" button. Select the drive and place in a Write Status by "writing" any bit configuration from channel.

Write High Clip

Register A clipping at approximately 35%. Attach the minus meter lead to -12V at 00Y 4J27 M.

4J27 pin D (+ lead) 0.65 to 0.89 V DC

Write Low Clip

Register B clipping at approximately 25%. Attach the plus meter lead to -12V at 00Y 4J27 M.

4J27 pin A (- level) 1.74 to 2.17 V DC

The remaining panel locations for the other bit tracks are not normally checked. All pin A points are common and the pin D points are common within the ABR card through isolating resistors. These points may be checked if a wiring error or individual bit track problem is suspected.

READ CLIPPING LEVEL CHECK

Place the tape unit in Read Status by resetting the channel and attempting a Read operation.  
Read High Clip

Register A clipping level at approximately 30%. Attach the minus meter lead to -12V at 00Y 4J27 M.

4J27 pin D (+ lead) 1.57 to 1.87 V DC

Read Low Clip

Register B clipping level at approximately 7.5%. Attach the plus meter lead to -12V at 00Y 4J27 M.

4J27 pin A (- lead) 0.53 to 0.71 V DC

Clipping voltages which are not within the specified limits cannot be varied except for the B register during Read. The B register clipping voltage can be varied by adjusting the pot at 4F13. It should be nominally set to 0.6 volts.

Other clipping voltages which are out of tolerance can be corrected by replacing clipping level cards.  
69/90 KC OPERATION

A further clipping level change was made to the "B" register input during Read only. This level will automatically go to zero clipping on alternate error, backspaces. After the first read error (and backspace) the B register clipping will be at zero during the second read of the same record. Clipping automatically goes back to 7.5% on the third read, then zero on the fourth and so on.

The number of backspaces is limited, of course, by the program error routine or by the fact that the record was read correctly during one of the re-reads above.

In order to determine whether the clipping levels are switching between 7 1/2% and zero it will be necessary to force a read error. Replace the capstan motor plugs in the tape unit and write a short record which has invalid characters and no 1 bits. Backspace the tape and read the record.

If the clipping level is at zero the B register clipping voltage at 4J27 pin A should be between:

+0.26 to -0.14 V DC

Try reversing the meter leads to obtain this reading because the voltage level should be at or close to reference (-12). If the level is at about 0.6 V DC, backspace the record and read it again. The level should switch between near zero and 0.6 V DC with each backspace read.

For further information concerning EC levels, refer to the CEM and Service Aid section of the system type concerned.

March 1, 63

### 253 (251) Head Cable Grounding IBM 729 II thru VI, Relay & NOR (US origin only)

The 729 Head assemblies have a small cable assembly which runs from the head plug to the photo cell sensing area. The photo cell outputs are through a shielded pair with the shield returning to "J" ground through Head plug connector #2. This cable assembly is clamped with metal clamps in three places. The friction tape used in making the cable is the only insulation provided to keep the shielding at "J" ground from shorting to frame ground. It has been found that occasionally in the assembly of this cable the tape may not fully insulate the shielding.

When the head is installed in a tape unit, a ground loop may result causing sporadic troubles. The problem can further be aggravated by head up and down movement.

It is suggested that the head cable be checked if a ground loop is suspected. It can be checked with a meter from head plug connector #2 or the common between the two photo cells to frame ground.

This problem may be found on head assemblies manufactured since approximately July, 1962. It has been corrected on new head assemblies. Any head assemblies received or maintained as spare parts should be checked for this condition.

April 12, 63

### 254 (256) 60/90 KC Tape Systems 1 μsec Write Pulse IBM 729-V and VI

800 CPI tape systems should be checked to be certain a 1 μsec. write pulse is being generated.

A 1 μsec. write pulse is necessary to ensure tape system reliability. The system TAU should be checked to make certain the respective EC, as listed below, has been installed.

The following EC's ensure a 1 μsec. write pulse on 90 KC TAUs.

7090/94	EC 251693	B/M 5324048
7080	EC 251439 B	B/M 5324369
7070/74	EC 251439 C	B/M 5324369
1414 VII	EC 251161	No B/M
1414 I	Designed In Machine	No EC
1401	Designed In Machine	No EC

April 12, 63

### 255 (264) Replacement Parts for Switch Assemblies used with Tape Switching and Selection IBM 7155 - 7261

A reinforced switch operating plunger, P/N 362127, has been made available as a field replacement part. This new plunger may be used in tape switching (7155) or tape selection (7261) switch assemblies.

In the tape selection switch assembly P/N 575331, the "OFF-LINE" position uses operating plunger P/N 5337832.

If an old style switch assembly having operating

plungers with round shanks (lower portion of plunger) is encountered, it will be necessary to replace all operating plungers with the newer square shank type. This will necessitate replacing the interlock guide bar, to accommodate the square shank of the newer operating plungers. Also, on the tape selection switch assembly, if the change from round to square shank, plungers is needed, it will be necessary to put (2) two washers, P/N 5337833, on each of the seven (7) non-locking operating plungers, Reset, etc.

If switch rework instructions are desired, they may be obtained by ordering P/N 5324376 on a MES from Poughkeepsie.

The following part numbers have been released for field maintenance and are available from COP Only, Field Requisition Card Code 6. Those parts pertaining to tape switching should be entered in the 7155 parts catalog P/N 123-0394-0 or 10-706-604-0.

P/N 575324	Switch assembly (2 pos. 8 button)
P/N 575325	Switch and panel assembly (2 pos. 8 button)
P/N 569876	Switch and panel assembly (4 pos. 16 button)
P/N 569877	Switch assembly (4 pos. 16 button)
P/N 575331	Switch assembly (Tape Selection 7261)
P/N 5337832	Plunger (OFF-LINE pos. only Tape Selection)
P/N 5337833	Washer
P/N 5320793	Plastic pushbuttons 1 set (tape selection)
P/N 362124	Plastic pushbutton 1 set (tape switching)
P/N 362125	Interlock bar for 8 button switch assembly
P/N 362126	Interlock bar for 16 button switch assembly
P/N 362127	Switch Operating Plunger
P/N 362128	Spring for plungers with squared shank
P/N 419174	Lamp 28V #327
P/N 362119	Lamp 6.3V #349 changed by EC 252267
P/N 5324376	Instructions for changing plungers in switch assemblies (order from Poughkeepsie)

July 19, 63

### 256 (265) Stretching Tape on Unload IBM 729 NOR II thru VI (US origin)

IBM 729 NOR tape drives with EC 252528 installed may stretch tape on a system Rewind-Unload instruction. This tape stretch may occur due to the drive being in a backward-stop status during unload.

EC 252528 has been released to the field on CEM 729EC-130 (93). Engineering Change 252528 has been factory installed on all 729 NOR tape units shipped since approximately April 1, 1963.

Engineering is releasing a correction for the problem on EC 253039. In view of the importance of this correction, it is suggested to make the change as soon as possible. Present logics should be marked accordingly until updated logics are received. The change is as follows:

Remove wires: TU.09.25.1 C06E-C08E TU.09.10.1  
TU.09.10.1 C08E-C12A TU.09.15.1

Add wires: TU.09.25.1 C06E-C12A TU.09.15.1  
TU.09.10.1 C08E-C22G TU.09.50.1

Add 0.05 capacitor TU.09.25.1 D03E - D03J

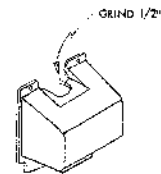
A suggested 0.05 capacitor is P/N 532176 which is available from COP Only. This capacitor is necessary to ensure unloading if at load point.

July 19, 63

### 257 (266) Head Cable Damage due to Plastic Dust Cover IBM 729-II thru VI

The plastic dust cover can cut into the head cable assembly when the head rises on an unload operation. This cable is the one going from the head cable plug to the loadpoint and tape indicate photocell area.

This condition can be eliminated by grinding approximately 1/2 inch off the cover on the right side of the cutout as shown:



Aug 16, 63

### 258 (267) Binding Brake Assemblies IBM 729 NOR and Relay (US origin)

A tight or binding clutch condition is often prevalent after rebuilding clutch assemblies. This tight condition has been found to be greatly aggravated by the brake assembly and is attributed to a breakdown of the powdered iron in this assembly.

The magnet brake rotor, P/N 332785, in the brake assembly will greatly reduce the probability of the brake assembly binding.

The magnetic brake rotor, P/N 332802, will be isolated and substituted with the reel drive clutch rotor, P/N 332785.

It is suggested when the brake clutch assemblies are rebuilt, to use reel clutch rotors, P/N 332785, to help reduce frictional drag.

This rotor part number change should be noted in the Parts Catalog.

Aug 16, 63

### 259 (268) Erase Head Leads IBM 729-II thru VI (US origin)

Erase head leads can be knocked off or broken during transport cleaning if they extend below the bottom of the erase head. This problem can be eliminated by carefully forming the Erase Head connecting pins up at an approximate 45 degree angle. This is sufficient to keep the erase head leads from extend-

below the bottom surface of the Ease Hecc.  
Aug 16, '63

### 0 (269) Exhaust Fan P/N 352581 IBM 729 NOR II thru VI (US origin)

Motor Burn-Out - The set screws in the top cover  
exhaust fan blades are found to be working loose.  
This results in the blade sliding down the motor  
shaft and catching on the guard causing motor burn-

This condition has been found only on the cadmium  
plated exhaust fans. No problem has been experi-  
enced with exhaust fans painted black.

It is suggested all 729 NOR tape drives be checked  
and the fan blade set screws tightened on all cad-  
mium plated exhaust fans.

Aug 16, '63

### 1 (-) Reference Manual and Service Aids IBM 729 All Models

The 729 Service Aids section has been conducted  
to include important current or new information.  
The latest revisions of the Reference Manuals (729  
Model V or 729 NOR machines) including most of the  
ones not reprinted are:

CE Reference Manual F/N 223-6868-3  
729 Relay Type

CE Reference Manual F/N 223-6988-2  
729 NOR Type

Information pertaining to 729 Model V and VI Re-  
type operation is identical to the NOR. Thus  
Reference Manual F/N 223-6988-2 may be used  
on these units.

Jan 20, '64

### 2 (-) New Gate Fan (P/N 4062612) IBM 729 NOR Mod II through VI (French origin only)

Starting from S/N X4857, 729's of French origin  
will be equipped with a new gate fan. However,  
this type of fan cannot be used on all 729's NOR  
or to S/N X4857. In case of fan failure, order  
as follows:

729 NOR up to S/N X3323 (units equipped with  
two fans), it is not possible to use this new fan.  
Consequently order as before the former fan  
P/N 8016930.

729 NOR from S/N X3324 to S/N X4856 (units  
equipped with one fan). The new fan must be  
used. However, it will not be directly inter-  
changeable and it will be necessary to order for  
the first replacement B/M 8023446 (fan and  
adapter assembly). After, only the new fan  
P/N 4062612 should be ordered.

729 NOR S/N X4857 and later. These units  
will be equipped with the new fan in the French  
Plant. Therefore, order directly P/N 4062612.

The new fan will be equipped with a receptacle;  
connect it directly on the raceway. Cable 8010850  
previously used (Raceway to terminal block #10) must  
be removed.

March 9, '64

### 263 (-) Faulty RP Cards P/N 371749 IBM 729 Relay Machine

This type of card at JT level 4700  
trouble such as:

- Failure to write on or
- Write frequency of
- Write pulse of

JT 47627 or  
Use cards  
at JT level, if above failures are  
experienced.

Cancelled, see SA CEM 329 (-)  
This card solves these problems.

March 9, '64

### 264 (-) Circuit Protectors - Type "SECUREX" IBM 729 (French origin only)

Subject CP's have been improved. Some of the  
physical dimensions have been modified. However,  
these CP's have the same P/N as those of the for-  
mer production. Therefore, after ordering one of  
these CP's, it will be possible to receive either  
the old or the new style version.

The main improvement has been to add a guide  
to the reset button. Because of this guide, the dia-  
meter of which is 7 mm, the former hole on the  
supporting plate of the CP must be enlarged from  
5 mm to 7,5 mm.

New and old style CP's are electrically directly  
interchangeable.

#### Part Numbers affected

CP 3A	P/N 2092387
CP 1,5 A	P/N 2092572
CP 1A	P/N 8011177
CP 2A	P/N 8011178
CP 3A	P/N 8011179
CP 5A	P/N 8023821
CP 7A	P/N 8023881
CP 8A	P/N 8016931
CP 10A	P/N 8016938
CP 2A	P/N 8021667
CP 4A	P/N 8021670

revised Aug 8, '66 (March 9, '64)

### 265 (276) Undetected Dropping of Ready IBM 729 NOR all Models (US origin only)

Many system problems are often the result of a  
tape drive dropping Ready status to the TAU unit  
and going undetected. The NOR tape drive has  
been very susceptible to these noise conditions.  
This is because the NOR SMS circuitry responds  
very quickly to a signal level change. The relay  
tape drives use relays in the Ready circuits which  
require a period of time to drop out. It is suggested  
that the following be checked to minimize the  
possibility of dropping Ready.

1. Install 729 CEM's #124 (92) and #130 (93) on  
all tape drives as soon as possible. Improved  
circuitry is incorporated which provides greater  
reliability.
2. The make of the door interlock switch can be  
intermittent and cause trouble. Vibrate and  
check with a meter, replacing any with resistan-  
ce or a noisy make.
3. The capstan out Micro switches can be a source  
of intermittent problems difficult to diagnose.  
These capstan out switches will not reset the  
start latch. It is recommended that you periodi-  
cally use an ohmmeter and manually vibrate

these capstan out switches (capstan extended),  
replacing any showing resistance or a noisy  
make while being vibrated.

4. Sagging, sliding glass doors can cause dropping  
of Ready. It is suggested that the magnetic  
detents be checked for proper adjustment. With  
the glass door fully closed, the magnet mounting  
screws can be loosened through the inside deco-  
rative cover access holes. After loosening the  
magnet mounting screws, the magnet can be rais-  
ed with the screw-driver blade and will snap  
into position against its detent bracket. Tighten  
magnet mounting screws.

5. Check the vacuum column switches for proper  
operation. Reference 729 Service Aid 247 (258).

The tape-in-column switches have given trouble on  
the NOR tape drives; however, this problem has  
been corrected by 729 CEM #130 (93). If machine  
availability prevents installation of CEM #130 (93)  
right away, it is advisable to thoroughly clean the  
tape-in-column vacuum switch points. Apply a thin  
coating of the SMS contact cleaner, P/N 451053  
(see 7000 Service Aid 24).

To further minimize noisy switch contacts until  
CEM #130 (93) is installed, a 10MFD capacitor  
(suggested P/N 124588 or equivalent) may be in-  
stalled, plus side to "J" ground, at the following  
points.

C17F	(+S capstan out switch)
C18K	(-S door interlock switch)
C18F	(+S tape in left column switch)
C18G	(+S tape in right column switch)

March 9, '64

### 266 (277) Clarify Logic Page Updating IBM 729 NOR all Models (US origin only)

This service aid is being released to eliminate con-  
fusion when updating logic pages released by the  
following engineering changes.

EC 252528B (CEM 130 (93)) - Logic pages, for areas  
of the NOR tape drive affected by EC 252528B,  
were released under different part numbers. This  
necessitates substitution by logic page designation,  
rather than part number, when this change is install-  
ed. It was necessary to release logic pages under  
different part numbers because EC 252528B is an  
optional change, and therefore will not be installed  
on all field machines. This creates a need for two  
different sets of logic, one for NOR drives with  
EC 252528B installed and one for NOR drives with-  
out EC 252528B.

EC 252268V - This change was erroneously sent to  
all systems using 729 tape drives. Logic pages sent  
with this V suffix change should not be installed.  
Logic pages and instructions at the 252268V level  
should be scrapped. EC 252268W will be released  
to correct EC 252268V and will be sent to all in-  
stallations which have NOR drives.

March 9, '64

### 267 (278) Tape Damage (Edge Creasing) IBM 729 Relay and NOR all Models

This information contains possible areas to check  
when tape creasing is experienced. Information in  
this service aid will be revised when deemed ne-  
cessary.

The following items should be checked to minimize  
tape creasing.

- a. Review 729 Service Aid 183 (246) (Drag Pot).
- b. Make certain that no binds or rough spots are in the magnetic clutch shafts and bearing.
- c. Check for minimum reel shaft end play. (Do not over-tighten).
- d. Remove all warped reels from service.
- e. Replace any rubber latch rings not allowing tape reels to slip on and off easily.
- f. Check split or ceramic guides for smoothness in operation or a steady even tension.
- g. Check the High Speed Rewind idlers for end play and rough bearings.
- h. Check for proper reel hub to rewind idler to column alignment.
- i. Check H-shield for being free of binds.
- j. Observe if excessive machine vibration is prevalent during High Speed Rewinding.
- k. Check High Speed Rewind motor and coupling for proper alignment with the reel shaft.
- l. Check tape for excessive curvature which may cause irregular rewinding.
- m. Observe operating personnel to see that proper tape storage and tape handling procedures are being employed.
- n. Check the tape in column switches for adequate contact tension and proper operation. Refer to 729 Service Aid 247 (258).
- o. If the problem exists on Relay tape drives, review 729SA 93 (180) and check the timer switch.

March 9, 64

## 268 (279) Duplicate or Missing Records IBM 729 Relay or NOR all Models

Some 729 systems are encountering duplicate records on tape when none should exist. The failures are a partial record followed by a complete duplicate or two good records which are duplicate. There may, or may not, be a skip between either type.

**A - Possible Cause:** Trouble in the Select and Load Point area will cause any or all of these problems, as follows:

1. A write error occurs and we try again.
2. The program issues a backspace command.
  - a) The Load Point latch in the 729 comes on erroneously during backspace. As the line, "At Load Point" ends backspace (normal operation), the backspace over the last record is either not executed or only partially done. The next write command is executed with a load point delay, resulting in the duplicate record situation where a skip is involved.
  - b) The Load Point latch in TAU is set as a result of a false load point signal, but the "Select and Load Point" signal from the 729 does not stay up. "At Load Point" will terminate backspace as usual. The next write command will bring up "Reset" which includes "RDD 144", the reset for TAU Load Point Latch. If the "Select and Load Point" line is not up, TAU Load Point goes off and we do the write command without skipping. The result will be either a partial record, then a duplicate, or two full duplicates with a normal inter record gap.
3. Missing records can occur if a false Load Point indication is experienced while reading tape.

### SOLUTION

Many 729's in the field have the Load Point and Tape Indicate photocells misaligned. This photocell is directional and should have the aperture aligned parallel to the tape motion. When misaligned, the photo lamp voltage may be set high to obtain reliability in sensing load point and tape indicate. With the increased intensity, stray reflections may fire the photocell in error.

If duplicate or missing records are experienced, the photocell apertures should be aligned parallel to the tape path. The photo lamp voltage should be reduced to the minimum point where reliable sensing occurs. A nominal setting would be 5.5 V, although good operation may be obtained as low as 5.0 volts. Be sure that the voltage drop across the individual Load Point and Tape Indicate lamps does not differ more than 10 per cent.

**B - Possible Cause:** Noise on the "Select and Load Point" or "Read Bus" lines from the tape drive.

### SOLUTION

Eliminate sources of noise, such as vacuum column switches, ground loops, etc. Refer to 729 Service Aid 244 (252).

March 9, 64

## 269 (281) Tape Dump after Installing EC 252528 IBM 729 NOR all Models (US origin only)

If tape dumping or twisting in the columns is being experienced after installing 729 CEM #130 (93) (EC 252528) the following wiring change may be made.

Remove	Add
D09E-D13Q	D09E-D19P
D19P-D13Q	D13Q-D16Q
D20D-D20B	D20D-C20Q
D20B-C20Q	D20B-D15P

This puts the reel tape take-up motor under control of the head down switch. Positioning tape in the split guides prior to lowering tape improves loading.

The partial left-brake pot must be adjusted for minimum drag to help minimize the possibility of tape damage. This can be done by turning the partial left-brake adjusting pot to its maximum counter-clockwise position.

Tight or binding clutches may cause tape damage if this wiring change is used.

This is not an Engineering Change and should be used only if necessary.

March 9, 64

## 270 (271) Binary Tracking on 800 CPI

### IBM 729 V and VI

Binary Tracking is a condition which can exist on any model 729. However, 800 CPI operation is more likely to exhibit failures because of the higher character transfer rate. The symptoms will be temporary or permanent read failures and may appear as an interchangeability problem.

Binary Tracking can occur because of start-stop operation in the forward direction but is more likely to occur after a backspace. The condition leading up to creating a failure when a backspace is involved is as follows:

1. An output tape is being written on a drive with the mechanical skew adjusted properly.
2. A write check occurs and backspace command is given.
3. During the backspace operation the tape assumes a different tracking path.
4. The next record written may be skewed several microseconds either for part of the record or the total record. Usually the stopping action of the prolay will force the tape back to its normal tracking path before another record is written. This will leave one record skewed while the records before and after are correct.

The following are known or possible causes of Binary Tracking:

### 1. Dirty or Binding Ceramic Guide

Oxide build-up on the ceramic guide may be forced between the rear ceramic

flange and metal barrel during the backspace operation. The loss of proper guiding action will cause the record to be skewed. The best corrective action for this problem is to insure the split guide is properly cleaned with the cleaning brush. This brush is included with the tape drive cleaning kit, P/N 352465.

### 2. Vacuum Column Tops

729 Mod V and VI have new cylindrical tape guides at the top of each column, P/N 347878, and new column top plates, P/N 347889 and P/N 347890. These new column tops were designed to decrease the distance between the column top and the back of the vacuum column, and therefore provide additional tape guidance. By guiding tape on both sides of the capstan, the tendency for Binary Tracking is reduced. The column top plates must butt against the columns or their purpose will be defeated.

### 3. Excessive End Play

Nylon pulley or prolay armature end play exceeding 0.003 inches may cause Binary Tracking.

### 4. Start-Stop Skew

This is a reprint of CEM 729 SA-68 (142). It is possible for the left nylon pulley to cause as much as 4 microseconds of skew under start-stop operations. When tape is either started or stopped moving, the nylon pulley can cause the tape to assume one of two tracking paths. The resulting skew between tracks "1" and "C" can be as great as 4  $\mu$ s.

To detect this effect, scope tracks "1" and "C", syncing on track "1", in the same manner as when checking write skew (1  $\mu$ s/cm, 0.05v/cm, 10:1 probes).

Apply sufficient finger pressure against the left fork arm to take up any existing end-play in the fork arm itself. "Flick" the left nylon pulley (using snapping motion with thumb and index finger) while writing continuous "1"s and monitoring skew as previously described. If skew between "1" and "C" changes, and remains changed until "flicked" again, the nylon must be replaced.

Often this effect is severe enough to be detected by simply performing a start-up operation, without the necessity for using any additional technique.

Skew should always be checked whenever a nylon pulley is replaced for any reason. If skew is off, after installing a new pulley, be certain the new pulley not at fault before adjusting mechanical skew.

#### New Style Idler Pulley

The new heavier idler will reduce Binary Tracking tendencies. If this problem suspected, the old style nylon idlers on the left and right trays should be placed with the new style idlers, P/N 526253.

Sept 27, 63

### 71 (272) Bit Viewer for Heavy Duty Tape IBM 729 All Models

This tool was developed so that information written on HD Magnetic Tape could be examined without damaging the tape. IBM transport cleaner and developer medium should not come in contact with HD tape.

#### Use the Bit Viewer:

- Shake up the developer solution before using.
- Support the tape to be viewed, oxide side up, against the bottom of the Bit Viewer with the White Plastic Card.
- Wash the solution back and forth slowly by rocking the Bit Viewer from side to side; the record image will take shape.
- Inter-record gaps can be checked by making 3/4 inch mark on the White Plastic Card.

Precautions should be used to prevent physical damage to the tape being inspected.

When the iron filings in the solution become magnetized and the solution becomes viscous, a small magnet or degasser will loosen the filings.

#### Kit 461180 - Bit Viewer Complete

- P/N 461181 - Bit Viewer
- P/N 461182 - Bit Viewer Case
- P/N 461263 - White Plastic Card
- P/N 517960 - Cleaning Fluid (Six-ounce can)
- P/N 460997 - Capsule of Powdered Iron

Behind the viewer back fluid, a small screw in the side of the frame may be moved which exposes an access hole through which fluid may be added. The solution used in the viewer is the tape cleaning fluid, P/N 517960, with powdered iron, P/N 460997, added at the rate of one (1) capsule per six-ounce can of cleaning fluid.

The Bit Viewer Assembly, P/N 461180, should be ordered with Field Requisition Card Code 8, CCP Only, one per installation.

Sept 27, 63

### 2 (273) Tie Down "+T" Read Gate IBM 729 NOR All Models

Reference: NOR Logic Page TU.08.10.1; Logic Block 3B is an APH card with output at J13F. This is tied to E03G Logic Block 2B with an output at E03F (+T Read Gate). Present NOR circuitry has no loading of the line from J13F to E03G. As a result, a slow rise of the +T Read Gate line may be experienced. This may cause failure to read the first part of a record from a few characters many characters.

To ensure that a good level is maintained on the +T Read Gate line, a 1.6K, 1/2W resistor should be tied from E03G to -12V. The resistor may be mounted on the back panel.

OK. 1/2W resistor, P/N 317018 may be ordered using Field Requisition Card Code 6, CCP Only.

Sept 27, 63

### 3 (274) Fail to Stop at Load Point IBM 729 NOR All Models

The tape intermittently fails to stop at load-point. This problem can be corrected

by installing an additional 10 MFD capacitor, P/N 491316, in series with the present 10 MFD capacitor on the YAW card at location A3E05, reference TU.09.55.1.

P/N 491316 may be ordered with Field Requisition Card Code 6, CCP Only.

Sept 27, 63

### 274 (280) Caution - Safety Hazard IBM 729 Accent Panel-Rear Door Trim Relay and NOR All Models

#### 1. ACCENT PANEL

**SAFETY** The center accent panel providing access to the pre-amp gate may have sharp corners which present a hazardous condition. The handle for opening and closing the accent panel is spot welded to the top of the accent panel. The very ends of this handle are cut at an angle, and may be sharp. This has been corrected in the Plant.

It is suggested that the next time any maintenance is done on a 729 tape drive, it should be inspected for this condition. If sharp corners on the handle exist, it is suggested to round them off with a file and peen close to the top of the accent panel with a hammer.

#### 2. REAR DOOR TRIM (New Style Non-folding) - US origin

**SAFETY** A new style one piece rear door has replaced the older style rear folding door on new 729 tape drives. A limited number of these may have shipped with very sharp edges on the upper and lower trim pieces when the trim was cut to length. It is suggested that new 729 tape drives received in the field since October 25, 1963 be checked for this condition. Those exhibiting this problem on the trim pieces should have the sharp edges removed by filing or sanding smooth. This has been corrected on all 729 tape drives since November 6, 1963.

Dec 6, 63

### 275 (282) Tape Transport Cleaning IBM 729 NOR Operation Relay - All Models

The tape drive transport mechanism should be cleaned at least once every eight hours, or every ten full reel passes, whichever occurs first.

The materials required for cleaning the transport are available in a Tape Drive Cleaning Kit, P/N 352465. The contents of the cleaning kit are listed by individual part numbers in CEM 729 SA-239 (260).

Prolonged or repeated contact of the tape transport cleaner with the user's skin should be avoided.

**DANGER:** Caution should be exercised whenever the transport cleaner is used; and the user should be familiar with General Safety CEM-15 (8) or CEM 729 SA-62 (162).

#### Split Guides

Use the brush and thoroughly remove all oxide accumulation on the surface and between the two ceramic elements.

#### "H" Shield

The underside of the "H" feed-through shield should be cleaned with a lint-free cloth or pad moistened with the approved cleaning fluid.

#### Rewind Idler Pulley

Clean with a lint-free cloth or pad moistened with the approved cleaning fluid.

#### Drive Capstan

Do not clean the drive capstan while it is rotating under power. Use the brush handle wrapped with the cleaning cloth and scrub vigorously. The capstan must be rotated manually.

#### Nylon Pulley

Use a lint-free cloth or pad and the approved cleaning fluid. A motion around the circumference of the pulley should be used.

#### Stop Capstan

Use a lint-free cloth or pad moistened with the approved cleaning fluid to clean this item at the point where the nylon pulley contacts it.

#### Cleaner Blade

Use a lint-free cloth or pad moistened with the approved cleaning fluid to clean this item. Do not rub hard on the cleaner blade, but use a light motion.

### Read/Write Head

Use a lint-free cloth or pad moistened with the approved cleaning fluid to clean the head.

### Columns

The columns should be cleaned weekly with the approved cleaning fluid. **DO NOT**, under any circumstances, use any metal instruments to clean the columns. Frequency of cleaning may need to be changed, depending on the type of tape and the amount of tape passed.

