4040 FI5 RF FRONT END MODULE (3X7683, 3X7748)
ADVANCE DATA SHEET

MIXED DIGITAL AND ANALOG TV AND ATSC APPLICATIONS

Preliminary

1 APPLICATIONS

- Mixed digital and analog TV
- Advanced Television Systems Committee (ATSC) applications

2 FEATURES

- Reception standard: NTSC M/N and ATSC
- VHF, Hyperband, and UHF
- Frequency range of 50 MHz to 860 MHz
- Single 5V supply voltage
- CVBS, Audio and 2nd intermediate frequency (IF) audio application outputs
- Built-in video buffer
- Band selection and tuning via I^2C bus
- Functionality of both an analog multimedia front end and a digital tuner

3 INTRODUCTION

The 4040 FI5 RF Front End Module combines the functions of both an analog multimedia front end and a digital tuner in a single unit. Applications can therefore provide for reception of digital signals according to ATSC (8-VSB), while retaining NTSC analog TV capability with a single front-end module.

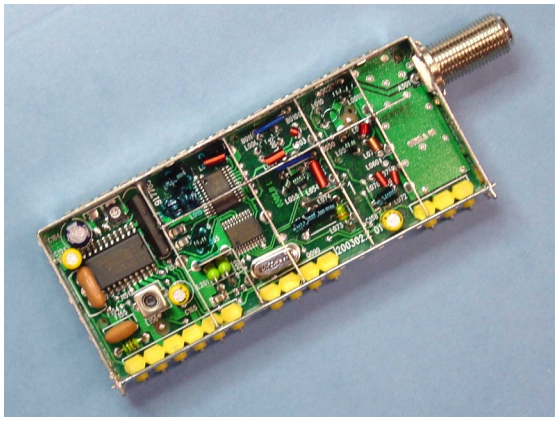

Figure 1 4040 FI5 RF Front End Module

For reception of digitally modulated signals, a balanced IF output is available at pins 16 and 17, with a center frequency of 44 MHz. The IF outputs are designed to interface directly with an applicable external surface acoustical wave (SAW) filter. An

automatic gain control (AGC) input at pin 5 allows for external control of the output signal amplitude. This tuner covers a frequency range of 50 MHz to 860 MHz with a channel bandwidth of 6 MHz.

The standard for analog TV reception is NTSC M/N. The front end includes a hyper-band tuner that covers the frequency range of 50 MHz to 860 MHz and an IF part with SAW filter, IF amplifier, and video and sound demodulators. The audio frequency (AF) and composite video broadcast signal (CVBS) signals are available at the audio and video output pins, respectively. A video buffer is built in for direct connection to a 75Ω input.

For both digital and analog applications, the reception frequency range is divided into VHF low, VHF high and UHF. Band selection and tuning are done completely via the I²C-bus. A digital automatic frequency control (AFC) function can be implemented because the AFC voltage generated by the IF demodulator is fed to an integrated A/D converter in the phase-locked loop (PLL) IC and is readable via the I²C bus.

A DC/DC converter for 33V generation is built in so that only a single supply voltage of 5V is required.

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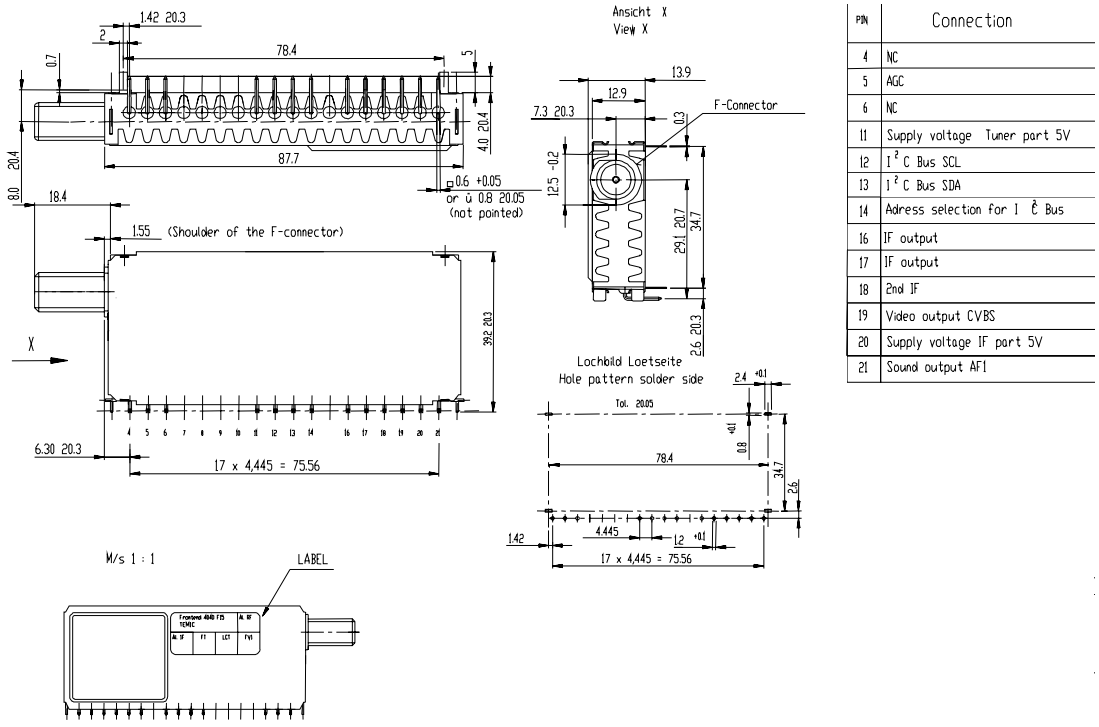
4 MECHANICAL SPECIFICATIONS

