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my 4052 System ROMS - 4/8/00

The eight 8Kx8 ROMs were Motorola custom ROMs SCM92116P to SCM92123P they are clocked parts. I had to fool the Data I/O Model 29B with Unipak2.

I selected the pinout #50 which was 24 pin with clock on pin 20. It only had address lines through A11, so I had to hardwire pin 21 - A12 to ground or +5V. I also selected family code 27 (same as Intel 2732 4Kx8 EPROM) - so 27 50 for the Family/Pin

I used a second ZIF socket and pushed pin 21 out of the lower Unipak2 socket and had a jumper cable, so I could download the LO code with Pin 21 grounded, and then move the jumper to +5 and download the HI code.

Set the Data I/O to Translation Format 83.

I lost the comments I made including the 4Kbyte checksums, but do have all the code files.

I found NEC 16Kx1 DRAMs uPD416-2 at my local surplus store (mistakenly in a 64Kx1 200nsec bin) for $1 each and they worked fine as Mostek 4116 substitutes.

Now I have 55214 bytes memory with no backpack ROMs and 54690 with the Character ROM and FFT#2 ROM.

The ROM part numbers were:

	Ckt Bd	CHECKSUM Lo4K	Hi4K	
0160-0260-3 U810	F000	51FD		E000 to FEFE EVEN CONSTANT ROM
0160-0261-3 U820	ADA1	67D1		4800 to 7FFE even ROM
0160-0262-3 U825	F489	4D79		8000 to BFFE even ROM
0160-0263-4 U835	57B7	5B78		C000 to FFFE even ROM
0160-0264-3 U870	B3F7	6C07		4801 to 7FFF odd ROM
0160-0265-3 U880	1F02	F75D		8001 to BFFF odd ROM
0160-0266-4 U885	A17D	7A29		C000 to FFFF odd ROM
0160-0267-3 U893	F000	F0F7		E001 to FEFF ODD CONSTANT ROM

a 74S138 is used as the ROM decoder for even and one for odd - same inputs

Y1 output - 820/870 pair
A14=1, A15=0
A10=0, AND A11,12,13<>0

Y2 output - 825/880 pair
A14=0, A15=1

Y3 output - 835/885 pair
A14=1, A15=1

also Y5 output looks like patch ROM address space, enables U805/U897 74S471

My 4052 has Ser#B023898 Firmware ver 4.2
my parts and schematics tech manual says:

for the 'main' ROMs 820,825,835,870,880,885,893

-1 B010100 to B021229
-2 B021230 and later

apparently patch ROMs 845,863 were used:
-1 B010100 to B021229
-2 B021230 to B022300
-3 B022301 to B024075
-4 B024076 to B034726
-5 B034727 to ...

the manual is the 4052/4052A parts and schematics Rev Aug 1983.

I saw 8437 date codes on the ROMs, so maybe my unit was upgraded later?

note the -4 code in parts 263 and 266.
both 260 and 267 had all 'FF's in the LO part of the code. According to the tech service manual, they are the Even patch ROM and Odd patch ROM respectively.

>Note: actually the two patch FPLA sockets were empty

The tech manual lists the following 64K ROM space:

0000-3FFF 16K ROM (switchable bank) for backpacks and ROM expanders
4000-43FF Jump tables for ROM pack
4400-47FF Patch ROM
4800-FFFF 46K ROM Basic

also note in the 64K of RAM space
E000-FEFF is a 7936 byte DATA ROM?

My 4054 ser# B011167 had version 4.4 firmware and apparently the Option 30 refresh graphics (but now that board appears to be missing).

The ROM part numbers were:

	Ckt Bd	CHECKSUM Lo4K	Hi4K	
0160-0260-2 U810	F000	4D82		E000 to FEFE EVEN CONSTANT ROM
0160-0261-2 U820	1A1F	79B1		4800 to 7FFE even ROM
0160-0262-2 U825	EC21	7173		8000 to BFFE even ROM
0160-0263-3 U835	77D1	A175		C000 to FFFE even ROM
0160-0264-2 U870	1A0A	CBFE		4801 to 7FFF odd ROM
0160-0265-2 U880	2EA1	2C65		8001 to BFFF odd ROM
0160-0266-3 U885	43D1	AF5C		C000 to FFFF odd ROM
0160-0267-2 U893	F000	DDE8		E001 to FEFF ODD CONSTANT ROM

also had both 28 pin Signetics N82S107F (Data I/O 99-63 for TI 82S105) FPLA decoder for patches:

0160-0379-5 U845	70BB	patch even? FPLA
0160-0380-5 U863	5E49	patch odd? FPLA

along with two MMI 5309 actually 74S471 256x8 (08-08) (Data I/O =11-08) proms:

-34006	U805	0808
-34105	U897	6013

Intel D2732A-2 EPROMS (4Kx8). Data I/O Unipak Family Pinout 27 24
Circuit board 670-7632-00 (GPIB)
Circuit board 670-7289-00 (Character) with pin 18 cut on all four ROMs
And jumpered to pin 4 of U111 LS138. Also U111-pin 6 jumpered to edge card A6 (PIAE-1, PIA Enable)

4052R08 Signal Processing #2 FFT ser#B011503

2 eproms	checksum
160-1417-00 U1 V2.0	3F8D
160-1418-00 U11 V2.0	79CE

4052R14 GPIB Enhancement

2 eproms	checksum
160-1638-00 U1 V1.0	84276
160-1639-00 U11 V1.0	7176B

4052R11 Character and Symbol

4 eproms	checksum
160-1313-00 U1 V1.0 1981	4DC70
160-1314-00 U11 V1.0	4C335
160-1315-00 U13 V1.0	61D0D
160-1316-00 U15 V1.0	C2679

REMEMBER - the firmware backpacks are located at 0000 in the 4052 ROM space when bank selected.

- First 16 bytes of ROM1 = FF

- Byte at 10Hex = 40, byte at 11Hex=52

- Next, appears to be four 16-bit vectors into the ROM

Address	GPIB ROM	Character ROM
0012 powerreset?	01A6	00F8
0014 init?	01B6	0000
0016 ?	01AF	00FB
0018 ?	0000	011D

- Followed by 00 at 000A,000B and 000C

- First BASIC Call is at 001D, six bytes of ASCII Text, followed by two byte Entry Address? The text is right padded with the SPACE (20H) character if not six chars long

Last CALL string ENTRY ADDRESS is followed by 00 in next byte to terminate list of Calls

GPIB ROM	Entry Address
ARSIZE	0800
BININ	0838
BINOUT	08BD

CONFIG	08EB
DCL	10FA
DECHEX	0A08
UNDEF	1001
ERRHLP	0A57
GET	10E0
GTL	10F6
HEXDEC	0E06
IFC	1114
LISTEN	1133
LLO	113B
LOCS	113F
POLL	0E57
PPE	0F4A
PPD	0F34
PPOLL	0F95
PPU	0FB5
PRISTR	0FBA
RBIN	0FE5
RWLS	114E
SDC	115B
SRQOFF	02C8
SRQON	02F3
TALK	115F
UNL	1175
UNT	117A
VARCLR	101D
VARSET	1020
VARTST	1092
WBIN	10B3
VLIST	1A02
NEWTAP	02FF
TNAME	1BA2
LAST	1C96
THEADE	1D16
STBHLP	0A52

CHAR ROM	Entry Address
ENDRAG	0BF7
CLDRAG	0C07
CURSOR	0C17
TYPEKY	0C99
SMOTH	0D57
ARC1	0DFB
ARC2	1615
CIRCLE	18FB
LETTER	1ACA
LRESET	2335
LQUAL	22D8
LSMOTH	0CB1
LMFONT	234E
LAFONT	2348
LROT	244F
LSLANT	23C8
LSCALE	2499
LDIM	2702
LRATIO	261A
LSIZE	2680
LHOME	2770
LMOVE	24FE

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LCENTR      1AD0
LVERTI      1AD5
LETVN       1ADB
STROKE      280A
CLRBUF      2C16
```

READ IN AS FAM/PINOUT 27 50 WITH PIN 21 PULLED LOW OR HIGH FOR EACH 4Kbyte chunk

Remember to set the Data I/O translation format to 83

This is the Tektronix GPIB Diskette Drive Firmware Cartridge for the 4052 and 4054 ☺

Special 2 socket 16Kbyte cartridge

670-6251-00 ser#
ONE ROM MOSTEK

	checksum
160-6251-00 U1 LOW	13F4
160-6251-00 U1 HI	6C2F

```
.................
@R.....".....COM
PRS..CUSTAT..DIS
MOU..DREL  ..DRE
S  ..DSTAT .{DUP
   ..FFRMT .XFIL
E  .AFORMAT.\FMV
ALS..FREL  ..FRE

S  ..HERRS ..MOU
NT ..MRKBBG.yNEX
T  ..RENAME./REW
IND..SETTIM..SPA
CE .2TIME  ..USE
RLI..UNIT  .....
```