Cleaning of the transport area should be done using a minimum amount of cleaning fluid. The cleaning cloth or pad should be damp and not saturated with cleaning fluid when cleaning. Occasionally, loose fibers will come detached from the cleaning cloth or applicators during cleaning. A visual inspection should be made to be certain that none of these loose fibers remain in the transport area after cleaning.

Dec 20, 63

### 276 (283) Defective Erase Heads

IBM 729 NOR  
Relay - All Models  
(US origin)

Erase Heads, P/N 352502, have been shipped from the Poughkeepsie factory with defects. These have been interspersed in spare parts and also installed on 729 tape drives, all models.

During an erase head grinding process the brass shim may not have ground off even with the pole faces. This defect can easily be detected by dragging a fingernail across the pole faces. If the brass shim extends below the pole surfaces into the tape path, it is suggested that the shim be stoned down. In some instances, the brass shim and shunt may come loose due to a poor application of epoxy (green in color). In these cases, the erase head should be replaced. Erase heads in current production do not have these defects; and they are assembled with a dark blue or black epoxy.

During the next PM period, it is recommended that all 729 erase heads assembled with green epoxy be checked for the possible defects mentioned above.

Dec 20, 63

### 277 (284) Capstan Rubber Change

IBM 729 NOR  
Relay - All Models  
(US origin)

The capstans on the capstan motors have always had the rubber made up in two layers; a thick base layer and a second thinner layer. This can be easily seen, as the thin outer layer is approximately 1/16 of an inch thick and a definite line is distinguishable where the two layers are laminated together.

A change in the capstan rubber composition has been made; and only one layer of rubber is put on the capstan. It primarily improved the Count-5 area; however, general start-stop adjustments are usually easier to make. One noticeable change will be that wider prolay drive gaps will accompany the newer single-ply drive capstan adjustments.

All shipments of the replaceable capstan, P/N 554148, starting November 6, 1963, will be the single-ply capstans, 729 tape drives shipping from the factory, starting approximately January 1, 1964, should have the newer single-ply capstans on the capstan motors.

Replaceable capstans, P/N 554148, may be ordered with Field Requisition Card, COP Only.

Dec 20, 63

### 278 (285) Door Maintenance Reduction

IBM 729 Relay

The following aids and changes have been used in the field to reduce door maintenance. Items 1 and 2 are not engineering changes.

1. Negator spring breakage can be caused by the spring wearing against the mounting bracket. This wear can be prevented by reversing the take-up drum, P/N 535820, so that the flange is between the spring and the bracket.

2. Some installations have been successful in decreasing pulley damage (nylon) by using just the long cable, P/N 526265 or P/N 8022910 - French origin. The long cable is attached to the spring assembly in the normal manner. It is then looped over the pulley and attached to the door cable bracket, P/N 535742. When this method is used, the defent action of the pulley is eliminated.
3. A defective window stop is one of the major causes of negator spring, pulley or cable breakage. All units should have B/M 585615, see CEM 729EC-113 (84).

A hard-to-operate window becomes an aggravation to the operator which soon results in part breakage. Refer to the 729 Reference and Instruction Manual, P/N 223-6988-2, Page 58 for proper adjustment and lubrication.

Dec 20, 63

### 279 (286) Vacuum Switch Filters

IBM 729 NOR  
Relay - All Models  
(US origin)

729 CEM's 142 (99) and 144 (101) announced a new RC filter network for the vacuum switches. This new assembly, P/N 362122, uses a 5 MFD capacitor with a 250 volt rating and a 30 ohm, 1/2 watt resistor.

A few reports of the 30 ohm, 1/2 watt resistor burning open in this new assembly have been received. It is suggested that if this condition is encountered the 1/2 watt resistors be replaced with one (1) watt 30 ohm resistor, using the same capacitor. The part number for the 1 watt, 30 ohm resistor is P/N 509507.

Parts may be ordered with Field Requisition Card, COP Only.

Jan 6, 64

### 280 (-) B/M 5324381 installation CEM 144 (101)

IBM 729  
(US origin)

Before installation of B/M 5324381, check with an ohmmeter any portion of a change involving relay 10 wiring changes.

If the relay coil wiring A and B terminals are reversed, installing the noise suppression diode across the R10 coil may result in damage to the diode and transistor card at 3B24.

April 20, 64

### 281 (-) Updating of Clutch and Brake Component P/N's and Corrections to Parts Catalogs

IBM 729 - All Models  
(French origin)

	Machines of US origin	Machines of French origin
Clutch assembly	528395	528395
Left Brake assembly	528390	528390
Right Brake assembly	530704	530704
Rotor clutch	332785	8026688
Rotor brake	332302	332802
Seal rotor	333208	333208
Cover	554173	332771
Magnetic Powder	332770	332770

The following corrections should be made in the 729's Catalog:

729 RELAY						
FORM	DATE	PAGE	FIG.	REF.	OLD P/N	NEW P/N
10-706-469-6	May 15, 63	40	25	21	8021081	-
		26	15	56	554173	332771
		26	15	76	554173	332771
		26	15	79	332785	8026688
		27	15	12 and 13	must be inverted	

10-706-561-0	Sept 15, 62	36	19	1	9021081	-
		22	10	113	535628	332771
		22	10	130	535628	332771
		22	10	133	332785	8026688
		24	10.A, 14 and 15 must be inverted			
0-706-561-1	Jan 1, 63	36	19	1	8021081	-
		22	10	113	554173	332771
		22	10	130	554173	332771
		22	10	133	332785	8026688
		24	10.A, 14 and 15 must be inverted			
0-706-561-2	Jan 8, 63	44	27	21	8021081	-
		28	16	78	554173	332771
		28	16	98	554173	332771
		28	16	101	332785	8026688
		29	16, 54 and 55 must be inverted			

revised Nov 25, 66 (May 22, 66)

## (288) 729 NORLAY Magnetic Tape Unit IBM 729 Mod. BII-BVI

Manufacture of 729 NOR tape drives has been discontinued in Poughkeepsie as of January, 1964 and in Essonnes as of July, 1964. Engineering Change 253500 used a variation of the 729 tape unit, called NORLAY, which is now being manufactured. The NORLAY tape drive is identical to the 729 NOR unit in appearance and operation. There are no TAU EC's required to allow use of 729 NORLAY units. First customer shipments of NORLAY drives from Poughkeepsie scheduled for February 1964 and from Essonnes for August 1964.

major differences and improvements between the NORLAY and the NOR are:

1. The NORLAY SMS Card population has been reduced by approximately 42 cards.

2. The NORLAY drive has 15 more relays than the present NOR drive. This will reduce noise problems because SMS circuits which are affected by noise have been replaced with relays.

3. The right and left reel control clutch assemblies have been replaced with 48 volt D.C. motors. The stop clutch assemblies have been retained, but are limited in use to the load and unload operations.

4. The NORLAY uses a power supply which supplies five D.C. levels instead of seven. (+14 and -7.5 volts supplies have been eliminated.)

5. The NORLAY has improved Prolay circuits. This is accomplished by removing a series chokes and using -48 volts instead of -7.5 volts for Prolay control.

6. The NORLAY has an improved Front Door Assembly. The sliding door is controlled by two large pistons which eliminate the negator springs, pulleys, cables, etc., used in the present doors. Also, the NORLAY rear door is of one-piece construction and is easily removed if space restrictions do not allow maximum opening.

7. Relays are located on rear logic panel.

8. Training on the 729 NORLAY consists of a Self Training Package, available from Licott Stationery Stores. A prerequisite for 729 NORLAY training is pre-training on 729 NOR or Relay tape drives. The package consists of:

1. Instructor Outline and Student Self Study Guide - F/N R23-2751

2. Instruction-Reference Manual - F/N 223-2740

3. NORLAY Instructional System Diagrams Supplement - F/N S23-4017

The NORLAY tape unit does not have a built-in tape drive tester. Therefore, a separate tape drive tester is required per installation. P/N 461390 is a universal tester, to be used with the 729 NORLAY drive, as well as with the 729 and 7330 tape units. The universal tester, P/N 461390, obsoletes Relay Tester P/N 460633 and 7330 Tester P/N 461142.

The universal tester is similar in appearance to 7330 Tester P/N 461142. There is a permanently attached cable that plugs into the tape drive's 200 position connector. The universal tester is equipped with an auto-cycle feature and two phone jacks ("B" bit and "I" bit). A line terminator (P/N 348590 for 729 and 36801 for 7330) must be used when operating a tape drive from the tester.

Installations where there is an overlap of 729 Relay and NORLAY tape drive may use the Relay tape drive tester, P/N 460633 can be used with NORLAY units. The Relay drive does not have a "CE Cable" connector, so the following modifications are necessary to allow auto-cycle to function.

1. Remove the tester from case by removing the six holding screws.

2. Turn tester upside down. All locations will be referenced to the tester in this position.

3. Remove wire from CE Connector # 18.

4. Pull wire back through cable facing until it will reach to pin # 4 of the top wafer of the response selector switch. Count pins counterclockwise from the common, but not including the common. Solder wire to pin # 4.

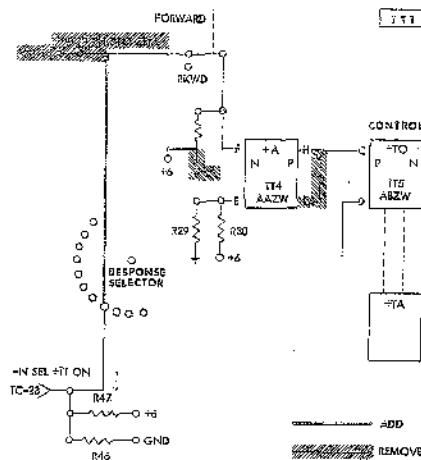
5. SMS Card locations TT1 to TT10 are counted left to right looking at the wiring side:

Remove  
yellow wire                      TT4-G to TT5-C

Add  
yellow wire                      TT4-H to TT5-C

6. Remove  
-6 volt jumper from R19 to R23  
-6 volt jumper from R19 to R18

Add  
-6 volt jumper from R23 to R18  
+6 volt jumper from R19 to R17



With the tester modified in this manner, 729 NORLAY tape drives and 729 Relay tape drives can be tested with or without using the CE Cable. If the CE Cable is not used, the indicator lamps will not be lit, and the following switches will be inoperative:

1. Reset
2. Start
3. Load-Rewind
4. Unload

If 729 NORLAY units are added to an installation which did not previously have 729 tape drives installed, the following tools and test equipment will be necessary.

Description	P/N
1. Universal Tape Drive Tester	461390
2. Terminator	348590
3. Power Cable (TD-to Cust. Recept.) - 220 V	460663
Power Cable 380 V	8012757
4. 556 CPI Skew Tape 729 II, IV	461096
800 CPI Skew Tape 729 V, VI	461197
5. Preamp Calibration Tape	461108
6. Pot Adj. Tool	461228

If NORLAY tape drives are overlapped with NOR or Relay drives, some of the above tools may already be present in the installation.

The 48 volt D.C. motors, which replace the clutches, are supplied by two vendors. Consequently, two different style brushes are necessary and both appear on the Initial Spare Parts listing. P/N 5355426 is for Robbins and Myers and P/N 5355433 is for CE Motors.

March 13, 64



### 283 ( - ) Motors' Connectors (French Origin)

IBM 729  
All Models

Motors supply by Essonnes from June 1964 will be equipped with US connectors.

Consequently, before a field motor change (listed of P/N here under), it is necessary to recover the removed motor connector to reinstall it on the new motor:

HS Rewind Motor	8010816
Tape Take Up Motor	8010830
Head Take Up Motor	8022358
Capstan Motor	8022785
Vacuum Pump Motor Mod. 2-5	8015289
Vacuum Pump Motor Mod. 4-61	8010396

July 21, 64

### 284 ( - ) Field Replacement of Vacuum Pumps

P/N 8015289	IBM 729-II & V
P/N 8010396	IBM 729-IV & VI
IBM 729 Relay and NOR	Mod II to VI
(French Origin)	

The hose of the vacuum pumps supply by Essonnes from July 1964 are 1/6 turned from the original position.

Consequently, before a field 729 Relay or NOR vacuum pumps change, it will be necessary to make turned the hose of 1/6 to allow a correct installation.

July 21, 64

### 285 (289) Installation Procedure

IBM 729-11-VI  
A II-VI  
B II-VI

Based on field experiences, the following items should be checked during the installation of the type 729.

1. Remove the rubber shipping stops on the capstan motors.
2. Check the adjustments of the capstan in-out sensing switches.
3. Check line voltage, the D.C. supply voltages, and Pralay neutral-drive currents.
4. Check high-speed rewind, load and unload operation.
5. Scope and check the Pralay start-stop adjustments. Adjust if necessary.
6. Run I.R.G. Diagnostic.
7. Scope preamp output, skew, and asymmetry (Mod 5 and 6). Adjust if necessary.
8. Run required tape drive reliability diagnostics.

March 13, 64

### 286 (290) Reduce Tape Dump (US Origin)

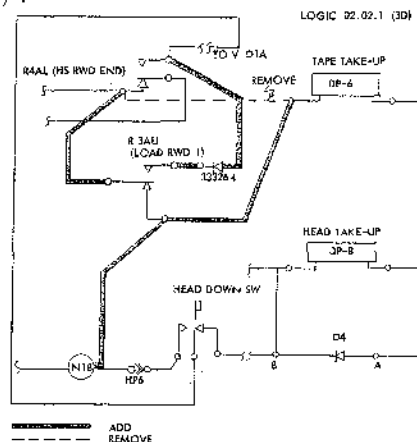
IBM 729-II-VI

If tape dumping or twisting in the columns is experienced during loading, the following circuit changes may be made to bring the head down first before lowering tape into the columns. This is done by putting the reel take-up motor under control of the head down microswitch.

Remove wire from R4AL N/C to DP6 pick

Add wire from	R4AL N/C to R3AU op
	R3AU N/C to DP6 pick
	R3AU N/C to NEON 18 (wire to head down switch)
Add diode from	R4AL N/O (plate ) to R3AU N/O (cathode)

Use any available diode normally used in back circuit elimination or arc suppression, such as a top-hat, AM type or small, two-plate selenium type. If diodes are not available, order P/N 333264 on Field Requisition Card code 6 from COP Only.



The above circuit will be installed by ECR 45-229 on all machines leaving the plant, and subsequently will be picked up on EC 253520.

EC 253520 will be made available to the field as an optional field Bill of Material.

Be certain to check the high speed rewind and the partial right brake for a small amount of slack tape after high speed rewinding prior to loading. This is necessary to ensure that tape damage will not occur as a result of the head coming down prior to lowering tape.

The time required to install this change, approximately thirty minutes, may be coded 32 and charged to EC 253520, referencing this Service Aid.

April 10, 64

### 287 (304) Defective Filter Capacitors

IBM 729 II - VI  
A II - A VI  
(US origin)

Defective filter capacitors are being encountered in 729 power supplies. The defective capacitors are Sangamo Electrolytic can type with brown, light brown, tan, or similarly colored tops. When checking power supplies to determine requirements, it need only be necessary to check the color of the top; since only Sangamo capacitors have brown tops.

A chemical reaction is taking place within the capacitors between the brown plastic top and the electrolytic. This results in INTERNAL corrosion of the terminals, rendering the capacitors ineffective.

This problem is predominantly found in 729 tape drives prior to the NOR. However, some of the earlier NOR drives do have the Phase III power supplies, which are exposed to this problem. It has been determined that at least 50 per cent of the capacitors in Phase I, II, and III power supplies are of the Sangamo brown top variety and are defective.

Some difficult-to-diagnose problems on the tape drive have been corrected by replacing defective capacitors in the supplies. Intermittent motion, noise, false tape indicate, tape runaway, and read/write errors are problems that have been caused by these defective parts.

All brown top Sangamo capacitors in all 729 power supplies must be replaced as soon as possible. Survey all affected 729 tape drives and order sufficient stock immediately. Specific part numbers will be found in the individual 729 ALD's.

INSTALLATION TIME - 2.3 hrs.

Installation time may be coded 34, referencing this service aid. Parts may be ordered on field requisition Card Code 6, COP Only.

Sept 18, 64

88 (292) Possible Card Damage after Installation of EC 252528B or B/M 8023445 - JT 84735 for Machines of WTC Origin

IBM 729  
Mod A II - A VI

The backpanel wire from E03E to E01R (+T Read Gate) is occasionally stretched tightly via pin E02J (-48 volts). A number of shorts between this wire and in E02J have developed after installation of B/M 5324385 or B/M 8023445, the NOR Improvement Change, refer to CEM 729EC-137(93). The movement which results from removing and adding wire wraps to pin E02J causes the insulation of the wire from E03 to E01R to be damaged, and a short can result.

It is recommended that the insulation of the wire from E03E to E01R be inspected immediately after installation of EC 252528B or B/M 8023445. If damage exists, the wire should be re-routed.

The +T Read Gate is shorted to -48 volts, intermittent or solid read failures will result. This condition may or may not show up off line.

May 8, 64

89 (293) T. D. Terminator Rework and Off Line Meter Check

IBM 729  
All Mod

If terminators P/N 348590 and 348591 should be reworked to provide termination for the Process Line (T/C 48 and 49). This applies especially to terminators used in conjunction with tape drive testers.

If the Process Line is unterminated, the Process Meter may run when the T.D. being used on the tester. Terminator rework is outlined in B/M instructions P/N 5325018 and 5325019, or can be accomplished as follows:

- Remove keeper plate mounting screw; then remove terminating shoe housing.
- Look at the wiring side with the resistor board mounting plate on the bottom. Locate the spare resistors on the first resistor board from the mounting plate. (P/N 348590 will have the spare resistors on the extreme right of the board. P/N 348591 will have the spare resistors on the extreme left of the board).
- Break the voltage bus wires to the spare 120-ohm and 360-ohm resistors.
- Using #24 yellow wire P/N 122393, solder a jumper from the voltage end of the spare 120-ohm resistor (lower resistor board) to the ground end (black wire) of the 120-ohm resistors on the top resistor board.
- Using #24 yellow wire P/N 122393, solder a jumper from the voltage end of the 360-ohm resistor (lower resistor board) to the voltage end of the 360-ohm resistors on the top resistor board.
- Using #24 yellow wire P/N 122393, solder a jumper from the junction of the 120-ohm and 360-ohm resistors to T/C 49. (Use clip P/N 598041.)
- Using #24 black wire P/N 106320, solder a jumper wire from the ground end of the 120-ohm resistors on the top resistor board to T/C 48. (Use clip P/N 598041.)

The Process Meter is to be checked Off Line, the process line must be made live. This can be accomplished by tying the process line through a 100-ohm 2-watt resistor (P/N 213536) to a -6 volt pin. The 100-ohm resistor should be tied to the following back panel pins for the three types of 729 tape drives.

729 Relay	A04E to -6 volts
729 NOR	J18C to -6 volts
729 NORLAY	C12C to -6 volts.

move resistor upon completion of meter checkout.

Time to rework terminators may be coded 36. Make reference to this service aid number.

Parts may be ordered on field requisition card Code 6, COP Only.

May 8, 64

90 (294) Hang-Up on Rewind Command at Load Point

IBM 729, B II to BVI  
(US origin)

When a rewind command is given to a tape drive which is at load point, the TAU should disconnect without sending rewind to the tape drive. This is done by the select and load point line being active in TAU. It is possible in a 729 NORLAY to have the select and ready line active before the select and load point line. This allows the rewind latch in TAU to be set. TAU will hang because the drive, being at load point, can not send back select and re-

wind to turn off the rewind latch.

This condition was corrected by EC 254024 (ECR 45-292) on machines serial no. 12718 and 61322 and above. A field change will be released in the near future. In the meantime, install the following change if trouble is experienced:

Remove wires	C19R - C19J C19D - C19J
Add wires	C19R - C19J C19D - F13L C12N - C13N.

Wire wrap capacitor 0.05 Mfd-10v-P/N 532176 from F13L to F12K.

NOTE: The add wire C12N to C13N is a voltage bus correction, which is included in ECR 45-292.

The time required to install this change may be coded 32 and charged to EC 254024, referencing this service aid.

May 8, 64

291 (295) NOR Drives with Rear Preamps IBM 729, All to A VI (US origin)

A variation of the NOR drive was manufactured for two months prior to changing new production to NORLAY drives. The major difference in this variation is the absence of a front preamp gate. The preamp circuitry is incorporated in the rear logic gate. This variation of the NOR drive is identical in operation and external appearance to the standard NOR drive.

Serial numbers of NOR drives with preamps in the rear are:

Mod II, V	34687-35083
Mod IV, VI	92636-92810.

The NOR drive with preamps in the rear were all shipped at an EC 252719 level. A history of engineering changes which affect this NOR variation is as follows:

EC 250455	Mod VI	Parent change which released rear preamps (Factory Only)
EC 252268	Mod VI	Picked up a number of ECR's and updated parent change EC 250455 (Factory Only)
EC 252719	Mod II, IV, V, VI	Released rear preamps for Mod II, IV, V, and updated parent change at EC 252268 level for Mod VI (Factory Only)
EC 252268V	Mod VI	Field change-updates Mod VI pages to EC 252268 level. Erroneously sent for all NOR drives, including those with preamps in the front.
EC 252268W	Mod VI	Field change-advises that EC 252268V was sent in error and should only be installed on Mod VI NOR drives with rear preamps.
EC 253500	Mod II, IV, V, VI	Released NORLAY drive and discontinued factory use on NOR pages. This level appears in EC history on some logic pages.
EC 253506	Mod II, IV, V, VI	Original process meter change. EC level appears on EC history on some logic pages even though change was obsolete.
EC 253517	Mod II, IV, V, VI	Process Meter change.

Some logic pages released for NOR drives with rear preamps have the designation 729 PA or 729 PATS at the top of the logic page. This indicates that the page is for a 729 NOR drive with rear Pre-Amps or rear Pre-Amps with Tape Switching.

The single write oscillator test cards cannot be used in 729 NOR drives with rear preamps. Variable frequency double card P/N 373305 must be used when writing "off line" using the built-in tester.

Some NOR engineering changes released on CEM's and service aids need to be modified when installed on NOR drives with rear preamps. Some changes are not applicable at all. A listing of CEM's or service aids released in 1963 and 1964 which fall into these categories are:

CEM's	
102	Not applicable
93	Not applicable
92	Not applicable
90	Not applicable

### Service Aids

281 Modification required as follows. (Do not install wires in Service Aid 281.)

Remove	Add
D09E-D13Q	D09E-D14P
D13Q-D14P	D13Q-C23D
D18H-D18R	D18H-D18R
D18R-D20B	D20B-D15P

276 Modification required--steps 1 and 5 do not apply to NOR tape drives with rear preamps. EC 252268 was factory installed on all rear preamp NOR's and picked up the improvements in EC 251452A (CEM 92) and 252528B (CEM 93).

273 Not applicable

259 Not applicable.

May 8, 64

### 292 (296) Clarify Logic Page Updating IBM 729, All Mod (US origin)

The following information will be helpful when updating logic pages in conjunction with process meter installations.

1. If a change is denoted by an "R" prefix (Example: R251440) in the history block of a logic page or drawing, it should be disregarded as a prerequisite for manual page replacement. The "R" prefix denotes a change to redraw a logic page (no machine logic affected).
2. Some NOR logic pages have the designation "PA" or "PATS" between the title of the logic page and the page location. This indicates a logic page for a NOR drive with Pre-Amps in the rear, or Pre-Amps in the rear with Tape Switching.
3. B/M 5325030 and 5325031 - Logic pages P/N 348397 and P/N 348596 (TU.95.00.1) were erroneously sent out with these B/M's. Disregard these pages. No replacement for logic page TU.95.00.1 is required on B/M 5325030 and B/M 5325031.
4. EC 253506 - Original process meter installation change which was obsolete. Disregard as prerequisite for logic page replacement.
5. EC 249230 - Factory change which released NOR drives. NOR logic pages and discontinued factory use of relay logic pages. (Refer to 729 Service Aid-117 (207). This EC level appears on both relay and NOR logic page histories and should be disregarded as a prerequisite for logic page replacement.
6. EC 253039 - Some logic pages for NOR drives were sent at EC 253039 level. EC 253039 is a factory and field change to correct stretching tape on a rewind-unload on NOR drives with optional EC 252528 installed. (Refer to CEM 729 Service Aid-256 (265). Logic pages at a 253039 level can be used if the wiring in Service Aid-256 (265) is installed.
7. EC 250455, 252268, and 252719 - Engineering Changes which affect only NOR drives with preamps in the rear. See 729 Service Aid-291 (295) for detailed description.
8. EC 253500 - This change released the NORLAY drive, NORLAY logic pages and also discontinued factory usage of NOR logic pages. This EC level appears on NOR logic page histories and should be disregarded as a prerequisite for logic page replacement.

May 22, 64

### 293 (298) Tape Contamination IBM 729, All Mod (US origin)

729 tape drives (new build and re-con) shipped from Poughkeepsie from approximately March 1, 1964 to May 1, 1964 are subject to a condition which can cause tape contamination. The contamination may be caused by fine metal filings which cling to the inner surfaces of the upper R/W head Mu metal shield, P/N 526024. Servicing in this area or normal load and unload operations can cause these metal particles to be knocked onto the head and tape area.

To eliminate this potential problem the upper head Mu metal shield should be removed and cleaned thoroughly with a rag and tape transport cleaner, P/N 517960.

Any replacement R/W head assemblies received during the period of March 1 to May 1, 1964 are also subject to this condition, and should be checked.

Time to check and correct this problem can be charged to Code 34, referencing this service aid.

May 22, 64

### 294 (299) 1. Insure Ready does not become Active during Rewind-Unload 2. Eliminate Ready Dropping IBM 729 BII to BVI (US origin)

1. Due to pick and drop times of the relays involved in a Rewind-Unload operation, it is possible to send a short, Select and Ready response back to TAU after sensing Load Point. If the program is in the process of determining which

tape units are ready, the Select and Ready response indicates the drive performing the Rewind-Unload is ready. When the drive is again addressed, it has completed the Unload sequence, is not ready, and a TAU hang-up occurs.

ECR 45-230 was generated to insure that "Ready" does not become active during a Rewind-Unload. This is accomplished by deconditioning the +A circuit at 4 B, logic page RA.30.40.1 with -5 Unload, thereby preventing Mechanical Ready from becoming active when tape reaches Load Point. Tape drives with a serial number prior to 12304 and 61141 do not have this ECR installed. If this condition is experienced, the following wiring can be installed:

Remove	Add
E16C-E16L	E16C-C13D
C17A-C17J	C13Q-C16K
	C16Q-E15B
	C17A-C19G

2. Vibration of the Operator's Panel can cause the Door Interlock switch to break contact and drop Ready. ECR 45-249 was released to correct this condition by adding a capacitor to the Door Interlock switch.

Tape drives with serial numbers prior to 12450 and 61218 do not have this ECR installed. If this condition is experienced, a 10ufd capacitor, P/N 526498, may be mounted on the Door Interlock switch. Wire the +terminal of the capacitor to the n/a points and the -terminal to the common.

ECR's 45-230 and 45-249 will be picked up on EC 253760, which will be a mandatory field change.

The time required to install this change may be coded 33. Make reference to this service aid.

Parts may be ordered on field requisition card, Code 6, COP Only.

May 22, 64

### 295 (301) Erase Head Check - Off Line IBM 729, All Mod

Using the off line tester, write all bits continuously in a Backward direction. Since the tape is going in a backward direction, the erase head will erase the bits that were just written. Read forward over the area that was written and scope the read bus for each bit. The erase head should erase all bits to less than 0.4 v.

June 6, 64

### 296 (308) Write Echo Errors IBM 729, BII to BVI (US origin)

Due to circuit loading trouble, write echo errors may be experienced when six or more Norlay tape drive units are connected on the same bus. Should you have this condition, install the following circuit change:

### Remove Wires

G11A - E13R  
G11D - G09B  
G11H - C19P  
G11G - G10F.

### Add Wires

E13R - G11H  
G09B - G11G  
C19P - G11A  
G10F - G11D.

This change is now being installed in the Plant under ECR 12-060. It will be released to the field under EC 254103.

The time required to install this change may be coded 33 and charged to EC 254103, referencing this service aid.

July 10, 64

## 297 (303) High Resistance Ground in Multiple Volt Power Supply IBM 729, BII to BV (US origin)

Reference: 729-B Parts Catalog (123-0405-0), Figure 29.

The heat sink (item 44) is mounted on a metal bracket and insulated from this bracket by nylon spacers on the left and by two pieces of channeled rubber on the right. This rubber is subject to electrical breakdown, causing a high resistance ground in the area of 1 to 0.5 meg. ohms.