4.1 MECHANICAL DRAWING



PIN	Connection
4	NC
5	AGC
6	NC
11	Supply voltage Tuner part 5V
12	I²C Bus SCL
13	I²C Bus SDA
14	Adress selection for I²C Bus
16	IF output
17	IF output
18	2nd IF
19	Video output CVBS
20	Supply voltage IF part 5V
21	Sound output AF1

Figure 2 Mechanical Drawing 3x7683

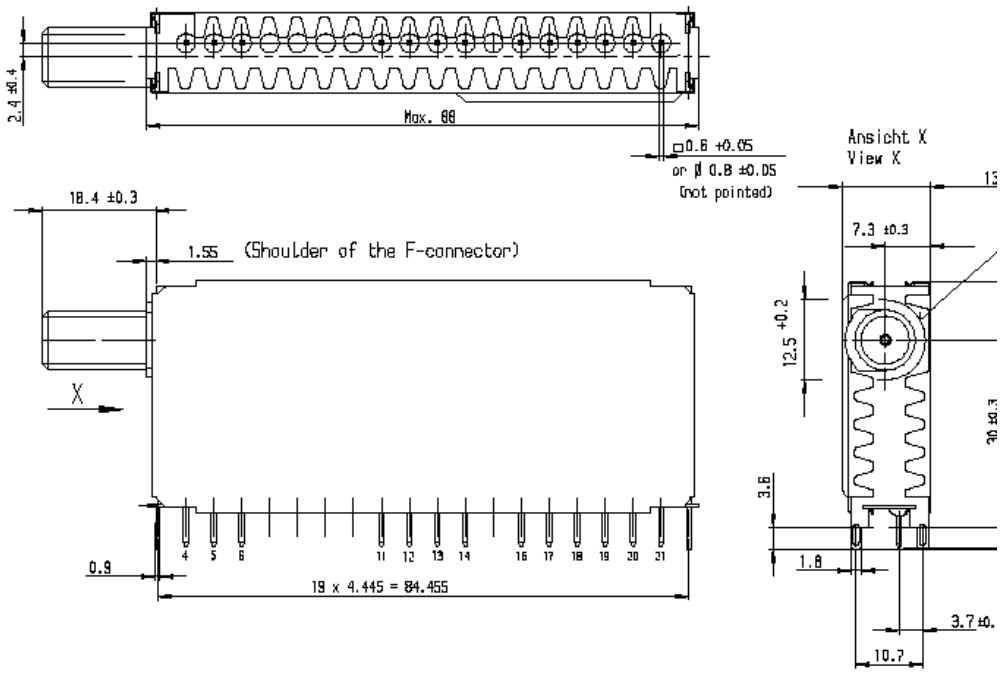
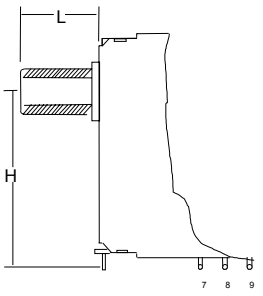
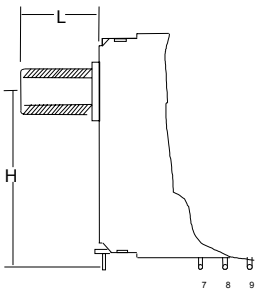


Figure 3 Mechanical Drawing 3x7748

4.2 SOCKET CHARACTERISTICS

Table 1 Socket Characteristics

DESCRIPTION	3X 7683	3X 7748 (VERTICAL)
Socket Drawing		
Weight	57 g	57 g
Socket type	F-connector	F-connector
Socket length	18 mm	18 mm
Socket height	29.1 mm	30 mm

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5 OPERATING CHARACTERISTICS

The operating characteristics listed in Table 2 reflect the conditions necessary for optimal performance and operating reliability.