The high resistance ground at the power supply will create a ground loop. A ground loop in one tape drive unit can cause highly intermittent noise trouble (R/W errors - False TI) on any unit on the same bus.

1. Checking for a ground loop on 729-B. Disconnect the green wire in the read head cable from ground. We should read 10 meg. ohms between the green wire and machine frame. Be sure that the I/O shoes and power cables are disconnected.
2. Correct insulation of power supply heat sink. Add several layers of electrical tape between the rubber insulators and the bracket.

The time required to check and correct the above condition should be charged to Code 34, with reference to this service aid.

June 19, 64

## 98 (314) Proloy Coil Assembly IBM 729, All Mod

When it becomes necessary to replace the proloy coil assembly (P/N 528524), the stop coil must be identified so that the proper number of shims may be applied. There is a 0.005-inch shim over the stop coil in addition to a 0.002 inch shim.

On assemblies with a molded plug, the coil marked with a black stripe is connected to plug pins 1 and 3. Used on a right proloy, this coil is a Right Stop; used on a left proloy, the marked coil is the Left Go.

Aug 11, 64

## 299 (305) A. False Load Point Indications IBM 729 B. Failing to Stop at Load Point All Mod

The voltage across the LP and TI lamps should be adjusted to obtain reliable operation and should fall in the range of 5.0 to 6.5 volts. Although there is a variety of settings for the three types of 729's given in CE Reference Manuals and prior CEM Service Aids, reliable operation on all types should be obtained when the lamp voltage is adjusted for  $5.7 \pm 0.2$  volts (with tape in columns). Symptoms resulting from sensing false load points range from stopping too soon on a load or rewind to missing or duplicate records. See 729 SA-268 (279).

If false load point indications are experienced with a TI-LP lamp setting of  $5.7 \pm 0.2$  volts, the following areas should be investigated:

1. Check that photocell apertures are aligned parallel to tape edges and that excessive overlap between the TI and LP light patterns does not exist. Excessive overlap can be corrected by carefully forming the LP-TI lamp common strap, rotating the lamp on the new style assembly, or replacement of the lamp assembly.
2. Insure the voltage drop across the individual LP and TI lamps does not differ by more than 10 per cent.

3. A new photocell block, which has smaller diameter apertures to reduce the effects of stray light, is being used on new production machines. This block, P/N 528193, is available in COP Only. Early NORLAY drives do not have the new style block.
4. NORLAY - False load points, especially on the load sequence following a high speed rewind, can be corrected on the NORLAY by replacing the 10 ufd capacitor (P/N 491316) in the Photo Amplifier YAW Card at 1D20 with a 5 ufd capacitor, P/N 483239.

3. If a drive fails to recognize load point, the following areas should be investigated:

1. Lamp voltage.
2. Photocell alignment and proper light patterns.
3. Insure the voltage drop across the individual LP and TI lamps does not differ by more than 10 per cent.
4. NOR - Slow response of the LP Photo Amplifier (YAW Card) may cause a failure to sense load point on a sequence, such as reading a record from load point and then immediately re-winding. The response can be made faster by replacing the 10 ufd capacitor (P/N 491316) in the Photo Amplifier YAW Card with a 5 ufd capacitor, P/N 483239. Location of this card is 3E05.

Capacitors and photocell blocks may be ordered on Field Requisition Card, Code 6, COP Only.

June 19, 64

## 300 (306) Removal and Replacement of Pneumatic Door Cylinder IBM 729, B II to VI

With the sliding panel in its uppermost position, remove the upper cylinder holding nut. Unscrew the cylinder from the stud on the bottom of the door, leaving the stud in place.

To install a new cylinder, screw it onto the stud in the bottom of the door and reinstall the upper holding nut.

Parts at the top and bottom of each unit are partially blocked by movable covers. Loosen the cover holding screw and move the cover to change the damping action. Close both lower parts equally if the window slams when being lowered; open both upper parts equally if window action is too sluggish when raised.

**SAFETY** When receiving a new cylinder, the spring latch must be held firmly while removing the shipping tape or wire from around the cylinder, and the cylinder must be allowed to expand slowly against hand pressure to its full extended position. If this is not done, the piston, which is under strong spring pressure, may break through its retainer, causing a hazardous condition.

The cylinder must not be taken apart for any reason, as the spring may be loose and fly violently from its case. If any malfunction occurs, replace the cylinder assembly with a new one.

Refer to NORLAY Parts Catalog No. 123-0405-0 for door hardware part numbers.

July 3, 64

## 301 (309) Tape Losing Proximity with the Read/Write Head IBM 729, All Mod (US origin)

One cause of the tape leaving the R/W head during the starting motion can be contributed to the proloy pulley.

The combination of very smooth tape and a glazed pulley surface will cause the two to adhere. This is the same condition as if two pieces of glass were placed surface to surface. When the tape starts to move, it tends to follow the idler in a circular direction. This action causes a wave in the tape which is transmitted to the head.

The above problem usually results in high write error counts, temporary read errors (drop out) and noise records (failure to erase). The loss of signal is more prevalent on the "1" bit track.

To observe this condition, set up the scope, drive, and tester for checking start-stop time. Go forward with a full loop of tape in the left column and a long go down time (Count Five). If the trouble is present, you will observe a dip in the envelope of 7-9 ms after go. This dip is more severe on the "1" bit track.

The only correction to this problem at present is replacement of both nylon pulleys. A pulley constructed of a new material is now being tested. If satis-

factory results are obtained, an engineering change will be made.

In analyzing this problem, it must be remembered that there are other causes for collapsing of the start envelope. They are:

1. R/W head wrap angle adjustment
2. Split guide tension
3. Prolay adjustment.

Aug 7, 64

**302 (310) Backspace Test Procedure IBM 729, Ail Mod**

The following procedure has proven useful in detecting an intermittent failure to complete a backspace operation.

1. Select a tape which is in very good condition and not likely to cause write checks.
2. Program a Skip, Write Tape Mark, Backspace operation for the entire reel. This will leave the tape erased.
3. Issue Backspace command.
4. If tape stops before loadpoint, read forward to verify a tape mark was read.
5. A tape mark indicates failure to backspace.
6. If a Tape Mark is not found in step 4, it is likely that tape drive electrical noise or noise from the tape caused the stop.

Aug 7, 64

**303 (311) Vacuum Switch Filter IBM 729 II to VI  
A II to VI  
(US origin)**

CEMs 729 EC-142 (99) (Relay) and 144 (101) (Nor) announced a new RC filter network for the vacuum switches. This new assembly, P/N 362122, uses a 5 Mfd capacitor with a 250-volt rating and a 30-ohm, 1/2-watt resistor.

A few reports of the 30-ohm 1/2-watt resistor burning open in this new assembly have been received. It is suggested that if this condition is encountered, the 1/2-watt resistors be replaced with one (1) watt 30-ohm resistors, using the same capacitor.

A new assembly, P/N 5331854 with a 250-volt capacitor and 1-watt 30-ohm resistor has been released. All B/M's 5324381, CEM-144 (101), which have not been shipped as of approximately July, 1964 will have the new assembly P/N 5331854 substituted for P/N 362122. B/M's 5324303, see CEM 729 EC-142 (99), are considered 100% shipped, and will not be changed.

The time required to change the resistor may be coded 32. Make reference to this 729 SA number.

P/N 5331854 may be ordered on Field Requisition Card, COP Only.

revised Nov 13, 64 (Aug 7, 64)

**304 (313) Intermix of Metered and Non-Metered Tape Drive Units IBM 729  
All Mod**

Should the condition arise where non-metered (customer owned) units are used on the same I/O bus with metered units, the meters will not function correctly.

To allow the meters to operate correctly, a change must be made to the non-metered units. Two jumpers must be added, as follows:

T/C 48 A shoe to T/C 48 B shoe  
T/C 49 A shoe to T/C 49 B shoe.

If tape switching is installed on the non-metered unit, the second set of shoe connectors must also be modified.

Aug 11, 64

**305 (-) Installation of B/M 8023445 and IBM 729 NOR  
B/M 8026561**

This CEM supersedes the Advance CEM with the same title, dated August 11, 64.

Troubles are encountered after installation of B/M 8023445 JT 84735 and B/M 8026561 JT 85180V, mainly when the tape is loaded after a high speed rewind. Any of the following can happen:

1. Tape is damaged by the coming out of the capstans.
2. Tape is dumped in both columns.
3. Head falls down with only about 3 cm tape length in left column and there is no more action.
4. Head falls down and comes up again, ready status goes off.
5. Tape is damaged by the head which reaches its down position before reels have stopped.

To avoid # 3, a Field B/M 8026801 JT 85593 has been released, changing the brake conditions. (This Field B/M will be shipped automatically)

B/M's 8023445, 8026561 and 8026801 should be installed concurrently. Troubles # 1, 2 and 4 are eliminated by making the following adjustments.

**1. Right brake (P1)**

Must be adjusted at about 600 grs ± 200 grs. If the small amount of tape after H.S. rewind is not correct, it will be adjusted by shifting the lamps lighting the photo cell. Recheck the spot concentration.

NOTE: A too important right brake adjustment (1 kg and over) will cause troubles # 3 and 4.

**2. Partial left brake (P2)**

After JT 85180V, the partial left brake was adjusted for minimum drag, to avoid stretching the tape. In fact you must adjust it so that at the end of the H.S. rewind the tape is slightly tight to be flush with the nylon pulleys. Avoid a loop above the left column. (To check it, disconnect the Head take up motor during the H.S. rewind). Then, check by depressing the tape with one finger, in front of the split guides; light depression should turn the left reel.

Trouble # 5 is eliminated by replacing the mercury switch P/N 8020329 with an old style P/N 159821.

Check that all machines with JT 84735 are equipped with the mercury switch bulb # 159821 (which can easily be recognized at their straight electrodes).

Nov 25, 64

**306 (-) 729 B II to VI (French origin)**

This CEM supersedes the Advance CEM with the same title, dated Sept 2, 64.

**1. TAPE DUMPING (ECR 90028)**

To avoid tape dumping during loading after a HS Rewind, potentiometer R23 (P/N 8018018) and diode SR 17 (P/N 315902) have been added.

This potentiometer must be adjusted so that at the end of the HS rewind, the tape is slightly to be flush with the nylon pulleys. Avoid a loop above the column. (To check it, disconnect the head bake up motor during the HS Rewind). Then, check by depressing the tape with one finger, in front of the slit guides; a light depression should turn the left reel.

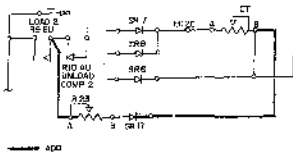
**2. FALSE LOAD POINT INDICATIONS (ECR 90029)**

Are particularly encountered on the load sequence following a HS Rewind. This failure has been eliminated by shorting R2 AU N/C contact (Logic RA 40-15-1) so that the TI and LP lamps light only when the head is in down position.

NOTE: Some Tape Drives between S/N 5357 and 5373 have been manufactured without these changes. Refer to machine history.

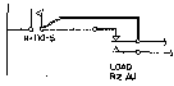
In order to standardize all the machines, apply the following modifications.

RA 40-45-1



Location of R23 - Hole CP12 on the CP panel  
Location of SR17 - above SR15.

RA 40-15-1



ADD  
REMOVE

Refer to the machine history: ECR 90028, ECR 90029.

RA-10-50-0  
Direct RA-40-15-1  
RA-40-45-1 accordingly  
Relay # 10

The Tape Drives, between S/N 5357 and 5403, have been erroneously shipped with a 4 positions relay P/N 128843 instead of a 2 positions relay P/N 11135.

The machines above mentioned connect the A lower wires to the A upper wires according to WD RA-40-45-1-B-6.

Nov 25, 64

7 (316) Excessive Read/Write Errors or TAU Hang-Up

IBM 729 (All Mod.)

Excessive R/W errors or TAU hang-ups may be caused by the tape sticking to the stop capstan.

The problem can be related to an accumulation of a tacky substance on the stop capstan, primarily the forward stop capstan. This substance may be visually observed as being shiny and clear or may contain a considerable quantity of debris. In either case, it is of a tacky or sticky nature.

Read/write errors will be caused by the failure of the tape to get up to proper speed. This may be observed on the scope as a severe breakup of the start envelope. The TAU hang-up will occur when writing short records. The tape fails to move. The TAU is hung waiting for first bit because nothing is read.

If a sticking condition is suspected, a quick check may be made in the following manner:

With tape loaded and suspected of being stuck, open the door. Open the vacuum column doors and hit Unload. If the tape is stuck, the head will rise, picking the tape up with the stop capstan.

A very close examination must be made before the conclusion is reached that the tape is sticking to the stop capstans is being experienced.

Aug 8, 64

8 (318) 1200-Foot Master Skew and Preamp Calibration Tapes

IBM 729 (All Mod.)

1200-foot Master Skew tapes and a 1200-foot Preamp Calibration tape have been added to facilitate skew and preamp adjustments. 600-foot master tapes will no longer be available. Part numbers are:

1200' Tape	Description	600' Tape - obsolete
432154	Master Skew - 556 CPI	461096
432153	Master Skew - 800 CPI	461197
432152	Preamp Calibration	461108

To preserve the accuracy of Master Skew tapes, care should be taken not to High Speed Rewind them. Repeated High Speed Rewinds can cause skew to vary and also increases the possibility of damage to the tape.

The preamp circuitry of the 729 II and IV was not designed to handle an 800 CPI data rate. Therefore, 800 CPI master skew tapes should not be used on 729 II and IV drives. Uniform circuit responses may or may not result when an 800 CPI tape is read on these models.

Sept 18, 64

309 (319) Partial Brake Adjustment

IBM 729 A II to AVI  
B II to BVI

Three conditions must be met when adjusting Partial Brakes.

1. The proper amount of tape remaining on the machine reel at the end of the H.S. portion of rewind (1/4 to 1/2 inch).
2. The left reel does not backlash leaving a 1/4 inch of tape across the H.S. Rewind idlers.
3. Tape is not taut enough across the H.S. Rewind idlers to cause stretching when the head is lowered.

The following procedure can be used to adjust the left and right partial brakes on NOR and NORLAY type 729's.

- a. Position the H.S. Rewind motor plug so the bottom of the plug just covers the photo cell port.
- b. Set both left and right partial brakes to minimum brake (maximum resistance).
- c. Pull the head up motor plug. High-Speed rewind a full 2400 foot reel of tape. Increase the right partial brake for 1/4 to 1/2 inch of tape on the machine reel at the end of H.S. rewind.
- d. With the head tape up motor still crimped, High-Speed rewind a 2400 foot reel of tape and increase left partial brake until tape stops without both the left reel backlashing.

revised Sept 18, 65 (Sept 3, 65)

310 (320) Flapper Valve, Eddy Current Switch and Tape-in-Column Switch Adjustment

IBM 729 A II to AVI

729 NOR

A. A different adjustment of the flapper valves is required for 729's at JT 85593B. The reason for the change of adjustment is to improve loading of the drive. The flapper valves are adjusted wide open in the following manner:

1. The inside screw on both flapper valves is adjusted so that the screw point projects one or two threads.

Facing the front of the drive, the inside screw is the left-hand screw on the right flapper valve and the right-hand screw on the left flapper valve. See Vacuum Manifold Assembly in CE Reference Manual.

2. The outside screw on both flapper valves is adjusted by turning them all the way down.

B. A "reels stopped" condition after high speed rewind is indicated by the mercury switch contacts on the eddy current device. It is important that the tape reels stop completely before tape begins to load. To allow a later transfer of the switch, the clearance between the stator and the magnets should be adjusted for a 0.005" to 0.010" gap. An IBM card may be used for adjustment. Do not allow any of the magnets to touch the stator during normal operation.

729 NOR and NORLAY

Vacuum and TIC switches adjustment.

Loading Check

When the tape is being loaded, the reel control switches must transfer before the TIC switches. This can be checked as follows. Be very careful of hands when performing this test.

- a) Disconnect the tape take-up motor.
- b) Depress load - rewind.
- c) After the head comes down, lower tape manually into the right column. Now lower tape into the left column carefully. If the switches transfer in the normal sequence, the tape will go in and rewind normally. If not, the left reel will get an up-clutch or capstans will pop out. This means the left TIC switch transferred too soon.

March 10, 65

311 (321) Read/Write Head Cover

IBM 729 II to VI  
IBM 729 A II to AVI  
IBM 729 B II to BVI  
(US origin)

**SAFETY**

Hand injury may be caused by sharp edges and corners on the upper read/write head cover, P/N 528560. This condition should be corrected by rounding the edges and corners with a fine file. The filed surface must be

~~Covered with a clear acrylic coating (purchased locally) to prevent oxidation.  
The time required to make this change is approximately 15 minutes.  
service aid.~~

~~cancelled - May 27, 66~~ Make reference to this  
Oct 2, 64

### 312 (322) Power Cable Connector IBM 729 (All Mod.)

When a tape drive is taken off line, it is necessary to couple the power cables. The cable from the channel (TAU) to the first unit may not have a latch lever. The parts to install this latch are available. Order P/N 351010 and 351012, on Field Requisition Card Code 6, COP Only.

Oct 30, 64

### 313 (323) Replacement of Reel Drive Clutch, P/N 5344998 IBM 729 B II to BVI (US origin)

There have been three different types of Reel Drive Clutches used on the 729 NORLAY tape drive. (Reference: Parts Catalog Form No. 123-0405, List 24, Item 6.)

Type 1: Silver body--coil resistance of 114 ohms  
Type 2: Black body with yellow leads--coil resistance of 46 ohms  
Type 3: Black body with white leads--coil resistance of 78 ohms

Type 1 and 2 clutch assemblies have been discontinued and are not available for field replacement. Since the two clutches used in each drive are wired in series, they must be of the same type. If it is necessary to replace a Type 1 or 2 clutch assembly, both sides must be replaced using Type 3. All three types have the same part number.

Oct 30, 64

### 314 (324) Excessive Read and Write Errors IBM 729 B II to BVI (US origin)

An improperly routed voltage wire on NORLAY drives can cause "8" bits to be picked up, resulting in excessive read and write errors. This condition is a result of noise induced by a +6-volt jumper routed near the input of the 8-bit preamp.

This problem should be corrected by removing the orange, +6-volt jumper from TB 3-4 to D23L and substituting an 18-inch jumper rerouted as follows:

TB 3-4 via G23B via F27R via D27B via D23A to D23L.

This condition can exist and should be corrected on all NORLAY drives with serial number prior to 13,475 and 61,857.

Time required to change the +6-volt jumper may be coded 33.

Nov 13, 64

### 315 (325) General Service Hints IBM 729 (All Mod.)

#### 1. Column Door Repair

The piano hinge is attached to the door by pins. After much usage, the pins may become loose and cause the door to fit improperly. It is suggested that when these pins become loose, they can be removed by squeezing with diagonal pliers and turning counterclockwise. Replace the pin with a self-tapping screw of the proper size or a 3-48 x 3/16 screw (P/N 366).

#### 2. Magnetic Clutch Powder Leakage

When the coil assembly is installed in the clutch housing, it is sealed in with glyptol. Should this seal become broken, the powder can leak past the coil and out the air vents in the clutch housing. Reseal with glyptol or replace housing.

#### 3. Reel Drive Belts

When it is necessary to replace a reel drive belt (RELAY-NOR type), the cable to the clutch brushes and capstan motor switches must be disconnected. When the cable is reconnected, it could be routed through the

center of both belts, using the existing cable clamps. This will eliminate disconnecting the cable on the next belt replacement.

#### 4. Stop Capstan

Whenever it is necessary to replace a stop capstan of the new type, see CEM 729 SA-208 (213), replace only the rubber housing, P/N 352488.

When adjusting the stop capstans, they should be rotated clockwise for left and counterclockwise for right. Rotation in these directions should cause the gap to decrease.

#### 5. Read/Write Head Mu Metal Shield - Lower

If this shield is malformed, it may contact the tape break lamp connector and cause a ground. If it contacts the right prolay cover, vibration from the prolay could generate noise in the read head or cause mechanical skew to change.

#### 6. Split Ceramic Guides

a. The rear ceramic portion of this guide may be replaced in the field. Use P/N 528355. DO NOT replace the front ceramic or the complete guide assembly. DO NOT, under any circumstances, disturb the adjustment of the guide mounting stud. If this stud becomes loose (glyptol nut), the head assembly must be replaced.

b. Many times the rear ceramic guide is found loose. That is, it can be rotated. This condition can cause up to 1 microsecond of changing mechanical skew. This looseness can be corrected by tightening the blue steel clip. However, we suggest the guide be replaced. Use P/N 528355.

#### 7. Magnetic Clutch Assembly Rotor (For US origin only)

Early vintage rotors had a radial groove cut in the outboard side. This groove was just under the felt seal and was found to cause damage to the seal. New build rotors do not have this groove. Some rotors were reworked by filling the groove with epoxy. This also caused damage to the seal by the roughness of the epoxy.

We suggest that all grooved rotors be replaced during the next rebuild.

#### 8. Failure of the Read/Write Head to Raise on Unload

This problem may be caused by the jackshaft worn gear bottoming in the sector gear. This can be corrected by installing two parallel 0.002-inch strips of brass shim stock between the jackshaft housing and the front casting. The idea is to shim the worn gear away from the sector gear. Obtain shim stock locally.

#### 9. Relay Interference - RELAY Type 729

The cable running to the Neon panel may be loose and allowed to rest on top of the wire contact relays when the door is closed. When the door is opened, the cable can pull a wire out of the relay. This usually happens in the area of R104. We suggest the cable be tied up or clamped to prevent its contact with the relays.

#### 10. Eddy Current Switch Rotor

If this rotor is found loose, be sure the set screws are tightened on the flat of the shaft.

#### 11. High Speed Rewind Idlers

When it is necessary to replace this idler, the complete assembly should be ordered. Use P/N 528350. The complete assembly is shimmed and adjusted for alignment to the columns, transport, and reel. If component parts are replaced, we can not be sure of proper alignment.

Dec 11, 64

### 316 (326) P/N 528510 Prolay Armature IBM 729 (All Mod.)

A different method of manufacturing prolay armatures has been employed since approximately September, 1964. Although there is no dimensional change, it is difficult to see the bevel because it is ground in the same direction as the rest of the prolay armature.

Since it is essential that the armature bevels line up with the neutral pole pieces for proper prolay operation, the following methods can be used to determine the location of the bevels:

1. Place a straightedge lengthwise on the flat surface of the

armature, hold up to a light, and mark location of bevel with marking pen.

- Place a piece of crocus cloth on a smooth, hard surface and rub flat surface of armature perpendicular to direction of grind. The bevel will then be apparent and permanently identified.

Dec 11, 64

## 7 (327) Improve Asymmetry Adjustments IBM 729 (All Mod.)

The 729 Mod 5 and 6 drives have tracks which cannot be adjusted to within 15 microseconds of asymmetry. Asymmetry cannot be adjusted on these tracks because the write current balance pots on the YEU- and AUS-cards reach maximum resistance before 0 to 0.25 microseconds of asymmetry can be obtained. This balance is brought about by a combination of:

- Write head characteristics
- Influence of the erase head on the write coils
- Characteristics of write triggers and/or drivers.

In some instances, write trigger or driver card selection will allow proper asymmetry to be reached. In other cases, it has been necessary to replace the read/write head assembly.

In drives where asymmetry cannot be adjusted properly, this condition can be corrected by shorting out the fixed 100-ohm resistor on the YEU- or AUS-Write Current Balance Cards. This can be accomplished by adding the following back lead jumpers.

RELAY	NOR	NORLAY
E09E - E09K	K24E - K24K	B01E - B01K
E09G - E09L	K24F - K24J	B01F - B01J
E09H - E09M	K24G - K24L	B01G - B01L
E10E - E10K	K24H - K24M	B01H - B01M
E10G - E10L	K26E - K26K	B02E - B02K
E10H - E10M	K26F - K26J	B02G - B02L
E11E - E11K	K26G - K26L	B02H - B02M

The heads should be checked for proper polarity and adjustment before adding the jumpers and adjusting asymmetry. Because of the influence of the erase head on the write coils, asymmetry should be checked any time an erase head is added, replaced, or readjusted.

Field engineering change adding these jumpers will not be released. They may be added on an "as required" basis. Logic pages should be updated to show the jumpers when they are installed. New production tracks by JT 86407.

Dec 11, 64

## (328) Quick Mount Tape Reel Latch IBM 729 (All Mod.)

The following assembly and adjustment procedures are to assist you in servicing the device. Additional diagrams, with reference to part numbers, can be found in the NORLAY Parts Catalog and CE Instruction Maintenance Manual. All parts catalogs and manuals will be updated in future editions.

### INSTALLATION PROCEDURE

Open front door or window and remove power from machine.

Remove the following parts from reel hubs:

- 528329 Knob
- 517730 Bearing
- 530914 Cover
- 530913 Rubber Ring

Place narrow split-ring 5344962 on reel with tapered side facing away from flange; push ring snug against hub flange.

Compress large split-ring 5344960 and slip solid retainer ring 5344961 over until it falls into groove. Allow split-ring to return to its normal state. Place split-ring 5344960 and retainer 5344961 assembly on reel hub, with chamfer side of ring periphery facing away from flange, snug tapers of both rings. Split-ring 5344960 must fit snugly on machine hub.

Position pivot shaft 90 degrees from face of handle 5331873. Place heavy thrust washer 5344955 over pivot shaft (Round-Off rim side toward handle cam surface). Place three Belleville washers 5344957 over shaft as follows: ID of first against heavy thrust washer 5344955, OD of the second against OD of the first and the ID of the third against ID of the second. See reference assembly drawing 5331875.

Visually center light thrust washer 5344956 on OD of the third Belleville. Place three shims 602074 over pivot shaft threads.

NOTE: The B/M contains 12 shims P/N 602074 and 8 shims P/N 1090887.

This quantity is supplied for adjustment purposes. For fine adjustment use 1090887.

- Place cavity of cover 5344951 over handle while taking care to guide light thrust washer 5344956 and Bellevilles into cover counterbore.
- While holding handle, cover assembly and reel hub, guide pivot shaft thread into the tapped hole of reel hub shaft. Turn reel hub counterclockwise until cover approaches split-ring. Open handle and proceed to tighten.

### ADJUSTMENT PROCEDURE

- Use Gage No. 467453.

- Place gage over split ring of assembly and locate against flange of reel hub. Notches on gage should be facing front.
- Compress gage handle to snug gage against split ring diameter.
- Open and close latch and adjust according to the position of the Go-No Go Notches as further described.

CAUTION: With latch open, be sure cover 5344951 is completely returned to open state.

NOTE: As a guide in the following pictorial gage conditions

a. The upper leaf of gage is shaded with the lower leaf being unshaded.

b. Reference made to single straight edge of upper leaf (shaded) as "A"



c. Reference made to the two edges of the lower leaf (unshaded) as "B"



- The following chart shows action necessary for various gage readings.

#### LATCH OPEN

#### LATCH CLOSED

1.



Gap Showing

Gap Between "A" and "B"  
Too Great



Gap Showing

Edge "A" Not in Line  
With "C"

ACTION: Remove Shim(s)

2.



Overlap

Edge "A" Overlaps "B"



Large Overlap

Edge "A" Overlaps "C"  
Excessive

ACTION: Add Shim(s)

3.



Edge "A" in Line  
With "B" With Slight Gap  
Permissible Providing



Edge "A" in Line  
With "C" or With Overlap

ACTION: None Required--Correct Adjustment

### C. Final Assembly

After completing all adjustments and test procedure, remove cover and handle assembly from reel hub. Place nylon pellet P/N 5344963 into pivot shaft thread cavity. Re-assemble according to Installation Procedure Item 9.

revised Dec 19, 66 (Jan 8, 65)





**CAUTION:** Removal of Reel Latch Device, assembled with pellet on reel hub, requires a new pellet before re-assembling.

**LUBRICATION**

- A. Lubricate the latch handle P/N 5331873 cam surface at contact points to the heavy thrust washer P/N 5344955. Use molykote lubricant P/N 5331870. Each cam surface is to receive an amount equal to a small droplet, such as would be deposited from the small end of a toothpick.
- B. Do not lubricate any other part.

**TEST PROCEDURE**

**CAUTION:** Latch handle must be closed when window is closed.

Mount several tape reels to check the following:

- Must accept all tape reels within standard specification.
- Firmly hold reel.

Jan 8, 65

**319 (-) New Style Autotransformer IBM 729 All Mod  
P/N 8023393 (French origin)**

Since approximately August 1965, Tape Drives will be equipped with new style autotransformer P/N 8026393 instead of P/N 8011133.

- A. For these drives a voltage change requires.
  - 1. B/M 2086553 to change from 220V to 408, 380, 235 or 195V.
  - 2. B/M 2085652 to change from 408, 380, 235 or 195V to 220V.
- B. Old style autotransformer P/N 8011133 will be obsolete.

To install the new style P/N 8026393 order B/M's:

2085650	Autotransformer
JT 86720 2086553	Cables
2085652	Jumpers (for 220V only)

revised Feb 24, 67 (May 12, 65)

**320 (330) Fall to H. S. Rewind IBM 729 All Mod**

Clear plastic file reels allow light from an external source to illuminate the H.S. REW photo cell, as a result, the Tape Drive will low speed rewind in a high speed area. The trouble can be corrected by loosening the photo cell holding clamp and sliding the photo cell farther into the housing. Keep the slot in the photo cell aligned parallel with the front of the Drive.

March 5, 65

**321 (331) General Service Hints IBM 729  
(All to AVI - BII to BVI)**

**1. Write TM on Skew Tape**

When skew is being checked, using the tape control unit, it is advantageous to have a TM at the end of the reel to allow the tape to be stopped. The TM may be written from TAU after reading the tape to the end of the reel, by inserting a file protect ring or by manually picking up the file protect relay.

**2. Use TD tester with NOR Drives**

The Relay Drive Tester or Universal Tester may be used to check NOR Drives. The pre-amps can be adjusted more accurately because they are observed at the Read Buss.

**3. NOR Ground System (Rear Pre-amps) - (US origin only)**

The circuit between electrical and frame ground on the NOR Drive with rear pre-amps is similar to the NORLAY. It goes from J10J to K06R, paddle connector to read head cable outer shield. The green lead from the other end of the read head cable shield is fastened to the frame ground adjacent to the read head connector. With this wire disconnected the resistance between logic panel ground pins and frame ground should be at least 5 meg ohms.

March 5, 65

**322 (332) Prevent Tape Twisting in Columns IBM 729 BII to  
on Load and Keep Ready down if BVI (US origin)  
Tape Dumps**

**NOTE:** For machines of French origin a similar change is under Field Test and will be shipped automatically.

Without this change, the reel brakes are partial left and full right with the drive unloaded. When the operator is winding the tape on to the machine reel, the left reel has a tendency to coast as the reel release button is released. This will form a loose loop of tape across the transport.

At present, no partial brake is applied to the left reel until loading starts at the high speed rewind end. This condition will allow a backlash and form a loose loop of tape.

In both of the above cases a loose loop during the load operation can cause tape twisting upon entering the columns.

If the tape dips below the TIC ports ready will drop. If the tape recovers, ready will come back up. This condition can result in partial records being left on tape.

Starting with machines serial 00-13688 and 61865 ECR 12-125 (EC254098) has been installed to correct the above conditions. A mandatory field change will be released in the near future. In the meantime, if you are experiencing trouble, the following change may be installed. It is identical to the field B/M 5325449 soon to be released.

1. Relocate the wire on R4BUOP, which comes from tape in right column. Switch B-OP and place it on R10AUOP. Use splice 216230 and extend to reach. Attach clip 186967.
2. Relocate the wire on R10AU N/C, which comes from RIAL N/C and place it on R10AU N/O.
3. The following wires are to be relocated in the relay gate. This requires cutting off existing clip, pulling back in cable, and attaching new taper pin at new termination point.
  - a) The wire in SR6A from left tape in column switch-B N/O to be placed in EC 2g. Attach 187243 plug.
  - b) The wire in SR5A from right tape in column switch-B N/O to be placed in EC 2F. Attach 187243 plug.
  - c) The wire on RIAL N/O from R110-2 N/O to be placed on R7BL N/O. Attach 186967.
4. Make these additional deletes and adds:

DELETE		ADD	
SR2A	to	RIAL N/C	to EC 2g
SR6B	to	EC 2d	to EC 2d
SR5B	to	EC 2f	to R10BUOP
SR5B	to	SR2B	to R8ALOP
SR8A	to	SR2A	to R7BLOP
SR8B	to	SR7B	
R7BLOP	to	R6ALOP	
R7BLOP	to	R8ALOP	

parts required for this section (4) are:

Taper Pin	187243	-	(3)
Spade Clip	186967	-	(7)

All added wiring to be PT. #347102 #22 yellow stranded.

The selenium rectifiers no longer used are to remain in machine.

You may have installed the loading portion of the above change by pre-release instructions from the Field Engineering Department, Poughkeepsie Plant. These wiring instructions, while gaining the same results, were different than the formal change. In order to correct this wiring to match the formal logic, the following wiring changes may be made. This is for the loading portion only.

DELETE		ADD	
R6B	to	EC 2d	
IAL N/C	to	SR6A	RIAL N/C to EC 2g
Left TIC sw B N/O	to	SR6A	Left TIC sw B N/C to EC 2g
Right TIC sw B N/O	to	SR5A	Right TIC sw B N/C to EC 2f
R5A	to	EC 2f	
R5B	to	SR2B	
R8A	to	SR2A	
R8B	to	SR 7B	
		EC 2g	to EC 2d

The following wiring will add the keep ready down change to the above.

7BL op	to	R6AL op	R6AL op	to	R8AL op
7BL op	to	R8AL op	RIAL N/O	to	R7BL op

After this change is installed, it may be necessary to readjust the left partial brake. Adjust as per CEM 7295A-309(319).

If your machine has special feature B/M 572355 (Tape Selection) installed, special Feature EC 299171 must be installed concurrently.

revised Feb 24, 67 (May 12, 65)

### 3 (333) Protay Pulley P/N 526253 IBM 729 All Mod

Since approximately February, 1965, the Protay Pulley, P/N 526253, has been manufactured of a new material. This material is a fibrite impregnated with teflon. The reason for this change in material is to correct the problem outlined CEM 7295A-301(309). There will be no field engineering change made to replace those nylon pulleys now in use. Order new pulleys as required.

There are some differences in handling these new pulleys:

The start time is slightly improved. However, this is not the intent for changing.

The new pulley is subject to chipping, if dropped.

If the new pulley is burned by maladjustment, it will bubble and could damage the drive capstan.

March 19, 65

### 4 (334) AC Raceway Motor Plugs IBM 729 All Mod (US origin)

Drives installed since November 1, 1964 may have defective plugs and sockets in the AC Raceway. Drives shipped after February 22, 1965 have been corrected.

The molded plugs with ASI marked on the side have prongs that are too long. Long prongs push too far into the connector in the socket and break the supporting plastic piece.

The connector in the socket may be broken loose. In this case, the connector may fall down or be pushed down by the plug causing it to short against the raceway covers when the plug is reinserted.

The following corrective action must be taken.

Remove power from the Drive

Check the prongs of each molded plug for a maximum length of 13/32

inches. If they are too long, cut them off at 13/32 inches. Taper the end and remove rough edges with a file.

3. Check the socket (P/N 204283). Insert and remove the plug several times. With the plug removed, visually check the 4 connectors in each socket to make certain none are pushed in. The AC Raceway Cover may be removed to verify that the connector is broken. If any are broken, replace the socket (P/N 204283).

New parts should also be checked for this condition prior to installing them in the tape drive.

NOTE: Some 729's A or B of French origin with the new Raceway P/N 8020303 may have the same fault.

revised July 29, 65 (March 29, 65)

### 325 (335) Duo Relay Wiring IBM 729 All to A VI (US origin)

Some NOR 729 tape drives in the field have the A and B side wiring of the duo relays reversed from the standard. This includes the point wiring as well as the coil.

No engineering change will be released to correct this condition. However, this condition does affect the installation of CEM 144(101). This is covered in Domestic B/M Correction Letter No. 11.

April 16, 65

### 326 (336) False Tape Indicate with Tape Switching IBM 729 BII to BVI

To correct this problem, it is necessary to switch the shield for the "Turn on TI" line. The turn on TI shield wire is now taped back in the cable at the switching relays. The following wiring change may be made.

Plug shield wire (now taped back) into R13-11 op  
Jumper R13-11 op to R14-11 op  
Wire from R13-11 N/O to TC AA2  
Jumper T/C AA2 to T/C AB2  
Wire from R14-11 N/O to TC BA2  
Jumper TC BA2 to TC BB2

If R13-11 and R14-11 points are already in use, any unused points may be wired.

April 16, 65

### 327 (337) Tape Dump in Columns IBM 729 All to AVI

Due to vibration, the varistors (P/N 317572) which parallel the clutch coils (TU 15. 00. 0) can short out to the .5 ufd capacitor terminals adjacent to the ones on which they are mounted. These varistors are illustrated in Figure 20, Reference 37 of 729 Parts Catalog, Form # 123-0393-2 and Figure 20, Reference A10, Form 10706 561-2 for Tape Drives of French origin.

This results in improper clutch response causing tape to intermittently dump in columns and/or the drive to drop ready. Shorting or arcing of the varistors can be eliminated by positioning or using plastic insulating tape on the under side.

May 14, 1965

### 328 (-) Manual Loading Improvement IBM 729 All to AVI (French origin)

On the machines with JT 85593B (head down first) the operators should be recommended to slightly stretch the tape in manual loading.

In order to facilitate this operation, the following wire change is advised.

As a result of this feature, a light left partial brake is still applied when the reel release push button is depressed.

Wiring change :  
Add D21R to G20D  
Alter manually the wiring Diagram # TU 09. 45. 1.

May 14, 65

### 329 (-) SMS Card Type RP P/N 371749 IBM 729 All Models (French origin)

This Service Aids CEM supersedes SA CEM 263 (-).

Highly intermittent and often difficult to trace failures can be experienced with some of the subjects SMS cards fitted on 729's.

The trouble is an intermittent short between the ground winding and the delay winding itself, which is not detectable with an ohmmeter.

These cards generally exhibit these fault symptoms:

- Failure to write on one track
- Write frequency doubling
- Write pulse distortion

The fault can usually be seen with the Unit attached to the Tape Tester off line, while writing in Low Density and scoping the Read Busses.

SMS Cards manufactured since October 1965 are equipped with improved insulation components.

revised May 27, 66 (Sept 7, 65)

### 330 (300) Aluminum Hub Tape Reel IBM 729 All Models

**SAFETY** During the first quarter of 1964, the Supplies Division began shipment of a newly designed tape reel. The major differences and improvements are:

1. The center hub is made of aluminum. This will prevent hub contraction, which is the major cause of flange warpage.
2. The flange openings are smaller and will diminish the chance of tape edge damage during handling.
3. The inside flange spacing is smaller and should result in a smoother wind. Because of this smaller space between the flanges, the reel alignment to the rewind idler and columns must be correct to prevent tape edge damage. The position of the reel is dependent upon the position of the reel mounting hub, P/N 528302, in reference to the main casting. The distance between the outer edge of the reel mounting hub flange and the machined surface of the casting under the file protect pin is 1.047, or 1-3/64, inches.
4. The aluminum hub reel requires the use of a new file protect ring. This new ring is orange and has its tab offset. The old ring (which is red) should not be used, because the new reel has no recess for the tab. Using the old ring will cause the reel to be cocked when it is mounted.

There have been several reports that the new file protect ring tab interferes with the file protect pin. This may be due to the adjustment of the N.F.P. relay. The minimum clearance between the pin and F.P. ring with the relay energized should be 0.060 inches.

May 22, 65

### 331 (338) Quick Reel Release Latch IBM 729 All Models (US origin)

This service aid should be used in conjunction with 729 Service Aid 318 (328) When installing or servicing the Quick Reel Release Latch.

1. There are two B/M's:

B/M 5325376 Nor-Relay  
B/M 5325091 Norlay - 7330

The difference is in the length of the latch handle screw. The B/M for the Nor-Relay requires the longer screw, P/N 5331873. Short screw for Norlay - 7330 drives is P/N 5344952.

2. A seven-ounce tube of Molycote lubricant may be obtained from COP by ordering P/N 357830. Final shipments of the Quick Reel B/M's will not contain the lubricant.
3. There have been reports of latch handle screw breakage when installing P/N 5331873. It breaks at the pellet hole on the threaded portion of the latch.

Possible causes of breakage may be:

- a. Worn shafts. A worn reel clutch shaft should be replaced before installing device.
- b. When the previous style split-ring locking device was removed, the adjusting set-screw may have been left in the shaft not allowing enough thread depth remaining to install the longer latch handle screw.
- c. The thread of the reel clutch shaft should be tapped out and cleaned out to reduce friction when installing.
4. Teflon Shims - Care should be taken when assembling the hub and latch handle parts to be sure the edge of the teflon is not nicked or turned over. Burrs around the machined edges where the teflon shim is placed should be removed. The teflon shims may be ordered from COP. There are two part numbers:

Left 5331871	28 per card
Right 5331872	28 per card

There are 28 shims on a break-a-way cardboard backing. When installing, take care not to let the adhesive touch any surface. The cardboard backing may be broken down to individual shims. Then one half of the backing may be broken away to allow positioning the exposed half of the shim on the clean surface. The remaining backing may then be removed and the entire shim smoothed down with a pencil or other smooth object. Care should be exercised to insure no lubricant comes in contact with the teflon shim. The lubricant would destroy the shims adhesive properties.

5. When it is necessary to adjust the latch or replace the shims, the nylon pellet must not be re-used. To more easily remove the old pellet, heat it with a match or lighter. The heat will cause the pellet to resume its original shape. It can then be removed with minimum difficulty. A new pellet, P/N 5344963 must be used when re-assembling.
6. After adjustment is correct and the pellet is inserted, the latch must be tightened. Do not use vise grips, pliers or similar devices to hold the hub or shaft. They are not necessary. A rag should be placed over the hub to allow a better hand grip when tightening. This will insure adequate holding power of the latch assembly.

Adjustments should be checked on a six-month basis. Teflon shims replaced as required.

June 25, 65

### 332 (339) Capstan Motor Rebuild Kit IBM 729 II, IV, V, VI (US origin)

Kit P/N 5355445 for 1800 RPM Motor  
Kit P/N 5355440 for 1200 RPM Motor

Bills of Material have been released to facilitate the rebuilding of Capstan Drive Motors in the Field.

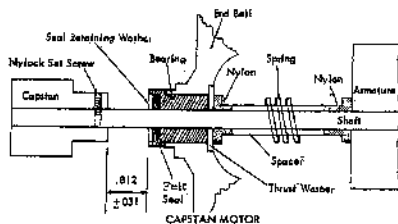
The kit furnishes the parts necessary to correct many cases of over-extension, noisy operation, failure to retract, and over-heating. Each Kit contains:

1. 1 Metal Spacer.
2. 1 Spring (heavy for 1800 RPM Motor, light for 1200 RPM Motor)
3. 2 Nylon Bushings.
4. 1 Thrust Washer (this washer has a small ear to prevent turning. This must be removed for older motors or not used).
5. Rubber seal.

DO NOT ATTEMPT TO REPLACE THE END BEARINGS.

#### Installation Procedure

- Carefully remove capstan tip.
- Stone or file shaft to remove burrs.
- Scribe line on end bell and motor body for reference when reassembling.
- Remove two long bolts from motor.
- Slide front end bell off of the shaft, being careful not to damage bearing.
- Remove old parts, 2 nylon bushings, spacer, spring and washer.
- Remove Rubber seal. Be careful not to bend Felt Retaining Washer, as it is re-used.
- Clean shaft and end bell. Clean the end bearing with No. 6 oil on cotton swab.
- Install new parts, lubricate with No. 6 oil (use reference drawing).
- Re-assemble motor using scribed lines from step No. 3 for reference. Check for possible binds.



number of these kits were erroneously shipped with a white felt washer in place the rubber seal. The rubber seal for these kits may be ordered from COP, N 535442.

Sept 3, 65

### 3 (340) NORLAY Reel Control Vacuum Column Switching IBM 729B

- √ 5344891 - Mod 2 & 5
- √ 5344892 - Mod 4 & 6

Due to the additional current being handled by the reel control vacuum column switches in NORLAY type 729's, the useful life of the switch may be considerably less than it is in the relay and NOR type 729.

Depending upon the amount and type of usage, the switches may need replacement after as little as six months use.

An attempt should be made to clean, adjust or replace the points of these units.

When reel response becomes noticeably sluggish, or tape is dumping in the vacuum columns, or if the switch contacts are visibly pitted, the entire assembly should be replaced.

June 25, 65

### 1 (-) Prolay Pulley Shaft Retaining Wire P/N 528606 IBM 729 All Models

**FETY** Hand injuries can result from retaining wire P/N 528606 protruding past the edge of the prolays arm. This condition should be corrected by filing 1/16 of an inch from the end of the retainer, and stoning the new tip to remove any burrs or sharp edges.

Present supply of the following part numbers are affected.

528606	Retainer
528515	Arm Assembly
528520	Arm Assembly
528535	Prolay Assembly
528540	Prolay Assembly
526025	Prolay Assembly
526027	Prolay Assembly

Future production will be improved.

June 11, 65

### 335 (341) Modified NORLAY Reel Drive Clutch IBM 729 BII to BVI

Future shipments of NORLAY reel drive clutch, P/N 5344998, will be modified. This change adds two setscrews in the hub of the clutch rotor. The setscrews are used to lock the rotor to the reel shaft, and to positively position the key in the keyway. The modified unit will eliminate the problem of rotor keyway wear.

Installation and adjustment of the new style clutch remains the same as the previous one other than tightening the added setscrews.

The rotor-to-armature gap should be checked around the entire periphery of the disk. The correct clearance is 0.007" to 0.012". The gap is adjusted by the addition or removal of shims.

June 25, 65

### 336 (342) Tape Losing Proximity with the Read/Write Head IBM 729 II to VI A II to A VI B II to B VI

A similar problem of this type was outlined in 729 Service Aid 301 (309). However, the cause and results are quite different.

When a tape record is backspaced, the record stops at approximately 0.15 inch to the left of the write gap (R/W Head). The erase head is positioned about 0.4 inch to the left of the write gap. Thus, there is 0.25 inch of a record that does not go back under the erase head and must depend on the write gap for erasure.

Due to the high acceleration gained in using the single ply capstan, the tape may become airborne soon after "go". This condition can be observed by scooping the start envelope with a full loop of tape in the left column. However, the full loop may not always be necessary. If the condition is present, you will see a complete envelope collapse at 4 ms. after "go".

The condition described above will result in "1" bits being left in the IRG. You will also note that the IRG will be wider, indicating a backspace took place (creep forward). There have been some cases of "C" bits and "1/2" bits if the problem is severe.

Why the "1" bit? Tape normally has some degree of curvature. It will usually curve toward the "C" track. Thus, when it is straightened out, the "1" track becomes slack and most apt to leave the head. The degree of curvature will tend to make some tapes more prone to failure. This does not mean the tape is unacceptable.

A new slotted erase head bracket has recently been designed to allow adjustment to the right. Contrary to instructions in previous publications, the new bracket must be adjusted for maximum movement to the right (without restricting "H" shield movement). This adjustment eliminates the effects of the conditions mentioned above.

Time asymmetry must be checked after any adjustment of this new bracket in the field. This bracket is now standard on all shipments of 729's and R/W Heads. EC 255044 or JT 87208 will soon release the bracket to the field.

Oct 29, 65

337 (-) Positioning of the Vacuum Switch Capacitors IBM 729 B II to VI (French origin)

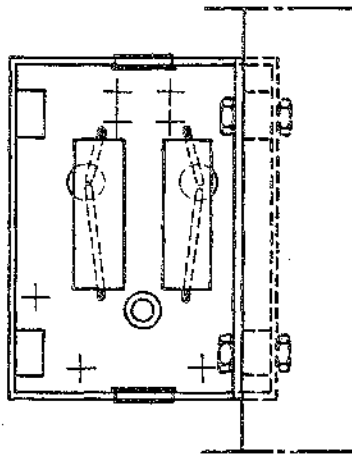
**SAFETY** A short hazard exists in the capacitors located outside the Vacuum Switches.

The wire or the body of the capacitor may be damaged by the outer sharp corner of the Vacuum column.

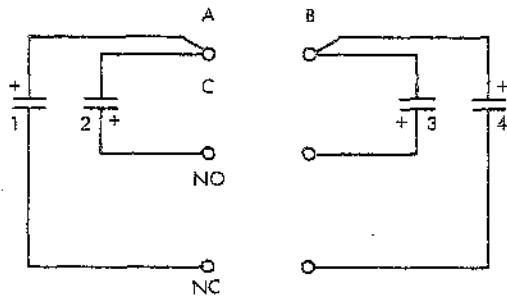
It is recommended to change the positioning of the outer capacitors with respect to the switches; they must be vertical instead of horizontal.

To do this, disconnect the 4 capacitors, re-position the 2 outer capacitors vertically and then reconnect as indicated below.

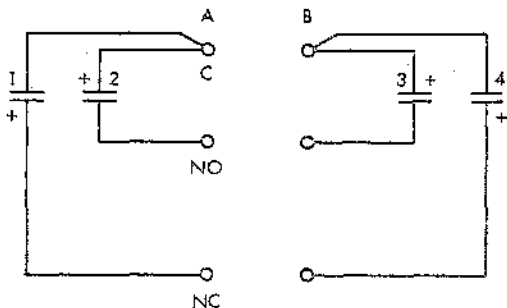
LOCATION



WIRING



UPPER SWITCHES



LOWER SWITCHES

Note :  
1 and 4 : outer capacitors  
2 and 3 : inner capacitors

December 13, 1965

338 (343) 140I TAU Hangups IBM 729 A II to A VI

Problem: 140I TAU hangups may occur when a rewind-unload instruction follows immediately after a rewind instruction on the same tape drive.

Solution: Remove the 1.8 MFD capacitor shown at block 2C on page TU 08.20.2.

This Service Aid is applicable to all models of NOR drives when attached to a 140I (only).

Dec 17, 65

339 (344) Parts Catalog Corrections IBM 729 II-VI, AII, AIV-AVI, BII, BIV-BVI (US origin)

This Service Aid will be used for notification of new part numbers not included in the current Parts Catalogs. Future publications will be updated to include these numbers. Additions and deletions will be made to this Service Aid as required.

CORRECTIONS

Page No.	Fig No.	Item No.	Old P/N	New P/N	Description
13	3	17	535147	No change	Description should read "Cable"
45	11	29	528512	526253	
105	40	6	535628	554173	Mag clutch cover assy with seal
149	43	26	528222	528222	Description should read "Connector, Recp, Elect-14 male contacts"

ADDITIONS

36	8-G	--		535247	Set screw, rewind coupling
54	16	not shown		331196	Micro switch, timer
66	21	26/27		317797	Bulb, AC power on/off
106	40	not shown		332770	Magnetic clutch powder, vial

revised Feb 24, 67 (Dec 10,65)

340 (345) Eliminate Unnecessary Rebuilding of the Right Stop Clutch IBM II, IV, V, VI (US origin)

The right stop clutch can reach a condition where it can no longer be adjusted satisfactorily by Pot # 3 for a desirable coasting stop on a high speed rewind. When this condition exists and the clutch functions properly for all other requirements, R5 can be altered to approximately 800 Ohms (25 Watts minimum) to extend the life of the right stop clutch.

Dec 10, 65

IBM is now supplying to our customers a 5 1/4 inch tape reel with and without tape. This reel can be used in storing programs, small quantities of records and various systems tests. The reel is capable of holding 200 feet of H D tape and supplied at the various test densities.

When using this reel, the following limitations must be considered:

- The reel is designed for one-time use only.
- There is no file protect.
- Available in gray only.
- The reel does not have an aluminum hub.
- No standard tape containers are available. The reel will be shipped in a heavy cardboard box.
- Capstan speed (112 inch/second models) can exceed reel take-up speed because of the small hub. This condition could occur when rewinding with very little tape on the file reel (5 1/4-inch reel). If the tape dumps in the column because the small reel does not take tape up fast enough, we can not consider this a tape drive failure.

Dec 10, 65

### 12 (347) Improved Prolay Operation at Low Go-Down Time and Elimination of R-19 Burnout

IBM 729  
B11, B1V-BV1

An alteration to the prolay neutral current circuit (Page RA 40.55.1 - P/N 5344818) is required to allow a neutral current adjustment to 2,5 nps nominal.

The following circuit changes should be made:

- R 19 should be 15 Ohms (50 Watts), P/N 518104.
- R B should be 10 Ohms (160 Watts), P/N 322687.
- Remove R 12 (50 Ohms, 50 Watts, P/N 322739 or P/N 8023833) from circuit.

This circuitry change replaces the original wiring of EC 254337 or JT 86507V EM EC 168 (-).

revised Jan 13, 67 (Dec 28, 65)

### 13 (348) Lint Free Cleaning Cloth

IBM 729  
All Models

Lint free cloth is now available for cleaning the tape transport area. Ten (10 x 9") cloths are packaged under P/N 2108930.

The above part number replaces P/N 352468 which is listed as part of the tape cleaning kit, (729 SA 237 - 260). This new part number (2108930) must be ordered in conjunction with the kit (P/N 352465) because the cleaning kit will no longer furnish any cleaning cloths.

Order from COP Only.

Jan 7, 66

### 14 (349) Lubrication of Exhaust Fan Motor

IBM 729 II, IV - VI  
All, AIV - AVI,  
BII, BIV - FVI  
(US origin)

Exhaust fan motor, P/N 554159, is presently being installed in all new build and factory reconditioned 729's. This motor must be lubricated with IBM#6 anti-rust oil. The subject motors are lubricated at the factory prior to field shipment.

This item should be added to the PM schedule.

Jan 7, 66

### 345 (-) Installation of Quick Reel Release Latch

IBM 729  
All Models

- 1) There have been reports of latch handle screw breakage when installing P/N 5331873. It breaks at the pellet hole on the threaded portion of the latch.

Possible causes of breakage may be:

- a) Worn shafts. A worn reel clutch shaft should be replaced before installing device.
  - b) When the previous style split-ring locking device was removed, the adjusting set-screw may have been left in the shaft not allowing enough thread depth remaining to install the larger latch handle screw.
  - c) The thread of the reel clutch shaft should be tapped out and cleaned out to reduce friction when installing.
- 2) Teflon Shims - Care should be taken when assembling the hub and latch handle parts to be sure the edge of the teflon is not nicked or turned over. Burrs around the machined edges where the teflon shim is placed should be removed. The teflon shims may be ordered from COP Only. There are two part numbers:

Left	5331871	28 per card
Right	5331872	28 per card

There are 28 shims on a break-a-way cardboard backing. When installing take care not to let the adhesive touch any surface. The cardboard backing may be broken down to individual shims. Then one half of the backing may be broken away to allow positioning the exposed half of the shim on the clean surface. The remaining backing may then be removed and the entire shim smoothed down with a pencil or other smooth object. Care should be exercised to insure no lubricant comes in contact with the teflon shim. The lubricant would destroy the shims adhesive properties.

- 3) When it is necessary to adjust the latch or replace the shims, the nylon pellet must not be re-used. To more easily remove the old pellet, heat it with a match or lighter. The heat will cause the pellet to resume its original shape. It can then be removed with minimum difficulty. A new pellet, P/N 5344963 must be used when re-assembling.
- 4) After adjustment is correct and the pellet is inserted, the latch must be tightened. Do not use vise grips, pliers or similar devices to hold the hub or shaft. They are not necessary. A rag should be placed over the hub to allow a better hand grip when tightening. This will insure adequate holding power of the latch assembly.

Adjustments should be checked on a six-month basis. Teflon shims replaced as required.

Feb 24, 66

### 346 (-) Improper Locking of the R/W Head

Unsteady stop time and difficulty to obtain a good start stop envelope, may be caused by the head lifting when the prolays hit the stop capstan.

This is caused by weak springs, P/N 528336, not holding the head locked in down position. This failure can be detected by ability to force the head upward when it is locked in down position by upward pressure applied to stop capstan.

The symptoms are intermittent Read Write errors only on start stop status.

In case of improper locking, replace the springs, P/N 528336 (two by R/W head).

March 18, 66

### 347 (-) Unwanted Selection with Tape Switching

IBM 729 NORLAY  
(French origin)

Intermittent, unwanted selection may occur in the 729 NORLAY with Tape Switching.

This trouble occurs when one unit being requested a Rewind/Unload operation, another unit (or several units) is also executing this operation.

It is also possible that, during a Sort Program, when a write operation is requested on one unit, another unit is selected and erroneously receives the write instruction which may destroy the records on its tape.

This is due to the circuit of SMS card APF, located at F16, being intermittently activated.

For the machines showing this trouble, it is suggested to short the 100 Ohm resistor mounted in series with the -6 Volts wired to F 16 A.

Refer to logic sheet RA-30-00-1.

May 13, 66

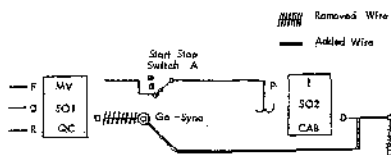
### 348 (350) 729/7330 Universal Tester Problems

IBM 729 II, IV-VI  
AII, AIV-VI  
BII, BIV-VI

**PROBLEM 1:** Erroneous "Count 5" indications may be experienced when using the tester for off-line start-stop adjustments. This is caused by the slow rise time (20-30 ms. saw-tooth output) from the "go" sync hub.