Table 2 Operating Characteristics

PARAMETER	MIN	TYP	MAX	UNIT	
Frequency range, referenced to center frequency of 6 MHz bandwidth					
VHF Low	57		160	MHz	
VHF High	165		454	MHz	
UHF	459		858	MHz	
Frequency range, for analog modulated signals (referred to picture carrier)					
VHF Low, ch 2 to G	55.25		157.25	MHz	
VHF High, ch H to W+26	163.25		451.25	MHz	
UHF, ch W+27 to 69	457.25		801.25	MHz	
Recommended takeover frequencies (referred to center frequency)					
VHF Low / VHF High		162		MHz	
UHF		457		MHz	
IF (oscillator operates above received frequency)					
Digital modulation		44.0		MHz	Center, typical
Picture carrier		45.75		MHz	
Sound carrier		41.25		MHz	
Power supply voltage					
Voltage V_{S1}	4.75	5	5.25	V	5V ± 5%
Current consumption V_{S1}			200	mA	
Input impedance					
VHF/UHF Common (F-connector)		75		Ω	unbalanced
Temperature					
Operating temperature	0		60	°C	
Storage temperature	-25		60	°C	

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6 TUNER MEASUREMENT TEST CONDITIONS

All tuner data is held under the following conditions unless otherwise noted:

- Measurement tolerance: 10% or 1 dB
- Ambient temperature: + 25°C ± 3°C
- Supply voltages: V_{S1} ± 5%

7 TUNER DATA

Table 3 Tuner Data

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Voltage gain, ch 02 to ch 69	Measured between antenna input and IF output Pin 16 and Pin 17. The input is loaded with 75Ω and the IF output is loaded with a test circuit (see section 8 Test Circuits)	38	45		dB
Noise figure	VHF Low		6	8	dB
	VHF High		6	9	dB
	UHF		6	8	dB
VSWR, within channel BW around center frequency	VHF Low		2.0	3.0	
	VHF High		2.0	3.0	
	UHF		2.0	3.0	
AGC range	VHF Low	45			dB
	VHF High	40			dB
	UHF	35			dB
IF rejection	VHF Low	50			dB
	VHF High	60			dB
	UHF	60			dB
Image rejection	VHF Low	60			dB
	VHF High	60			dB
	UHF	50			dB
RF Tilt	The peak-to-peak amplitude variation within a 6 MHz bandwidth, centered around the channel center frequency, shall not exceed 2.5 dB in magnitude.				
Phase noise					
VHF Low	Measured at 1 kHz distance from carrier		-68	-60	dBc/Hz
VHF High			-60	-55	dBc/Hz
UHF			-57	-55	dBc/Hz
VHF Low	Measured at 10 kHz distance from carrier		-95	-80	dBc/Hz
VHF High			-85	-80	dBc/Hz
UHF			-85	-80	dBc/Hz
VHF Low	Measured at 100 kHz distance from carrier		-110	-100	dBc/Hz
VHF High			-106	-100	dBc/Hz
UHF			-103	-100	dBc/Hz

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PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Intermodulation					
Composite triple beat	With a fully loaded multi-tone signal generator (129 channels), with carrier levels at +0 dBmV, and with AGC set for maximum gain (= 4V), distortion levels shall not exceed the following limits.	60			dB
Composite second order beat		60			dB
IP3 (two tone)		90			dBµV
1 dB Compression point					
VHF Low, VHF High, UHF	Measured with AGC = 4V (= maximum gain)	80			dBµV

8 TEST CIRCUITS

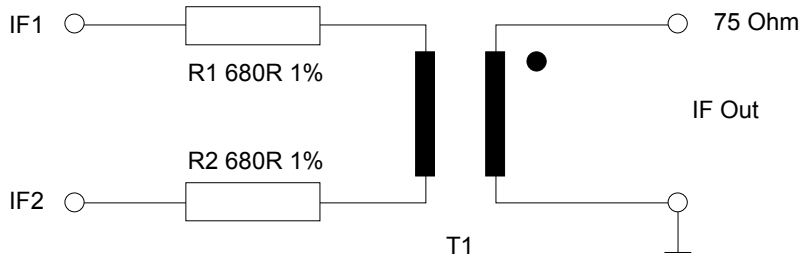

Figure 4 Test Circuit

- Dummy attenuation: 22.6 dB
- T1 = RF – Transformer
- W – Ratio = 1:4 (IF – in 4 / IF – out 1)
- Type: MCL T4-1 or equivalent

9 OUTPUT PARAMETERS

9.1 VIDEO OUTPUT

Output signal type: CVBS

Conditions: Antenna input level 66 dBµV
12.5% Residual carrier

Table 4 Video Output

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
CVBS Output level	DC Coupled	0.8	1	1.2	Vp-p
Load impedance			75		Ω
Video S/N, (unweighted, flat field [0 IRE])	VHF	46			dB

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PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
	UHF	45			dB
Frequency response, reference: 0.2 MHz, (sin x)/x	1 MHz	-1.5		1.5	dB
	2 MHz	-2		2	dB
	3 MHz	-4		2	dB
	3.58 MHz	-8		-1	dB
Differential gain	NTC 7 Composite			5	%p-p
Differential phase	NTC 7 Composite			5	°p-p
C/L Gain		-50	-15	+20	%
C/L Delay	Measured with group delay precorrection	-100	-25	+50	ns

9.2 SOUND OUTPUT

Conditions: Antenna input level: 66 dBµV
Video signal: color bar
Test signal: 1 kHz, 25 kHz deviation
75 µs preemphasis

Table 5 Sound Output

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output level	AC		1.3		Vp-p
	DC	2.1	2.5	2.9	V
Output resistance			200		Ω
Load impedance	Measurements with 75 µs deemphasis	2.2			kΩ
AF level		400	500	600	mV rms
THD+N				0.5	%
S/N	Unweighted		49		dB
Frequency response: 40 Hz to 15 kHz	6 kHz deviation	-1		1	dB

9.3 2ND IF OUTPUT

Table 6 2nd IF Output

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
AC level of 4.5 MHz		50	120		mVp-p
Load impedance		0.5			kΩ

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10 I²C BUS

10.1 WRITE DATA FORMAT FOR I²C BUS

Table 7 Write Data Format

	MSB							LSB	ACK
Address byte	1	1	0	0	0	MA1	MA0	R/W[1]	A[2]
Divider byte 1	0	n14	n13	n12	n11	n10	n9	n8	A
Divider byte 2	n7	n6	n5	n4	n3	n2	n1	n0	A
Control byte 1	1	CP[3]	T2	T1	T0	RSA	RSB	OS	A
Control byte 2	P7	P6	P5	P4	P3	P2	P1	P0	A

[1] R/W = 0: write mode

[2] A = Acknowledge

[3] CP = 0: charge pump current low

10.2 ADDRESS SELECTION FOR I²C BUS

Table 8 Address Selection

MA1	MA0	ADDRESS	VOLTAGE AT PIN 14
0	0	C0	(0 to 0.1) V_{S1}
0	1	C2	(0.2 to 0.3) V_{S1} or open circuit
1	0	C4	(0.4 to 0.6) V_{S1}
1	1	C6	(0.9 to 1) V_{S1}

10.3 OSCILLATOR FREQUENCY AND DIVIDER BYTE CALCULATION

Table 9 Oscillator Frequency and Divider Byte Calculation

RSA	RSB	REFERENCE DIVIDER	MIN. TUNING STEP	F_{REF}
1	1	512	62.5 kHz	7.8125 kHz
X	0	640	50.0 kHz	6.25 kHz
0	1	1024	31.25 kHz	3.90625 kHz

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Use the following formula to calculate oscillator frequency and divider byte.

$$f_{osc} = f_{ref} \times 8 \times SF$$

Where:

f_{osc} = Local oscillator frequency

f_{ref} = Crystal reference frequency / 512 = 4 MHz / 512 = 7.8125 kHz

SF = Programmable scaling factor

Scaling factor is SF = $16384 \times n14 + 8192 \times n13 \times 4096 \times n12 + 2048 \times n11 + 1024 \times n10 + 512 \times n9 + 256 \times n8 + 128 \times n7 + 64 \times n6 + 32 \times n5 + 16 \times n4 + 8 \times n3 + 4 \times n2 + 2 \times n1 + n0$

10.4 CONTROL BYTE

Table 10 Control Byte 1 Settings (Default)

	MSB							LSB	ACK
Control byte 1	1	0	0	0	1	1	1	0	A

Table 11 Control Byte 2 (Band Selection)

BAND	ACTIVE PORT	P7	P6	P5	P4	P3	P2	P1	P0
VHF Low	P7, P5	1	0	1	0	0	X[1]	X	X
VHF High	P7, P4	1	0	0	1	0	X	X	X
UHF	P5, P4	0	0	1	1	0	X	X	X

[1] X is not used

10.5 READ DATA FORMAT

Table 12 Read Data Format (I^2C)

	MSB							LSB	ACK
Address byte	1	1	0	0	0	MA1	MA0	R/W	A
Status byte	POR	FL	I2	I1	I0	A2	A1	A0	A

Note: MSB is transmitted first.

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Table 13 Read Data Format Descriptions

CODE	DESCRIPTION
R/W	1 = Read mode
POR	Power on reset flag (POR =1 at power on)
FL	In lock flag (FL= 1 when PLL is locked)
I2, I1, I0	Digital levels for I/O ports P7, P5 and P4 (not used)
A2, A1, A0	Digital output of 5-level ADC for AFC function. Value for correct tuning: A2 = 0, A1= 1, A0 = 0

Caution: Short circuit at pin 18, 19, or 21 can damage internal circuits.

11 ELECTROSTATIC DISCHARGE (ESD) PROTECTION

WARNING: The tuner contains components that can be damaged by electrostatic discharge.

Observe these precautions:

- Ground yourself before handling the tuner.
- Do not touch the tuner connector pins without ESD protection.