**SOLUTION:** The belly dancer on S01D to the "go" sync hub should be moved from S01D to S02D. This will insure a good output from the "go" hub. Refer to the diagram below for the specific wiring.

**PROBLEM 2:** Any "N" line outputs originating in the tester (such as WR pulse) may fail occasionally but no ill effects will result. No alteration of the existing wiring in this area is anticipated.



May 21, 66

### 349 (351) Alphabetic Labels

IBM 729 II-VI  
AII, AIV-VI  
BII, BIV-VI

Alphabetic labels are now available to provide positive tape drive identification. These labels (one set of alphabetic letters A-Z), can be obtained by ordering P/N 5313152.

Order on Field Requisition Card, COP Only.

May 21, 66

### 350 (352) Shifting Mechanical Skew

IBM 729 II, IV-VI  
AII, AIV-VI  
BII, BIV-VI

When mechanical skew only changes after unloading the tape drive, look for the head striking the casting or loose set screws in the rear pivot shaft.

The loose set screw condition may be checked by grasping the two-stop capstans (head up) and exerting considerable pressure in one direction, then the opposite direction (left and right facing the drive). If the upper head assembly moves in relation to the lower half, the set screws (as per 729 Parts Catalog, 123-0393, figure 6, item 153) are loose.

**NOTE:** Whenever head assemblies are replaced in the field, the set screw (sector gear stop) should be checked to insure that the upper portion of the head assembly does not strike the casting on an unload operation.

May 21, 66

### 351 (353) Left/Right Partial Brake Adjustment

IBM 729 AII, AIV-VI  
BII, BIV-VI

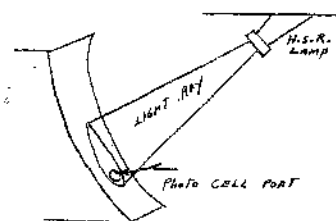
This CEM supersedes CEM 729 SA - 309 (319).

There are several conditions to consider when making partial brake adjustments.

1. Not enough partial brake
  - a. Slack tape may be formed when stopping from a high speed rewind. This can cause dumping when loading.
  - b. Slack tape may be formed when unloading to go into a high speed rewind. This can cause tape damage.
2. Too much partial brake
  - a. Tape stretch may be caused when loading. Head down first.
  - b. Tape may be pulled between tape stack and left reel flange when unloading.

The following procedure may be used to adjust the partial brakes on NOR and NORLAY tape drive units.

1. Set both left and right partial brake pots to minimum brake (maximum resistance).
2. Position HSR photo lamp as far to the left as possible and re-focus so the bottom of the light band just covers the photo cell.



3. (NOR Only)  
Pull the head take-up motor plug. High speed rewind a full 2400' reel of tape. Increase the right partial brake for the proper stopping point. (1/4" of tape on machine reel.)
4. (NOR Only)  
Again, with the head take-up motor plug pulled, HSR a 2400' reel. Increase the left partial brake until the tape stops without the left reel back-lashing; that is, the tape is level across the transport.
5. (NORLAY Only)  
Pull the tape take-up motor plug. High speed rewind a full 2400' reel of tape. Increase the right partial brake for the proper stopping point. (1/4" of tape on machine reel.)
6. (NORLAY Only)  
Again, with the tape take-up motor plug pulled, HSR a 2400' reel. Increase the left partial brake until the tape stops without the left reel back-lashing; that is, the tape is level across the transport prior to the head coming down. After the head comes down, the tape should be taut from each reel to its respective split guide.

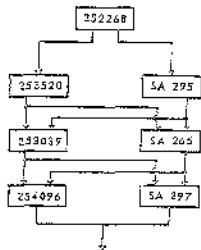
May 21, 66

### 352 (354) EC Information

IBM 729 AII, AIV-VI  
(US origin)

The purpose of this Service Aid is to clarify the existing problems and solutions related to the installation of the ECs and/or SAs shown in the flow charts below. All 729 NOR drives with pre-amps in the rear were shipped to the field with EC 252268 already installed.

ow chart "A" indicates the required EC activity following this factory only change. The problems which may be encountered and their resolution are as follows:



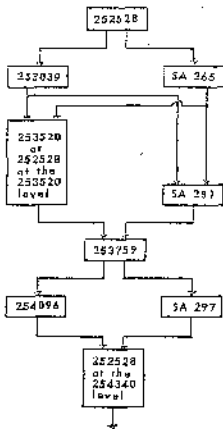
EC 252268 (basically a NOR improvement change) was incomplete. The update of this change was incorporated into one EC (253520 - CEM 116). This change is applicable to NOR drives with pre-amps in the front also; thus, only the one section which applies to NOR drives (with pre-amps in the rear) should be installed. As the chart indicates, Service Aid 295 in conjunction with the ALDs from the formal change could be installed in the place of EC 253520. This is not recommended as a permanent alternative. Service Aid 295 is correct logic wise; however, the actual point to point wiring differs with that of the formal EC. Thus, to facilitate wiring compatibility on future ECs, it is necessary to remove the wiring of Service Aid 295 and install the applicable section of EC 253520.

Service Aid 265 with the ALDs from EC 253039 is equivalent to EC 253039. Service Aid 297 with the ALDs from EC 254096 is equivalent to EC 254096.

ECs 253520, 253039 and 254096 (or equivalent Service Aids) may be installed in any sequence following EC 252268.

ECs 252528 and 253759 do not apply to NOR drives with pre-amps in the rear.

EC 254096 is now mandatory.



ow chart "B" is applicable to NOR drives with the pre-amps in the front. The problems and the required solutions when installing the ECs listed in the chart are as follows:

EC 252528 (CEM 93) was either factory or field installed. The first two sections of this change were incomplete. The update of this change and an additional improvement were combined into EC 253520 (CEM 116). EC 253520 (EC 252528 at the 253520 level) and Service Aid 281 (with ALDs from 253520) are equivalent. However, the point to point wiring of SA 281 and EC 253520 are not identical.

EC 253039 and Service Aid 265 (with ALDs from 253039) are exactly alike.

EC 253759 is correct.

ECs 253039, 253520 and 253759 or equivalent Service Aids may be installed in any sequence following EC 252528 and ahead of EC 254096.

EC 254096 and Service Aid 297 (with ALDs from 254096) are also equivalent. The only stipulation when installing either of these is that EC 253759 and EC 252528 must be installed first to keep the ALDs accurate. CEM 116 does not indicate this fact. Ignore the statement in EC 252528 (at the 254340 level) which requires EC 254096 as a prerequisite.

EC 252528 (at the 254340 EC level) announces that ECs 252528 and 254096 are mandatory. It is necessary to order the paperwork for EC 252528 (at the 254340 level) to obtain the correct logics for EC 252528 if it was not originally installed at the 254340 level.

Contact Boulder PE Technical Operations, Department 960 if further information is required.

May 21, 66

### 353 (355) 729 Vacuum Blower Motors

IBM 729 II, IV-VI  
AII, AIV-VI  
BII, BIV-VI  
(US origin)

Vacuum blower motors, P/N 528102 and 351020 (RELAY and NOR drives) are now high usage items because of worn bearings. The motors are not on the Parts Returnable List and the cost to the field for new replacement motors is quite high. The bearings may be replaced in the field.

The replacement bearings must be purchased locally. Two bearings, one from each of the two lists shown below will suffice as replacements:

- |                 |               |
|-----------------|---------------|
| 1. NORMA 9088DD | 2. MRC 2045FF |
| FAFNIR 38KLL    | FAFNIR 204KDD |
| ND CWC 87038    | HOOVER 77204  |
|                 | ND 77504      |
|                 | SKF 6204 2Z   |
|                 | NORMA 204PP   |

REBUILD TIME: Approximately one hour.

SPECIAL TOOLS REQUIRED: Bearing puller.

Extreme caution must be exercised when removing and reinstalling the impellers, to insure they are not damaged or bent. When disassembling the motor, care must be taken to not lose the shims inside the motor. The NORLAY vacuum blower motors, P/N 5345042 and P/N 5345031 can also be rebuilt. However, the aforementioned bearings may not be applicable to these vacuum blower motors. Again, the bearings should be purchased locally.

May 21, 66

### 354 (-) Skew Error Problem

IBM 729 IV, VI  
A - IV, VI B - IV, VI  
(French origin)

Numerous skew errors can occur when a 729 IV or VI Tape Drive is working with some low Go Down times. This problem is specially perceptible with Tape Drives attached to a channel of either a 7010, 1410 or a 1460 system. It is due to a bad tape motion during the very fast Stop-and-Start sequence.

According to the type of 729 Tape Drive used, a different solution is recommended:

- 729 NORLAY: Refer to CEM 729 EC 181 (-). An additional potentiometer can be installed in the Left Stop circuit to decrease the Left Stop current from 4 Amp. to about 3 Amp.
- 729 RELAY AND NOR: It is recommended to increase the Left Stop gap to  $0.009 \pm 0.001$  inches. However, with the Left prolay in Stop position ensure manually that there is no risk of tape creeping.

Before using the above recommendations, it is understood that all basic adjustments will have been carried out and checked carefully.

It is recommended to check the skew with the oscilloscope connected at the First Bit Latch in the TAU.

revised Feb 28, 67 (June 28, 66)

### 355 (-) Sharp Edges and Corners

IBM 729  
All Models

**SAFETY** Different parts of the machine have their edges and corners so sharp that a CE or an Operator may be injured. This safety hazard is particularly dangerous on the following parts:

- 729 B - Vacuum - Switch door P/N 529793
- 729 RELAY - NOR - Front door center frame P/N 535720
- 729 RELAY - NOR - Window handle P/N 535745

It is recommended to round the edges and corners of these parts during the next maintenance time.

June 28, 66



356 (-) Reassembling of Reel Clutches IBM 729  
All Model

It is suggested that when replacing clutch powder, proper alignment be maintained between the clutch coil, rotor and cover, using machine shaft as a guide. Cover screws will be tightened carefully, checking for binds.

Magnetic Powder P/N 332770 (US and French Machines).

revised Nov 25, 66 (Sept 2, 66)

357 (-) Premature Wearing of Tape Reel Latch IBM 729  
All Models

In this device, a thrust washer is placed against the handle assembly. This washer has a flat surface on one side, and a round-off rim on the other side. B/M 5.325.376 indicates that it must be installed with the flat side toward the handle cam surface.

A recent investigation has pointed out that, with this setting, a quick wearing was experienced. To prevent that quick wearing, do the following as soon as possible.

- 1) Remove the assembly from the machine.
- 2) Clean all parts carefully, by removing all grease.
- 3) Lubricate the latch handle cam surface and the thrust washer, on the round-off rim side, with molybdate lubricant P/N 5.331.370.
- 4) Place thrust washer against the handle assembly with the round-off rim side toward the handle cam surface.
- 5) Assemble the other parts and reinstall the device on the machine.

Dec 19, 66

358 (358) Prevent Tape Stretching IBM 729 All  
AIV - AVI  
US Origin

Some NOR drives exhibit a tendency to stretch tape at the completion of a manual unload operation.

This can be attributed to:

1. Application of full brake on both reels when the head-up microswitch makes.
2. inertia of each reel.

This situation can be eliminated by placing full brake on the left reel and only partial brake on the right reel. The change to partial brake can be accomplished by the following alterations on TU 09.45.1:

1. Remove the wire from 3C21H to 3C21J.
2. Remove the wire on 3C21E. Do not pull the other end of this wire loose.
3. Attach this same wire to 3C21H.
4. Tie 3C21E to 3C21J.
5. Update logic page TU 09.45.1 to reflect these changes.

The above wiring is applicable on NOR drives at EC 251452 or higher.

Aug 5, 66

359 (359) Removal of Reel Clutch Assemblies IBM 729 II, IV-VI  
All, AIV-VI  
BII, BIV-VI

The removal of the subject assemblies is quite difficult for one man when using the method described in the 729 Instruction Maintenance Manual. The task strictly becomes a one-man job if four 5-inch carriage bolts, P/N 322581, are inserted (one at a time) through the rear tape casting in place of the existing bolts, P/N 124987.

The longer bolts allow extension of the rear casting and also provide the necessary support. The original bolts are shown on page 50, figure 19, list 20, item 118 of the Norlay Parts Catalog.  
Order from COP Only.

Aug 5, 66

360 (360) 729V and VI Asymmetry Adjustment IBM 729V - VI  
729AV - AVI  
729BV - BVI

**Problem:** Section II of 729 EC CEM 176 (124) (EC 254339) or 729 Service Aid 317 (327) removed the 100-ohm fixed resistor on the subject card. This alteration was required to facilitate proper asymmetry adjustment on heads and associated circuitry with the impedance unbalanced more than 100 ohms. Thus, the change eliminated needless parts replacement.

The implementation of this change has created the opposite effect on some drives. Since the removal of the 100-ohm resistor, it is impossible to equalize the impedance of the head and associated circuitry in the opposite direction.

**Solution:** The problem can be remedied by reversing the wiring on the drives which exhibit this unbalance condition. Any alteration in this area will require a time asymmetry check as per 729 S.A. 159 (202).

**NOTE:** Caution must be observed when changing the 200-ohm pot wiring to ensure that write polarity is not altered. When the reversal is completed, the pot must be electrically attached to the opposite half of the write coil and the opposite half of the write driver circuit.

The above solution requires rework of the SMS panel wiring if EC 254339 or JT 86407 729 S.A. 317 (327) are installed. The resistors were shorted out instead of being removed. Thus, the existing wires (listed in S.A. 317) (327) must be moved to the opposite side of the write coil. Refer to the machine logics to determine the required alterations.

Nov 25, 66

361 (361) Tape Switching Noise Problems IBM 729  
II, IV-VI  
All, AIV-AVI  
BII, BIV-BVI

**Symptoms:** False end of tape indications, false load point indications, and noise on the read bus.

**Problem:** Sporadic noise pulses on the select line are caused by improper reference voltage applied to the convert card.

**Solution:** Norlay Drives- Tie Pin K of F16 (RA 30.00.1) Directly to -6 volts.

Nor Drives- Tie Pin K of J20 (TU 08.00.1) Directly to -6 volts.

Relay Drives- Tie Pin K of A17 (10.01.1) Directly to -6 volts.

Nov 25, 66

362 (362) Improved Magnet Assembly in 729 II, IV-VI  
Eddy Current Device AII, AIV-VI  
BII, BIV-VI

The new magnet assembly provides increased reliability due to the following functional changes:

1. The mounting screws are changed from 6-32 to 10-32.
2. The tolerance on the height of the individual magnets is tightened.

These improvements insure consistent results from proper adjustment of the gap and minimize the possibility of it coming loose. The adjustments of the eddy current device remain the same as per the Maintenance Manual.

P/N 2501344 replaces the old assembly P/N 348462.

No field change is forthcoming on this alteration.

Order from COP Only.

Nov 25, 66

363 (363) Reel Drive Clutch Shaft Assemblies 729  
US Origin

Boulder Manufacturing will incorporate component changes on the subject assembly on 729 Norlay drives by January, 1967 (approximate date). These alterations will improve reliability and minimize parts replacement. The improvements are as follows:

1. Clutch P/N 2501377 replaces P/N 5344998.
2. Key P/N 2501378 replaces P/N 5344999.
3. Wave Washer P/N 5708456 replaces P/N 556672.
4. Spacer P/N 5355425 is removed and not replaced since the new clutch is larger.
5. The shaft assembly P/N 5344986 will have a flat surface to tighten the clutch set screws against. The improved shaft will retain the same P/N.

The recommended parts replacement on defective old style reel drive clutch assemblies is as follows:

1. Replace the rotor and stator (clutch).
2. Replace the wave washer.
3. Remove the spacer and leave it out.
4. Replace the shaft.
5. Replace the key.
6. Replace the spline P/N 5355444.

Items 1, 2 and 3 are required as minimum corrective action for an effective repair.

Factory only EC 730180 will incorporate this change on new production machines.

Nov 25, 66

54 (365) P/N 333208 Particle Clutch Felt Seal IBM 729  
M2, M4, M5, M6  
A2, A4, A5, A6  
B2, B4, B5, B6

An undetermined number of oversized felt seals, P/N 333208, have been shipped to the field. Two factors can help to identify the defective parts.

- The defective seal is slightly gray in color when compared to a good "white" seal.
  - The height of an oversized seal is 23/64ths. The good seal is 21/64ths.
- Any parts found to be defective should be scrapped locally.

May 5, 67

55 (364) Reel Shaft Clutch IBM 729  
B2, 4, 5, 6  
US Origin

One of the failures associated with the reel shaft clutch (P/N 5344998) is a mechanical failure of the bracket (P/N 5355402) used to retain the outer field assembly. The bracket is a sheet metal part with a small tab that engages a

hole in the clutch assembly. Due to the oscillating action, the tip of this bracket may wear and eventually break off. When this bracket breaks, the leads to the clutch will be broken causing complete clutch replacement.

It is suggested that the bracket tip be inspected for wear and replaced as required. As announced in an earlier Service Aid, a new clutch assembly will soon be available. A new bracket is also in the process of release.

Dec 23, 66

366 (366) New Style Proloy Armature Shaft and Retainer IBM 729  
M2, M4, M5, M6  
A2, A4, A5, A6  
B2, B4, B5, B6

A redesigned proloy armature shaft and retainer have been released by Engineering and are now production practice.

P/N 526235 is now obsolete and is replaced by armature shaft P/N 2501461 and retainer P/N 528606.

Order: Field Requisition Card, COP Only.

May 19, 67

367 (-) Wiring Diagram Error Corrections 729 AII to AVI  
BII to BVI  
French Origin

I 729 AII to AVI

Ref.: Logic Page TU.09.15.1 (P/N 8016997) - JT 86068 -  
The output line -S Select + Ready I/O coming from the 1D block is only going to TU.08.10.1.

II 729 BII to BVI

Ref.: Logic Page RA.10.70.0 (P/N 8026482) - JT 85645 -  
At location F13, the fourth circuit should be removed. It was replaced by a TG card located at 01A1 A05. (Logic RA.30.80.1 - Block 5D).

III 729 BII to BVI

Ref.: Logic Page RA.10.80.0 (P/N 8026483) - JT 85814 -  
After installing B/M 8027198 JT 87508, add a wire on the subject Logic Page at location EC2E with the reference SR2B (See Page RA.40.45.1).

June 30, 67

PRELIMINARY ISSUE

Pages 1 to 94 of Format 6"x9" are still valid. A complete revised CEM Section 729 SA will be issued at a later date.

270 (271) Binary Tracking on 800 CPI IBM 729  
V and VI

Binary Tracking is a condition which can exist on any model 729. However, 800 CPI operation is more likely to exhibit failures because of the higher character transfer rate. The symptoms will be temporary or permanent read failures and may appear as an interchangeability problem.

Binary Tracking can occur because of start-stop operation in the forward direction but is more likely to occur after a backspace. The condition leading up to creating a failure when a backspace is involved is as follows:

1. An output tape is being written on a drive with the mechanical skew adjusted properly.
2. A write check occurs and backspace command is given.
3. During the backspace operation the tape assumes a different tracking path.
4. The next record written may be skewed several microseconds either for part of the record or the total record. Usually the stopping action of the prolay will force the tape back to its normal tracking path before another record is written. This will leave one record skewed while the records before and after are correct.

The following are known or possible causes of Binary Tracking:

1. Dirty or Binding Ceramic Guide

Oxide build-up on the ceramic guide may be forced between the rear ceramic flange and metal barrel during the backspace operation. The loss of proper guiding action will cause the record to be skewed. The best corrective action for this problem is to insure the split guide is properly cleaned with the cleaning brush. This brush is included with the tape drive cleaning kit, P/N 352465.

2. Vacuum Column Tops

729 Mod V and VI have new cylindrical tape guides at the top of each column, P/N 347878, and new column top plates, P/N 347889 and P/N 347890. These new column tops were designed to decrease the distance between the column top and the back of the vacuum column, and therefore provide additional tape guidance. By guiding tape on both sides of the capstan, the tendency for Binary Tracking is reduced. The column top plates must butt against the columns or their purpose will be defeated.

3. Excessive End Play

Nylon pulley or prolay armature end play exceeding 0.003 inches may cause Binary Tracking.

4. Start-Stop Skew

This is a reprint of CEM 729 SA-68 (142). It is possible for the left nylon pulley to cause as much as 4 microseconds of skew under start-stop operations. When tape is either started or stopped moving, the nylon pulley can cause the tape to assume one of two tracking paths. The resulting skew between tracks "1" and "C" can be as great as 4  $\mu$ s.

To detect this effect, scrape tracks "1" and "C", syncing on track "1", in the same manner as when checking write skew (1  $\mu$ s/cm, 0.05v/cm, 10:1 probes).

Apply sufficient finger pressure against the left fork arm to take up any existing end-play in the fork arm itself. "Flick" the left nylon pulley (using snapping action with thumb and index finger) while writing continuous "1"s and monitoring skew as previously described. If skew between "1" and "C" changes, and remains changed, until "flicked" again, the nylon must be replaced.

Often this effect is severe enough to be detected by simply performing a start-stop operation, without the necessity for using any additional technique.

Skew should always be checked whenever a nylon pulley is replaced for any reason. If skew is off, after installing a new pulley, be certain the new pulley is not affixed before adjusting mechanical skew.

5. New Style Idler Pulley

The new heavier idler will reduce Binary Tracking tendencies. If this problem

is suspected, the old style nylon idlers on the left and right prolays should be replaced with the new style idlers, P/N 526253.

Sept 27, 63

271 (272) Bit Viewer for Heavy Duty Tape IBM 729  
All Models

This tool was developed so that information written on HD Magnetic Tape could be examined without damaging the tape. IBM transport cleaner and developer medium should not come in contact with HD tape.

To use the Bit Viewer:

1. Shake up the developer solution before using.
2. Support the tape to be viewed, oxide side up, against the bottom of the Bit Viewer with the White Plastic Card.
3. Wash the solution back and forth slowly by rocking the Bit Viewer from side to side; the record image will take shape.
4. Inter-record gaps can be checked by making 3/4 inch mark on the White Plastic Card.

Care should be used to prevent physical damage to the tape being inspected.

If the iron filings in the solution become magnetized and the solution becomes thin, a small magnet or degausser will loosen the filings.

P/N 461180 - Bit Viewer Complete

- P/N 461181 - Bit Viewer
- P/N 461182 - Bit Viewer Case
- P/N 461263 - White Plastic Card
- P/N 517960 - Cleaning Fluid (Six-ounce can)
- P/N 460997 - Capsule of Powdered Iron

Should the viewer leak fluid, a small screw in the side of the frame may be removed which exposes an access hole through which fluid may be added. The solution used in the viewer is the tape cleaning fluid, P/N 517960, with powdered iron, P/N 460997, added at the rate of one (1) capsule per six-ounce can of cleaning fluid.

The Bit Viewer Assembly, P/N 461180, should be ordered with Field Requisition Card Code 8, COP Only, one per installation.

Sept 27, 63

272 (273) Tie Down "+T" Read Gate IBM 729 NOR  
All Models

Reference: NOR Logic Page TU.08.10.1; Logic Block 3B is an APH card with an output at J13F. This is tied to E03G Logic Block 2B with an output at E03F (+T Read Gate). Present NOR circuitry has no loading of the line from J13F to E03G. As a result, a slow rise of the +T Read Gate line may be experienced. This may cause failure to read the first part of a record from a few characters to many characters.

To ensure that a good level is maintained on the +T Read Gate line, a 1.6K, P/N 317018, load resistor should be tied from E03G to -12V. The resistor may be mounted on the back panel.

1.6K 1/2W resistor, P/N 317018 may be ordered using Field Requisition Card Code 6, COP Only.

Sept 27, 63

273 (274) Fail to Stop at Load Point IBM 729 NOR  
All Models

Tape intermittently fails to stop at load-point. This problem can be corrected by installing an additional 10 MFD capacitor, P/N 491316, in series with the present 10 MFD capacitor on the YAW card at location A3E05, reference TU.09.55.1.

P/N 491316 may be ordered with Field Requisition Card Code 6, COP Only.

Sept 27, 63

74 (280) Caution - Safety Hazard  
Accent Panel-Rear Door Trim

IBM 729  
Relay and NOR  
All Models

ACCENT PANEL

**SAFETY** The center accent panel providing access to the pre-amp gate may have sharp corners which present a hazardous condition. The handle for opening and closing the accent panel is spot welded to the top of the accent panel. The very ends of this handle are cut at an angle, and may be sharp. This has been corrected in the Plant.

It is suggested that the next time any maintenance is done on a 729 tape drive, it should be inspected for this condition. If sharp corners on the handle exist, it is suggested to round them off with a file and peen close to the top of the accent panel with a hammer.

REAR DOOR TRIM (New Style Non-folding) - US origin

**SAFETY** A new style one piece rear door has replaced the older style rear folding door on new 729 tape drives. A limited number of these may have tipped with very sharp edges on the upper and lower trim pieces when the trim was cut to length. It is suggested that new 729 tape drives received in the field since October 25, 1963 be checked for this condition. Those exhibiting this problem on the trim pieces should have the sharp edges removed by filing or sanding smooth. This has been corrected on all 729 tape drives since November 6, 1963.

Dec 6, 63

75 (282) Tape Transport Cleaning  
Operation

IBM 729 NOR  
Relay - All Models

The tape drive transport mechanism should be cleaned at least once every eight hours, or every ten full reel passes, whichever occurs first.

The materials required for cleaning the transport are available in a Tape Drive Cleaning Kit, P/N 352465. The contents of the cleaning kit are listed by individual part numbers in CEM 729 SA-239 (260).

Prolonged or repeated contact of the tape transport cleaner with the user's skin should be avoided.

**WARNING:** Caution should be exercised whenever the transport cleaner is used; and the user should be familiar with General Safety CEM-15 (8) or CEM 729 SA-62 (162).

Split Guides

Use the brush and thoroughly remove all oxide accumulation on the surface and between the two ceramic elements.

1" Shield

The underside of the "H" feed-through shield should be cleaned with a lint-free cloth or pad moistened with the approved cleaning fluid.

Wind Idler Pulley

Clean with a lint-free cloth or pad moistened with the approved cleaning fluid.

Drive Capstan

Do not clean the drive capstan while it is rotating under power. Use the brush handle wrapped with the cleaning cloth and scrub vigorously. The capstan must be rotated manually.

Nylon Pulley

Use a lint-free cloth or pad and the approved cleaning fluid. A motion around the circumference of the pulley should be used.

Top Capstan

Use a lint-free cloth or pad moistened with the approved cleaning fluid to clean this item at the point where the nylon pulley contacts it.

Cleaner Blade

Use a lint-free cloth or pad moistened with the approved cleaning fluid to clean this item. Do not rub hard on the cleaner blade, but use a light motion.

Read/Write Head

Use a lint-free cloth or pad moistened with the approved cleaning fluid to clean the head.

Columns

The columns should be cleaned weekly with the approved cleaning fluid.

**NOT**, under any circumstances, use any metal instruments to clean the

columns. Frequency of cleaning may need to be changed, depending on the type of tape and the amount of tape passed.

Cleaning of the transport area should be done using a minimum amount of cleaning fluid. The cleaning cloth or pad should be damp and not saturated with cleaning fluid when cleaning. Occasionally, loose fibers will come detached from the cleaning cloth or applicators during cleaning. A visual inspection should be made to be certain that none of these loose fibers remain in the transport area after cleaning.

Dec 20, 63

276 (283) Defective Erase Heads

IBM 729 NOR  
Relay - All Models  
(US origin)

Erase Heads, P/N 352502, have been shipped from the Poughkeepsie factory with defects. These have been interspersed in spare parts and also installed on 729 tape drives, all models.

During an erase head grinding process the brass shim may not have ground off even with the pole faces. This defect can easily be detected by dragging a fingernail across the pole faces. If the brass shim extends below the pole surfaces into the tape path, it is suggested that the shim be stoned down. In some instances, the brass shim and shunt may come loose due to a poor application of epoxy (green in color). In these cases, the erase head should be replaced. Erase heads in current production do not have these defects; and they are assembled with a dark blue or black epoxy.

During the next PM period, it is recommended that all 729 erase heads assembled with green epoxy be checked for the possible defects mentioned above.

Dec 20, 63

277 (284) Capstan Rubber Change

IBM 729 NOR  
Relay - All Models  
(US origin)

The capstans on the capstan motors have always had the rubber made up in two layers; a thick base layer and a second thinner layer. This can be easily seen, as the thin outer layer is approximately 1/16 of an inch thick and a definite line is distinguishable where the two layers are laminated together.