12 FREQUENCY TABLE AND I²C BUS CODE

12.1 NTSC M/N OFF AIR

Table 14 NTSC M/N Air (IF_{PC} = 45.75 MHz)

RECEPTION FREQUENCY				I²C BUS CODE (HEX)							
				F STEP = 62.5 KHZ				F STEP = 50 KHZ			
				CONTROL BYTE		DIVIDER BYTE		CONTROL BYTE		DIVIDER BYTE	
AIR CHANNEL	CHANNEL NUMBER	PIX CARRIER (MHZ)	BAND	1	2	1	2	1	2	1	2
2	2	55.25	VHF Low	8E	A2	06	50	88	A2	07	E4
3	3	61.25	VHF Low	8E	A2	06	B0	88	A2	08	5C
4	4	67.25	VHF Low	8E	A2	07	10	88	A2	08	D4
5	5	77.25	VHF Low	8E	A2	07	B0	88	A2	09	9C
6	6	83.25	VHF Low	8E	A2	08	10	88	A2	0A	14
7	7	175.25	VHF High	8E	94	0D	D0	88	94	11	44
8	8	181.25	VHF High	8E	94	0E	30	88	94	11	BC
9	9	187.25	VHF High	8E	94	0E	90	88	94	12	34
10	10	193.25	VHF High	8E	94	0E	F0	88	94	12	AC

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RECEPTION FREQUENCY				I²C BUS CODE (HEX)							
				F STEP = 62.5 KHZ				F STEP = 50 KHZ			
				CONTROL BYTE		DIVIDER BYTE		CONTROL BYTE		DIVIDER BYTE	
AIR CHANNEL	CHANNEL NUMBER	PIX CARRIER (MHZ)	BAND	1	2	1	2	1	2	1	2
11	11	199.25	VHF High	8E	94	0F	50	88	94	13	24
12	12	205.25	VHF High	8E	94	0F	B0	88	94	13	9C
13	13	211.25	VHF High	8E	94	10	10	88	94	14	14
14	14	471.25	UHF	8E	31	20	50	88	31	28	64
15	15	477.25	UHF	8E	31	20	B0	88	31	28	DC
16	16	483.25	UHF	8E	31	21	10	88	31	29	54
17	17	489.25	UHF	8E	31	21	70	88	31	29	CC
18	18	495.25	UHF	8E	31	21	D0	88	31	2A	44
19	19	501.25	UHF	8E	31	22	30	88	31	2A	BC
20	20	507.25	UHF	8E	31	22	90	88	31	2B	34
21	21	513.25	UHF	8E	31	22	F0	88	31	2B	AC
22	22	519.25	UHF	8E	31	23	50	88	31	2C	24
23	23	525.25	UHF	8E	31	23	B0	88	31	2C	9C
24	24	531.25	UHF	8E	31	24	10	88	31	2D	14
25	25	537.25	UHF	8E	31	24	70	88	31	2D	8C
26	26	543.25	UHF	8E	31	24	D0	88	31	2E	04
27	27	549.25	UHF	8E	31	25	30	88	31	2E	7C
28	28	555.25	UHF	8E	31	25	90	88	31	2E	F4
29	29	561.25	UHF	8E	31	25	F0	88	31	2F	6C
30	30	567.25	UHF	8E	31	26	50	88	31	2F	E4
31	31	573.25	UHF	8E	31	26	B0	88	31	30	5C
32	32	579.25	UHF	8E	31	27	10	88	31	30	D4
33	33	585.25	UHF	8E	31	27	70	88	31	31	4C
34	34	585.25	UHF	8E	31	27	D0	88	31	31	C4
35	35	597.25	UHF	8E	31	28	30	88	31	21	3C
36	36	603.25	UHF	8E	31	28	90	88	31	32	B4
37	37	609.25	UHF	8E	31	28	F0	88	31	33	2C
38	38	615.25	UHF	8E	31	29	50	88	31	33	A4
39	39	621.25	UHF	8E	31	29	B0	88	31	34	1C
40	40	627.25	UHF	8E	31	2A	10	88	31	34	94
41	41	633.25	UHF	8E	31	2A	70	88	31	35	0C
42	42	639.25	UHF	8E	31	2A	D0	88	31	35	84
43	43	645.25	UHF	8E	31	2B	30	88	31	35	FC
44	44	651.25	UHF	8E	31	2B	90	88	31	36	74
45	45	657.25	UHF	8E	31	2B	F0	88	31	36	EC
46	46	663.25	UHF	8E	31	2C	50	88	31	37	64
47	47	669.25	UHF	8E	31	2C	B0	88	31	37	DC
48	48	675.25	UHF	8E	31	2D	10	88	31	38	54
49	49	681.25	UHF	8E	31	2D	70	88	31	38	CC
50	50	687.25	UHF	8E	31	2D	D0	88	31	39	44