A change in the capstan rubber composition has been made; and only one layer of rubber is put on the capstan. It primarily improved the Count-5 area; however, general start-stop adjustments are usually easier to make. One noticeable change will be that wider prolay drive gaps will accompany the newer single-ply drive capstan adjustments.

All shipments of the replaceable capstan, P/N 554148, starting November 6, 1963, will be the single-ply capstans, 729 tape drives shipping from the factory, starting approximately January 1, 1964, should have the newer single-ply capstans on the capstan motors. Replaceable capstans, P/N 554148, may be ordered with Field Requisition Card Code 6, COP Only.

Dec 20, 63

278 (285) Door Maintenance Reduction

IBM 729 Relay

The following aids and changes have been used in the field to reduce door maintenance. Items 1 and 2 are not engineering changes.

1. Negator spring breakage can be caused by the spring wearing against the mounting bracket. This wear can be prevented by reversing the take-up drum, P/N 535820, so that the flange is between the spring and the bracket.
2. Some installations have been successful in decreasing pulley damage (nylon) by using just the long cable, P/N 526265 or P/N 8022910 - French origin. The long cable is attached to the spring assembly in the normal manner. It is then looped over the pulley and attached to the door cable bracket, P/N 535742. When this method is used, the defent action of the pulley is eliminated.
3. A defective window stop is one of the major causes of negator spring, pulley or cable breakage. All units should have B/M 585615, see CEM 729EC-113 (84).

A hard-to-operate window becomes an aggravation to the operator which soon results in part breakage.

Refer to the 729 Reference and Instruction Manual, F/N 223-6988-2, Page 58 for proper adjustment and lubrication.

Dec 20, 63



729 (286) Vacuum Switch Filters

IBM 729 NOR  
Relay - All Models  
(US origin)

729 CEM's 142 (99) and 144 (101) announced a new RC filter network for the vacuum switches. This new assembly, P/N 362122, uses a 5 MFD capacitor with a 250 volt rating and a 30 ohm, 1/2 watt resistor.

A few reports of the 30 ohm, 1/2 watt resistor burning open in this new assembly have been received. It is suggested that if this condition is encountered the 1/2 watt resistors be replaced with one (1) watt 30 ohm resistor, using the same capacitor. The part number for the 1 watt, 30 ohm resistor is P/N 509507.

Parts may be ordered with Field Requisition Card Code 6, COP Only.

Jan 6, 64

280 (-) B/M 5324381 Installation  
CEM 144 (101)

IBM 729  
(US origin)

Before installation of B/M 5324381, check with an ohmmeter any portion of a change involving relay 10 wiring changes.

If the relay coil wiring A and B terminals are reversed, installing the noise suppression diode across the R10 coil may result in damage to the diode and transistor card at 3B24.

April 20, 64

281 (-) Parts Catalogs Corrections

IBM 729  
Relay and NOR  
(French origin)

The following corrections should be made in the 729's Catalog:

729 RELAY						
FORM	DATE	PAGE	FIG.	REF.	OLD P/N	NEW P/N
10-706-469-6	May 15, 63	40	25	21	8021081	-
		26	15	56	554173	332771
		26	15	76	554173	332771
		26	15	79	332785	8026688
		27	15	12 and 13 must be inverted		
729 NOR						
10-706-561-0	Sept 15, 62	36	19	1	8021081	-
		22	10	113	535628	332771
		22	10	130	535628	332771
		22	10	133	332785	8026688
		24	10A	14 and 15 must be inverted		
10-706-561-1	Jan 1, 63	36	19	1	8021081	-
		22	10	113	554173	332771
		22	10	130	554173	332771
		22	10	133	332785	8026688
		24	10A	14 and 15 must be inverted		
10-706-561-2	Jan 8, 63	44	27	21	8021081	-
		28	16	78	554173	332771
		28	16	98	554173	332771
		28	16	101	332785	8026688
		29	16	54 and 55 must be inverted		

May 22, 64

282 (288) 729 NORLAY Magnetic Tape Unit

IBM 729  
Mod. BII-BVI

Manufacture of 729 NOR tape drives has been discontinued in Poughkeepsie as of January, 1964 and in Essonnes as of July, 1964. Engineering Change 253500 released a variation of the 729 tape unit, called NORLAY, which is now being

manufactured. The NORLAY tape drive is identical to the 729 NOR unit in appearance and operation. There are no TAU EC's required to allow use of 729 NORLAY units. First customer shipments of NORLAY drives from Poughkeepsie are scheduled for February 1964 and from Essonnes for August 1964.

The major differences and improvements between the NORLAY and the NOR drives are:

1. The NORLAY SMS Card population has been reduced by approximately 42 cards.
2. The NORLAY drive has 15 more relays than the present NOR drive. This will reduce noise problems because SMS circuits which are affected by noise have been replaced with relays.
3. The right and left reel control clutch assemblies have been replaced with 48 volt D.C. motors. The stop clutch assemblies have been retained, but are limited in use to the load and unload operations.
4. The NORLAY uses a power supply which supplies five D.C. levels instead of seven. (+140 and -7.5 volts supplies have been eliminated.)
5. The NORLAY has improved Prolay circuits. This is accomplished by removing the series chokes and using -48 volts instead of -7.5 volts for Prolay control.
6. The NORLAY has an improved Front Door Assembly. The sliding door is controlled by two large pistons which eliminate the negator springs, pulleys, cables, etc., used in the present doors. Also, the NORLAY rear door is of one-piece construction and is easily removed if space restrictions do not allow maximum opening.
7. Preamps are located on rear logic panel.

CE training on the 729 NORLAY consists of a Self Training Package, available in Endicott Stationery Stores. A prerequisite for 729 NORLAY training is previous training on 729 NOR or Relay tape drives. The package consists of:

1. Instructor Outline and Student Self Study Guide - F/N R23-2751
2. CB Instruction-Reference Manual - F/N 223-2740
3. 729 NORLAY Instructional System Diagrams Supplement - F/N S23-4017

The NORLAY tape unit does not have a built-in tape drive tester. Therefore, one external tape drive tester is required per installation. P/N 461390 is a universal tester, to be used with the 729 NORLAY drive, as well as with the 729 Relay and 7330 tape units. The universal tester, P/N 461390, obsoletes Relay Drive Tester P/N 460633 and 7330 Tester P/N 461142.

The universal tester is similar in appearance to 7330 Tester P/N 461142. There is one permanently attached cable that plugs into the tape drive's 200 position connector. The universal tester is equipped with an auto-cycle feature and two skew sync jacks ("8" bit and "1" bit). A line terminator (P/N 348590 for 729 and P/N 556801 for 7330) must be used when operating a tape drive from the tester.

In installations where there is an overlap of 729 Relay and NORLAY tape drives, 729 Relay tape drive tester, P/N 460633 can be used with NORLAY units. The NORLAY drive does not have a "CE Cable" connector, so the following modifications are necessary to allow auto-cycle to function.

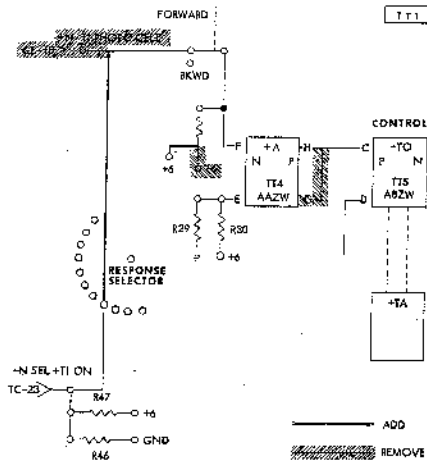
1. Remove tester from case by removing the six holding screws.
2. Turn tester upside down. All locations will be referenced to the tester in this position.
3. Remove wire from CE Connector # 18.
4. Pull wire back through cable lacing until it will reach to pin # 4 of the top wafer of the response selector switch. Count pins counterclockwise from the common, but not including the common. Solder wire to pin # 4.
5. SMS Card locations TT1 to TT10 are counted left to right looking at the wiring side:

Remove  
yellow wire TT4-G to TT5-C

Add  
yellow wire TT4-H to TT5-C

6. Remove  
-6 volt jumper from R19 to R23  
-6 volt jumper from R19 to R18

Add  
 -6 volt jumper from R23 to R18  
 +6 volt jumper from R19 to R17



In the tester modified in this manner, 729 NORLAY tape drives and 729 Re-tape drives can be tested with or without using the CE Cable. If the CE Cable is not used, the indicator lamps will not be lit, and the following switch will be inoperative:

1. Reset
2. Start
3. Load-Rewind
4. Unload

When 729 NORLAY units are added to an installation which did not previously have 729 tape drives installed, the following tools and test equipment will be necessary.

Description	P/N
Universal Tape Drive Tester	461390
Indicator	348590
Power Cable (TD-to Cust. Recept.) - 220 V	460663
Power Cable 380 V	8012757
56 CPI Skew Tape 729 II, IV	461096
30 CPI Skew Tape 729 V, VI	461197
Preamp Calibration Tape	461108
Tool of Adj.	461228

When NORLAY tape drives are overlapped with NOR or Relay drives, some of the tools may already be present in the installation.

48 volt D.C. motors, which replace the clutches, are supplied by two vendors. Consequently, two different style brushes are necessary and both appear in the initial Spare Parts listing. P/N 5355426 is for Robbins and Myers and 5355433 is for GE Motors.

March 13, 64

(-) Motors' Connectors  
 (French Origin)

IBM 729  
 All Models

Units supplied by Essonnes from June 1964 will be equipped with US connectors.

Consequently, before a field motor change (listed of P/N here under), it is necessary to recover the removed motor connector to reinstall it on the new motor.

Rewind Motor	8010816
Take Up Motor	8010830
Head Take Up Motor	8022358
Capstan Motor	8022785
Vacuum Pump Motor Mod. 2-5	8015289
Vacuum Pump Motor Mod. 4-61	8010396

July 21, 64

284 (-) Field Replacement of Vacuum Pumps

P/N 8015289

P/N 8010396

IBM 729 Relay and NOR  
 (French Origin)

IBM 729-II & V

IBM 729-IV & VI

Mod II to VI

The hose of the vacuum pumps supply by Essonnes from July 1964 are 1/6 turned from the original position.

Consequently, before a field 729 Relay or NOR vacuum pumps change, it will be necessary to make turned the hose of 1/6 to allow a correct installation.

July 21, 64

285 (289) Installation Procedure

IBM 729-II-VI

A II-VI

B II-VI

Based on field experiences, the following items should be checked during the installation of the type 729.

1. Remove the rubber shipping stops on the capstan motors.
2. Check the adjustments of the capstan in-out sensing switches.
3. Check line voltage, the D.C. supply voltages, and Prolay neutral-drive currents.
4. Check high-speed rewind, load and unload operation.
5. Scope and check the Prolay start-stop adjustments. Adjust if necessary.
6. Run I.R.G. Diagnostic.
7. Scope preamp output, skew, and asymmetry (Mod 5 and 6). Adjust if necessary.
8. Run required tape drive reliability diagnostics.

March 13, 64

286 (290) Reduce Tape Dump  
 (US Origin)

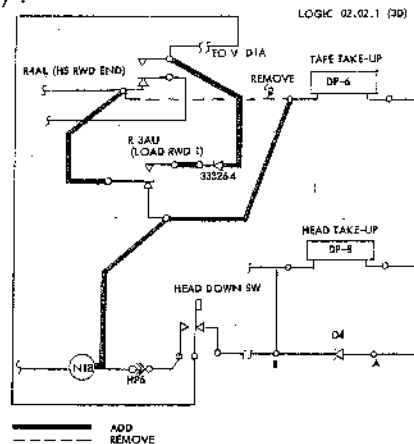
IBM 729-II-VI

If tape dumping or twisting in the columns is experienced during loading, the following circuit changes may be made to bring the head down first before lowering tape into the columns. This is done by putting the reel take-up motor under control of the head down microswitch.

Remove wire from R4AL N/C to DP6 pick

Add wire from R4AL N/C to R3AU op  
 R3AU N/C to DP6 pick  
 R3AU N/C to NEON 18 (wire to head down switch)  
 Add diode from R4AL N/C (plate) to R3AU N/C (cathode)

Use any available diode normally used in back circuit elimination or arc suppression, such as a top-hat, AM type or small, two-plate selenium type. If diodes are not available, order P/N 333264 on Field Requisition Card code 6 from COP Only.



The above circuit will be installed by ECR 45-229 on all machines leaving the plant, and subsequently will be picked up on EC 253520.

EC 253520 will be made available to the field as an optional field Bill of Material.



Be certain to check the high speed rewind and the partial right brake for a small amount of slack tape after high speed rewinding prior to loading. This is necessary to ensure that tape damage will not occur as a result of the head coming down prior to lowering tape.

The time required to install this change, approximately thirty minutes, may be coded 32 and charged to EC 253520, referencing this Service Aid.

April 10, 64

**287 (304) Defective Filter Capacitors**

**IBM 729 II - VI  
A II - A VI  
(US origin)**

Defective filter capacitors are being encountered in 729 power supplies. The defective capacitors are Sangamo Electrolytic can type with brown, light brown, tan, or similarly colored tops. When checking power supplies to determine requirements, it need only be necessary to check the color of the top, since only Sangamo capacitors have brown tops.

A chemical reaction is taking place within the capacitors between the brown plastic top and the electrolytic. This results in INTERNAL corrosion of the terminals, rendering the capacitors ineffective.

This problem is predominantly found in 729 tape drives prior to the NOR. However, some of the earlier NOR drives do have the Phase III power supplies, which are exposed to this problem. It has been determined that at least 50 per cent of the capacitors in Phase I, II, and III power supplies are of the Sangamo brown top variety and are defective.

Some difficult-to-diagnose problems on the tape drive have been corrected by replacing defective capacitors in the supplies. Intermittent motion, noise, false tape indicate, tape runaway, and read/write errors are problems that have been caused by these defective parts.

All brown top Sangamo capacitors in all 729 power supplies must be replaced as soon as possible. Survey all affected 729 tape drives and order sufficient stock immediately. Specific part numbers will be found in the individual 729 ALD's.

INSTALLATION TIME - 2,3 hrs.

Installation time may be coded 34, referencing this service aid. Parts may be ordered on field requisition Card Code 6, COP Only.

Sept 18, 64

**288 (292) Possible Card Damage after  
Installation of EC 252528B for  
Machines of US Origin  
or B/M 8023445 - JT 84735 for  
Machines of WTC Origin**

**IBM 729  
Mod A II - A VI**

The backpanel wire from E03E to E01R (+ T Read Gate) is occasionally stretched tightly via pin E02J (-48 volts). A number of shorts between this wire and pin E02J have developed after installation of B/M 5324385 or B/M 8023445, the NOR Improvement Change, refer to CEM 729EC-137(93). The movement which results from removing and adding wire wraps to pin E02J causes the insulation of the wire from E03 to E01R to be damaged, and a short can result.

It is recommended that the insulation of the wire from E03E to E01R be inspected immediately after installation of EC 252528B or B/M 8023445. If damage exists, the wire should be re-routed.

If the + T Read Gate is shorted to -48 volts, intermittent or solid read failures will result. This condition may or may not show up off line.

May 8, 64

**289 (293) T. D. Terminator Rework and  
Off Line Meter Check**

**IBM 729  
All Mod**

All terminators P/N 348590 and 348591 should be reworked to provide termination for the Process Line (T/C 48 and 49). This applies especially to terminators used in conjunction with tape drive testers.

If the Process Line is unterminated, the Process Meter may run when the T. D. is being used on the tester. Terminator rework is outlined in B/M Instructions P/N 5325018 and 5325019, or can be accomplished as follows:

- a. Remove keeper plate mounting screw; then remove terminating shoe housing.
- b. Look at the wiring side with the resistor board mounting plate on the bottom. Locate the spare resistors on the first resistor board from the mounting plate. (P/N 348590 will have the spare resistors on the extreme right of the board. P/N 348591 will have the spare resistors on the extreme left of the board).
- c. Break the voltage bus wires to the spare 120-ohm and 360-ohm resistors.
- d. Using #24 yellow wire P/N 122393, solder a jumper from the voltage end of the spare 120-ohm resistor (lower resistor board) to the ground end (blackwire) of the 120-ohm resistors on the top resistor board.
- e. Using #24 yellow wire, P/N 122393, solder a jumper from the voltage end of the 360-ohm resistor (lower resistor board) to the voltage end of the 360-ohm resistors on the top resistor board.
- f. Using #24 yellow wire P/N 122393, solder a jumper from the junction of the 120-ohm and 360-ohm resistors to T/C 49. (Use clip P/N 598041.)
- g. Using #24 black wire P/N 106320, solder a jumper wire from the ground end of the 120-ohm resistors on the top resistor board to T/C 48. (Use clip P/N 598041.)

If the Process Meter is to be checked Off Line, the process line must be made active. This can be accomplished by tying the process line through a 100-ohm 1/2-watt resistor (P/N 213536) to a -6 volt pin. The 100-ohm resistor should be tied to the following back panel pins for the three types of 729 tape drives.

729 Relay	A04E to -6 volts
729 NOR	J18C to -6 volts
729 NORLAY	C12C to -6 volts.

Remove resistor upon completion of meter checkout.

Time to rework terminators may be coded 36. Make reference to this service aid number.

Parts may be ordered on field requisition card Code 6, COP Only.

May 8, 64

**290 (294) Hang-Up on Rewind Command  
at Load Point**

**IBM 729, B II to BVI  
(US origin)**

When a rewind command is given to a tape drive which is at load point, the TAU should disconnect without sending rewind to the tape drive. This is done by the select and load point line being active in TAU. It is possible in the 729 NORLAY to have the select and ready line active before the select and load point line. This allows the rewind latch in TAU to be set. TAU will hang because the drive, being at load point, can not send back select and rewind to turn off the rewind latch.

This condition was corrected by EC 254024 (ECR 45-292) on machines serial no. 12718 and 61322 and above. A field change will be released in the near future. In the meantime, install the following change if trouble is experienced:

Remove wires	C19R - C19J C19D - C19J
Add wires	C19R - C19J C19D - F13L C12N - C13N.

Wire wrap capacitor 0.05 Mfd-10v-P/N 532176 from F13L to F12K.

NOTE: The add wire C12N to C13N is a voltage bus correction, which is included in ECR 45-292.

The time required to install this change may be coded 32 and charged to C 254024, referencing this service aid.

May 8, 64

VI (295) NOR Drives with Rear Preamps IBM 729, All to AVI (US origin)

variation of the NOR drive was manufactured for two months prior to changing new production to NORLAY drives. The major difference in this variation is the absence of a front preamp gate. The preamp circuitry is incorporated in the rear logic gate. This variation of the NOR drive is identical in operation and external appearance to the standard NOR drive.

Serial numbers of NOR drives with preamps in the rear are:

Mod II, V	34687-35083
Mod IV, VI	92636-92810

The NOR drive with preamps in the rear were all shipped at an EC 252719 level. History of engineering changes which affect this NOR variation is as follows:

250455	Mod VI	Parent change which released rear preamps (Factory Only)
252268	Mod VI	Picked up a number of ECR's and updated parent change EC 250455 (Factory Only)
252719	Mod II, IV, V, VI	Released rear preamps for Mod II, IV, V, and updated parent change at EC 252268 level for Mod VI (Factory Only)
252268 V	Mod VI	Field change—updates Mod VI pages to EC 252268 level. Erroneously sent for all NOR drives, including those with preamps in the front.
252268 W	Mod VI	Field change—advises that EC 252268 V was sent in error and should only be installed on Mod VI NOR drives with rear preamps.
253500	Mod II, IV, V, VI	Released NORLAY drive and discontinued factory use on NOR pages. This level appears in EC history on some logic pages.
253506	Mod II, IV, V, VI	Original process meter change. EC level appears on EC history on some logic pages even though change was obsolete.
253517	Mod II, IV, V, VI	Process Meter change.

The logic pages released for NOR drives with rear preamps have the designation 729 PA or 729 PATS at the top of the logic page. This indicates that the page is for a 729 NOR drive with rear Pre-Amps or rear Pre-Amps with Tape Switching.

Single write oscillator test cards cannot be used in 729 NOR drives with rear preamps. Variable frequency double card P/N 373305 must be used when running "off line" using the built-in tester.

The NOR engineering changes released on CEM's and service aids need to be diffused when installed on NOR drives with rear preamps. Some changes are not applicable at all. A listing of CEM's or service aids released in 1963 and 1964 which fall into these categories are:

CEM's	Service Aids
2	Not applicable
3	Not applicable
2	Not applicable
1	Not applicable

Modification required as follows. (Do not install wires in Service Aid 281.)

Remove	Add
D09E-D13Q	D09E-D14P
D13Q-D14P	D13Q-C23D
D18H-D18R	D18H-D18R
D18R-D20B	D20B-D15P

Modification required—steps 1 and 5 do not apply to NOR tape drives with rear preamps. EC 252268 was factory installed on all rear preamp NOR's and picked up the improvements in EC 251452A (CEM 92) and 252528B (CEM 93).

273	Not applicable
259	Not applicable.

May 8, 64

292 (296) Clarify Logic Page Updating IBM 729, All Mod (US origin)

The following information will be helpful when updating logic pages in conjunction with process meter installations.

1. If a change is denoted by an "R" prefix (Example: R251440) in the history block of a logic page or drawing, it should be disregarded as a prerequisite for manual page replacement. The "R" prefix denotes a change to redraw a logic page (no machine logic affected).
2. Some NOR logic pages have the designation "PA" or "PATS" between the title of the logic page and the page location. This indicates a logic page for a NOR drive with Pre-Amps in the rear, or Pre-Amps in the rear with Tape Switching.
3. B/M 5325030 and 5325031 - Logic pages P/N 348397 and P/N 348596 (TU.95.00.1) were erroneously sent out with these B/M's. Disregard these pages. No replacement for logic page. TU.95.00.1 is required on B/M 5325030 and B/M 5325031.
4. EC 253506 - Original process meter installation change which was obsolete. Disregard as prerequisite for logic page replacement.
5. EC 249230 - Factory change which released NOR drives. NOR logic pages and discontinued factory use of relay logic pages. (Refer to 729 Service Aid-117 (207). This EC level appears on both relay and NOR logic page histories and should be disregarded as a prerequisite for logic page replacement.
6. EC 253039 - Some logic pages for NOR drives were sent at EC 253039 level. EC 253039 is a factory and field change to correct stretching tape on a rewind-unload on NOR drives with optional EC 252528 installed. (Refer to CEM 729 Service Aid-256 (265). Logic pages at a 253039 level can be used if the wiring in Service Aid-256 (265) is installed.
7. EC 250455, 252268, and 252719 - Engineering Changes which affect only NOR drives with preamps in the rear. See 729 Service Aid-291 (295) for detailed description.
8. EC 253500 - This change released the NORLAY drive, NORLAY logic pages and also discontinued factory usage of NOR logic pages. This EC level appears on NOR logic page histories and should be disregarded as a prerequisite for logic page replacement.

May 22, 64

293 (298) Tape Contamination IBM 729, All Mod (US origin)

729 tape drives (new build and re-con) shipped from Poughkeepsie from approximately March 1, 1964 to May 1, 1964 are subject to a condition which can cause tape contamination. The contamination may be caused by fine metal filings which cling to the inner surfaces of the upper R/W head Mu metal shield, P/N 526024. Servicing in this area or normal load and unload operations can cause these metal particles to be knocked onto the head and tape area.

To eliminate this potential problem the upper head Mu metal shield should be removed and cleaned thoroughly with a rag and tape transport cleaner, P/N 517960.

Any replacement R/W head assemblies received during the period of March 1 to May 1, 1964 are also subject to this condition, and should be checked.

Time to check and correct this problem can be charged to Code 34, referencing this service aid.

May 22, 64

294 (299) 1. Insure Ready does not become Active during Rewind-Unload 2. Eliminate Ready Dropping IBM 729 BII to BVI (US origin)

1. Due to pick and drop times of the relays involved in a Rewind-Unload operation, it is possible to send a short, Select and Ready response back to TAU after sensing Load Point. If the program is in the process of determining which



tape units are ready, the Select and Ready response indicates the drive performing the Rewind-Unload is ready. When the drive is again addressed, it has completed the Unload sequence, is not ready, and a TAU hang-up occurs.

ECR 45-230 was generated to insure that "Ready" does not become active during a Rewind-Unload. This is accomplished by deconditioning the +A circuit at 4 B, logic page RA.30.40.1 with -S Unload, thereby preventing Mechanical Ready from becoming active when tape reaches Load Point. Tape drives with a serial number prior to 12304 and 61141 do not have this ECR installed. If this condition is experienced, the following wiring can be installed:

Remove	Add
E16C-E16L	E16C-C13D
C17A-C17J	C13Q-C16K
	C16Q-E158
	C17A-C19G.

2. Vibration of the Operator's Panel can cause the Door Interlock switch to break contact and drop Ready. ECR 45-249 was released to correct this condition by adding a capacitor to the Door Interlock switch.

Tape drives with serial numbers prior to 12450 and 61218 do not have this ECR installed. If this condition is experienced, a 10ufd capacitor, P/N 526498, may be mounted on the Door Interlock switch. Wire the +terminal of the capacitor to the n/o points and the -terminal to the common.

ECR's 45-230 and 45-249 will be picked up an EC 253760, which will be a mandatory field change.

The time required to install this change may be coded 33. Make reference to this service aid.

Parts may be ordered on field requisition card, Code 6, COP Orly.

May 22, 64

## 295 (301) Erase Head Check - Off Line IBM 729, All Mod

Using the off line tester, write all bits continuously in a Backward direction. Since the tape is going in a backward direction, the erase head will erase the bits that were just written. Read forward over the area that was written and scope the read bus for each bit. The erase head should erase all bits to less than 0.4 v.

June 6, 64

## 296 (308) Write Echo Errors IBM 729, BII to BVI (US origin)

Due to circuit loading trouble, write echo errors may be experienced when six or more Norlay tape drive units are connected on the same bus. Should you have this condition, install the following circuit change:

### Remove Wires

G11A - E13R  
G11D - G09B  
G11H - C19P  
G11G - G10F.

### Add Wires

E13R - G11H  
G09B - G11G  
C19P - G11A  
G10F - G11D.

This change is now being installed in the Plant under ECR 12-060. It will be released to the field under EC 254103.

The time required to install this change may be coded 33 and charged to EC 254103, referencing this service aid.

July 10, 64

## 297 (303) High Resistance Ground in Multiple Volt Power Supply IBM 729, BII to BVI (US origin)

Reference: 729-B Parts Catalog (123-0405-0), Figure 29.

The heat sink (Item 44) is mounted on a metal bracket and insulated from this bracket by nylon spacers on the left and by two pieces of channelled rubber on the right. This rubber is subject to electrical breakdown, causing a high resistance ground in the area of 1 to 0.5 meg. ohms.

The high resistance ground at the power supply will create a ground loop. A ground loop in one tape drive unit can cause highly intermittent noise trouble (R/W errors - False TI) on any unit on the same bus.

1. Checking for a ground loop on 729-B. Disconnect the green wire in the read head cable from ground. We should read 10 meg. ohms between the green wire and machine frame. Be sure that the I/O shoes and power cables are disconnected.
2. Correct insulation of power supply heat sink. Add several layers of electrical tape between the rubber insulators and the bracket.

The time required to check and correct the above condition should be charged to Code 34, with reference to this service aid.

June 19, 64

## 298 (314) Proloy Coil Assembly IBM 729, All Mod

When it becomes necessary to replace the proloy coil assembly (P/N 528524), the stop coil must be identified so that the proper number of shims may be applied. There is a 0.005-inch shim over the stop coil in addition to a 0.002 inch shim.

On assemblies with a molded plug, the coil marked with a black stripe is connected to plug pins 1 and 3. Used on a right proloy, this coil is a Right Stop; used on a left proloy, the marked coil is the Left Go.

Aug 11, 64

## 299 (305) A. False Load Point Indications IBM 729 B. Failing to Stop at Load Point All Mod

The voltage across the LP and TI lamps should be adjusted to obtain reliable operation and should fall in the range of 5.0 to 6.5 volts. Although there is a variety of settings for the three types of 729's given in CE Reference Manuals and prior CEM Service Aids, reliable operation on all types should be obtained when the lamp voltage is adjusted for 5.7 ± 0.2 volts (with tape in columns). Symptoms resulting from sensing false load points range from stopping too soon on a load or rewind to missing or duplicate records. See 729 SA-268 (279).

A. If false load point indications are experienced with a TI-LP lamp setting of 5.7 ± 0.2 volts, the following areas should be investigated:

1. Check that photocell apertures are aligned parallel to tape edges and that excessive overlap between the TI and LP light patterns does not exist. Excessive overlap can be corrected by carefully forming the LP-TI lamp common strap, rotating the lamp on the new style assembly, or replacement of the lamp assembly.
2. Insure the voltage drop across the individual LP and TI lamps does not differ by more than 10 per cent.
3. A new photocell block, which has smaller diameter apertures to reduce the effects of stray light, is being used on new production machines. This block, P/N 528193, is available in COP Orly. Early NORLAY drives do not have the new style block.
4. NORLAY - False load points, especially on the load sequence following a high speed rewind, can be corrected on the NORLAY by replacing the 10 ufd capacitor (P/N 491316) in the Photo Amplifier YAW Card at 1D20 with a 5 ufd capacitor, P/N 483239.

B. If a drive fails to recognize load point, the following areas should be investigated:

1. Lamp voltage.
2. Photocell alignment and proper light patterns.
3. Insure the voltage drop across the individual LP and TI lamps

does not differ by more than 10 per cent.

4. **NCR** - Slow response of the IPhoto Amplifier (YAW Card) may cause a failure to sense load point on a sequence, such as reading a record from load point and then immediately re-winding. The response can be made faster by replacing the 10 ufd capacitor (P/N 491316) in the Photo Amplifier YAW Card with a 5 ufd capacitor, P/N 483239. Location of this card is 3E05.

Capacitors and photocell blocks may be ordered on Field Requisition Card, Code 6, COP Only.

June 19, 64

**(306) Removal and Replacement of IBM 729, B II to VI Pneumatic Door Cylinder**

the sliding panel in its uppermost position, remove the upper cylinder hold-down. Unscrew the cylinder from the stud on the bottom of the door, leaving stud in place.

Install a new cylinder, screw it onto the stud in the bottom of the door and install the upper holding nut.

At the top and bottom of each unit are partially blocked by movable covers. When the cover holding screw and move the cover to change the damping in. Close both lower ports equally if the window slams when being lowered; both upper ports equally if window action is too sluggish when raised.

**CAUTION** When receiving a new cylinder, the spring latch must be held firmly while removing the shipping tape or wire from around the cylinder, and the cylinder must be allowed to expand slowly against hand pressure to its full extended position. If this is not done, the piston, which is under strong spring pressure, may break through its retainer, causing a hazardous condition.

Cylinder must not be taken apart for any reason, as the spring may be loose and eject itself from its case. If any malfunction occurs, replace the cylinder completely with a new one.

Refer to NORLAY Parts Catalog No. 123-0405-0 for door hardware part numbers.

July 3, 64

**(309) Tape Losing Proximity with the IBM 729, All Mod Read/Write Head (US origin)**

Because of the tape leaving the R/W head during the starting motion can be attributed to the prelay pulley.

Combination of very smooth tape and a glazed pulley surface will cause the tape to adhere. This is the same condition as if two pieces of glass were placed together on a surface. When the tape starts to move, it tends to follow the pulley in the circular direction. This action causes a wave in the tape which is transmitted to the read/write head.

Above problem usually results in high write error counts, temporary read errors (drop out) and noise records (failure to erase). The loss of signal is more evident on the "1" bit track.

To solve this condition, set up the scope, drive, and tester for checking stop time. Go forward with a full loop of tape in the left column and a go down time (Count Five). If the trouble is present, you will observe a dip in the envelope at 7-9 ms after go. This dip is more severe on the "1" bit track.

The only correction to this problem at present is replacement of both nylon pulleys. A pulley constructed of a new material is now being tested. If satisfactory results are obtained, an engineering change will be made.

While analyzing this problem, it must be remembered that there are other causes of slapping of the start envelope. They are:

1. R/W head wrap angle adjustment
2. Split guide tension
3. Prelay adjustment.

Aug 7, 64

**(310) Backspace Test Procedure IBM 729, All Mod**

The following procedure has proven useful in detecting an intermittent failure to complete a backspace operation.

Select a tape which is in very good condition and not likely to cause write checks.

2. Program a Skip, Write Tape Mark, Backspace operation for the entire reel. This will leave the tape erased.
3. Issue Backspace command.
4. If tape stops before load point, read forward to verify a tape mark was read.
5. A tape mark indicates failure to backspace.
6. If a Tape Mark is not found in step 4, it is likely that tape drive electrical noise or noise from the tape caused the stop.

Aug 7, 64

**303 (311) Vacuum Switch Filter IBM 729 II to VI A II to VI (US origin)**

CEMs 729 EC-142 (99) (Relay) and 144 (101) (NOR) announced a new RC filter network for the vacuum switches. This new assembly, P/N 362122, uses a 5 Mfd capacitor with a 250-volt rating and a 30-ohm, 1/2-watt resistor.

A few reports of the 30-ohm 1/2-watt resistor burning open in this new assembly have been received. It is suggested that if this condition is encountered, the 1/2-watt resistors be replaced with one (1) watt 30-ohm resistors, using the same capacitor.

A new assembly, P/N 5331854 with a 250-volt capacitor and 1-watt 30-ohm resistor has been released. All B/M's 5324381, CEM-144 (101), which have not been shipped as of approximately July, 1964 will have the new assembly P/N 5331854 substituted for P/N 362122. B/M's 5324303, see CEM 729 EC-142 (99), are considered 100% shipped, and will not be changed.

The time required to change the resistor may be coded 32. Make reference to this 729 SA number.

B/M 5324381 may be ordered on Field Requisition Card, Code 6, COP Only.

Aug 7, 64

**304 (313) Intermix of Metered and IBM 729 Non-Metered Tape Drive Units All Mod**

Should the condition arise where non-metered (customer owned) units are used on the same I/O bus with metered units, the meters will not function correctly.

To allow the meters to operate correctly, a change must be made to the non-metered units. Two jumpers must be added, as follows:

T/C 48 A shoe to T/C 48 B shoe  
T/C 49 A shoe to T/C 49 B shoe.

If tape switching is installed on the non-metered unit, the second set of shoe connectors must also be modified.

Aug 11, 64

**305 (-) Installation of B/M 8023445 and IBM 729 NOR B/M 8026561**

This CEM supersedes the Advance CEM with the same title, dated August 11, 64.

Troubles are encountered after installation of B/M 8023445 JT 84735 and B/M 8026561 JT 85180V, mainly when the tape is loaded after a high speed rewind. Any of the following can happen:

1. Tape is damaged by the coming out of the capstans.
2. Tape is dumped in both columns.
3. Head falls down with only about 3 cm tape length in left column and there is no more action.
4. Head falls down and comes up again, ready status goes off.
5. Tape is damaged by the head which reaches its down position before reels have stopped.

To avoid # 3, a Field B/M 8026801 JT 85593 has been released, changing the brake conditions. (This Field B/M will be shipped automatically)

B/M's 8023445, 8026561 and 8026801 should be installed concurrently. Troubles # 1, 2 and 4 are eliminated by making the following adjustments.

1. Right brake (P1)

Must be adjusted at about 600 grs  $\pm$  200 grs. If the small amount of tape after H.S. rewind is not correct, it will be adjusted by shifting the lamps lighting the photo cell. Recheck the spot concentration.

NOTE: A too important right brake adjustment (1 kg and over) will cause troubles # 3 and 4.

### 2. Partial left brake (P2)

After JT 85180V, the partial left brake was adjusted for minimum drag, to avoid stretching the tape. In fact you must adjust it so that at the end of the H.S. rewind the tape is slightly tight to be flush with the nylon pulleys. Avoid a loop above the left column. (To check it, disconnect the Head take up motor during the H.S. rewind). Then, check by depressing the tape with one finger, in front of the slit guides; light depression should turn the left reel.

Trouble # 5 is eliminated by replacing the mercury switch P/N 8020329 with an old style P/N 159821.

Check that all machines with JT 84735 are equipped with the mercury switch bulb # 159821 (which can easily be recognized at their straight electrodes).

Nov 25, 64

On the machines above mentioned connect the A lower wires to the A upper position according to WD RA-40-45-1-B-6.

Nov 25, 64

## 306 (-) 729 B II to VI (French origin)

This CEM supersedes the Advance CEM with the same title, dated Sept 2, 64.

### 1. TAPE DUMPING (ECR 90028)

To avoid tape dumping during loading after a HS Rewind, potentiometer R23 (P/N 8018018) and diode SR 17 (P/N 315902) have been added.

This potentiometer must be adjusted so that at the end of the HS rewind, the tape is slightly to be flush with the nylon pulleys. Avoid a loop above the column. (To check it, disconnect the head take up motor during the HS Rewind). Then, check by depressing the tape with one finger, in front of the slit guides; a light depression should turn the left reel.

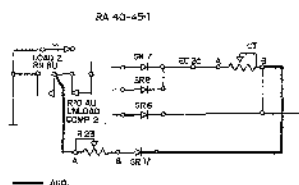
### 2. FALSE LOAD POINT INDICATIONS (ECR 90029)

Are particularly encountered on the load sequence following a HS Rewind. This failure has been eliminated by shorting R2 AU N/C contact (Logic RA 40-15-1) so that the TI and LP lamps light only when the head is in down position.

NOTE: Some Tape Drives between S/N 5357 and 5373 have been manufactured without these changes. Refer to machine history.

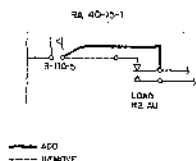
In order to standardize all the machines, apply the following modifications.

#### ECR 90028



Location of R23 - Hole CP12 on the CP panel  
Location of SR17 - above SR15.

#### ECR 90029



Add to the machine history: ECR 90028, ECR 90029.

WD-RA-10-50-0

Correct RA-40-15-1

RA-40-45-1 accordingly

3-Relay # 10

Some Tape Drives, between S/N 5357 and 5403, have been erroneously equipped with a 4 positions relay P/N 128843 instead of a 2 positions relay P/N 11135.



729 EC		Title	Remarks
New WTC No.	New DOM No.		
144	101	Eliminate Vacuum Switch Capacitor Breakdown US origin	
145	102	Tape Switching Lamp Voltage Change (US origin)	
146	103	Eliminate Time Delay on Load Rewind (French & US origin)	
147	104	Front Kickplate Retention (US origin)	
148	-	False Conditions while Transferring Tape Switching Relays (French origin)	
149	-	Tape Twisting in Columns after Installation of B/M8023445 (French origin)	
150	-	Installation of Use Meter (French origin)	
151	104	Front Kickplate Retention (French origin)	
152	105	Prevent Tape Stretch (US origin)	
153	107	Preparation for Installation of Process Meter (US origin)	
154	108	Installation of Process Metering (US origin)	
155	109	Prevent 7090/94 TAU Hang-Up (US origin)	
156	-	Make Process Line Inactive on "Off Line" Machines equipped of "Metering Device"	
157	113	Insure Positive Transfer of Tape in Column Switches (French origin)	
158	-	Logic Changes (French origin)	
159	106	Shield Tie Down for Tape Switching (French and US origin)	
160	-	Prevent Tape Stretch (French origin)	
161	-	Unloading Improvement (French origin)	
162	-	Tape Switching Indicator Lamp Voltage Change (French origin)	
163	-	Quick Mount and Remove Tape Reel Latch (French origin)	
164	-	New Photocell Block (French origin)	
165	112	Eliminate Timing Difference (U.S. origin)	
166	116	Head Down First (U.S. origin)	
167	115	Disconnecting of Meter While Servicing "Off Line" (U.S. origin)	
168	-	Reduce Neutral Current (French origin)	Cancelled - See GEM 729
169	117	Main Gate Door Hinge Stop (U.S. origin)	S. A. 342 (347)
170	118	Write Echo Error (U.S. origin)	
171	119	Read/Write Head Cover (U.S. origin)	
172	-	Delayed Capstans Coming Out (French origin)	
173	120	Improved Prolay operation at Low Go Down Time (U.S. origin)	Cancelled
174	122	Prevent Loading if Either Capstan is Extended Midway (U.S. origin)	
175	123	Prevent Tape Twisting in Columns on Load and Keep Ready Down if Tape Dumps (U.S. and Canadian origins)	
176	124	Eliminate Race Condition - Improve Asymmetry Adjustment and Eliminate Excessive R/W Errors (U.S. and Canadian origins)	
177	110	Improve Ready Controls (U.S. origin)	
178	-	Prevent Tape Twisting on Load and Keep Ready Down if Tape Dumps (French origin)	
179	125	Intermittent Loss of SMS Voltages (U.S. and Canadian origins)	
180	126	Erase Head Mounting Plate Installation	
181	-	Prevent Skew Errors (French origin)	
182	127	To Prevent Meter From Running While in a Stand-by Status on a Tape Switching Drive (U.S. origin)	
183	-	Updating Wiring Diagram (French origin)	



MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 AII to AVI	5325314	86178
729 BII to BVI	5325314	86178

ENGINEERING INSTRUCTIONS : 5325314

PREREQUISITES : None

INSTALLATION TIME : 0.3 Mach. Hour  
0.3 Man Hour  
1 Man

SPECIAL TOOLS : None

**IBM USE ONLY**

TYPE E - MES CODE 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - JT 86178-Vacuum Reducer

SERVICE CODE 32 or 42

December 10, 1964

158 (-) Logic Changes

IBM 729 A  
(French origin)

To improve loading and unloading operations.

To eliminate false Load Point during H.S. Rewind sequence due to a false "Go Internal" Pulse.

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 AII to VI	8026801	85593B

ENGINEERING INSTRUCTIONS : 8026801

PREREQUISITES

Type or History Code	B/M	JT
729 AII to VI	8026561	85180V

INSTALLATION TIME : 2.4 Mach. Hours  
2.4 Man Hours  
1 Man

**IBM USE ONLY**

TYPE E - MES CODE 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - JT 85593B - Logic Changes.

SERVICE CODE 32 or 42

December 9, 1964

159 (106) Shield Tie Down for Tape Switching

IBM 729 A II to A VI  
(French and US origin)

Provide shield termination on the "+P Set Hi Density" and "+P Rewind and Unload" lines by referencing them to -6 volts on drive with Tape Switching, B/M 348530 or 554180 installed for drives of US origin and B/M 8016913 installed for drives of French origin.

MACHINES OF US ORIGIN

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	EC
729AII to AVI	5325058	253378A

ENGINEERING INSTRUCTIONS : 5325058

PREREQUISITES : None

INSTALLATION TIME : 0.2 Mach. Hour  
0.5 Man Hour  
1 Man

**IBM USE ONLY**

TYPE E - MES CODE 3, Poughkeepsie

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - EC #253378A -Shield tie down.

SERVICE CODE 32 or 42

MACHINES OF FRENCH ORIGIN

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 AII to AVI	8026911	85913

ENGINEERING INSTRUCTIONS : 8026911

PREREQUISITES : None

INSTALLATION TIME : 0.2 Mach. Hour  
0.5 Man Hour  
1 Man

**IBM USE ONLY**

TYPE E - MES CODE 3, France

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - JT # 85913 -Shield tie down.

SERVICE CODE 32 or 42

December 9, 1964

160 (-) Prevent Tape Stretch

IBM 729 A II to A VI  
(French origin)

Eliminate stretching tape on the unload portion of a Rewind operation.

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 AII to AVI	8026908	85912

ENGINEERING INSTRUCTIONS : 8026908

PREREQUISITES : None

INSTALLATION TIME : None

**IBM USE ONLY**

TYPE E - MES CODE 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

CORDS : Update Machine History - JT 85912 Rewind Unload Improvement  
SERVICE CODE 32 or 42

December 9, 1964

1 (-) Unloading Improvement IBM 729A (French origin)

provide for unloading the machine immediately after power has been turned on with tape loaded in the vacuum columns.

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	EC	or	JT
729A II to A VI	2085904	-		86559

ENGINEERING INSTRUCTIONS: 2085904

PREREQUISITES :

Type or History Code	B/M	EC	or	JT
-	-	-		84735
-	-	-		84894
-	-	-		85915

INSTALLATION TIME : 0.2 Machine Hr.  
0.2 Man Hr.

IBM USE ONLY

TYPE E, Mes Code 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

CORDS : Add on Machine History :  
JT 86559 - Delay Unload Stop

SERVICE CODE : 32 or 42

March 24, 1965

(-) Tape Switching Indicator Lamp Voltage Change IBM 729A II to VI and IBM 729 II to VI (French origin)

The present production of switch console 7155 is equipped with 28 volt indicator lamps (P/N 362119) instead of 28 volts (P/N 419174).

The tape switching device installed at the Plant or the B/M's intended for field installation, have already been modified to equip the console with correct voltage (7.5 volts).

Before connecting 7155 console to 729 tape unit through tape switching device, check the voltage of the lamps on the 7155 and the 727 on the 729 Machine History. A 7155 with 6.3 volt indicator lamps should be connected to 729 without JT 84727.

On the 7155 console the lamp voltage can be recognized by the value of the resistor connected in their circuit.

For the 28 volt lamps, a 680 Ω resistor is connected in the circuit.

For the 6.3 volt lamps, a 10 Ω resistors is connected in the circuit.

1. 729 without JT 84727 to be connected to 7155 with 6.3 volt lamps. Install the following B/M on the 729 unit.

Type	B/M	JT
729 Relay	8023344	84727 A
729 NOR	8023343	84727 A

ENGINEERING INSTRUCTIONS : 8023343-8023344

PREREQUISITES : None

INSTALLATION TIME : 1.0 Mach. Hour  
1.0 Man Hour

2. 729 with JT 84727 to be connected to 7155 with 28 volt indicator lamps. Install the following B/M on the 7155 unit.

Type	B/M	JT
7155	8026726	85436

ENGINEERING INSTRUCTIONS : 8026762

PREREQUISITES : None

INSTALLATION TIME : 0.5 Mach. Hour  
0.5 Man Hour  
1 Man

NOTE

This B/M 8026762 must be ordered for each row of four indicator lamps.

IBM USE ONLY

TYPE E - MES CODE 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - JT84727A T.S. Low voltage lamps

SERVICE CODE 32 or 42

March 24, 1965

163 (-) Quick Mount and Remove Tape Reel Latch IBM 729 All Models (French origin)

Allow quicker mounting and removing of tape reels.

MACHINES AFFECTED : Refer to Machine History :

Type or History Code	B/M	EC	or	JT
729 II to VI	5325376	-		86470V
729A II to VI	5325376	-		86470V
729B II to VI	5325376	-		86470V

ENGINEERING INSTRUCTIONS: 5325376

PREREQUISITES : None

INSTALLATION TIME : 0.5 Machine Hr.  
0.5 Man Hr.

SPECIAL TOOLS : Gage # 461453

IBM USE ONLY

TYPE E, MES Code 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Add on Machine History :  
JT 86470V - Tape Reel Latch.

SERVICE CODE : 32 or 42.

March 24, 1965

164 (-) New Photocell Block IBM 729-B (French origin)

A new photocell block P/N 528193, which has smaller diameter apertures to reduce the effects of stray light is now available.



MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	EC	or	JT
729B II to BVI	2085825	-		85896V

ENGINEERING INSTRUCTIONS: 2085825

PREREQUISITES : ECR 90029

INSTALLATION TIME : 0.5 Machine Hr.  
0.5 Man Hr.

SPECIAL TOOLS : None

IBM USE ONLY

TYPE E, MES Code 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY.

RECORDS : Add on Machine History :  
Photo cell , assembly JT 85896  
Update parts catalogs

SERVICE CODE : 32 or 42

March 24, 1965

165 (112) Eliminate Timing Difference IBM 729 B II to B VI  
(US origin)

Eliminate timing difference between the Select and Ready line and the Select and Load Point line.

NOTE: This EC was pre-released in CEM 729 SA-290 (294). If service aid has been installed, logic page updating is all that is required to install this change.

Instruction Part Number: 5325337

TYPE	B/M	FIELD E/C	FACTORY E/C
729 B II - B VI	5325337	254024	254024

This change has been pilot tested and is correct.

No factory or field changes must be installed prior to this change.

INSTALLATION TIME: 1.2 Man hrs

SPECIAL TOOLS: None

IBM USE ONLY

TYPE E, MES Code 3, Poughkeepsie

WILL BE SHIPPED AUTOMATICALLY

Service Code 32 or 42

Oct 16, 64

166 (116) Head Down First IBM 729 II to VI, A II to A VI  
(US origin)

Improve loading by bringing head down prior to tape entering columns. Reel take-up motors are placed under control of the head down switch.

Instruction Part Numbers: 5325229 (RELAY)  
5325230 (NOR)

TYPE	B/M	FIELD E/C	FACTORY E/C
729 II, IV, V, VI	5325229	253520	253520
729 A II - A VI	5325230	253520	253520

This change has been pilot tested, but additional information is needed to install changes as contained in E/C Errata Sheets 729-010 for B/M 5325230 and 729-011 for B/M 5325229.

The following factory or field changes must be installed prior to this change.

TYPE	B/M	FIELD E/C	FACTORY E/C	CEM
729 II, IV, V, VI	5324510	252725	252725	146 (103)
729 A II - A VI	5324385	252528	252528B	130 (93)
729 A II - A VI (Rear Preamps)	none	none	252268	none

Concurrent installation of Special Feature EC 281095 is required if any of the following features are installed:

B/M	DESCRIPTION	RELAY
570053	Tape Selection without Tape Switching Interlock for Tape Switch	RELAY
570184	Interlock for Tape Switch	RELAY
570207	Remote File Protect with Remote Tape Selection	
570783	Tape Dump Protection	RELAY
575332	Tape Selection with Tape Switching	RELAY
580353	Tape File Protect Manual Control	NOR, RELAY
580425	Tape Dump Protection	NOR

INSTALLATION TIME: 1.6 Man hrs

SPECIAL TOOLS: None

IBM USE ONLY

TYPE E, MES Code 3, Poughkeepsie

This is a controlled B/M and is applicable only to tape drives with the prerequisites listed above.

WILL BE SHIPPED AUTOMATICALLY

Service Code 32 or 42

Febr 5, 65

167 (115) Disconnecting of Meter while Servicing Off Line IBM 729 A II to A VI  
(US origin)

To prevent the process meter from running while the machine is being serviced off-line on an active channel.

Instruction Part Number: 5325313

TYPE	B/M	FIELD E/C	FACTORY E/C
729 A II - A VI	5325313	254096	254096

The following factory or field changes must be installed prior to this change.

TYPE	B/M	FIELD E/C	FACTORY E/C
729 A II - A VI	See CEM 154 (108)	253517	253506

Special feature EC 281148 must be installed concurrently with this B/M if any of the following special features are installed.

B/M	DESCRIPTION
570461	Remote Tape Selection without Tape Switching
570585	Remote Tape Selection with Tape Switching
572288	Status Outputs - Tape

INSTALLATION TIME: 2.0 Man hrs.

IBM USE ONLY

TYPE E, MES Code 3, Poughkeepsie. Service Code 36

WILL BE SHIPPED AUTOMATICALLY

Jan 22, 65

~~8 (-) Reduce Neutral Current IBM 729B (French origin)~~

~~allow for more efficient operation of the proloy at low go down times.~~

~~MACHINES AFFECTED - Refer to Machine History~~

~~per or History Code B/M 2086550 or JT 86507 V~~

~~Engineering Instructions : 2086550~~

~~PREREQUISITES - None~~

~~INSTALLATION TIME - 0.5 man hrs., 1 man~~

~~SPECIAL TOOLS -~~

~~IBM USE ONLY  
TYPE E, MES Code 3, France. Service Code 32 or 42.~~

~~RECORDS - Update Machine History - JT 86507V - Reduce Neutral Current.~~

~~THIS B/M WILL BE SHIPPED AUTOMATICALLY~~

~~May 12, 65~~

9 (117) Main Gate Door Hinge Stop IBM 729 BII-B VI (US origin)

**SAFETY** A stop screw is installed to prevent the main gate door from swinging accidentally lifted off hinge pins.

Factory installed on ECR 45-269.

INSTRUCTION PART NUMBER : 5325369

TYPE	B/M	FIELD EC	FACTORY EC
729 BII-BVI	5325369	254020	254020

Factory or field changes must be installed prior to this change.

ESTIMATED INSTALLATION TIME - 0.5 man hrs.

IBM USE ONLY  
TYPE E, MES Code 3, Poughkeepsie. Service Code 33 or 42.

THIS B/M WILL BE SHIPPED AUTOMATICALLY

Febr 19, 65

1 (118) Write Echo Error IBM 729 BII-B VI (US origin)

Routing of the write echo line to TAU is improved. Write echo errors could be experienced if six or more tape drive units are connected on the same bus. This change could have been previously installed per CEM 729 SA-296(308) or factory ECR 12-060. EC 254103V will update logics.

INSTRUCTION PART NUMBER : 5325373

TYPE	B/M	FIELD EC	FACTORY EC
729 BII - BVI	5325373	254103	254103

Factory or field changes must be installed prior to this change.

ESTIMATED INSTALLATION TIME - 0.8 man hrs.

IBM USE ONLY  
TYPE E, MES Code 3, Poughkeepsie. Service Code 33 or 42.

THIS B/M WILL BE SHIPPED AUTOMATICALLY

April 2, 65

171 (119) Read/Write Head Cover IBM 729 All Mod (US origin)

**SAFETY** Hand injury may be caused by sharp edges and corners on the upper read/write head cover, P/N 528560. This condition should be corrected by rounding the edges and corners with a fine file. The filed surface must be covered with a clear acrylic coating (purchased locally) to prevent oxidation.

May 16, 65

172 (-) Delayed Capstans Coming Out IBM 729 (French origin)

The coming out of the capstans is delayed to increase the security during the loading sequence. A RC network is installed on R122 coil and the R122/4 NC contact is included in the picking circuit of DP3.

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	EC	or	JT
729B II to VI	2086616	-		86869

ENGINEERING INSTRUCTIONS : 2086616

PREREQUISITES :

History Code	B/M	EC	or	JT
729B II to VI	2086550	-		86507

INSTALLATION TIME : 1.25 Mach. Hrs.  
1.25 Man Hrs.  
1 Man

IBM USE ONLY

TYPE E - MES Code 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Add on Machine History  
Delay Capstan - JT 86869

SERVICE CODE : 32 or 42

revised Oct 19, 65 (May 24, 65)

~~173 (120) Improved Proloy Operation at Low Go Down Time IBM 729 BII to BVI (US Origin)~~

~~Potentiometer R-19 and Resistor R-8 are changed to different values to allow the proloy neutral current to be adjusted to 2.5 amperes. Factory installed on ECR 12-065.~~

~~Instruction Part Numbers: 5325367~~

TYPE	B/M	FIELD EC	FACTORY E/C
729 BII-BVI	5325367	254337	254337

~~No factory or field changes must be installed prior to this change~~

~~ESTIMATED INSTALLATION TIME: - 0.7 Man hrs.~~

~~IBM USE ONLY  
TYPE E, MES Code 3, Poughkeepsie. Service Code 32 or 42  
WILL BE SHIPPED AUTOMATICALLY.~~

~~May 14, 65~~





174 (122) Prevent Loading if either IBM 729 II, IV, V, VI  
Capstan is extended Midway (US origin)

After EC 252725 (Quick Load CEM 146 (103)) is installed, tape will be allowed to load if either capstan is extended midway. Tape damage can result from this condition.

INSTRUCTION PART NUMBER: 5325368

TYPE	B/M	FIELD E/C	FACTORY E/C
729 Relay 2, 4,5,6	5325368	254335	254335 or ECR 12-062

The following factory or field changes must be installed prior to this change.

TYPE	B/M	FIELD E/C	FACTORY E/C
729 Relay 2, 4,5,6	5325229	253520	253520

ESTIMATED INSTALLATION TIME man hours 0.2.

IBM USE ONLY

TYPE E - MES Code 3, Poughkeepsie. Service Code 32 or 42.

WILL BE SHIPPED AUTOMATICALLY

June 11, 65

175 (123) Prevent Tape Twisting IBM 729B II - BIV  
in Columns on Load (US and Canadian origins)  
and Keep Ready down  
If Tape Dumps

The unload status of the reel brakes is changed to full left and partial right. Partial left brake is applied upon reel stopped condition at high speed rewind end. If ready is dropped by the tape dump during processing, it is not allowed to come back up.

MACHINES AFFECTED -

Canadian origin: Prior to 729 B II-91-03069  
Prior to 729 B VI-91-07033

US origin: This change was factory installed by ECR 12-125 on machines above serial 13688 and 61865. This change may also have been installed from 729 Service Aid 321 (332) or by instructions from Field Engineering Poughkeepsie, Plant.

After this change is installed, it may be necessary to readjust the left partial brake. Adjust as per 729 Service Aid 309 (319).

INSTRUCTION PART NUMBER - 5325449

TYPE	B/M	FIELD EC	FACTORY EC
729 BII-BVI	5325449	254098	254098

The following factory or field changes must be installed prior to this change.

TYPE	B/M	FIELD EC	FACTORY EC
729 BII-BVI	5325286	253760	253760

Special feature EC 299171 must be installed concurrently with this B/M if special feature B/M 572355 (Tape Selection) is installed.