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RECEPTION FREQUENCY				I²C BUS CODE (HEX)							
				F STEP = 62.5 KHZ				F STEP = 50 KHZ			
				CONTROL BYTE		DIVIDER BYTE		CONTROL BYTE		DIVIDER BYTE	
AIR CHANNEL	CHANNEL NUMBER	PIX CARRIER (MHZ)	BAND	1	2	1	2	1	2	1	2
51	51	693.25	UHF	8E	31	2E	30	88	31	39	BC
52	52	699.25	UHF	8E	31	2E	90	88	31	3A	34
53	53	705.25	UHF	8E	31	2E	F0	88	31	3A	AC
54	54	711.25	UHF	8E	31	2F	50	88	31	3B	24
55	55	717.25	UHF	8E	31	2F	B0	88	31	3B	9C
56	56	723.25	UHF	8E	31	30	10	88	31	3C	14
57	57	729.25	UHF	8E	31	30	70	88	31	3C	8C
58	58	735.25	UHF	8E	31	30	D0	88	31	3D	04
59	59	741.25	UHF	8E	31	31	30	88	31	3D	7C
60	60	747.25	UHF	8E	31	31	90	88	31	3D	F4
61	61	753.25	UHF	8E	31	31	F0	88	31	3E	6C
62	62	759.25	UHF	8E	31	32	50	88	31	3E	E4
63	63	765.25	UHF	8E	31	32	B0	88	31	3F	5C
64	64	771.25	UHF	8E	31	33	10	88	31	3F	D4
65	65	777.25	UHF	8E	31	33	70	88	31	40	4C
66	66	783.25	UHF	8E	31	33	D0	88	31	40	C4
67	67	789.25	UHF	8E	31	34	30	88	31	41	3C
68	68	795.25	UHF	8E	31	34	90	88	31	41	B4
69	69	801.25	UHF	8E	31	34	F0	88	31	42	2C

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12.2 NTSC M/N CABLE

Table 15 NTSC M/N Cable (IF_{PC} = 45.75 MHz)

RECEPTION FREQUENCY				I²C BUS CODE (HEX)							
				F STEP = 62.5 KHZ				F STEP = 50 KHZ			
				CONTROL BYTE		DIVIDER BYTE		CONTROL BYTE		DIVIDER BYTE	
CABLE CHANNEL	CHANNEL NUMBER	PIX CARRIER (MHZ)	BAND	1	2	1	2	1	2	1	2
4A	1	73.25	VHF Low	8E	A2	07	70	88	A2	09	4C
2	2	55.25	VHF Low	8E	A2	06	50	88	A2	07	E4
3	3	61.25	VHF Low	8E	A2	06	B0	88	A2	08	5C
4	4	67.25	VHF Low	8E	A2	07	10	88	A2	08	D4
5	5	77.25	VHF Low	8E	A2	07	B0	88	A2	09	9C
7	7	175.25	VHF High	8E	94	0D	D0	88	94	11	44
8	8	181.25	VHF High	8E	94	0E	30	88	94	11	BC
9	9	187.25	VHF High	8E	94	0E	90	88	94	12	34
10	10	193.25	VHF High	8E	94	0E	F0	88	94	12	AC