ESTIMATED INSTALLATION TIME - 1.3 man hrs.

IBM USE ONLY

TYPE E, MES Code 3, Poughkeepsie. Service Code 33 or 42.

WILL BE SHIPPED AUTOMATICALLY

Oct 1, 65

176 (124) Eliminate Race Condition, Improve Asymmetry Adjustment and Eliminate Excessive R/W errors IBM 729 II, IV, V, VI  
AII - AVI, BII - BVI  
(US and Canadian origins)

PURPOSE

Section I (NORLAY only) All Models  
Eliminate a race condition when running backspace at load-point (adds a capacitor to backward line as per ECR 12-183).

Section II (Applicable to RELAY, NOR and NORLAY) Models 5 and 6  
Improve asymmetry adjustment (jumps out the 100 ohm fixed resistor on asymmetry adjustment cards as per ECR 12-104 or 729 SA 317 (327). Time asymmetry must be checked as per 729 SA 159 (202) after installing this section.

Section III (NORLAY only) All Models  
Eliminate excessive R/W errors due to "8" bit pickup (re-route plus 6 voltage line away from "8" bit preamp input).

MACHINES AFFECTED -

Canadian origin: All 729 Models II, IV, V and VI  
Prior to 729 BII-91-03078  
Prior to 729 BVI-91-07043

US origin: 729 NOR - NORLAY - RELAY

B/M	EC FIELD/FACTORY	INSTRUCTION P/N
5325538	254339	5325538

INSTALLATION TIME - 0.7 man hrs.

PREREQUISITES -

TYPE	B/M	EC	CEM
729 BII and BVI	5325373	254103	170 (118)
729 BII and BVI	5325286	253760	177 (110)

IBM USE ONLY

TYPE E, MES Code 3, Boulder. Service Code 32 or 42.

WILL BE SHIPPED AUTOMATICALLY

Nov 30, 65

177 (110) Improve Ready Controls IBM 729 BII to BVI  
(US origin)

This EC has two sections.

Section I: To insure ready does not become active during a rewind-unload operation, as per ECR 45-230.

Section II: To prevent dropping of ready status due to vibration of operator's panel, as per ECR 45-249.

NOTE: Wiring portion of this change may have been installed per 729 Service Aid 294 (299).

Instruction Part Number: 532586

TYPE	B/M	FIELD E/C	FACTORY E/C
729 BII-BVI	5325286	253760	253760

No factory or field changes must be installed prior to this change.

ESTIMATED INSTALLATION TIME - 1.8 Man Hrs.

IBM USE ONLY

TYPE E, MES Code 3, Poughkeepsie. Service Code 33 or 42.

WILL BE SHIPPED AUTOMATICALLY.

Feb 2, 66

8 (-) Prevent Tape Twisting on Load and Keep Ready Down if Tape Dumps (French origin) IBM 729 B

The unload status of the reel brakes is changed to full left and partial right.

If ready is dropped by the tape dump during processing, it is not allowed to come back up.

TYPE OR HISTORY CODE -

B/M	EC	JT
729 B II to VI	8027198	87508

ENGINEERING INSTRUCTIONS - 8027198

PREREQUISITES -

Type or History code -

B/M	EC	JT
2086616		86869

INSTALLATION TIME - 1.0 machine or system hrs., 1.0 man hrs.

IBM USE ONLY

Service Code 32 or 42.

- Ordering procedure: a) THIS B/M WILL BE SHIPPED AUTOMATICALLY  
 b) MES Code 3, France

RECORDS: Loading improvement JT 87508

March 17, 66

9 (125) Intermittent Loss of SMS Voltages IBM 729 BII, BIV-BVI (US and Canadian origins)

Problem:  
 Loss of SMS circuit voltages is due to poor quality crimp connections on the tape jumper wires to the SMS panel. This problem exists on orange Burndy connectors only, not the yellow Amphenol connectors.

Solution:  
 Tape jumper wires (terminal board to SMS panel) attached to TB-1, TB-2 and TB-3 with orange Burndy connectors must be reworked by soldering. It is necessary to solder all the aforementioned Burndy connectors because a continuity check is not 100 per cent effective when attempting to pinpoint the defective connections.

- MACHINES AFFECTED -  
 Canadian origin: All 729 Mod. 2, 4, 5, and 6.  
 Origin: All Narlay drives with the following serial numbers by model:  
 Model II 14521 through 15048  
 Model IV 62274 through 62894  
 Model V 14415 through 15049  
 Model VI 62247 through 62895

Estimated Rework Time: 0.5 hours per machine.

IBM USE ONLY

Service Code 34.

May 21, 66

10 (126) Erase Head Mounting Plate Installation IBM 729 II, IV-VI AII, AIV-VI BII, BIV-VI

PURPOSE: To provide a slotted erase head bracket, P/N 352 785, for increased adjustment latitude of the erase head. Refer to 729 Service Aid No 336 (342) for the detailed explanation of the purpose.

MACHINES OF FRENCH ORIGIN -

- Machines Affected: Machine without EC 255 044  
 Engineering Instructions: Part Number 5 325 826

Prerequisites: None

Type or History Code	B/M	EC
729 II - IV - VI	5 325 826	255 044
729 A II - IV - VI		
729 B II - IV - VI		

Installation Time: 0,5 Mach. Hrs.  
 0,5 Man. Hrs.  
 1 Man.

Special Tools: None

IBM Use Only.

Type A - MES Code 3 - France - Service Code 32 or 42.

This B/M will not be shipped automatically.

Records: Update Machine History: EC 255 044. Erase Head.

2. MACHINES OF U S AND CANADIAN ORIGINS -

Instruction Part Number: 5 325 826

B/M	E/C	Name
5 325 826	255 044	Erase Head Mounting Plate Installation.

Estimated Installation Time - 0,5 Man Hrs.

Prerequisites - No factory or field changes must be installed prior to this change.

IBM Use Only.

Type A - MES Code 3 - Boulder - Service Code 32.

revised Nov 25, 66 (March 18, 66)

181 (-) Prevent Skew Errors IBM 729 B Mod VI (French origin)

The Left Stop current can be decreased from 4 Amp. to about 3 Amp. owing to the potentiometer R. 31 to be installed in its circuitry.

This allows the elimination of the SKEW ERRORS liable to occur mostly when a 729 Mod VI NORLAY Tape Drive is attached to a 7010 system channel and working with some low GO down times.

MACHINES AFFECTED - Refer to machine history

TYPE OR HISTORY CODE	B/M	EC
729 B VI	8027923	900026 A

ENGINEERING INSTRUCTIONS - 8027923

PREREQUISITES - None

INSTALLATION TIME - 2 Mach. Hrs., 2 Man Hrs., 1 Man

SPECIAL TOOLS - None

IBM USE ONLY

TYPE A, MES Code 3, France. Service Code 32 or 42.

RECORDS (Machine History) - Update Machine History EC 900026 A - Potentiometer R.31

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

revised Feb 24, 67 (June 28, 66)



Engineering Changes

182 (127) To prevent Meter from Running while in a Stand-By Status on a Tape Switching Drive

IBM 729 II, IV-VI  
AII, AIV-VI  
BII, BIV-VI  
(US origin)

NOR AND NORLAY

B/M	E/C	Installation Time
5325624	254341	0.75 hours

Where Used: 729 AII, AIV-AVI with any of the following B/Ms already installed:

- B/M 348530 Tape switching
- B/M 554160 Tape switching
- B/M 554180 Factory installed tape switching an pre-amp in the rear machines.

729 BII, BIV-BVI with any of the following B/Ms already installed:

- B/M 5344945 Tape switching
- B/M 5345100 Factory installed tape switching without EC 254341.

PREREQUISITES -

Factory EC	Field EC	Field B/M	Machine Type
253516	253516	5325027	729 AII, AIV-AVI
253517	253517	5325031	729 AII, AIV-AVI
253517	253517	5325032	729 AII, AIV-AVI
253508	253517	5325032	729 BII, BIV-BVI
253760	253760	5325286	729 BII, BIV-BVI

EC 299175 (B/M 5325845) must be installed concurrently with this field B/M (5325624) if the following special feature B/Ms are installed:

B/M	Name
570378	Tape Bank Switching 729 AII, AIV-VI
570424	Program Tape Switching 729 AII, AIV-VI
570482	Tape Bank Switching Mod. 729 BII, BIV-VI

RELAY

B/M	E/C	Installation Time
5325623	254341	1.0 hours

Where Used: 729 II, IV-VI with B/M 570043 (tape switching) installed and without EC 254341.

PREREQUISITES -

Factory EC	Field EC	Field B/M	Machine Type
253516	253516	5325024	729 II, IV-VI
253517	253517	5325029	729 II, IV-VI

EC 299175 (B/M 5325845) must be installed concurrently with this field B/M (5325623) if the following special feature B/Ms are installed:

B/M	Name
570785	Tape Bank Switching
580482	Tape Bank Switching Mod.

The following list (cross reference) is supplied to equate B/M numbers, by machine type and model, to specific sequence numbers which will be listed in machine histories at a later date.

RELAY DRIVES

B/M	Model	Sequence Number
570043	II, IV-VI	D0011

NOR DRIVES

348530	AII, AIV-AVI	D0006
554160	AII, AIV-AVI	D0003
554180	AII, AIV-VI	D0001

NORLAY DRIVES

5344945	BII, BIV-BVI	D0001
5345100	BII, BIV-BVI	D0001

IBM USE ONLY

TYPE E, MES Code 3, Boulder. Service Code 32 or 42.

WILL BE SHIPPED AUTOMATICALLY

June 28, 66

**PRELIMINARY ISSUE**

Pages 1 to 46 of Format 6"x 9" are still valid. A complete revised CEM Section 729 EC will be issued at a later date.

### 147 (104) Front Kickplate Retention IBM 729 all Models (US origin only)

Optional - must be ordered.

A bracket, P/N 554149, is mounted over the front kickplate. This prevents the front kickplate from jumping off its holding brackets until the retaining bracket is raised.

Type or History Code	B/M	EC
729 all models	585957	251429

P/N 585957 - Engineering Instruction

PREREQUISITES: None

INSTALLATION TIME - 0.5 man hrs.

IBM USE ONLY

TYPE A, MES Code 3, Poughkeepsie. Service Code 32 or 42.

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

revised Febr 5, 65 (March 9, 64)

### 148 (-) False Conditions while Transferring Tape Switching Relays IBM 729 all Models with Tape Switching (French origin)

To prevent false conditions such as Unload, Rewind, Ready, etc., while transferring Tape Switching Relays.

#### I. 729 RELAY

Type or History Code	B/M	JT
729 Relay all Models	8019879	83696

MACHINES AFFECTED -

Check Logic 00-02-3 is not affected by JT 83696.

PREREQUISITES: None.

INSTALLATION TIME - 0.8 hrs.

#### II. 729 NOR

Type or History Code	B/M	JT
729 NOR all Models	8020786	83894

MACHINES AFFECTED -

Check Logic 02-00-0 is not affected by JT 83894.

PREREQUISITES: None.

INSTALLATION TIME - 0.8 hrs.

IBM USE ONLY

TYPE A, MES Code 3, Essonnes, France.

#### RECORDS - 1. 729 Relay

Add on Machine History:  
B/M 8019879 - JT 83696  
Subject: TS Improvement

#### 2. 729 NOR

Add on Machine History:  
B/M 8020786 - JT 83894  
Subject: TS Improvement

THESE B/M's WILL NOT BE SHIPPED AUTOMATICALLY.

April 20, 64

### 149 (-) Tape Twisting in Columns after Installation of B/M 8023445 IBM 729 NOR all Models (French origin)

Functional Improvement: After installing CEM 137 (93), B/M 8023445, tape dumping or twisting in the columns, may be experienced.

To avoid this possible failure, tape take up motor is put under control of the head down switch.

Type or History Code	B/M	JT
729 NOR all Models	8026561	85180V

Engineering Instruction: P/N 8026561

MACHINES AFFECTED -  
Refer to Machine History.

PREREQUISITES:

Type or History Code	B/M	JT	CEM
729 NOR all Models	8023445	84735X	137 (93)

INSTALLATION TIME - 0.5 hrs.

IBM USE ONLY

TYPE E, MES Code 3, Essonnes, France.  
Service Code 32 or 42.

RECORDS - Machine History: Add JT number 85180V  
Subject: Tape Twisting.

THIS B/M WILL BE SHIPPED AUTOMATICALLY.

April 20, 64

### 150 (-) Installation of Use Meter IBM 729 All Models (French Origin)

This change is separated into two sections:

1. B/M of preparation
2. B/M of installation

NOTE: IF T.S. feature has been field installed, and you receive a Meter Field B/M which does not consider T.S. feature as installed it means that MLC has not been informed of the field installation of this feature.

In this case please contact the Machine Level Control Group (Service 776) to obtain the complementation parts and instructions to install Meter Field B/M

on a 729 with T.S. feature.

MACHINES AFFECTED : REFER TO MACHINE HISTORY

Type	B/M	JT
<b>729 RELAY -</b>		
Preparation: 729 without Tape Switch	8023614	84880B
729 with Tape Switch	8023613	84880B
Installation: 729 without Tape Switch	8026531	84894A
729 with Tape Switch	8026530	84894A

Type	B/M	JT
<b>729 NOR -</b>		
Preparation: 729 without Tape Switch	8025599	84880
729 with Tape Switch	8023600	84880
Installation: 729 without Tape Switch	8023755	84894A
729 with Tape Switch	8023756	84894A

#### ENGINEERING INSTRUCTIONS:

729 Relay: Preparation 8023615 - Installation 8026532

729 Nor: Preparation 8023601 - Installation 8023753

PREREQUISITES: None

INSTALLATION TIME - Preparation + Installation

729 with Tape Switch - 5.5 mach. hrs., 5.5 man-hrs., 729 without Tape Switch - 4.0 mach. hrs., 4.0 man hrs.

SPECIAL TOOLS -

For B/M's installation only Kilt # 452375.

IBM USE ONLY

TYPE E, MES Code 3, France. Service Code 36 or 42.

RECORDS - Update Machine History catalogs.

THIS B/M WILL BE SHIPPED AUTOMATICALLY

Aug 31, 64

### 151 (104) Front Kickplate Retention IBM 729 Relay and NOR II thru VI (French origin) IBM 729 All Models

A Bracket P/N 354149, is mounted over the front Kickplate. This prevents the front Kickplate from jumping off its holding Brackets until the retaining bracket is raised.

MACHINES AFFECTED -  
Optional must be ordered.

B/M 8018412, JT 82536 - Type 729 Relay and Nor II thru VI

PREREQUISITES: None

INSTALLATION TIME - 0.5 mach. hrs.

SPECIAL TOOLS - None.

IBM USE ONLY

TYPE A, MES Code 3, France. Service Code 32 or 42.

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

Aug 31, 64

152 (105) Prevent Tape Stretch

IBM 729 AII-AVI  
(US origin)

Eliminate stretching tape on the unload portion of a Rewind-Unload operation.  
NOTE: This EC was pre-released in 729 CEM Service Aid 256 (265). If Service Aid 256 (265) has been put on, logic page updating is all that is required to ins this change.

INSTRUCTION PART NUMBER: 5324983

TYPE	B/M	FIELD E/C	FACTORY E/C
729 AII-AVI	5324983	253039	253039

This change has been pilot tested; but additional information is needed to install change as contained in E/C Errata Sheet 729-003, which is included with 3/M instructions.

No factory or field changes must be installed prior to this change.

NOTE: Concurrent installation of EC 280620 is required if Remote Tape Selection Feature, B/M 570461 or B/M 570585, is installed.

PILOT TEST INSTALLATION TIME

MAN HOURS: 0.5

IBM USE ONLY

TYPE E - MES Code 3, Poughkeepsie

THIS B/M WILL BE SHIPPED AUTOMATICALLY  
Service Code 32 or 42

May 22, 64

TYPE	B/M	FIELD E/C	FACTORY E/C
*729 II, IV, V, VI (TS)	5325029	253517	253506
729 AII-AVI	5325030	253517A	253506
*729 AII-AVI (TS)	5325031	253517	253506
*729 AII-AVI Rear Preamps (TS)	5325032	253517	253506
729 AII-AVI Rear Preamps	5325033	253517	253506

\*Tape Switching Installed.

This change has been pilot tested, but additional information is needed to install change as contained in E/C Errata Sheets 729-001 and 729-002, both of which are included with instructions for B/M 5325028 and B/M 5325029. The other B/M's do not require these Errata Sheets.

The following factory or field change must be installed prior to this change.

TYPE	B/M	FIELD E/C	FACTORY E/C
729 III	5325017	253516	253506
*729 II, IV, V, VI (TS)	5325024	253516	253506
729 II, IV, V, VI	5325025	253516	253506
729 AII-AVI	5325026	253516	253506
*729 AII-AVI (TS)	5325027	253516	253506

\*Tape Switching Installed

PILOT TEST INSTALLATION TIME

729 III 1.0 MAN HOUR

729 II, IV, V, VI 1.0 MAN HOUR

729 AII-AVI 1.0 MAN HOUR

IBM USE ONLY

TYPE E - MES Code 3, Poughkeepsie, Service Code 36.

THIS B/M WILL BE SHIPPED AUTOMATICALLY

July 8, 64

153 (107) Preparation for Installation of Process Meter

IBM 729 II-VI-AII-AVI  
(US origin)

Prepare tape units for installation of time meter to record system processing time.

INSTRUCTION PART NUMBER: 729 III - 5325017  
729 II, IV, V, VI - 5325018  
729 AII-AVI - 5325019

TYPE	B/M	FIELD E/C	FACTORY E/C
729 III	5325017	253516	253506
725 V, V, VI with Tape Switching (B/M 570043)	5325024	253516	253506
729 II, IV, V, VI	5325025	253516	253506
729 AII-AVI	5325026	253516	253506
729 AII-AVI with Tape Switching (B/M 348530, 554160, 554180)	5325027	253516	253506

This change has been pilot tested and is correct.

No factory or field changes must be installed prior to this change.

PILOT TEST INSTALLATION TIME:

729 III 3.0 MAN HOURS

729 II, IV, V, VI with Tape Switching 3.5 MAN HOURS

729 II, IV, V, VI 3.0 MAN HOURS

729 AII-AVI 3.0 MAN HOURS

729 AII-AVI with Tape Switching 4.5 MAN HOURS

IBM USE ONLY

TYPE E - MES Code 3, Poughkeepsie, Service Code 36.

THIS B/M WILL BE SHIPPED AUTOMATICALLY

August 7, 64

155 (109) Prevent 7090/94 TAU Hang-Up

IBM 729 AII-AVI  
(US origin)

OPTIONAL - Must be ordered if required on 7090/94 Tape Systems.

Eliminate TAU Hang-up due to "Select and Load Point" becoming active during a Rewind-Unload operation when another instruction to that address is waiting to be executed.

NOTE: This change does not apply to Nor tape drives with rear preamps.

Instruction Part Number: 5325253 System Affected: 7090/94

TYPE	B/M	FIELD E/C	FACTORY E/C
729 AII-AVI	5325253	253759	253759

This change has been field tested and is correct.

No factory or field changes must be installed prior to this change.

Concurrent installation of Special Feature E/C 281116, B/M 5325327, is required if any of the following special features is installed:

B/M	DESCRIPTION
570461	Remote Tape Selection without Tape Switching
570585	Remote Tape Selection with Tape Switching
572287	Status Outputs - Tape
572288	Status Outputs - Tape
572289	Status Outputs - Tape
580366	Tape Select and File Protect, Mod V and VI
580422	Tape Select and File Protect, Mod II and IV.

ESTIMATED INSTALLATION TIME - Man Hours: 0.3

SPECIAL TOOLS - None.

IBM USE ONLY

TYPE A - MES Code 3, Poughkeepsie, Service Code 32 or 42.

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

July 8, 64

154 (108) Installation of Process Metering

IBM 729 II-VI  
729 AII-AVI (US origin)

Install time meter to record system processing time.

INSTRUCTION PART NUMBER: 729 III 5325020  
729 II, IV, V, VI 5325021  
729 AII-AVI 5325022

TYPE	B/M	FIELD E/C	FACTORY E/C
729 III	5325020	253517	253506
729 II, IV, V, VI	5325028	253517	253506

156 (-) Make Process Line Inactive on "Off Line" Operation Machines equipped of "Metering Device"

IBM 729  
A II to A VI  
(French origin)

The process line is not down in the NOR tape drive when the "On Off Line" switch is in the off position.

This allows the process meter to run, if the drive is



loaded and remains cabled to an active channel and tape is away from Load Point.

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 AII to AVI	8026952	86068

ENGINEERING INSTRUCTIONS : 8026952

PREREQUISITES : None

INSTALLATION TIME : 2.0 Mach. Hours  
2.0 Man Hours  
1 Man

**IBM USE ONLY**

TYPE E - MES CODE 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - JT 86068 - Meter while test

SERVICE CODE 32 or 42

December 10, 1964

**157 (113) Insure Positive Transfer of Tape in Column Switches IBM 729 A and B (French origin)**

A plate is cemented to the front surface of the column manifold screen to reduce the air flow.

This insures positive transfer of the tape in column switch when tape is only one column. This change helps in the area of tape damage due to the capstan extending prematurely during a load operation.

MACHINES OF US ORIGIN

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	EC
729 BII to BVI	5325314	254095

ENGINEERING INSTRUCTIONS : 5325314

PREREQUISITES : None

INSTALLATION TIME : 0.3 Mach. Hour  
0.3 Man Hour  
1 Man

SPECIAL TOOLS : None

**IBM USE ONLY**

TYPE E - MES CODE 3, Poughkeepsie

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - EC 254095 - Vacuum Reducer

SERVICE CODE 32 or 42

MACHINES OF FRENCH ORIGIN

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 AII to AVI	5325314	86178
729 BII to BVI	5325314	86178

ENGINEERING INSTRUCTIONS : 5325314

PREREQUISITES : None

INSTALLATION TIME : 0.3 Mach. Hour  
0.3 Man Hour  
1 Man

SPECIAL TOOLS : None

**IBM USE ONLY**

TYPE E - MES CODE 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - JT 86178 - Vacuum Reducer

SERVICE CODE 32 or 42

December 10, 1964

**158 (-) Logic Changes**

**IBM 729 A (French origin)**

To improve loading and unloading operations.

To eliminate false Load Point during H.S. Rewind sequences due to a false "Go Internal" Pulse.

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 AII to VI	8026801	85593B

ENGINEERING INSTRUCTIONS : 8026801

PREREQUISITES

Type or History Code	B/M	JT
729 AII to VI	8026561	85180V

INSTALLATION TIME : 2.4 Mach. Hours  
2.4 Man Hours  
1 Man

**IBM USE ONLY**

TYPE E - MES CODE 3, France

THIS B/M WILL BE SHIPPED AUTOMATICALLY

RECORDS : Update Machine History - JT 85593B - Logic Changes.

SERVICE CODE 32 or 42

December 9, 1964

**159 (106) Shield Tie Down for Tape Switching**

**IBM 729 A II to A VI (French and US origin)**

Provide shield termination on the "+P Set Hi Density" and "+P Rewind and Unload" lines by referencing them to -6 volts on drive with Tape Switching, B/M 348530 or 554180 installed for drives of US origin and B/M 8016913 installed for drives of French origin.

MACHINES OF US ORIGIN

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	EC
729AII to AVI	5325058	253378A

ENGINEERING INSTRUCTIONS : 5325058  
PREREQUISITES : None  
INSTALLATION TIME : 0.2 Mach. Hour  
 0.5 Man Hour  
 1 Man

IBM USE ONLY

TYPE E - MES CODE 3, Poughkeepsie  
 THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY  
 RECORDS : Update Machine History - EC #253378A -Shield tie down.

SERVICE CODE 32 or 42  
MACHINES OF FRENCH ORIGIN

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 All to AVI	8026911	85913

ENGINEERING INSTRUCTIONS : 8026911  
PREREQUISITES : None  
INSTALLATION TIME : 0.2 Mach. Hour  
 0.5 Man Hour  
 1 Man

IBM USE ONLY

TYPE E - MES CODE 3, France  
 THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY  
 RECORDS : Update Machine History - JT # 85913 -Shield tie down.

SERVICE CODE 32 or 42

December 9, 1964

160 (-) Prevent Tape Stretch IBM 729 A II to AVI  
(French origin)

Eliminate stretching tape on the unload portion of a Rewind operation.

MACHINES AFFECTED : Refer to Machine History

Type or History Code	B/M	JT
729 All to AVI	8026908	85912

ENGINEERING INSTRUCTIONS : 8026908  
PREREQUISITES : None  
INSTALLATION TIME : None

IBM USE ONLY

TYPE E - MES CODE 3, France  
 THIS B/M WILL BE SHIPPED AUTOMATICALLY  
 RECORDS : Update Machine History - JT 85912 Rewind Unload Improvement

SERVICE CODE 32 or 42

December 9, 1964

INSTALLATION TIME - 1.5 machine hrs.  
2.5 man hrs.  
2 men

**IBM USE ONLY**

TYPE A, MES Code 3, France.  
Service Code 32 or 42.  
Machine Index Card required.

RECORDS - Machine History: Add B/M 8023539,  
JT 84516.

Wiring Diagrams: Manual Corrections.

PARTS DISPOSITION - Local disposition.

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

Machines of US origin:

Type or History Code	B/M	EC
729 Relay all models	5324510	252725

This change has been pilot tested and is correct.

P/N 5324510 - Engineering Instruction

**PREREQUISITES:**

Type or History Code	B/M	EC	CEM
729 II	585447	248974D	54
729 II and IV	585424	248697	33
729 II and IV	585374	247614B	62
		or 252822	

INSTALLATION TIME - 1.5 machine hrs.  
2.5 man hrs.  
2 men

**IBM USE ONLY**

TYPE A, MES Code 3, Mechanicsburg.  
Service Code 32 or 42.

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

March 9, 64

### 147 (104) Front Kickplate Retention IBM 729 all Models (US origin only)

Optional - must be ordered.

A bracket, P/N 554149, is mounted over the front kickplate. This prevents the front kickplate from jumping off its holding brackets until the retaining bracket is raised.

Type or History Code	B/M	EC
729 all models	585957	251429

P/N 585957 - Engineering Instruction

PREREQUISITES: None

INSTALLATION TIME - 0.5 man hrs.

**IBM USE ONLY**

TYPE A, MES Code 3, Mechanicsburg.  
Service Code 32 or 42.

THIS B/M WILL NOT BE SHIPPED AUTOMATICALLY

March 9, 64

### 148 (-) False Conditions while Transferring Tape Switching Relays IBM 729 all Models with Tape Switching (French origin)

To prevent false conditions such as Unload, Rewind, Ready, etc. . . . , while transferring Tape Switching Relays.

**I. 729 RELAY**

Type or History Code	B/M	JT
729 Relay all Models	8019879	83696

MACHINES AFFECTED -  
Check Logic 00-02-3 is not affected by JT 83696.

PREREQUISITES: None.

INSTALLATION TIME - 0.8 hrs.

**II. 729 NOR**

Type or History Code	B/M	JT
729 NOR all Models	8020786	83894

MACHINES AFFECTED -  
Check Logic 02-00-0 is not affected by JT 83894.

PREREQUISITES: None.

INSTALLATION TIME - 0.8 hrs.

**IBM USE ONLY**

TYPE A, MES Code 3, Essonnes, France.

RECORDS - 1. 729 Relay

Add on Machine History:  
B/M 8019879 - JT 83696  
Subject: TS Improvement

**2. 729 NOR**

Add on Machine History:  
B/M 8020786 - JT 83894  
Subject: TS Improvement

THESE B/M's WILL NOT BE SHIPPED AUTOMATICALLY.

April 20, 64

### 149 (-) Tape Twisting in Columns after Installation of B/M 8023445 IBM 729 NOR all Models (French origin)

Functional Improvement: After installing CEM 130 (93), B/M 8023445, tape dumping or twisting in the columns, may be experienced.

To avoid this possible failure, tape take up motor is put under control of the head down switch.

Type or History Code	B/M	JT
729 NOR all Models	8026561	85180V

Engineering Instruction: P/N 8026561

MACHINES AFFECTED -  
Refer to Machine History.

**PREREQUISITES:**

Type or History Code	B/M	JT	CEM
729 NOR all Models	8023445	84735X	137 (93)

INSTALLATION TIME - 0.5 hrs.

**IBM USE ONLY**

TYPE E, MES Code 3, Essonnes, France.  
Service Code 32 or 42.

RECORDS - Machine History: Add JT number 85180V  
Subject: Tape Twisting.

THIS B/M WILL BE SHIPPED AUTOMATICALLY.

April 20, 64