RECEPTION FREQUENCY				I²C BUS CODE (HEX)							
				F STEP = 62.5 KHZ				F STEP = 50 KHZ			
				CONTROL BYTE		DIVIDER BYTE		CONTROL BYTE		DIVIDER BYTE	
CABLE CHANNEL	CHANNEL NUMBER	PIX CARRIER (MHZ)	BAND	1	2	1	2	1	2	1	2
11	11	199.25	VHF High	8E	94	0F	50	88	94	13	24
12	12	205.25	VHF High	8E	94	0F	B0	88	94	13	9C
13	13	211.25	VHF High	8E	94	10	10	88	94	14	14
A	14	121.25	VHF Low	8E	A2	0A	70	88	A2	0D	0C
B	15	127.25	VHF Low	8E	A2	0A	D0	88	A2	0D	84
C	16	133.25	VHF Low	8E	A2	0B	30	88	A2	0D	FC
D	17	139.25	VHF Low	8E	A2	0B	90	88	A2	0E	74
E	18	145.25	VHF Low	8E	A2	0B	F0	88	A2	0E	EC
F	19	151.25	VHF Low	8E	A2	0C	50	88	A2	0F	64
G	20	157.25	VHF Low	8E	A2	0C	B0	88	A2	0F	DC
H	21	163.25	VHF High	8E	94	0D	10	88	94	10	54
I	22	169.25	VHF High	8E	94	0D	70	88	94	10	CC
J	23	217.25	VHF High	8E	94	10	70	88	94	14	8C
K	24	223.25	VHF High	8E	94	10	D0	88	94	15	04
L	25	229.25	VHF High	8E	94	11	30	88	94	15	7C
M	26	235.25	VHF High	8E	94	11	90	88	94	15	F4
N	27	241.25	VHF High	8E	94	11	F0	88	94	16	6C
O	28	247.25	VHF High	8E	94	12	50	88	94	16	E4
P	29	253.25	VHF High	8E	94	12	B0	88	94	17	5C
Q	30	259.25	VHF High	8E	94	13	10	88	94	17	D4
R	31	265.25	VHF High	8E	94	13	70	88	94	18	4C
S	32	271.25	VHF High	8E	94	13	D0	88	94	18	C4
T	33	277.25	VHF High	8E	94	14	30	88	94	19	3C
U	34	283.25	VHF High	8E	94	14	90	88	94	19	B4
V	35	289.25	VHF High	8E	94	14	F0	88	94	1A	2C
W	36	295.25	VHF High	8E	94	15	50	88	94	1A	A4
W+1	37	301.25	VHF High	8E	94	15	B0	88	94	1B	1C
W+2	38	307.25	VHF High	8E	94	16	10	88	94	1B	94
W+3	39	313.25	VHF High	8E	94	16	70	88	94	1C	0C
W+4	40	319.25	VHF High	8E	94	16	D0	88	94	1C	84
W+5	41	325.25	VHF High	8E	94	17	30	88	94	1C	FC
W+6	42	331.25	VHF High	8E	94	17	90	88	94	1D	74
W+7	43	337.25	VHF High	8E	94	17	F0	88	94	1D	EC
W+8	44	343.25	VHF High	8E	94	18	50	88	94	1E	64
W+9	45	349.25	VHF High	8E	94	18	B0	88	94	1E	DC
W+10	46	355.25	VHF High	8E	94	19	10	88	94	1F	54
W+11	47	361.25	VHF High	8E	94	19	70	88	94	1F	CC
W+12	48	367.25	VHF High	8E	94	19	D0	88	94	20	44
W+13	49	373.25	VHF High	8E	94	1A	30	88	94	20	BC
W+14	50	379.25	VHF High	8E	94	1A	90	88	94	21	34

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RECEPTION FREQUENCY				I²C BUS CODE (HEX)							
				F STEP = 62.5 KHZ				F STEP = 50 KHZ			
				CONTROL BYTE		DIVIDER BYTE		CONTROL BYTE		DIVIDER BYTE	
CABLE CHANNEL	CHANNEL NUMBER	PIX CARRIER (MHZ)	BAND	1	2	1	2	1	2	1	2
W+15	51	385.25	VHF High	8E	94	1A	F0	88	94	21	AC
W+16	52	391.25	VHF High	8E	94	1B	50	88	94	22	24
W+17	53	397.25	VHF High	8E	94	1B	B0	88	94	22	9C
W+18	54	403.25	VHF High	8E	94	1C	10	88	94	23	14
W+19	55	409.25	VHF High	8E	94	1C	70	88	94	23	8C
W+20	56	415.25	VHF High	8E	94	1C	D0	88	94	24	04
W+21	57	421.25	VHF High	8E	94	1D	30	88	94	24	7C
W+22	58	427.25	VHF High	8E	94	1D	90	88	94	24	F4
W+23	59	433.25	VHF High	8E	94	1D	F0	88	94	25	6C
W+24	60	439.25	VHF High	8E	94	1E	50	88	94	25	E4
W+25	61	445.25	VHF High	8E	94	1E	B0	88	94	26	5C
W+26	62	451.25	VHF High	8E	94	1F	10	88	94	26	D4
W+27	63	457.25	UHF	8E	31	1F	70	88	31	27	4C
W+28	64	463.25	UHF	8E	31	1F	D0	88	31	27	C4
W+29	65	469.25	UHF	8E	31	20	30	88	31	28	3C
66	66	475.25	UHF	8E	31	20	90	88	31	28	B4
67	67	481.25	UHF	8E	31	20	F0	88	31	29	2C
68	68	487.25	UHF	8E	31	21	50	88	31	29	A4
69	69	493.25	UHF	8E	31	21	B0	88	31	2A	1C
70	70	499.25	UHF	8E	31	22	10	88	31	2A	94
71	71	505.25	UHF	8E	31	22	70	88	31	2B	0C
72	72	511.25	UHF	8E	31	22	D0	88	31	2B	84
73	73	517.25	UHF	8E	31	23	30	88	31	2B	FC
74	74	523.25	UHF	8E	31	23	90	88	31	2C	74
75	75	529.25	UHF	8E	31	23	F0	88	31	2C	EC
76	76	535.25	UHF	8E	31	24	50	88	31	2D	64
77	77	541.25	UHF	8E	31	24	B0	88	31	2D	DC
78	78	547.25	UHF	8E	31	25	10	88	31	2E	54
79	79	553.25	UHF	8E	31	25	70	88	31	2E	CC
80	80	559.25	UHF	8E	31	25	D0	88	31	2F	44
81	81	565.25	UHF	8E	31	26	30	88	31	2F	BC
82	82	571.25	UHF	8E	31	26	90	88	31	30	34
83	83	577.25	UHF	8E	31	26	F0	88	31	30	AC
84	84	583.25	UHF	8E	31	27	50	88	31	31	24
85	85	589.25	UHF	8E	31	27	B0	88	31	31	9C
86	86	595.25	UHF	8E	31	28	10	88	31	32	14
87	87	601.25	UHF	8E	31	28	70	88	31	32	8C
88	88	607.25	UHF	8E	31	28	D0	88	31	33	04
89	89	613.25	UHF	8E	31	29	30	88	31	33	7C
90	90	619.25	UHF	8E	31	29	90	88	31	33	F4

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RECEPTION FREQUENCY				I²C BUS CODE (HEX)							
				F STEP = 62.5 KHZ				F STEP = 50 KHZ			
				CONTROL BYTE		DIVIDER BYTE		CONTROL BYTE		DIVIDER BYTE	
CABLE CHANNEL	CHANNEL NUMBER	PIX CARRIER (MHZ)	BAND	1	2	1	2	1	2	1	2
91	91	625.25	UHF	8E	31	29	F0	88	31	34	6C
92	92	631.25	UHF	8E	31	2A	50	88	31	34	E4
93	93	637.25	UHF	8E	31	2A	B0	88	31	35	5C
94	94	643.25	UHF	8E	31	2B	10	88	31	35	D4
A-5	95	91.25	VHF Low	8E	A2	08	90	88	A2	0A	B4
A-4	96	97.25	VHF Low	8E	A2	08	F0	88	A2	0B	2C
A-3	97	103.25	VHF Low	8E	A2	09	50	88	A2	0B	A4
A-2	98	109.25	VHF Low	8E	A2	09	B0	88	A2	0C	1C
A-1	99	115.25	VHF Low	8E	A2	0A	10	88	A2	0C	94
100	100	649.25	UHF	8E	31	2B	70	88	31	36	4C
101	101	655.25	UHF	8E	31	2B	D0	88	31	36	C4
102	102	661.25	UHF	8E	31	2C	30	88	31	37	3C
103	103	667.25	UHF	8E	31	2C	90	88	31	37	B4
104	104	673.25	UHF	8E	31	2C	F0	88	31	38	2C
105	105	679.25	UHF	8E	31	2D	50	88	31	38	A4
106	106	685.25	UHF	8E	31	2D	B0	88	31	39	1C
107	107	691.25	UHF	8E	31	2E	10	88	31	39	94
108	108	697.25	UHF	8E	31	2E	70	88	31	3A	0C
109	109	703.25	UHF	8E	31	2E	D0	88	31	3A	84
110	110	709.25	UHF	8E	31	2F	30	88	31	3A	FC
111	111	715.25	UHF	8E	31	2F	90	88	31	3B	74
112	112	721.25	UHF	8E	31	2F	F0	88	31	3B	FC
113	113	727.25	UHF	8E	31	30	50	88	31	3C	64
114	114	733.25	UHF	8E	31	30	B0	88	31	3C	DC
115	115	739.25	UHF	8E	31	31	10	88	31	3D	54
116	116	745.25	UHF	8E	31	31	70	88	31	3D	CC
117	117	751.25	UHF	8E	31	31	D0	88	31	3E	44
118	118	757.25	UHF	8E	31	32	30	88	31	3F	BC
119	119	763.25	UHF	8E	31	32	90	88	31	3F	34
120	120	769.25	UHF	8E	31	32	F0	88	31	3F	AC
121	121	775.25	UHF	8E	31	33	50	88	31	40	24
122	122	781.25	UHF	8E	31	33	B0	88	31	40	9C
123	123	787.25	UHF	8E	31	34	10	88	31	41	14
124	124	793.25	UHF	8E	31	34	70	88	31	41	8C
125	125	799.25	UHF	8E	31	34	D0	88	31	42	04

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13 ORDERING INFORMATION

The 4040 FI5 RF Front End Modules may be ordered in the packaging units and quantities shown in Table 16 and Table 17. For packaging options and quantities other than those shown, contact one of the offices listed on the last page of this document.

Table 16 Packaging Units

PACKAGING UNITS	4040 FRONT END MODELS	
	3X7683	3X7748
Number of Tuner Modules Per Box	72	72
Number of Boxes Per Master Box	10	40

Table 17 Order Quantities

NUMBER OF MASTER BOXES	TOTAL NUMBER OF TUNERS PER MASTER BOX	
	3X7683	3X7748
0.5	360	1,440
1.0	720	2,880
1.5	1,080	4,320
2.0	1,440	5,760
2.5	1,800	7,200
3.0	2,160	8,640
3.5	2,520	10,080
4.0	2,880	11,520
4.5	3,240	12,960
5.0	3,600	14,400

14 REVISION HISTORY

NAME	DESCRIPTION	ECN NO.	DATE	REF/REV
		42	25.05.00	07

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